МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

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English for Computer Science and Information Technologies

Навчальний посібник
для бакалаврів та магістрів
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Навчальний посібник складається з 8 розділів за окремими галузями інформаційних технологій: Artificial Intelligence, Big Data, Web Design, тощо. Кожен розділ містить текстові, відео або аудіо матеріали на розширення словникового запасу, розвиток комунікативних навичок, вміння працювати самостійно та в команді. Всі тексти, аудіо та відеоматеріали відібрані з автентичних професійних або науково-популярних джерел.

Призначено для студентів факультетів комп'ютерних та інформаційних технологій, денної та заочної форм навчання.

Бібліогр.: 37

The textbook consists of 8 units on specific areas of information technology: Artificial Intelligence, Big Data, Web Design, etc. Each unit contains texts, video, audio materials aimed at expanding vocabulary, developing communicative skills and the ability to work independently and in a team. All texts, audio and video materials are selected from authentic professional or popular science sources.

It is intended for students of computer and information technology faculties, full-time and extramural study.

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Introduction

В епоху глобалізації бізнесу та стрімкого розвитку інформаційних технологій змінився і світовий ринок праці, що відкрило нові можливості для професіоналів знайти роботу своєї мрії. Це безпосередньо стосується IT-компаній, працівники яких можуть знаходитись у різних країнах та навіть континентах. І, як відомо, в таких компаніях англійська мова стала де-факто мовою професійного спілкування. Окрім солідних професійних навичок (hard skills), вільне володіння англійською, а також ефективні комунікативні навички дозволяють бути значно більш конкурентоспроможними у пошуку роботи в світі IT.

Цей посібник спрямований на розвиток комунікативних навичок в галузі інформаційних технологій і призначений для студентів вищих навчальних закладів, що спеціалізуються на комп'ютерних науках і технологіях, а також для широкого кола читачів, зацікавлених у вдосконаленні знань мови у цій сфері. Передбачається, що студенти вже мають відповідний базовий рівень володіння англійською мовою та професійних знань.

Посібник складається з 8 розділів, кожний з яких присвячений окремій галузі інформаційних технологій, таких як Big Data, Web Design, Virtual Reality, тощо.

Кожен розділ містить текстові, відео або аудіо матеріали, споряджені низкою вправ на розширення словникового запасу, розвиток комунікативних навичок, вміння працювати самостійно та в команді. Всі тексти, аудіо та відео матеріали мають автентичне походження з професійних або науково-популярних джерел.

Крім того, в кожному розділі аналізуються певні лінгвістичні особливості англійської мови, такі як фразові дієслова, сталі словосполучення, а також граматичні теми підвищеної складності. Кожен розділ має список основних лексичних одиниць та відповідні завдання на відпрацювання та повторення.

Бажаємо успіху!

The era of business globalization and huge advances in information technologies have changed the world job market and opened new ways for professionals to find their dream jobs. This directly refers to IT companies, whose employees may be located in different countries and even continents, English being de facto their common language. That is why apart from possessing strong "hard" professional skills, a candidate's fluent English and effective communicative skills can make them more competitive in finding a job in the IT world.

This textbook is aimed at developing communicative skills in the sphere of information technologies and is designed for university students majoring in computer science and technologies as well as anyone interested in developing their language skills in this field. The learners are expected to have a solid basic level of the language and their professional field.

The textbook is divided into 8 units, each devoted to one subject area of information technologies such as Big Data, Web Design, Virtual reality etc.

All units comprise text, video or audio materials supplied with a set of exercises for developing vocabulary, communicative skills as well as abilities to work individually and in teams. All texts, audio- and video-materials in the textbook are borrowed from modern authentic professional or popular science sources.

Besides, each section focuses on analyzing some specific language phenomena, such as phrasal verbs or verb-noun combinations, as well as advanced grammar topics. The students may also benefit from a revision list of vocabulary items located at the end of each unit.

Good luck!

Unit1
Computer science is ...

"A computer is like a violin." You can imagine it making beautiful music, but you have to learn how to play it…
Bill Gates

Warming Up

1. What is computer science in your opinion?
2. Do you agree with the following opinions? Do you know these people?
   - Computer science is no more about computers than astronomy is about telescopes. (Edsger Dijkstra)
   - Computer Science: A study akin to numerology and astrology, but lacking the precision of the former and the success of the latter. (Stan Kelly-Bootle)
   - Science is what we understand well enough to explain to a computer. Art is everything else we do. (Donald Knuth)
   - Computer science education cannot make anybody an expert programmer any more than studying brushes and pigment can make somebody an expert painter. (Eric S. Raymond)

Start Thinking

1. Skim this excerpt, think about the content and discuss these questions in small groups. Explain the meaning of the underlined words.

1. History has witnessed that humanity went through several revolutions. The latest one is the revolution of information and communication technology. This revolution caused a rupture between everything that is old; what is considered new today is quickly turned into an old and obsolete trend tomorrow. Today's world is considered as a small village thanks to information technology. The process of communication and transmission of information has become so fast that it has spread all over the world. It has greatly affected human life and brought about a radical change. The world now depends entirely on technology, this technology though carrying a significant risk to destroy society.

2. What are the effects of new technologies on the daily lives of individuals and what impacts do they have on the different areas of life: economic, political, and social?

3. What kind of impact do the information technologies have on working conditions?

4. How can modern technology destroy our society? Do the advantages outweigh the risks?

2. Give synonyms to the words underlined in the text.

rupture; obsolete; to spread; to bring about; entirely; to phase out.

Reading 1

1. Make a list of skills you need to successfully find a job in an IT company. Which ones do you think are the most important? Read the text and find out if there is a difference between your opinion and the opinion of prospective employers.

The Crucial Computer Science Skills Employers Are Craving

You've spent a lot of time around technology. Whether through formal training or pursuing your natural interests, you have likely developed a skill set that employers all over will value. But if Computer Science is your subject of choice and potential career direction – you might well wonder if what you have is enough.

What computer science skills matter most? What do you need to lend a job in one of the many careers a degree in Computer Science can lead to? How can you demonstrate your abilities to potential employers and turn your skill set into a salary?

Whether you are considering a career in computer programming, web development, software development or one of many other careers tied to this booming field, you want to make sure what you learn will match what employers want. Keep reading to find out which computer science skills matter most to hiring managers and a few bonus skills that will really help you stand out.

The technical computer science skills employers want

We analyzed nearly 3,000,000 online job postings that sought applicants with Computer Science degrees in the last year to find out which technical skills employers were most commonly seeking. Note that these skills aren't pulled from listings for a specific job role – they reflect the skills identified in any job postings that are seeking candidates with a Computer Science degree. These are the desired technical skills listed:

- Java™
- SQL
- Software development
- Project management
- JavaScript™
- Software engineering
- Linux operating systems
- Python™
- Business process analysis

- Information systems design

But hiring managers and experts in various fields assure us that technical skills, while sometimes required for a position, aren't necessarily the green-light signal job applicants might hope for.

"I care most about an applicant's ability to solve a problem, how they think through a task and communicate with those around them," says Kevin Carlson, vice president of development at Data Finch Technologies. "This shows me how they'll work with the team long-term. I couldn't care less if they can pass a pop quiz on a certain technology."

Carlson explains that too many candidates think about meeting short-term needs and whatever is trending in the moment, when hiring is really a long-term play. In technology, constant learning is almost guaranteed, so some employers will be less concerned about which specific technical skills you have and a lot more interested in the soft skills and less-tangible traits and abilities you bring to the table.

Remember, an employer can always teach you a new process or platform – but it's hard to teach someone to be a team player or a motivated problem-solver.

Computer science skills: Beyond technical know-how

Soft skills stand out a lot more than you might think in technical interviews. These skills can be a mixture of natural personality traits as well as aptitudes developed from experience and practice.

1. Communication and collaboration

You probably saw this one coming. It's no secret that managers in deeply technical positions crave applicants who demonstrate interpersonal and communication skills.

For Jane Vancil, founder and CEO of IncentiLock, the search is even more specific.

"I wish more candidates came in with face-to-face communication skills," she says. "When someone can make eye contact and not glance at an electronic device during a 30-minute discussion, it imparts a respect and sincere interest that I feel will be extended to team members."

Vancil points out that the best applications are built upon a communication of ideas and instructions that are often difficult to put into a messaging platform, making communication skills vital. But this skill can go much deeper than talking and listening. During interviews, Vancil checks for clues to see if candidates become flustered easily. "Even if that is a yes, does the person self-regulate?" she asks.

Working well in a team is essential for almost any job, and many employers in technology are interested in seeing a true spirit of collaboration. "How many times does the person use the word 'I' when talking about a group project?" Vancil asks. "Giving credit to others for their contributions is a huge plus."

Most people feel nervous in interviews and may not believe they put their best foot forward. But after the interview, you have the chance to score lots of communication points by following up with a phone call. “You will likely only get to leave a message, but it lets us get a feel for how you communicate,” Vancil says. “It’s amazing how many people will simply not talk on the phone.”

2. Writing and presenting

If you are an excellent conversationalist, you might still want to brush up on some of the more formal modes of communication. “I’d advise Computer Science students to also work on soft skills like writing and speaking,” says Mike Soylu, co-founder of Pisano. Many positions involve a responsibility to explain your work to people who don’t understand the technical side of it.

Maybe you will give a presentation to board members or stakeholders who are funding your project. Maybe you will work with marketers or project managers who need to understand what your process will be. Whatever the specifics look like, being able to effectively communicate and explain your work is a huge plus. Try challenging yourself by taking a step back from your work and describing what you’re working on to audiences of different technical abilities – if you can explain it simply, it’s a sign of mastery.

Soylu recommends finding ways to practice these skills as soon as possible. “Take part in university clubs, write a blog, take extra courses that involve giving presentations. Any candidate who can communicate clearly and show these skills will definitely attract the attention of recruiters.”

3. Self-awareness

“I really appreciate a candidate when they have a good sense of self-awareness,” Carlson says. “They know what they’re good at and where they need improvement and where they don’t need it now.” Pairing that with a desire to learn is perfect for anyone in technology. If you don’t know where you are lacking, how can you grow? “The most interesting resumes, to me, are those that are asking for opportunities to learn,” Vancil says.

You don’t have to pretend to be the absolutely perfect, all-knowing candidate – and attempting to do so may be worse than giving an honest assessment. If you’re interviewing and not sure how to answer a hypothetical problem, acknowledge it and explain the steps you’d take to figure it out.

“I'm more than willing to give someone a chance even if they're not a perfect fit with the skills ‘wish list,’” Carlson adds.

4. Professionalism

Some tech companies are famous for their informal vibes, but no matter what you know about the place you are applying for – show the utmost professionalism. This can apply to how you dress, how you carry yourself and how you talk about your experiences. "Refrain from using words like 'exceptional' about yourself unless you can prove that you are far above the curve," Vancil advises, urging job hunters in technology to also clean up their social media. Consider how you want to be seen by employers and make sure your presence – in person and online – is professional. As appealing as it might be to thumb your nose at convention, take the time to self-evaluate your demeanor and online presence through the eyes of a stranger and ask yourself, "Would I trust this person with important work?"

2. According to the text say whether these sentences are true (T) or false (F). Underline the part of the text that supports your answer.

1. You need to stand out if you want to get a job in an IT company.
2. The desired technical skills reflect the skills identified in any job postings that are seeking candidates with a Computer Science degree.
3. Good technical skills required for a position make you the best choice for your prospective employee.
4. Interpersonal and communication skills exercise a significant influence on a job interview result.
5. Computer Science students have to work on their soft skills.
6. Writing, speaking and listening are necessary soft skills for becoming a member of a team.
7. If you are not sure how to answer a hypothetical problem during your interview you should acknowledge it and explain the steps you'd take to figure it out.

3. Complete these sentences with appropriate words and expressions from the lists below. You may need to change the form of some of the words.

value – estimate – assess

1. It's necessary to _____ the population size in this region.
2. This study did not _____ the capabilities of other up-to-date methods.
3. Our company _____ highly the many long-term business relationships with our regular customers.

subject – topic – ground – motive

1. There is no doubt that one of the challenges in writing manuals is staying on _____.
2. What _____ did you have for firing the manager?

3. The underlying _____of all their efforts was the effectiveness and efficiency of the work of the company.
4. The overall objective is to modify the educational environment in order to allow students to select and pursue the _____areas of their choice.

direction – turn – orientation

1. Your manager has an original _____of mind, he is very imaginative and his ideas are very bold.
2. The overall goal of the program was to facilitate adequate changes in the policy _____related to international trade.
3. We are at a critical juncture, and we have to move quickly and decisively in all_____.

field – domain – sphere – scope

1. Company's _____of activity includes custom software development, providing services for car navigation systems products, industrial equipment manufacturers and developing products related to Internet TV.
2. Works that are in the public _____ may be used freely, without obtaining permission from or compensating the copyright owner.
3. Business will continue to play a role in energy solutions, within its _____of responsibility.
4. The use of protocol layering is today ubiquitous across the _____of computer networking.

4. Match the idioms and phrasal verbs (1-11) from the text with their explanations (a-k).

1	to stand out	a	to direct attention toward something
2	pop quiz	b	to try as hard as you can
3	green-light signal	c	to be greater, better, or more advanced than the average in the relative field, especially in research or innovative pursuits
4	to point out	d	to avoid doing or stop yourself from doing something
5	to bring to the table	e	to be much better than other similar things or people
6	to give credit	f	to withdraw or remove oneself from something, often in order to consider it from a broader or more objective perspective
7	to put their best foot forward	g	to provide something that will be a benefit

8	to take a step back	h	a short, informal test that is given without any warning
9	to refrain from	i	to give someone praise or recognition
10	to be above the curve	j	to show a lack of respect toward someone or something
11	to thumb your nose	k	approval or permission

5. Use the above expressions in the sentences. Use the necessary form of the verbs.

1. Clarkson was the right person to hire – she ____ a lot of experience and some important skills.
2. The developers were given a ____ to go forward with the project.
3. I've got ____ to meet this deadline.
4. When their class was given a ____ she was the only one in the class who didn't pass.
5. ____ at authority seems to be the norm for teenagers.
6. Even requesting employees to avoid certain websites and ____ downloading applications cannot be a completely foolproof solution.
7. We had lots of good applicants for the job, but one ____ from the rest.
8. The company ____ in adopting new technologies.
9. I would ____ to the attitude and the quality of the team.
10. When you cannot solve the problem, it is probably time for you ____ and see what you are doing to fuel the situation.
11. The teacher ____ some spelling errors in my paper.

6. Match the two parts of the word combinations.

1	to pursue	a	a course
2	to meet	b	skills
3	to demonstrate	c	credit
4	to impart	d	your interest
5	to give	e	sure
6	to take	f	respect
7	to make	g	needs

7. Find all modal verbs in the text and explain their functions.

Reading 2

Read. Underline the correct item italicized in the text below.

The less-common computer science skills employers love to see

Now that you have a good idea of how a Computer Science applicant *can / would* meet job requirements and satisfy interviewers, let's take a look at a few of the things our experts wish they saw more often from job applicants.

1. Code navigation

"One of the most underrated skills for programmers is what I call code navigation – *can / being able to* find your way around a project," Soylu says. "I've seen many novice programmers get lost in codebases because they haven't practiced this skill enough."

He suggests finding a project on GitHub, downloading its code and trying to change some basic behavior. "For example, adding a built-in command that prints 'Hello, world' to your favorite shell program *can / must* be a nice start."

It *can / might* seem like a relatively small thing, but *being able to / being allowed to* analyze and pick up what's going on with existing code is an important part of programming. You're not likely to work on an app alone and employers *should / would* love to keep handoff-related downtime to minimum.

2. An online portfolio

Having a portfolio of projects that employers *can / have to* access just *might / is allowed to* tip the scales in your favor. "Websites, libraries, games or any projects candidates *must / can* provide when applying for a job is always a big differentiator," Soylu says. "And if they are open source, that's even better, because the recruiter *can / will be able* to assess how you code."

Soylu says even beyond the work itself, a portfolio also demonstrates courage and the discipline to finish a project.

3. Deployment strategy

"I think a lot of applicants come out of college with a great knowledge of algorithms, languages and data structures, but most of them have never had to deploy a large-scale application in the real world," Carlson says. "Learning how to think about development and technical architecture in a way that maps to a deployment strategy is something I rarely see."

Carlson says the exceptions to this are when students have worked on a project outside of school and have gained experience deploying it and serving actual customers. This kind of experience makes extracurricular projects and internships valuable additions to your resume.

By Brianna Flavin

Listening 1

https://www.youtube.com/watch?v=VCsgw_-3h-0

1. Watch and listen to an expert from a recruiting company speaking on soft skills appreciated in engineering professions. Fill in the gaps in the transcript with no more than 3 words.

Engineering essentially is what's known as a __1__. And the idea of engineers is to be able to come up with solutions that are going to __2__ or create things. Therefore clients love people who have the ability to solve problems. That's one of the major soft skills that our clients look for.

Because it's a __3__ and there's a lot of __4__, clients love to have engineers that are open to the idea of working within teams. And they might not necessarily always have the __5__. But as long as they are open to __6__ to other people - that's one thing that's gonna be successful within any sort of an engineering and development.

The third one is very much __7__. And if you're on a large site or if you're in an __8__, you have to have belief in your own understanding and abilities within engineering. Clients love people who back themselves. Clients love people who appreciate ... when people understand __9__ and their own experiences. So self belief is something the clients really really look for when they're interviewing candidates.

2. Answer the questions.

1. What are the three soft skills clients expect from an engineering specialist?
2. Why in your opinion is team work so important in engineering?
3. In what way should people achieve success working together?
4. How do you understand the expression "*people who back themselves*"?
5. Do you think these ideas apply to computer science engineers?

3. In the transcript find the words and expressions that mean the following. Make up sentences with the found words and expressions.

to suggest something; to try to find; to be ready to accept sth, e.g. idea; when / if; to value.

Reading 3

1. Refresh your knowledge of the computer history.

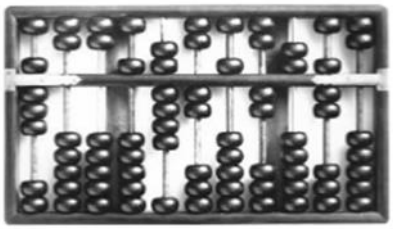
2. Do the following statements agree with the views of the writer? Write

T (TRUE) *if the statement agrees with the text*

F (FALSE) *if the statement contradicts with what is written*

NG (NOT GIVEN) *if it is impossible to say from the text*

1. Abacus was the only tool for calculating at that time.
2. The Arithmetic machine by Blaise Pascal could perform only a few operations.
3. The first electronic computer was built in MIT.
4. The ABC computer was named after its inventors.
5. The slide rule is still widely used around the world.
6. The slide rule allows performing several operations simultaneously.
7. The first punch cards were used in cloth making machines.
8. Joseph-Marie Jacquard was a French mathematician.
9. The first name of IBM's CEO is Mark.
10. IBM and Harvard University cooperated to create the first digital computer in mid 1940s.

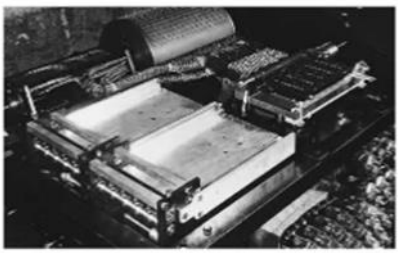


The earliest recorded calculating device, the abacus, is believed to have been invented by the Babylonians sometime between 500 B.C. and 100 B.C. It and similar types of counting boards were used solely for counting.

500 B.C.

Blaise Pascal invented the first mechanical calculator, called the Pascaline Arithmetic Machine. It had the capacity for eight digits and could add and subtract.

1642



Dr. John V. Atanasoff and Clifford Berry designed and built ABC (for Atanasoff-Berry Computer), the world's first electronic computer.

1937

Precomputers and Early Computers

1621

The slide rule, a precursor to the electronic calculator, was invented. Used primarily to perform multiplication, division, square roots, and the calculation of logarithms, its wide-spread use continued until the 1970s.

1804

French silk weaver Joseph-Marie Jacquard built a loom that read holes punched on a series of small sheets of hardwood to control the weave of the pattern. This automated machine introduced the use of punch cards and showed that they could be used to convey a series of instructions.

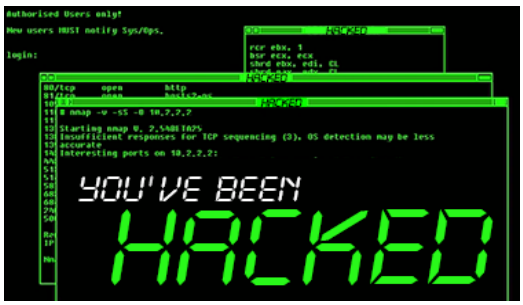
1944

The Mark I, considered to be the first digital computer, was introduced by IBM. It was developed in cooperation with Harvard University, was more than 50 feet long, weighed almost five tons, and used electromechanical relays to solve addition problems in less than a second; multiplication and division took about six and twelve seconds, respectively.

Reading 4

1. Work in groups. Discuss the question:

What types of hacking do you know of and why do you think people hack.



2. Scan the extracts below and find the answers to these questions.

1. Which group hacked into Hotmail?
2. What kind of computer crime do Internet bank consumers can face?
3. Which hacker was sent to jail for fraud?
4. What was the effect of the 1996 raid on Scotland Yard?
5. Which of the cases reported here involved teenagers?
6. How did My Doom affect search engines?

Hacking

1. Hotmail, Microsoft's free email service, was hacked into last September, exposing the correspondence of more than 40m users. A group calling itself Hackers Unite posted a Web address with details of how to access any Hotmail account. The service was shut down for five hours.

2. The UK Department of Trade and Industry has twice been prey to hackers, once in 1996 and again in 2000 when a DTI computer was programmed to reroute email. The Home Office investigated nine cases of hacking last year, one of which was the leaking of a report on a murder. In August 1996 hackers ran up a £1m phone bill for Scotland Yard but did not access files.

3. In May 2004 Sven Jaschan, 19, had confessed to creating the worm which was able to spread over the Microsoft Windows operating system knocking out an estimated one million computers in homes and businesses.

Described by authorities as a “computer freak”, he had pleaded guilty to charges of data manipulation, computer sabotage and interfering with public services. But because he was 17 when the crimes were committed, Jaschan had to be tried in a youth court and his punishment fell far short of the maximum sentence of five years in jail that computer sabotage carries under German law. Prosecutors had called for a two-year suspended jail sentence and 200 hours of community service for Jaschan, while the defence had argued for a maximum sentence of one year’s probation.

4. In March 2000, a Welsh teenager allegedly stole information from more than 26.000 credit card accounts across Britain, the US, Japan, Canada and Thailand, and published the details on the Internet. FBI agents and British police raided the home of Raphael Gray, 18, and arrested him and his friend. He has been charged with 10 counts of downloading unauthorised information.

5. 26 July 2004: A variant of Mydoom attacks Google, AltaVista and Lycos, completely stopping the function of the popular Google search engine for the larger portion of the workday, and creating noticeable slow-downs in the AltaVista and Lycos engines for hours.

Mydoom is primarily transmitted via e-mail, appearing as a transmission error, with subject lines including “Error”, “Mail Delivery System”, “Test” or “Mail Transaction Failed” in different languages, including English and French. The mail contains an attachment that, if executed, resends the worm to e-mail addresses found in local files such as a user’s address book. It is able to copy itself to the “shared folder” of peer-to-peer file sharing application Kazaa in an attempt to spread that way.

(Funny fact: The worm contains the text message “I'm just doing my job, nothing personal, sorry”.)

6. Kevin Mitnick is the hackers’ hero. His latest spell in jail was a 46-month sentence for fraud relating to breaking into the systems of several multinational corporations. He was allowed to get out of jail on condition that he did not have any contact with a computer.

7. Latest threat, which targets customers of eBay’s PayPal online payment service, highlights a growing trend in which online criminals combine computer viruses, spam distribution techniques, Trojan horse programs and “phishing” scams to circumvent security technology and fool internet users.

Listening 2

Google Glass

https://drive.google.com/file/d/1jeUB3Sr9PuHLVTAe-UcAFKgaV0-nCc2U/view?usp=sharing

1. Before listening do the preparation task first. Match the definitions (a–d) with the vocabulary.

1.	wearable tech	a	strange and scary
2.	specs	b	(slang) glasses; short for “spectacles”
3.	creepy	c	a being with both human and robot parts “cybernetic organism”)
4.	cyborg	d	technology you can wear

2. Listen to the audio and do the exercises.

”Wearable tech””, or technology you can wear, is one of the newest areas in the world of computing. Google has released a controversial product which works like a smartphone, but is worn on your face like a pair of glasses.

Finn and Neil discuss Google Glass and other wearable tech in the programme.

3. In which action movie (starring Arnold Schwarzenegger) did a character have special eyes that were like computers which gave information about the world around him?

a) Robocop
b) The Terminator
c) Total Recall.

4. Say whether the statements are TRUE or FALSE.

1. Google is not the only company that is developing wearable gadgets.
2. With Google Glass, the computer screen is built into the frame of the glasses.
3. Rory Cellan-Jones bought a pair of Google Glass.
4. Google Glass can be used as a camera.
5. People feel uneasy about this tech because they care about their privacy.
6. Casinos forbid using these smart glasses.
7. Nail wouldn’t like to have such a device because he is afraid of losing ability to think for himself.

Listening 3

Shaping smarter cities with new technologies

https://www.youtube.com/watch?v=qz7De0yrAV0

Watch the video and answer the questions below.

1. What network is created all around a city in Portugal?
2. Which technology in Tokyo impressed the blogger most?
3. How is augmented reality system called Daiquiri used in Los Angeles, California?
4. In what way do you think you could participate in such projects as a software engineer?

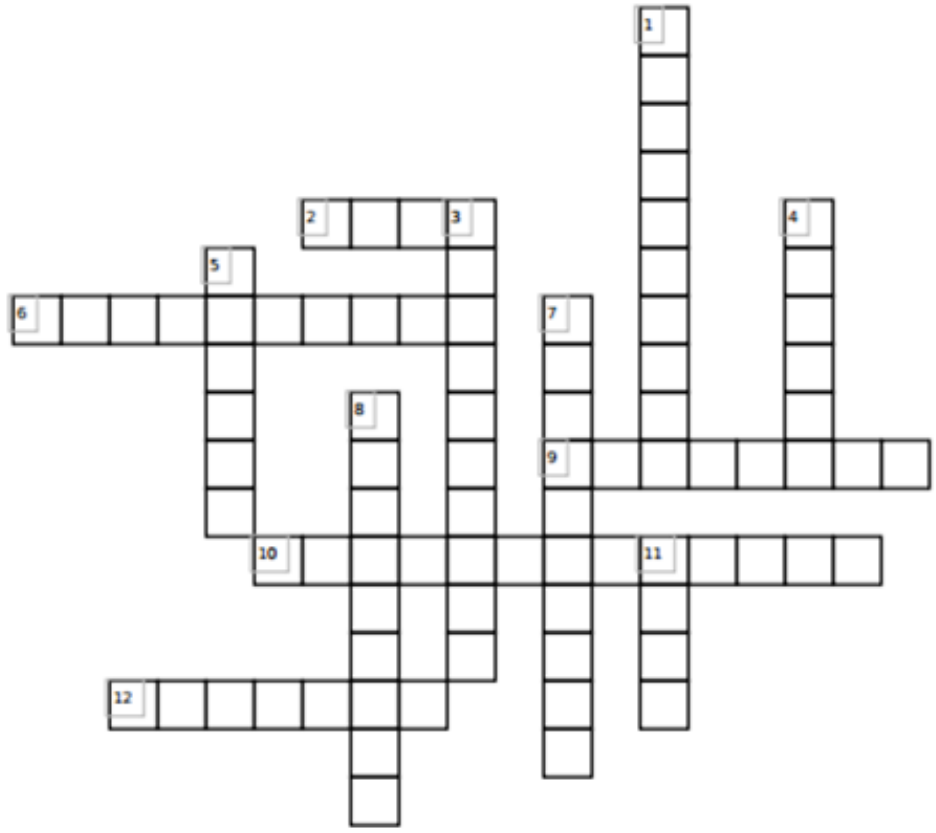
Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
rupture		
obsolete		
bring about		
phase out		
pursue		
aptitude		
deployment		
a stakeholder		
self-awareness		
controversial		
extracurricular		

a pop quiz		
give credit		
refrain (from)		
wearable		
a threat		
a fraud		
a search engine		
a precursor		
a punch card		
subtract		
an abacus		
underrated		
appreciate		

Improve your English with crossword puzzle.



Down:

1. _____Va..._____is an automatic check to ensure that data entered is sensible and feasible.
3. Another term commonly used for this subtopic is “conflict __re..._____.”
4. A combination of interacting elements organized to achieve one or more stated purposes is called a __sy...___.
5. A ___do...___ name is a unique, easy-to-remember address used to access websites, such as 'google.com', and 'facebook.com'.
7.____Fu..._____requirements describe the features of the software and the functions that it has to execute.
8. Software requirements specification establishes the basis for ____ag..._____ between customers and contractors or suppliers on what the software product is to do as well as what it is not expected to do.
11. A is _____in the abbreviation LAN.

Across:

2. This person will operate the software.
6. __Pr...__ in software development are simulations of how a real product will work and feel. They are used for design feedback and user testing.
9. A company or a person who has commissioned the software or who represents the software’s target market.
10. For most engineering professions, the term “___sp..._____” refers to the assignment of numerical values or limits to a product’s design goals.
12. U is _____ in the abbreviation UML.

Use of English

Verb / Adjective / Noun + Preposition

1. Complete the sentences with prepositions: about, at, for, from, in, into, of, on, to, with where necessary.

1. If you are *interested* ____ moving up the career ladder, there is no single path to do this.
2. When *talking* ____ your previous job or study experience, emphasize its positive aspects.
3. Using various automation tools, IT professionals can help *turn* routine tasks ____ automated processes that free up resources for more innovative work.
4. As businesses *depend* ____ their digital systems to function, cyber-attacks that threaten to delete or stall those functions can *lead* ____ massive damages.
5. Quantum computing is also in its very early stages, but it will also dramatically *affect* ____ our digital world over the next 25 years.

6. UX Designers are *in charge* ____ creating significant and relevant experiences for users of a particular product or platform.
7. As the IT Project Manager, you will be *responsible* ____ not only heading up a team, but guiding, hiring, and making decisions for the interest of all.
8. When working in a field that changes and adapts constantly, being *good* ____ problem-solving is a must.
9. Most mobile developers *specialize* ____ native platforms such as android or iOS operations systems or use a cross-platform technology.
10. Programming languages touch nearly every IT job role, so IT pros would *benefit* ____ strengthening these skills.
11. If tech moguls like Mark Zuckerberg and Steve Jobs hadn't been creative, they would have never *come up* ____ their groundbreaking products and revolutionary ideas.
12. Whatever field in IT you choose, you will also need to *commit* ____ learning and growing as a professional to *keep up* ____ the evolution of technology.

2. Make up your own sentences with these word combinations.

Grammar Focus

Modals

How to use
1. Modal verb + Infinitive
2. Always the Predicate
3. No auxiliaries: *I cannot (can't) do … Can you do …?*
4. No tenses (Past / Future; Continuous / Perfect …)
5. No infinitive (~~*to can*~~)
6. There are **usual verbs** (expressions) with modal meaning: *be able to (~ can); be allowed to (~ may); have to (~ must); managed to (~ could)*; …

Modal verb	Expressing	Example
must	strong obligation	*You must stop when traffic lights turn red.*
	logical conclusion / certainty	*He must be tired. He has been working the whole day.*
must not	prohibition	*You must not smoke in the hospital.*
can	ability	*I can ride a bicycle.*
	permission	*Can I use your phone please?*

	possibility	*Smoking can cause lung diseases.*
could	ability in the past	*When I was younger, I could run faster.*
	polite permission / request	*Excuse me, could you show me the way to the station?*
	possibility	*It could rain tonight.*
may	permission (more formal)	*May I take a seat?*
	possibility / probability	*It may rain tonight.*
might	permission (in the past)	*The boss said that we might have one more day off.*
	possibility / probability	*It might rain tonight.*
need not (= don't need to)	lack of necessity	*You need not buy bread. I have already bought it. (Cf. You don't need to buy bread.)*
should / ought to	50% obligation	*I should (ought to) consult the doctor. I have a terrible headache.*
	advice	*You should (ought to) revise the grammar rules.*
	logical conclusion	*He should be tired. He has been working the whole day.*

Expressions with Modal meaning	**Expressing**	**Examples**
be able to + V	ability / capacity / possibility	*Cf. This winter there was much snow and we **could** ski a lot. (**Potential** possibility) - This winter there was much snow and we **were able to / managed to** ski a lot. (**Realised** possibility)*
be allowed to + V	permission	*They are not allowed to smoke in the office.*
have to + V	obligation	*All the employees of the company have to follow definite corporate rules.*
	necessity in definite conditions	*He has to hurry if he wants to catch the train.*

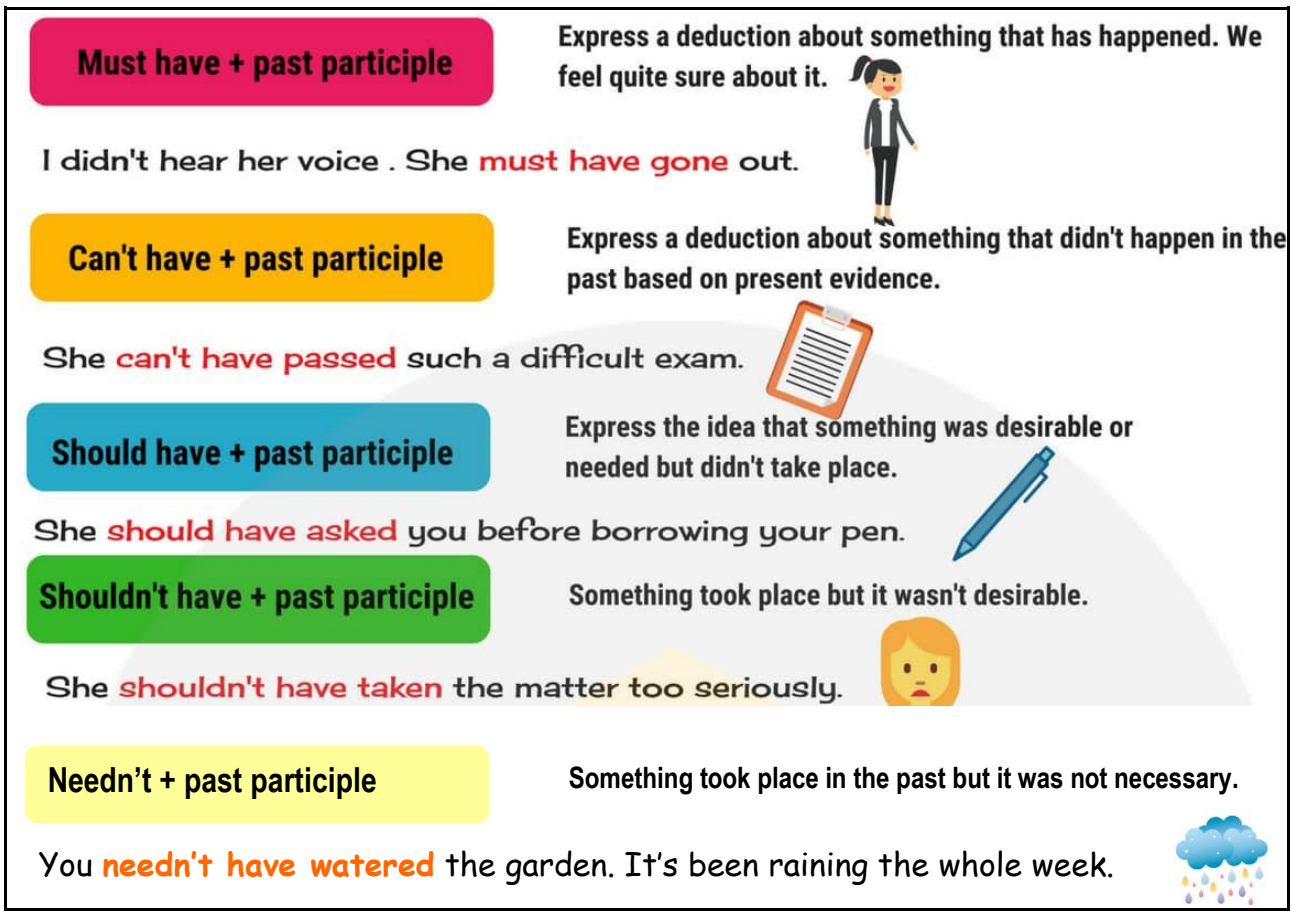
need to + V	necessity / lack of necessity	*You will need to create a plan to reach specific goals.* You don't need to make notes (=you needn't make notes): there are handouts with the main points of my presentation.
be to + V	necessity	*The equipment is to be checked before operation.*
	strong expectation	*The lecturer is to arrive soon.*

1. Fill in the gaps.

1. What ___ I do if I saved some files to my hard drive and they have disappeared?
a) must b) should c) may d) ought
2. He ___ be an expert in computers. He has fixed all my problems in several minutes!
a) can b) is c) must d) have to
3. Thanks to constant research, we ___ know much more about genes and inheritance.
a) can b) must c) need d) has to
4. If you need ___ a meeting, you ___ call all the participants.
a) set up, must b) set up, ought c) to set up, are d) to set up, should
5. I am almost out of time. I ___ go.
a) have to b) may c) might d) am
6. At work, we're not ___ give out personal details.
a) must b) may c) allowed to d) have to
7. Both drivers and pedestrians ___ obey the traffic rules.
a) ought b) can c) may d) must
8. When cycling, you ___ wear a helmet and fluorescent closing.
a) must b) should c) have to d) may
9. The results of the experiment ___ to be verified.
a) must b) should c) are d) can
10. He couldn't pay for the meal in a restaurant, so he ___ to ring his wife to bring him some money.
a) was able b) was c) had d) should
11. When writing a scientific paper, you ___ follow all of the usual writing rules – spelling, grammar, punctuation, sentence structure, etc.
a) can b) must c) ought d) may
12. Currently, the battery of an electric car ___ be fully charged in a few hours.
a) need b) might c) must d) can
13. Now you ___ buy and keep books on your shelves, you ___ download thousands of books onto one digital device.
a) needn't, can b) mustn't, cannot c) shouldn't, mustn't d) may, cannot

14. Spilled chemicals ___ to be wiped up immediately.
a) may b) must c) are able d) ought
15. We ___ to see the moon because it reflects light from the sun.
a) can b) might c) are able d) are allowed
16. To fight climate change, the entire world will ___ eat less meat.
a) be to b) have to c) must d) be allowed to
17. Broken friendship ___ be soldered, but will never be sound.
a) may b) must c) should d) has to
18. You ___ feed wild animals in the zoo. It's forbidden.
a) cannot b) can c) mustn't d) must
19. As floods and hurricanes are becoming more commonplace, the countries ___ to prepare long-term programmes to deal with climate change.
a) should b) must c) has d) have
20. With studying a language, as with any worthwhile endeavor, you ___ practice in order to improve.
a) may b) must c) have d) might

Modal verb + have + V-III



Compare: needn't have done vs didn't need to do

We needn't have taken am umbrella. = We **took** am umbrella but it was unnecessary.

We didn't need to take am umbrella. = We **didn't take** am umbrella, it was unnecessary.

2. Paraphrase the sentences making them less assertive using modal verbs must, may, might, can't with Perfect Infinitive.

1. He is so happy. I think, he has found his dream job. – He might have found …
2. I don't think he wrote this letter himself – his English is not so good.
3. I haven't seen them for a long time – probably they moved houses.
4. My computer is so slow – probably I have caught a virus.
5. Maybe he learned Spanish as a child.
6. It's possible that I left my English textbook at home.
7. Maybe she didn't mean what she said about you.
8. It's impossible that he failed the exam.
9. I am sure everybody enjoyed the trip.
10. She is late. Probably, she got lost.

3. Fill in the gaps with the following modals: must, might, couldn't, should, shouldn't, could, needn't, may, can't.

1. He ____ have gone to the USA. He doesn't have a visa.
2. Why did you leave without saying a word – you ____ have at least say good-buy to the hostess!
3. You ____ have seen her. She was standing next to you.
4. I explained it to her but she ____ have misunderstood - my Japanese isn't very good.
5. We'll ask at the reception desk. Someone ____ have handed the keys in.
6. I don't know why there weren't any buses yesterday. There ____ have been a strike, but I'm really not sure.
7. A: James was at the party last night. B: He ____ have been there. He's in Mexico.
8. I ____ have let you know what was happening but I forgot, sorry.
9. There was so much traffic. There ____ have been an accident.
10. You ____ have told her about problems with you boyfriend. She can't keep secrets.
11. You ____ have called them yesterday. Now it's too late.
12. Thank you very much! I ____ have passed the course test without your help!
13. You ____ have rewritten the whole text. It was easier just to take a photo of it.

4. Fill in the gaps.

1. A newspaper office used to be very noisy, with lots of phones ringing and urgent phone conversations. That must ___ an exciting atmosphere.
a) was b) to be c) have been d) be
2. You ___ have seen David at work. He is on holiday in France.
a) must b) can't c) should d) needn't
3. There is a speed limit sign ahead. You should ___ down.
a) slow b) to slow c) have slowed d) not slow
4. I think that both cyclists and drivers ___ to pay more attention to the Highway Code.
a) can b) should c) must d) need
5. Scientists say they may ___ the best evidence already for water on Jupiter's frozen moon.
a) found b) find c) have found d) have to find
6. Green tech can not only ___ improve the environment but also the business climate too.
a) helped b) to help c) have helped d) help
7. You ___ have heard that Ireland was one of the first places in the world to implement a smoking ban in public places.
a) can b) may c) should d) needn't
8. If the PV electricity production exceeds building demand then the excess ___ exported to the grid, and vice versa.
a) can't be b) can be c) can have been d) can't have been
9. I was sitting at the back row and heard almost nothing. You should ___ more loudly.
a) speak b) spoke c) spoken d) have spoken
10. You ___ have copied the document by hand. You could ___ a Xerox. It's available free.
a) need, to use b) shouldn't, have been used c) should, be used d) needn't, have used
11. You should ___ your abstract to the conference committee as soon as possible, otherwise it won't be included into the conference papers.
a) to submit b) submit c) have submitted d) have been submitted
12. Students who take regular classes must ___ all fees charged to their account by the fee payment deadlines.
a) to pay b) have paid c) be paid d) pay
13. The fish in the lake has died. – It ___ by the toxic waste from the factory.
a) must have been poisoned b) should poison c) should be poisoned d) may be poisoned
14. The hurricane caused huge damage to the transmission lines. Crews of engineers and operational stuff ___ overnight to restore power supply for the whole area.
a) can work b) should have worked c) had to work d) can't have worked
15. He can't ___ the eclipse. It could ___ only in the Southern Hemisphere.

a) watch, see b) have watched, be seen c) watch, have seen d) have watched, see
16. The water in the well has unpleasant smell. It might ___ with some chemicals.
a) have contaminated b) contaminate c) contaminated d) have been contaminated
17. The engineers have presented new sensors that ___ without cooling in hostile environments.
a) can operate b) can have operated c) can't operate d) can't have operated
18. Children should ___ from early childhood to keep their home clean.
a) teach b) not teach c) be taught d) have taught
19. With the new technology, the company ___ to process 5 times more waste with only 10 workers.
a) can b) may c) will be able d) have
20. The reason for the satellite launch failure may ___ a mistake in calculations.
a) be b) have been c) to be d) was

Hedging

Hedging is the use of linguistic devices to express **hesitation** or **uncertainty** as well as to demonstrate **politeness** and **indirectness**.
The language of hedging includes:

- Adverbs of frequency (*sometimes* or *often* but NOT *always*)
- Quantifiers (*some* or *many* but NOT *all*)
- **Modals** (*may* or *might*, but NOT *will*)
- 'Cautious' verbs (*indicate*, *suggest*, *appear*)
- Modal adverbs (*possibly*, *arguably*)
- Modifiers (*quite*, *somewhat*)

Example:
'Video games make people violent'.

- *There is **some** evidence to suggest that video games **may** be linked to violence.'*
- *'It is **often** thought that playing video games **can** have a harmful effect on young people'.*

5. Use modals can, might, may, and could to make this sentence more tentative.
1. Phrasal verbs <u>are</u> difficult for language learners to master. – ***may be***
2. Sharing your dreams and listening to other people's dreams <u>helps</u> to improve your empathy levels.
3. Policies that protect older people from the impact of economic decline <u>help</u> them to maintain good cognitive function in older age. – There is some evidence that ….

4. Running shoes cause injuries – but is going barefoot the fix? – Some people suggest that …
5. Let us consider how the extinction of ice age mammals forced us to invent civilisation.
6. Soft skills stand out a lot more than you think in technical interviews. These skills are a mixture of natural personality traits as well as aptitudes developed from experience and practice.
7. If you are an excellent conversationalist, you will still want to brush up on some of the more formal modes of communication.
8. All people feel nervous in interviews and do not believe they put their best foot forward. – Most people …
9. Having a portfolio of projects that employers can access will tip the scales in your favor.
10. The Abacus origin is not exactly established. It was invented **somewhere** between 300 and 500 BC.
11. A lot of international students mix well with domestic students.

Unit 2

Big data

"Data is a precious thing and will last longer than the systems themselves."

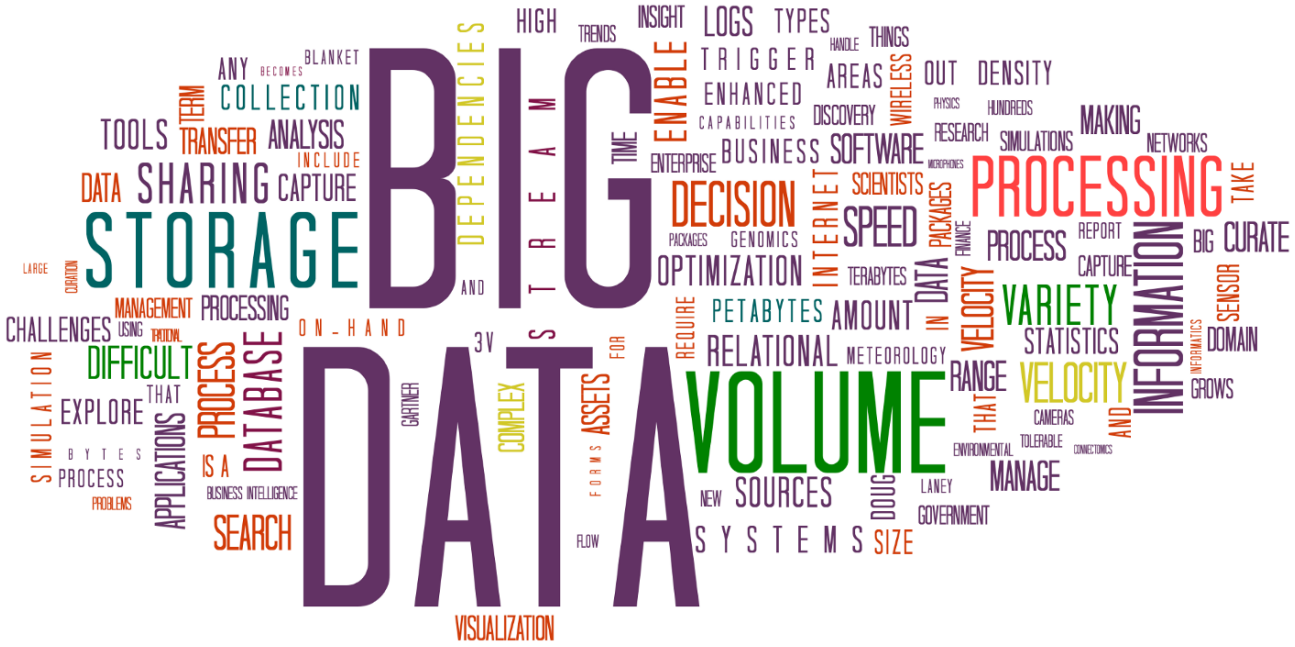
By Tim Berners-Lee,
Inventor of the World Wide Web

Warming Up

From the two pictures choose as many words as you can. Classify them as nouns, verbs, adjectives etc. Compose meaningful sentences describing *Big Data* ... Find words (and their derivatives) which are used most frequently.

Start Thinking

Discuss in groups. In your opinion, how each picture characterizes Big Data?



Listening 1

Big data: why should you care?

https://www.youtube.com/watch?v=ji18sDbWI_k

Listen to the recording and complete the tasks:

1. Choose one of the options to fill in the gaps

1. Data which other people have collected about you may define _____.

a) what you will do in the future

b) if you will be invited to a job interview

c) whether you will participate in a political campaign

2. If you stop watching this video now ____.

a) it will increase your profile's score by 0.7 points

b) you are likely to become an astronaut in 5 years

c) you are unlikely to become an astronaut in 5 years

3. The first example of data known to the author ___.

a) was from western Europe

b) was found in wolf's cave

c) was a set of carvings on a bone

4. For Big Data ____.

a) size doesn't matter

b) only size matters

c) not only size matters

5. Professor Paul Mattheus said that ____.

a) he was excited to use big data

b) the data from the brain scans are not big data

c) big data are patient's medical records

6. Data are collected automatically ____.

a) when we just move around

b) anytime we use computers

c) and you can always notice it

7. Data is collected in real time to predict ____ . **(Choose which is NOT mentioned)**

a) transport situation

b) sport results

c) disease circulation

d) energy requirements

8. AI means that ____.

a) you have to give all instructions to computer

b) you have to explain the difference between cat pictures and dog pictures

c) bad applicants are not given jobs in AI companies

d) machine learning algorithms are used

9. The applications of big data may include ____. **(Choose which is NOT mentioned)**

a) predicting possible aircraft accidents

b) nuclear physics

c) linguistics

d) medicine

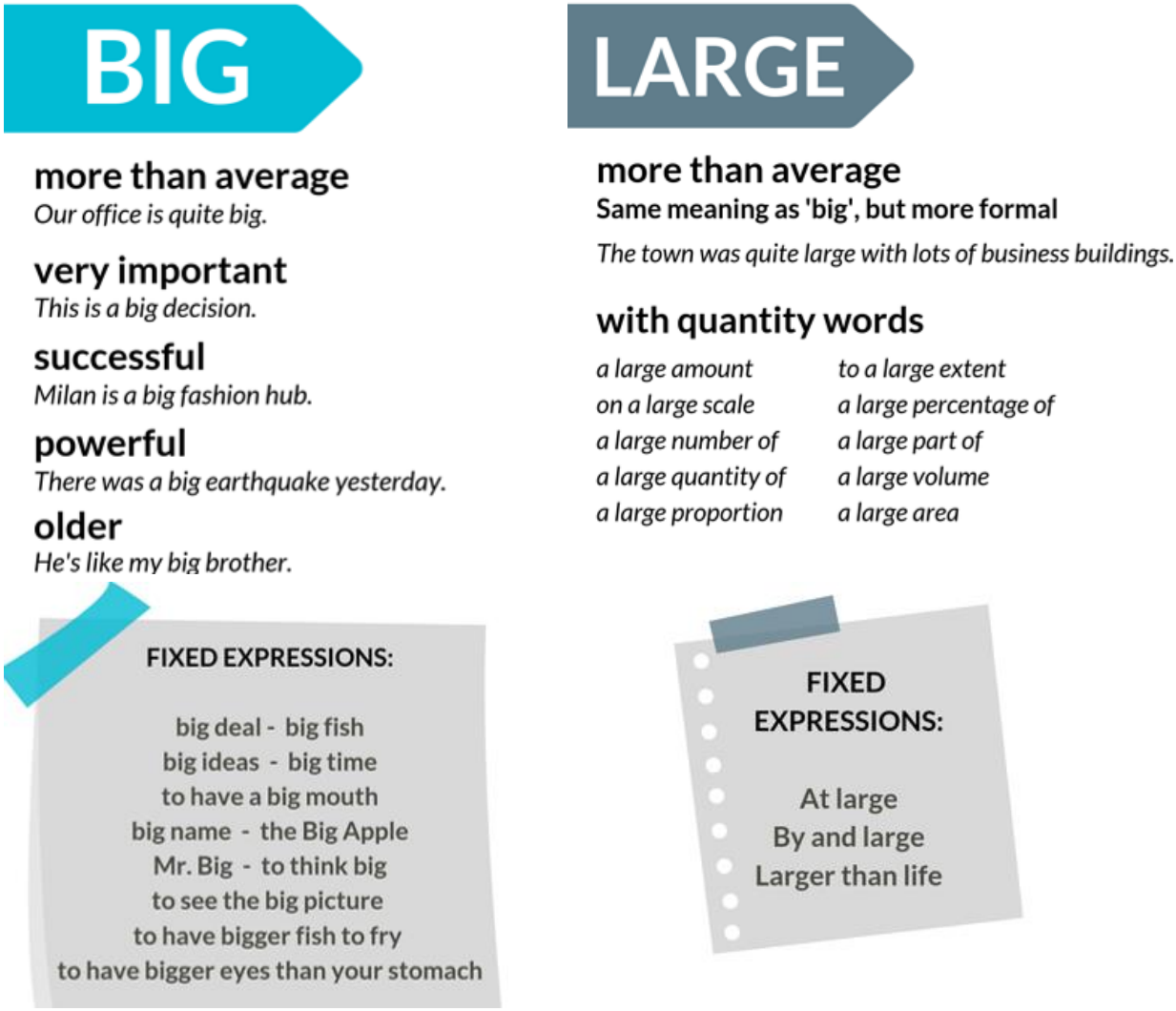
10. According to the author, President Obama won the elections because ____.

a) he used big data technologies

b) in his campaign he targeted all voters

c) he addressed the voters' needs

2. Focus on vocabulary. Analyse the difference between BIG and LARGE.



3. Complete the sentences with big or large.

1. They must have invested a ___ amount of money in that project.
2. Quitting your job is such a ____ decision!
3. The new hire seems very ambitious, I like how she thinks ____.
4. He spoke at ____ on the subject.
5. What do you see as the next ____ idea in technology?
6. Bill Gates wasn't the only ____ name at the conference.
7. By and ____, the product has met the customer's expectations.
8. The building was badly damaged by _____ fire.
9. Mainframes are a type of computers that are generally known for their ____ size, amount of storage, processing power and high level of reliability.
10. ____ scale data analysis is the process of applying data analysis techniques to a ____ amount of data, typically in ____ data repositories.

4. Focus on grammar. Following are the extracts from the video transcript containing complex sentences with subordinate clauses of different types. Match the clauses (1-17) (highlighted) and their functions (a-i). The letters can be repeated.

(1) **Whether you get a job interview or go to jail** could depend on the data (2) **other people have collected about you**.	a	expresses the result of a fact mentioned in the rest of the sentence the clause of result (*so…that*)
So you might want to spend five minutes learning a bit more about (3) **how it works** and (4) **what kind of world it's building around us**.	b	gives necessary information without which the meaning of the previous object is unclear or incomplete relative clause (*that, which, whose*, no conjunction)
How big is big data? It's getting bigger **so fast** (5) **that** (6) **if I gave you a figure**, it would be out of date before the end of this video.	c	expresses the condition of the following action to be true (*if*)
But (7) **though size does matter**, it's not the whole story.	d	serves as a subject of the sentence (*whether*)
There are four other things (8) **that make big data special** …	e	serves as an object of some action – with or without prepositions (*about how, about what, know which, …make sure we know*)
I asked neuroscientist Prof Paul Matthews (9) **if he was excited about using all the data from brain scans**	f	expresses a contrasting idea to the rest of the sentence clause of concession (*though*)
Big data is (10) **when I put those brain scans together**	g	serves as a part of a complex predicate usually after the verb to be (*is when*)
… postcodes (11) **where they've lived**	h	expresses the cause of the further action (*because*)
The way (12) **data is collected** …	i	shows the time when the following action happens (*when*)
… generates data (13) **which somebody can use**		
(14) **Because the data is being collected pretty much in real time**, those patterns can be projected forward		

(15) **When the same techniques are applied to humans**, things get s.		
data just helped him reach the voters (16) **whose votes were most crucial**		
Let's just make sure (17) **we use it the right way**		

Reading 1

Before reading.

1. Have you ever heard about 3 V's concerning the term Big Data? If yes, what are they?

2. How do we measure the volume of data?

3. Match the words from the text underlined with their equivalents. Use some of them in the sentences below.

1	to refer to	a	to engage in
2	insight	b	essential
3	to enhance	c	diverse
4	core	d	number / amount
5	to keep up with	e	credibility
6	conventional	f	to use
7	to pursue	g	to deal with
8	quantity	h	critical
9	humongous	i	standardization
10	to utilize	j	to stay level
11	seamlessly	k	to improve
12	substantially	l	traditional
13	heterogeneous	m	to acquire
14	vital	n	huge
15	crucial	o	central
16	to derive	p	precision
17	veracity	q	understanding
18	accuracy	r	widespread
19	homogenization	s	considerably
20	prevalent	t	in an ordered way

1. Technology changes so fast, it's hard to _____ it.
2. The change is in large part due to the ____ amount of information that we are confronted with.
3. The habit of travelling by aircraft is becoming more and more ____ each year.
4. He decided to ____ a career in microbiology.
5. Internet connections through ____ phone lines are fairly slow.
6. The figures on this slide ____ full time employees only.
7. While some experts have acknowledged the results of the tests, others have called their ____ into question.
8. This workshop is an opportunity to ____ your business knowledge and polish your networking skills.

4. Give your own definitions of the terms from the text using the pattern: X is a Y that (which, where …).

Social media; E-commerce; data mining; database; Web page; relational DBMS.

While reading.

5. Grammar focus. Pay attention to subordinate clauses introduced by conjunctions or clauses without conjunctions (highlighted in bold). Define the functions of the clauses.

6. Read the text and answer the questions after it.

What are the key characteristics of Big Data?

Big Data is among the fastest-growing sectors globally. It refers to collecting and analyzing large amounts of data to generate actionable insights **that** an organization uses to enhance its different aspects. It is a broad concept with numerous advantages. This is **why** companies in various sectors are focused on using this technology. To understand Big Data properly, you must get familiar with the big data core characteristics. Understanding the characteristics of Big Data Analytics will also help you understand the advanced concepts of this subject. In the following article, we'll discuss the definition, characteristics of big data, its types, components, advantages, and latest insights.

Introduction

Big Data is among the hottest terms in the tech sector. If you've been keeping up with the industry trends, you must have heard of Big Data. Government organizations, businesses, healthcare providers, and many other enterprises focus on using Big Data to enhance their operations and drive their growth. Experts estimate **that** the entire

digital universe reached 44 zettabytes by 2020, **which** means 40 times more bytes than there are stars in the universe.

Big Data allows companies and organizations to use large amounts of data effectively. It allows organizations to identify trends, patterns, and associations **that** would be quite challenging or nearly impossible to find with conventional data-processing solutions. As a result, there's a huge demand for big data professionals. However, if you want to pursue a career in this field, you must first get familiar with Big Data characteristics and its fundamentals.

What Is Big Data? – In Short

Big Data is the field of analyzing and extracting information from extremely large data sets. The term also refers to large quantities of data **that** grow exponentially with time. Such data is **so** humongous and complex **that** no conventional methods or traditional data management tools can process and store it effectively. There are many examples of Big Data. From social media platforms to E-commerce stores, organizations in various industries generate and utilize data to enhance their processes.

Big data includes multiple processes, including data mining, data analysis, data storage, data visualization, etc. The term "big data" refers both to these processes and all the tools **that** we use to support these processes.

Types of Big Data

There are primarily three types of data in big data:

1. Structured

Structured data refers to the data **that** you can process, store, and retrieve in a fixed format. It is highly organized information **that** you can readily and seamlessly store and access from a database by using simple algorithms. This is the easiest type of data to manage as you know **what** data format you are working with in advance. For example, the data **that** a company stores in its databases in the form of tables and spreadsheets is structured data.

2. Unstructured

Data with an unknown structure is termed unstructured data. Its size is substantially bigger than structured data and is heterogeneous in nature. A great example of unstructured data includes the results you get **when** you perform a Google search. You get webpages, videos, images, text, and other data formats of varying sizes.

3. Semi-structured

As the name suggests, semi-structured data contains a combination of structured and unstructured data. It is data that hasn't been classified into a specific database but contains vital tags **that** separate individual elements within the same. For example, a table definition in relational DBMS has semi-structured data.

Characteristics of Big Data

Following are the big data core characteristics. Understanding the characteristics of big data is vital to know **how** it works and **how** you can use it. There are primarily seven characteristics of big data analytics.

1. Velocity

Velocity refers to the speed of data processing. High velocity is crucial for the performance of any big data process. It consists of the rate of change, activity bursts, and the linking of incoming data sets.

2. Volume

Volume refers to the amount of data **that** you have. We measure the volume of our data in Gigabytes, Zettabytes (ZB), and Yottabytes (YB). According to the industry trends, the volume of data will rise substantially in the coming years.

3. Value

Value refers to the benefits **that** your organization derives from the data. Does it match your organization's goals? Does it help your organization enhance itself? It's among the most important big data core characteristics.

4. Variety

Variety refers to the different types of big data. It is among the biggest issues faced by the big data industry **as** it affects performance. It's vital to manage the variety of your data properly by organizing it. Variety is the various types of data **that** you gather from different kinds of sources.

5. Veracity

Veracity refers to the accuracy of your data. It is among the most important Big Data characteristics **as** low veracity can greatly damage the accuracy of your results.

6. Validity

How valid and relevant is the data to be used for the intended purpose.

7. Volatility

Big data is constantly changing. The **data you gathered** from a source a day ago might be different from **what** you found today. This is called variability of data, and it affects your data homogenization.

8. Visualization

Visualization refers to showing your big data-generated insights through visual representations such as charts and graphs. It has become prevalent recently **as** big data professionals regularly share their findings with non-technical audiences.

7. Answer the questions:

1. Why are companies in various sectors focused on using the technology of Big Data?
2. Is it true that there's a huge demand for big data professionals?
3. Why can't conventional methods or traditional data management tools process and store large amounts of data effectively?
4. How do we call data that can be processed, stored, and retrieved in a fixed format?
5. How do we differ structured from unstructured data?
6. What does the term ***Value*** refer to?
7. What characteristic of Big Data affect the accuracy of your results?
8. Why do the data you gathered from a source a day ago might be different from what you found today?
9. What form of representing data do Big Data professionals choose to share their ideas with non-technical audiences?

8. Insert who, which, that, what or when. If possible, leave the gap unfilled.

Big Data Sizes

Byte Comparison Table		
Metric	Value	Bytes
Byte (B)	1	1
Kilobyte (KB)	$1{,}024^1$	1,024
Megabyte (MB)	$1{,}024^2$	1,048,576
Gigabyte (GB)	$1{,}024^3$	1,073,741,824
Terabyte (TB)	$1{,}024^4$	1,099,511,627,776
Petabyte (PB)	$1{,}024^5$	1,125,899,906,842,624
Exabyte (EB)	$1{,}024^6$	1,152,921,504,606,846,976
Zettabyte (ZB)	$1{,}024^7$	1,180,591,620,717,411,303,424
Yottabyte (YB)	$1{,}024^8$	1,208,925,819,614,629,174,706,176

Some facts about the sizes of data __(1)__ we deal with

No doubt, everybody __(2)__ is using computers knows and operates the data storage metrics, like *terabytes*, *gigabytes*, *petabytes*, *megabytes*, etc.

Here are all of them together, __(3)__ helps to illustrate just how big some of those big numbers get!

If you're curious __(4)__ would come next in this table, here they are. 1024 yottabytes is equal to one brontobyte, and 1024 of those is called a geopbyte

How Big Is a Gigabyte?

Talking about the GB is a bit more commonplace – we see GBs everywhere, from memory cards to movie downloads, smartphone data plans, and more.

A single GB is equivalent to a little over 700 floppy disks or just over a single CD.

A GB is not a small number by any means, but these days it's a level of data __(5)__ we use up quickly, sometimes several times over each day. It's a number __(6)__ we very much run up against on a regular basis.

- 1 GB can store almost 300 songs in MP3 format.
- A single HD Netflix movie might gobble up over 4 GB as you watch.
- A DVD movie disc holds about 9.4 GB.
- Most smartphones store 64 GB or 128 GB of data (your apps, music downloads, etc.).
- Your smartphone data plan, __(7)__ you use when you're away from your wireless network at home, might be capped at 5 GB, 10 GB, or a bit more per month.

How Big Is a Terabyte?

The terabyte (TB) is the most common unit __(8)__ is used to measure hard drive size and a number __(9)__ you might actually run into from time to time.
A single TB is a lot of space. It would take 728,177 floppy disks or 1,498 CD-ROM discs to store just 1 TB worth of information.

- As of 2020, most new, average priced computer hard drives are in the 1 to 5 TB range.
- The Hubble Space Telescope generates about 10 TB of new data every year.
- Around 130,000 digital photos would require 1 TB of space ... close to 400 photos every day for a year!
- IBM's famous Watson game-playing supercomputer has 16 TB of RAM.

How Big Is a Petabyte?

The petabyte (PB) is just a crazy large chunk of data but it actually comes up more and more these days.

To store a single PB would take over 745 million floppy disks or 1.5 million CD-ROM discs, clearly not an efficient way to collect a petabyte of information, but it's fun to think about!

- The movie Avatar needed about 1 PB of storage to render those graphics.
- It's estimated __(10)__ the human brain can store around 2.5 PB of memory data.
- Over 3.4 years of 24/7 Full HD video recording would be around 1 PB in size.
- As of late 2018, the Wayback Machine was storing over 25 PB of data!
- 1 PB is equivalent to over 4,000 digital photos per day, over your entire life.

How Big Is an Exabyte?

Talking about even a single EB seems a bit crazy but there are situations __(11)__ the world really does run into this level of data.

Yes, it's comical, but heading back to the previous comparisons: to get to just a single EB would take 763 billion floppy disks or 1.5 billion CD-ROM discs. Can you imagine?

- Way back in 2010, the internet was already handling 21 EB per month, and nearly 6 times that amount (122 EB) just seven years later.
- Almost 11 million movies in 4K format would fit comfortably inside a 1 EB storage device.
- A single EB could hold the entire Library of Congress 3,000 times over.
- A single gram of DNA can hold 490 EB, at least in theory. That's over 5 billion 4K movies.

Reading 2

Before reading.

1. Match the <u>underlined</u> words from the text with the meanings (1-12) below.

1	to determine	a	a store	7	customers	g	cheating
2	a batch	b	to gauge	8	to enhance	h	utilizing
3	a warehouse	c	to adjust	9	fraud	i	to decide
4	crucial	d	a series	10	to estimate	j	yield
5	stakeholders	e	to improve	11	revenue	k	users
6	to fine-tune	f	decisive	12	harnessing	l	agents

2. Check the use of some of the words through examples. Make sentences of your own using the words in italics.

1. Distance is *gauged* by journey time rather than miles. It's very difficult to *gauge* how upset he really is by his controlled reaction.
2. You can *adjust* the amount of sugar in the recipe to your taste.
3. Sound engineers *utilize* a range of techniques.
4. They obtained a *yield* of 8 percent on their investment. Polluted water decreases crop *yields*.
5. The banking sector is *crucial* to economic recovery.

6. It is hoped this sustainable form of energy could be *harnessed* to power electronic gadgets. All visitors are fitted with climbing *harnesses*.

3. Read the text and complete the tasks after it.

Main components of Big Data

1. Ingestion

Ingestion refers to the process of gathering and preparing the data. You'd use the ETL (extract, transform, and load) process to prepare your data. In this phase, you have to identify your data sources, (1) determine **whether** you'll gather the data in (2) batches or stream it, and prepare it through cleaning and transforming raw data prior to processing and analysis.

2. Storage

Once you have gathered the necessary data, you'd need to store it. Here, you'll perform the final step of the ETL, the load process. You'd store your data in a data (3) warehouse or a data lake, depending on your requirements. This is why it's (4) crucial to understand your organization's goals **while** performing any big data process.

3. Analysis

In this phase of your big data process, you'd analyze the data to generate valuable insights for your organization. There are four kinds of big data analytics: prescriptive, predictive, descriptive, and diagnostic. You'd use artificial intelligence and machine learning algorithms in this phase to analyze the data.

4. Consumption

This is the final phase of a big data process. Once you have analyzed the data and have found the insights, you have to share them with others. Here, you'd have to utilize data visualization and data storytelling to share your insights effectively with a non-technical audience **such as** (5) stakeholders and project managers.

Advantages of Big Data

There are numerous advantages of Big Data for the organisations. Some of key ones are as following:

1. Enhanced Decision-making

Big data implementations can help businesses and organizations make better-informed decisions in less time. It allows them to use outside intelligence **such as** search engines and social media platforms to (6) fine-tune their strategies. Big data can identify trends and patterns **that** would've been invisible otherwise, helping companies avoiding errors.

2. Data-driven Customer Service

Another huge impact big data can have on all industries is in the customer service department. Companies are replacing the traditional customer feedback system with

data-driven solutions. Such solutions can analyze customer feedback more efficiently and help them offer customer service to the (7) consumers.

3. Efficiency Optimization

Organizations use big data to identify the weak areas present within them. Then, they use these findings to resolve those issues and (8) enhance their operations substantially. For example, Big Data has substantially helped the manufacturing sector improve its efficiency through IoT and robotics.

4. Real-time Decision Making

Big Data has transformed several areas by enabling real-time trackings, **such as** inventory management, supply chain optimization, anti-money laundering, and (9) fraud detection in banking & finance.

Key Big Data Insights of 2021

Here are some key big data statistics that reflect the growth and impact of this field:

1. The global Big Data market size is estimated to grow from $138.9 billion in 2020 to $229.4 billion by 2025. It'll grow at an astonishing CAGR of 10.6% during this period.
2. From 2020 to 2025, the big data industry in the Asia Pacific region will grow at the highest CAGR compared to other regions, including North America.
3. 99.5% of collected data never gets analyzed, indicating there's a lot of growth potential.
4. Fortune 1000 companies can gain $65 million more net income by enhancing their data accessibility by just 10%.
5. 300 new hours of video are uploaded to YouTube every minute, **which** is why they have more than 1 billion gigabytes of data on their servers.
6. Experts believe that the healthcare industry can benefit substantially from utilizing big data analytics. They (10) estimate **that** this sector can save as much as $300 billion per year by using big data.
7. The global (11) revenue of business intelligence and analytics tools software solutions in 2018 was an astonishing $24 billion.

It's clear from the above statistics **that** the Big Data industry is growing rapidly. We generate tons of data every day, and organizations recognize the value of this data. **Therefore**, (12) harnessing the power of Big Data technologies can help multiple sectors in enhancing their growth.

Conclusion

Big Data is among the most in-demand technologies currently. Companies of various industries are looking for ways to utilize Big Data to enhance their operations, attract more customers, and get ahead of their competitors. The first three characteristics of big data are volume, velocity, and variety. Additional characteristics of big data are variability, veracity, visualization, and value. Understanding the characteristics of Big Data is the key to learning its usage and application properly.

As companies start using more data, the demand for Big Data professionals will increase accordingly. This is why there's a steady increase in the demand for many Big Data roles since 2013.

4. Find the words in the text which match the following definitions:

1) computer systems able to perform tasks that normally require human intelligence.
2) a program that searches for and identifies items in a database that correspond to keywords.
3) a process or set of rules to be followed in calculations or other problem-solving operations.
4) the interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data.
5) websites and applications that enable users to create and share content or to participate in social networking.
6) a unit of information equal to one billion or, strictly, 2^{30} bytes.
7) primary data.

5. Complete the sentences with the information from the text.

1. Referring to data, ETL means extract, transform and ____ .
2. Big data are stored in ____ .
3. Big data analytics can be divided into prescriptive, predictive, ____, and diagnostic.
4. The final phase of a big data process is ____ .
5. To fine-tune their strategies businesses use ____ .
6. The traditional customer feedback system in big companies are being replaced with ____ .
7. Big Data allow real-time trackings in several areas such as inventory management, supply chain optimization, ____ and fraud detection in banking & finance.

Listening 2

Big data and nuclear physics

https://www.youtube.com/watch?v=j-0cUmUyb-Y

Before Listening.

1. Match the words from the video and their explanation / synonym. Use some of the words
(1-10) in the sentences below.

1	voluminous	a	to fight
2	to overwhelm	b	quickly
3	to wrangle	c	to exceed
4	to mushroom	d	practically
5	dedicated	e	vast
6	fledgling (adj.)	f	to exploit
7	to outstrip	g	specialized
8	to employ	h	to cover
9	to orchestrate	i	various
10	diverse	j	to manage
11	seamless	k	to overrun
12	fleetingly	l	to flourish, spring up (sprang, sprung)
13	virtually	m	nascent
14	to span	n	coherent

1. When Netflix went public in 2002, it had just 600,000 subscribers, and the _____ company was losing money.
2. The IT sector has _____ over the past decade to become one of the engines driving the Ukrainian economy.
3. During lockdowns teachers _____ popular streaming platforms, like ZOOM, for classes.
4. Recruiting office has to handle ____ amounts of e-mails.
5. Swedish telecoms giant Ericsson predicted that superfast 5G internet will ____ up to 65% of the world's population by the end of 2025.
6. A young computer scientist is designing a new generation of artificial intelligence programs to efficiently ____ floods of information.
7. Even the most primitive computer can ____ the human brain in certain types of calculations.
8. Misinformation about the coronavirus is threatening to ____ tech platforms.
9. Data analytics is a broad term that encompasses many ____ types of data analysis.

10. Intel is building AI abilities into its main processors while working on ____ hardware, too.

2. Watch the video and say whether the following statements are TRUE or FALSE.

1. Modern technologies fit very well to handle big data.
2. Physicists at CERN have faced problems with increasing amount of data for more than 50 years.
3. At first, to analyze the CERN data, foreign physicists had to connect to the CERN's mainframe from their countries.
4. CERNET was created to unite different networks inside CERN with internet.
5. In the 1980's remote access to European and American networks was really difficult.
6. The internet working standard was first adopted in Europe and then in the US.
7. Before 1990's, to access information from the network, you had to know where it was stored.
8. In early 2000's, having buildings full of computers, CERN could easily analyse the necessary data.
9. Distributing data from CERN to other organisations didn't depend on relationships.
10. Cloud computing has been very popular recently to analyze big data.
11. At CERN big data are created as a result of tracing proton collisions.
12. CERN's sensors capture more than 40 million collisions per second.
13. According to the author, with big data we can analyze real-time situations like traffic, weather or business tendencies.

Discussion

In the video the author mentions an old metaphor the "the whole is greater than the sum of its parts". How do you understand it? Give some examples.

Reading 3

1. Read the text and match the challenges and their names. Justify your choice.

2. Formulate each solution in one sentence.

3. Choose one word from the list given in the brackets to fill in the gaps.

4. Explain the meaning of the underlined words in italics / expressions and make sentences of your own with these words.

The 'scary' seven: Big Data challenges and ways to solve them

Before going to battle, each general needs to study his opponents: ____ (what, how, that) big their army is, ____ (what, how, that) their weapons are, ____ (what, how, that)

many battles they've had and ____ (what, that, which) primary tactics they use. This knowledge ____ (can, must, has to) enable the general to craft the right strategy and be ready for battle.

Just like that, before ***going big data***, each decision maker has to know ____ (what, how, that) they are dealing with. Here, our big data consultants cover 7 major big data challenges and offer ____ (them, they, their) solutions. Using this 'insider info', you will be ____ (have, able, allowed) ***to tame*** the scary big data creatures without letting them defeat you in the battle for building a data-driven business.

Challenges

1	Dangerous big data security holes
2	Paying loads of money
3	Troubles of upscaling
4	Insufficient understanding and acceptance of big data
5	Complexity of managing data quality
6	Tricky process of converting big data into valuable insights
7	Confusing variety of big data technologies

Challenge #1: _____

Oftentimes, companies fail to know even the basics: ____ (whose, what, that) big data actually is, ____ (whose, what, that) its benefits are, ____ (whose, what, that) infrastructure is needed, etc. Without a clear understanding, a big data adoption project risks to be doomed to failure. Companies ____ (had, should, may) waste lots of time and resources on things they don't even know how to use.

And if employees don't understand big data's value and/or don't want to change the existing processes for the sake ____ (on, of, to) its adoption, they can resist it and impede the company's progress.

Solution:

Big data, being a huge change for a company, ____ (should, mustn't, may not) be accepted by top management first and then down the ladder. To ensure big data understanding and acceptance at all levels, IT departments need to organize numerous trainings and workshops.

To see to big data acceptance even more, the implementation and use of the new big data solution need to ____ (be, have, was) monitored and controlled. However, top management should not overdo with control because it may have an adverse ____ (fact, affect, effect).

Challenge #2:

It can be easy to get ____ (loose, lost, last) in the variety of big data technologies now available on the market. ____ (You need, Need you, Do you need) Spark or would the

speeds of Hadoop MapReduce be enough? Is it better to store data in Cassandra or HBase? Finding the answers can be tricky. And it's even easier to choose poorly, if you are exploring the ocean of technological opportunities without a clear view of what you need.

Solution:

If you are new to the world of big data, trying to seek professional help would be the right way to go. You could hire an expert or turn ____ (on, at, to) a vendor for big data consulting. In both cases, with joint efforts, you'll be able to work out a strategy and, based on that, choose the needed technology stack.

Challenge #3:

Big data adoption projects entail lots of expenses. If you opt for an on-premises solution, you'll have to mind the costs of new ***hardware***, new ***hires*** (administrators and developers), ***electricity*** and so on. Plus: although the needed frameworks are open-source, you'll still need to pay for the development, setup, configuration and maintenance of new ***software***.

If you decide on a cloud-based big data solution, you'll still need to ***hire staff*** (as above) and pay for ***cloud services***, big data solution ***development*** as well as setup and maintenance of needed ***frameworks***.

____ (Therefore, Moreover, Despite), in both cases, you'll need to allow for future expansions to avoid big data growth getting out of hand and costing you a fortune.

Solution:

The particular salvation of your company's wallet will depend on your company's specific technological needs and business goals. For instance, companies who want flexibility benefit from cloud. While companies with extremely harsh security requirements go on-premises.

There are also hybrid solutions when parts of data are stored and processed in cloud and parts – on-premises, which can also be cost-effective. And resorting to data lakes or algorithm optimizations (if done properly) can also save money:

1. ***Data lakes*** can provide cheap ____ (algorithm, programming, storage) opportunities for the data you don't need to analyze at the moment.
2. ***Optimized algorithms***, in their turn, can reduce computing power consumption 5 to 100 ____ (units, times, ones). Or even more.

All in all, the key to solving this challenge is properly analyzing your needs and choosing a corresponding course of action.

Challenge #4:

Data from diverse sources

Sooner or ____ (further, later, quicker), you'll run into the problem of data integration, since the data you need to analyze comes from diverse sources in a variety of different formats. For instance, e-commerce companies need to analyze data from website logs,

call-centers, competitors' website 'scans' and social media. Data formats will obviously differ, and matching them can be problematic. For example, your solution has to know that skis named *SALOMON QST 92 17/18, Salomon QST 92 2017-18* and *Salomon QST 92 Skis 2018* are the same thing, while companies ScienceSoft and Sciencesoft are ____ (not, no, too).

Unreliable data

Nobody is hiding the fact that big data isn't 100% accurate. And all in all, it's not that critical. But it doesn't mean that you ____ (shouldn't, cannot, mustn't) at all control how reliable your data is. Not only can it contain wrong information, but ____ (so, also, too) duplicate itself, as well as contain contradictions. And it's unlikely that data of extremely inferior quality can bring any useful insights or shiny opportunities to your precision-demanding business tasks.

Solution:

There is a whole bunch of techniques dedicated to cleansing data. But first things first. Your big data needs to have a proper model. Only after ____ (create, created, creating) that, you can go ahead and do other things, like:

- Compare data to the single point of truth (for instance, compare variants of addresses to their spellings in the postal system database).
- Match records and merge them, if they relate to the same entity.

But mind that big data is never 100% accurate. You have to know it and deal with it.

Challenge #5:

Security challenges of big data are quite a vast issue that deserves a whole other article dedicated to the topic. But let's look at the problem on a larger scale.

Quite often, big data adoption projects put security off till later stages. And, frankly ____ (telling, saying, speaking), this is not too much of a smart move. Big data technologies do evolve, but their security features are still neglected, since it's hoped that security will be granted on the application level. And what do we get? Both times (with technology advancement and project implementation) big data security just gets cast aside.

Solution:

The precaution against your possible big data security challenges is putting security first. It is particularly important at the stage of designing your solution's architecture. Because if you don't get along with big data security from the very start, it'll bite you when you least expect it.

Challenge #6:

Here's an example: your super-cool big data analytics looks at what item pairs people buy (say, a needle and thread) solely based on your historical data about customer behavior. Meanwhile, on Instagram, a certain soccer player posts his new look, and the two characteristic things he's wearing are white Nike sneakers and a beige cap. He

looks good in them, and people who see that want to look this way too. Thus, they rush to buy a similar pair of sneakers and a similar cap. But in your store, you have only the sneakers. As a result, you lose revenue and maybe some loyal customers.

Solution:

The reason that you failed to have the needed items in stock is that your big data tool doesn't analyze data from social networks or competitor's web stores. While your rival's big data among other things does note trends in social media in near-real time. And their shop has both items and even offers a 15% discount if you buy both.

The idea here is that you need to create a proper system of factors and data sources, whose analysis will bring the needed insights, and ensure that nothing falls out of scope. Such a system should often include external sources, even if it may be difficult to obtain and analyze external data.

Challenge #7:

The most typical feature of big data is its dramatic ability to grow. And one of the most serious challenges of big data is associated exactly with this.

Your solution's design may be thought through and adjusted to upscaling with no extra efforts. But the real problem isn't the actual process of introducing new processing and storing capacities. It lies in the complexity of scaling up so that your system's performance doesn't decline and you stay within budget.

Solution:

The first and foremost precaution for challenges like this is a decent architecture of your big data solution. As long as your big data solution can boast such a thing, fewer problems are likely to occur later. Another highly important thing to do is designing your big data algorithms while keeping future upscaling in mind.

But besides that, you also need to plan for your system's maintenance and support so that any changes related to data growth are properly attended to. And on top of that, holding systematic performance audits can help identify weak spots and timely address them.

Win or lose?

As you could have noticed, most of the reviewed challenges can be foreseen and dealt with, if your big data solution has a decent, well-organized and thought-through architecture. And this means that companies should undertake a systematic approach to it.

If your company follows these tips, it has a fair chance to defeat the Scary Seven.

5. Find in the text examples of different tools for EMPHASIZING.

inversion: *not only …*

intensifiers: *particularly*, _____

rhetorical questions: *is it better to use…?*

metaphors: *ocean of technological opportunities*
linkers: *moreover*, _____
verb *do*
superlative: *the most (typical)*
introductory phrases*: The idea here is that…*, ___

Listening 3
Data sources of big data

https://www.youtube.com/watch?v=tc-kWwK0KW4

1. Watch the video. What is meant by the pictures? Choose the words from the video.

1		2		3	
4		5		6	
7		8		9	

2. Watch the video again if necessary and answer the questions.

1. What two things do they suggest comparing your data with?
2. What are the characteristics of strings?

3. Where are structured data usually stored?
4. How are data for Global Positioning System (GPS) generated?
5. What are the examples of structured data received from human interaction with a computer?
6. How much video is uploaded from YouTube?
7. What examples of human interaction as unstructured data are given?
8. What is a common characteristic of different types of unstructured data?

Reading 4

Before reading.

1. Before you start reading the text, discuss in groups what is more dangerous for your health: to eat over-salted or over-sweetened food? What kind of food is unhealthy?

2. Think of and give the examples of situations when you have to eat unhealthy food.

3. What different tastes can you name?

While reading.

4. Analyse the use of "that" in the text. Define its function: a demonstrative pronoun; the conjunction introducing a relative clause; the conjunction introducing an object clause. Say whether this word can be changed into "which" or omitted.

Big data says food is too sweet

"This is the first study of this scale to study food choice beyond the artificial constraints of the laboratory," said study lead author Danielle Reed, PhD, a behavioral geneticist at Monell. "Sweet was the most frequently mentioned taste quality and the reviewers definitively told us **that** human food is over-sweetened."

The study used data posted on an open-source data science site to examine 393,568 unique food reviews of 67,553 products posted by 256,043 Amazon customers over a 10-year period. Using a sophisticated statistical modeling program to identify words related to taste, texture, odor, spiciness, cost, health, and customer service, the scientists computed the number of reviews **that** mentioned each of these categories.

"Reading and synthesizing almost 400,000 reviews would essentially be impossible for a human team, but recent developments in machine learning gave us the ability to understand both which words are present and also their underlying semantic meaning," said study coauthor Joel Mainland, PhD, an olfactory neurobiologist at Monell.

The focus on product over-sweetness was striking, as almost one percent of product reviews, regardless of food type, used the phrase "too sweet." When looking at reviews

that referred to sweet taste, the researchers found **that** over-sweetness was mentioned 25 times more than under-sweetness.

The findings, published online in advance of print in *Physiology & Behavior*, indicated that over 30 percent of the Amazon food product reviews mentioned 'taste,' making it the most frequently-used word.

Drilling down, the scientists found **that** sweet taste was mentioned in 11 percent of product reviews, almost three times more often than bitter. Saltiness was rarely mentioned, a somewhat surprising finding in light of public health concerns about excess salt consumption.

Seeking to better understand individual differences in how people respond to a given food, the scientists also looked at responses to the 10 products **that** received the widest range of ratings, as defined by the variability in the number of stars **that** the product received. They identified two factors **that** tended to account for polarizing reviews related to a product: product reformulation and differing perspectives on **that** product's taste. With regard to taste, people often rated the sweetness of a product differently. Response to a product's smell also contributed to differences in opinion about a particular product.

"Genetic differences in taste or olfactory receptor sensitivity may help account for the extreme reactions **that** some products get," said Reed. "Looking at the responses to polarizing foods could be a way to increase understanding of the biology of personal differences in food choice."

Together, the findings illustrate the potential uses of big-data approaches and consumer reviews to advance sensory nutrition, an emerging field **that** integrates knowledge from sensory science with nutrition and dietetics to improve health. Moving forward, similar methods may inform approaches to personalized nutrition **that** can match a person's sensory responses to inform healthier food choices.

Post-reading task.

5. Complete the definitions (1-7) below with the underlined words from the text: nutrition, sensitivity, saltiness, geneticist, olfactory, neurobiologist, spiciness.

1. A _____ is a scientist who studies heredity. 2. _____ is the property of being seasoned with for example pepper or cinnamon and so highly flavored. 3. _____ means relating to the sense of smell. 4. A _____ is a scientist who has specialized knowledge in neuroscience. 5. _____ is the property of many foods and some substances, e.g. sea water. 6. _____ is the quality or condition of being perceptive to external stimuli. 7. _____ is the process of obtaining the food necessary for health and growth.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
Big Data		
core characteristics		
conventional data-processing solutions		
E-commerce stores		
data mining		
spreadsheets		
webpages		
semi-structured data		
vital tags		
velocity		
veracity		
variety		
variability		
data homogenization		
visualization		
sizes of data		
ingestion		
data warehouse		
data lake		
consumption		
stakeholders		

Find 10 key words from the unit in the crossword puzzle: →↓ ↘

V	S	T	R	U	C	T	U	R	E	D	G
W	O	V	E	R	A	C	I	T	Y	D	D
A	P	L	I	N	A	M	O	U	N	T	V
R	L	E	A	N	H	A	R	N	E	S	S
E	Z	B	T	T	S	A	C	L	O	U	D
H	N	P	P	A	I	I	N	J	Y	R	J
O	L	T	Z	T	B	L	G	C	M	R	P
U	Q	Z	N	R	N	Y	I	H	E	T	B
S	N	G	J	L	D	X	T	T	T	K	L
E	D	Z	T	P	P	T	G	E	Y	Z	D

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Grammar Focus

Subordinate Clauses

Types of Subordinate Clause depending upon its function in a sentence

Noun Clause

Relative (Adjective) Clause

Adverb Clause

Time: when, whenever, since, until, before, after, while, as, by the time, as soon as

Cause and effect: because, since, now that, as long as, so, so that

Contrast: although, even, whereas, while, though

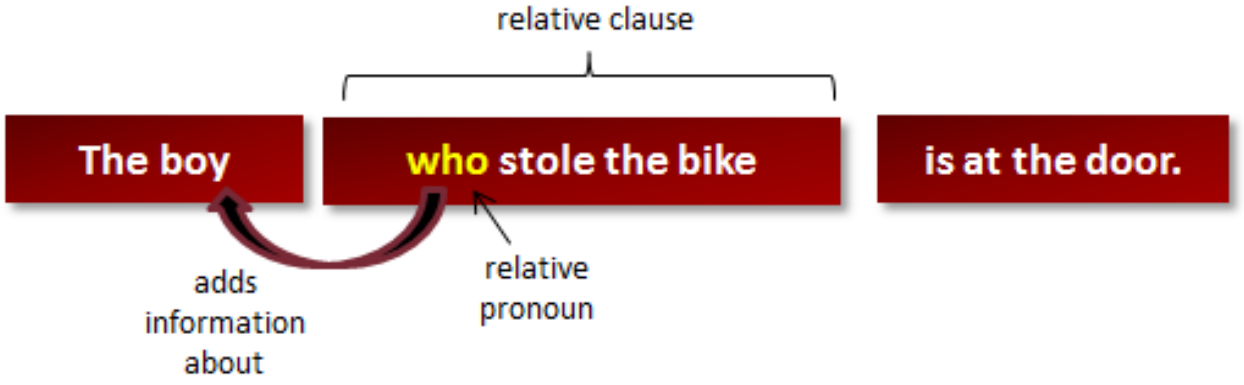
Condition: if, unless, even if, providing or provided that, in case

Noun clause can be used as

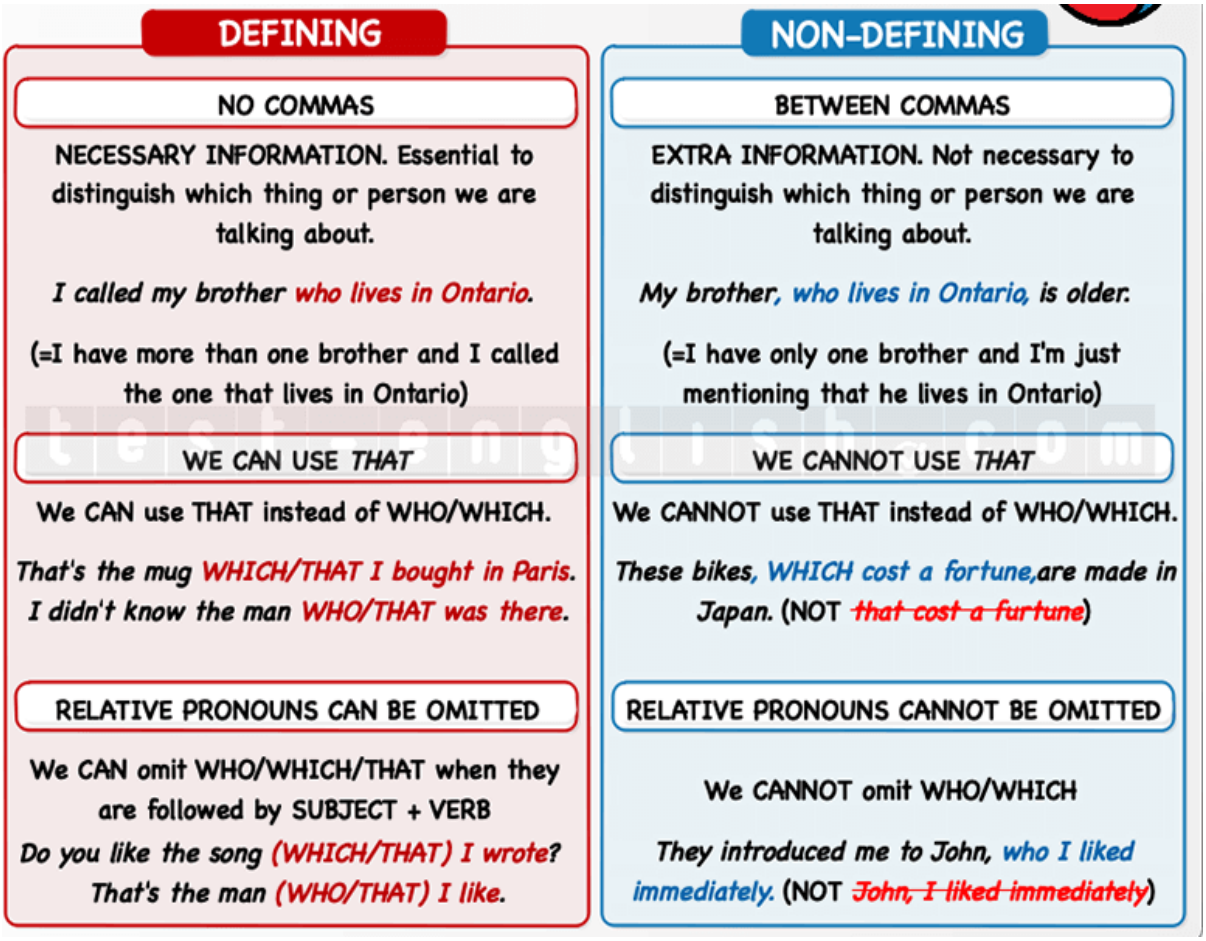
Subject	*What we have learnt today* is really important.
Direct object	We expect *that the test will be successful*.
Indirect object	Don't forget to send whoever attended the conference a follow-up email.
Object of a preposition	He referred to *what was discussed before*.
Predicate noun	The problem is *that we have lost our way*.

Relative Clauses

Relative clauses give **extra information** related to a previously mentioned **noun** or **pronoun** within a sentence. A relative clause always starts with a **relative pronoun**.



RELATIVE CLAUSES	
RULE	**EXAMPLE**
who / that refer to people	They caught the man **who / that** spied for China.
which / that refer to objects	I lost the map **which / that** she gave me.
whose refers to possession	She complained to the man **whose** dog bit her.
when refers to a moment in time	Christmas Day is a day **when** people are happy.
where refers to a particular place	We visited the house **where** our father was born.
In non-defining sentences, the word that cannot replace who or which.	Mata Hari, **who** was a famous female spy, was born in Holland. Buckingham Palace, **which** is in London, is a favourite tourist site.



1. Determine the type of subordinate clauses highlighted in bold: subject, object, relative, time, place.

The ways **we move around our cities (1)** and the world have changed dramatically in recent years. Many of those changes are driven by examples of big data **which create more efficient solutions to our travel and transportation needs (2)**, including: the development of GPS and intelligent map programs; better sequencing of traffic signals; advancements in **how air travel is managed and sold (3)** etc. **When you turn the key in your ignition (4)**, you probably are experiencing several ways big data affects your personal life. Most automobiles **which have been produced in the last decade or so (5)** have smart technology designed to monitor the condition of the car, track mileage and fuel consumption, and improve your driving experience in other ways. That data is also collected to help the auto industry continue to make more efficient and reliable vehicles.

You likely haven't opened a physical map in the car in years, if ever. **What was once a normal part of a road trip experience (6)** has now been moved to either built-in GPS systems or smart maps programs on phones. You no longer have to guess about **how long your trip will take (7)**, **when you will arrive (8)**, or **what traffic conditions you might experience (9)**. And, of course, your own travel data is being collected to

help improve the accuracy of these systems for everyone Big data also has revolutionized the airline industry at virtually all levels. From the moment **you begin to search for a ticket (10)**, you begin a journey through multiple examples of big data in use. Fares are set by automated data collection and analysis, and schedules are created based on predictions **that are made from the collection of big data (11)**. And, of course, airlines are keeping track of **how frequently you fly (12)**, **what you prefer to drink (13)**, and other information to customize your experience.

2. Insert that, who, whose, which, where. Sometimes not only one option is possible.

1. I don't remember the street ___ we parked the car.
2. Picasso, ___ painted "Guernika", was Spanish.
3. A spider is an animal ___ has eight legs.
4. This exercise is for students ___ native language is Greek.
5. This is the restaurant ___ we usually have lunch.
6. That's the man ___ I told you about.
7. That's the road ___ the accident happened.
8. He was the last one ___ climbed that mountain.
9. My new car, ____ I bought just a month ago, has broken.
10. That's the student ____ project was considered the best.

3. Leave out conjunctions (who, that, which) if possible.

1. Computer scientists from Saarbrücken developed a novel text analysis technology **that** considerably improves searching very large text collections by means of artificial intelligence.
2. Users **who** enter texts are automatically provided with background information, for example company-internal guidelines and manuals or web links.
3. Your storage solution can be in the cloud, on premises, or both. You can store your data in any form **which** you want.
4. The computers **which** students are now using are 2.4-GHz machines with 128 MB of random access memory.
5. 5G refers to networks **that** use cutting-edge technology, including augmented reality and virtual reality.
6. Quantum computers, **which** some companies are using now in banking and finance, are several times faster than conventional computers.
7. As network and cloud services evolve, manufacturers have access to a whole new set of infrastructure options **that** they can use to improve the way they support shopfloor operations.

8. With AI, social media and other digital technologies playing an increasingly prominent part in people's lives, now is the time to start thinking about the impacts **that** they can make long-term.
9. Keeping IoT infrastructure secure in a way **which** effectively mitigates evolving cyber attacks is a must.
10. Software-as-a-Service (SaaS) is the version of cloud computing **that** most people are used to on a day-to-day basis.
11. With programming language R you can solve any problem **which** you encounter in data science.
12. A professional **who** specializes in Python can hold a number of job titles, including Python Developer, Data Scientist, and Machine Learning Engineer.

4. Insert a comma (for non-defining relative clause) or leave the gap empty (for defining relative clause).

1. Both cloud computing and Big Data are quickly maturing and becoming widespread, but a determined effort is needed to create a holistic environment ____ in which both can thrive and develop their full potential.
2. For analyzing texts, we rely on extremely large knowledge graphs ____ which are built upon freely available sources such as Wikipedia or large media portals on the web.
3. The new technique has its origin in another technology pioneered by the Jalali group, time stretch dispersive Fourier transform____ which is a method for slowing down and amplifying faint but very fast signals so they can be detected and digitized in real time.
4. The technique reshapes the signal carrying the data in a fashion____ that resembles the graphic art technique known as anamorphism____ which has been used since the 1500s to create optical illusions in art and, later, film.
5. Data Processing is therefore needed first____ which usually includes data cleansing, standardization, transformation and aggregation.
6. Big data is an extremely large volume of data and datasets____ that come in diverse forms and from multiple sources.
7. If each record only needs to be processed once before writing to disk____ which is the case for a typical batch processing, Spark won't yield advantage compared to Hadoop.
8. Albeit data preprocessing is a powerful tool____ which can enable the user to treat and process complex data, it may consume large amounts of processing time.
9. Spark is a general-purpose framework ____ which, thanks to its generality, allows implementing several distributed programming models.
10. NoSQL databases are non-relational data management systems ____ which do not require a fixed scheme, making them a great option for big, raw, unstructured data.

5. Fill in the gaps with which or where (for defining relative clause) or <comma> which or < comma> where (for non-defining relative clause).

A data lake is a central location ____ holds a large amount of data in its native, raw format. Compared to a hierarchical data warehouse ____ stores data in files or folders, a data lake uses a flat architecture and object storage to store the data. Object storage stores data with metadata tags and a unique identifier ____ makes it easier to locate and retrieve data across regions, and improves performance. By leveraging inexpensive object storage and open formats, data lakes enable many applications to take advantage of the data.

Data lakes were developed in response to the limitations of data warehouses. While data warehouses provide businesses with highly performant and scalable analytics, they are expensive, proprietary and can't handle the modern use cases _____ most companies are looking to address. Data lakes are often used to consolidate all of an organization's data in a single, central location, where it can be saved "as is," without the need to impose a schema (i.e. a formal structure for how the data is organized) up front like a data warehouse does. So data can be dumped in the place ____ it is stored until it is needed in future. Data in all stages of the refinement process can be stored in a data lake: raw data can be ingested and stored right alongside an organization's structured, tabular data sources (like database tables), as well as intermediate data tables ____ are generated in the process of refining raw data. Unlike most databases and data warehouses, data lakes can process all data types (including unstructured and semi-structured data like images, video, audio and documents) ____ are critical for today's machine learning and advanced analytics use cases.

6. For each sentence choose ONE option only.

1. Look! That's the painting ____

a) Sheila fancies.
b) which Sheila fancies.
c) that Sheila fancies.
d) 1, 2 and 3 are all possible.

2. I work for a company ____

a) that exports clothing.
b) which exports clothing.
c) exports clothing.
d) 1 and 2 are both possible.

3. She went to a school ____

a) where they studied all subjects in English.
b) they studied all subjects in English
c) which they studied all subjects in English.

d) that they studied all subjects in English.
4. I spoke to the guy ____
a) which deals with complaints.
b) who deals with complaints.
c) deals with complaints.
d) 1 and 2 are both possible.
5. I bought a palmtop computer ____
a) that's got a Chinese-English dictionary built in.
b) which has got a Chinese-English dictionary built in.
c) got a Chinese-English dictionary built in.
d) 1 and 2 are both possible.
6. My little sister, ____, has just said her first words.
a) who I love very much
b) whom I love very much
c) that I love very much
d) 1 and 2 are both possible.
7. We stayed in a hotel ____
a) where had a swimming pool and a sauna.
b) which had a swimming pool and a sauna.
c) had a swimming pool and a sauna.
d) 1 and 2 are both possible.
8. We stayed in a hotel ____
a) where every room had a broadband connection.
b) which every room had a broadband connection.
c) that every room had a broadband connection.
d) every room had a broadband connection.
9. I've got a friend ____
a) her husband goes skydiving.
b) who husband goes skydiving.
c) which husband goes skydiving.
d) whose husband goes skydiving.
10. Hong Kong is a place ____
a) where has a lot of tall buildings.
b) where there are a lot of tall buildings.
c) which has a lot of tall buildings.
d) 2 and 3 are both possible.
11. I entered the same University ____
a) that my parents studied
b) where my parents studied

c) my parents studied in
d) 2 and 3 are both possible.
12. My dad, ____, wrote a story about our adventures.
a) who we went yachting this summer with
b) with who we went yachting this summer
c) with whom we went yachting this summer
d) whom we went yachting this summer with
13. If a syntax error occurs, a compiler may tell you the line in your code ____
a) where the error is.
b) the error is on.
c) on which there is the error.
d) all are possible.
14. The article discusses the types of techniques used to develop a quality product ____
a) which includes black box, white box, and software testing types.
b) included black box, white box, and software testing types.
c) that includes black box, white box, and software testing types.
d) includes black box, white box, and software testing types.
15. In cohort analysis, a cohort is understood as a group of people ____
a) who share a common characteristic (or action) during a given time period.
b) which share a common characteristic (or action) during a given time period.
c) who share a common characteristic (or action) during a given time period.
d) that share a common characteristic (or action) during a given time period.

That vs What

THAT	WHAT
Conjunction before Relative clause The people that live here are my good friends. The problem that they are discussing is really important.	**Questions** What is he? What is he doing? What colour is his car? What about starting earlier today? What if nobody shows up?
Conjunction before Object or Subject clause *that* just connects the subordinate clause to the main clause I know [that] you are looking for a new job. That you are looking for a new job is not a secret.	**Conjunction before Object or Subject clause** *what* is an object in the following clause (*what = what exactly*) I know what you are looking for. What you are looking for is sometimes before your own eyes.

Conjunction in the clause of Result (*so … that*)
He was so tired that he couldn't move. He put the screen so [that] everybody could see it.
Demonstrative Pronoun
That is my sister. You can take that chair.
Pronoun to substitute a previous Noun (*that of*)
His house is similar to that of his parents
Adverbial to emphasize (*that = so*)
I wouldn't like to wait that long.

Determiner
What a lovely picture!

7. Fill in the gaps with what or that.

1. Listen carefully to the words ____ I am using.
2. I don't understand ____ you are saying.
3. I don't want to know ____ he said.
4. I thought ____ you wanted to go to University.
5. She is certain ____ she saw her cousin last night.
6. ____ I want is more freedom.
7. The teacher asked us ____ we saw.
8. She doesn't understand ____ is going on.
9. She doesn't understand ____ her mother is manipulating her.
10. Robert doesn't know ____ you are here.
11. The neighbors said ____ our music was too loud.
12. ____ he said didn't make sense.
13. ____ he said nothing wasn't a surprise. He always behaves like ____.
14. I could not believe ____ he was saying.
15. I could not believe ____ he was telling my secret to everyone.
16. Everyone says he is a liar. ____ doesn't surprise me.
17. I think ___ you could have more responsibilities.
18. Her parents don't know about the things ____ she does behind their back.
19. Children have to follow the rules ____ their parents set.
20. Listen carefully to ____ I am saying.
21. He claimed his mother let him do ____ he wanted.
22. The cellphone ____ was confiscated was Andrew's.
23. ____ he said is not important.
24. ____ she passed her exam didn't surprise us.
25. How many people know ____ I'm talking about?
26. My father thinks ____ he wants.

27. She didn’t think ____ her mother would find out.
28. ____ my brother does on his own time is not your business.
29. I noticed ____ she was upset.
30. It’s too bad ____ you can’t go.
31. They know ____ he said to her.
32. They knew ____ he did this.
33. I don’t understand ____ you are saying.
34. I’m sorry – that’s not ____ I’m looking for.
35. Do you know ____ her name is?
36. I know ____ she is from France.
37. We realize ____ we did was a mistake.
38. Do you know ____ time it is?
39. Didn’t they tell you ____ to wear?
40. He knows exactly ____ I'm talking about.

Unit 3
Web Design

Design is not just what it looks like and feels like. Design is how it works.

Steve Jobs

Warming Up

Discuss these questions.

1. What is meant by web design?
2. What in your opinion are the most important aspects in web design?
3. Have you ever created a web site? If yes – tell the class about it.

Start Thinking

Working over a website, designers have to concentrate on the following aspects. Rank them from the most important to the least important.

– **usability** (the website is convenient, clear, logical and easy to use)
– **utility** (the website provides useful content and solves users' problems)
– **accessibility** (the website is convenient for different categories of users)
– **desirability** (the website is attractive and problem-solving, it retains users and creates positive experience which they are ready to repeat).

Reading 1

1. Read the passage about Web Design Concepts. Choose one option to complete the gaps.

Web design has many similarities with print design. The Web, like printed media, was originally __1__ (design / designing / designed) for distributing text to be read widely by people. As multimedia was introduced on the Web, many people began to make comparisons __2__ (among / between / with) the Web and television.

Push technology, in which information is sent to the user __3__ (automatically / automatic / automation), was introduced as a way of making the Web more of a passive medium. However, the comparison between the Web and television is still not accurate.

Multimedia

One of the most common misconceptions about Web design is __4__ (which / what / that) a good site must dazzle the user with a multimedia experience, and that the content of the site is of secondary importance. As a Web designer, you want your site users to have a __5__ (satisfied / satisfying / satisfy) experience, but dazzling them is not necessarily your goal. The primary goal in Web design is to give users what they want, not __6__ (which / what / that) you think they want. This goal can be achieved with a complex balance of well-planned design, high-quality content, and proper use of available media. If multimedia makes __7__ (meaning / task / sense) and enhances the usability of a site, you should use it. If multimedia does not enhance the user experience, or if it degrades the user experience by __8__ (create / creating / created) an unnecessarily long download, then you should not use it.

Interactivity

Web design actually has much more in common with software interface design __9__ (that / than / there) either print design or television. The key difference between Web design and design for traditional media such as print or television is interactivity. Web designers must be aware of the way information is presented on the screen, and also of the ease with __10__ (which / what / that) site visitors can use the site's navigation and other interactive elements. __11__ (Fortunately / On the one hand / Ultimately), if you do not satisfy your Web users' needs or desires, they will find other sites that will. The Web designer who thinks only from his or her own perspective and not from the users' perspective will certainly find dissatisfied Web visitors, clients and __12__ (customers / colleagues / competitors).

2. What do you think is the main purpose of the sentences formulated like this?

1. One of the most common misconceptions about Web design is ____.
2. The primary goal in Web design is ____.
3. It is well-planned design, high-quality content, and proper use of available media that ____.
4. It is interactivity that ____.
5. The reason why the users may be dissatisfied with some sites is that ____.

Reading 2

1. Read this passage. Summarise the main idea in several sentences. Complete the exercises below.

Modern web design

Nowadays, World Wide Web could definitely be named the web of life. It is the thing that connects people from all around the world whatever their aims and wishes are

about. Personal and professional communication, ordering and delivery of goods and services, education and mentoring, searching for new information, advertising, watching films, tracking everyday stuff and accounting finances, and so on and so forth – seems, there's no sphere to which the Internet wouldn't add its own two cents. No doubt, there are both advantages and disadvantages brought by technology and new ways of broader and faster communication of all kinds. Still, today we are going to focus more on the variety of perspectives for positive influence of the web on people's lives of global society.

As a domain of human activity, web design lies on the crossroads of many sciences and practices. Among them the following should be mentioned:

- drawing and composition
- painting and coloristics
- logic and schematism
- analysis and statistics
- visual arts
- programming
- user research
- psychology
- copywriting
- branding and marketing etc.

Covering diverse aspects of a website functionality and appearance, some designers work in teams every member of which specializes in a particular sphere while the others can work out different of the mentioned aspects individually. Anyway, in vast majority of cases web design is the sphere of digital products which have to be functional and user-centered. As famous American designer Charles Eames said "*Design is a plan for arranging elements in such a way as best to accomplish a particular purpose*" and his words totally reflect the idea of modern web design.

Web design is what creates the overall look and feel when you're using a website. It's the process of planning and building the elements of your website, from structure and layout to images, colors, fonts and graphics.

Web design has numerous components that work together to create the finished experience of a website, including graphic design, user experience design, interface design, search engine optimization (SEO) and content creation. These elements determine how a website looks, feels and works on various devices. Web design is different from web development, which is the actual coding that makes a website work. When you're building a website, you need both web design and web development. Although you can find web designers who are also web and UX developers, these are distinct skill sets.

The people who take your ideas and turn them into a mockup that shows what your future website will look like are web designers. They handle the creative part of designing a website.

Web developers – also sometimes called engineers or coders – take the mockup your web designer made and translate it into a coding language so it can be displayed on the web. They make websites functional, which often means custom-coding widgets and other tools.

A **user experience developer**, also known as a UX developer, is the one who makes your website user-friendly. They have technical skills as well as design skills and put them to work creating websites that attract and keep visitors.

Why is web design important

What really matters is first impression. We can't stress this point enough: if you don't have a strong web presence, you're holding your brand back.

Prospective customers who search the web for your brand and find nothing might think you've gone out of business. If they search and find something subpar, they'll get the impression that you don't care much about your company or product. Make every relationship that begins on your website a great one by getting your web design right.

Now that you know what's what and who's who, let's look at some tell-tale signs of great web design and what distinguishes it from not so great web design.

What does good web design look like?

Good web design isn't subjective. With other types of design, like illustration or sticker design, a lot of what constitutes "good" is up to the viewer's taste. With web design, the line between "good" and "not good" is much more defined. A well-designed website is a website that perfectly creates the experience your visitor is looking for.

Web design that works is web design that converts. In webspeak, "convert" means getting the user to take a specific action. When a user follows through with an action that your website set them up to take, your website makes a conversion. Conversions can be anything, like signing up for a newsletter, making a purchase, opening an account or accessing more content on the website.

Effective web design brings a few different elements together to promote conversions. These include:

- Compelling use of negative space
- Clearly presented choices for the user (the fewer choices the user has, the less likely they are to become overwhelmed and confused)
- Obvious, clear calls to action
- Limited distractions and a well thought-out user journey (ie. using only images and text that are 100% relevant to the subject on the page, featuring only buttons that lead to desired actions and using font variations for emphasis and calls to action, not just for the sake of featuring different fonts)

- Responsive design (a design that resizes and reorients itself to the user's screen, making the website easy to use on any device: phone, tablet, laptop or desktop browser.
- Appropriately sized fonts that follow a hierarchy (see "Limited distractions")
- Relevant, high-quality content and images that hook your readers' attention
- A balance between the amount of text and images on each page (too much text can overwhelm a visitor, too little text can be equally disengaging)

Every design choice you make will affect your website's usability and conversion rate in some way.

If you don't think aesthetic design choices affect conversions, think again. Your website must be attractive – especially to your prospective user, so try to figure out what style is going to speak to them.

Invest in eye-catching images that work with your brand. Stay away from obvious stock photography.

Remaining true to your brand is key to successful website design. Even the most gorgeous website is useless if it doesn't match your brand.

Other building blocks of an effective web design are:

- Buttons
- Fonts
- Color palette
- The visual balance between your images and copy on each page

Of course, good web design isn't just utilitarian. Visitors like websites that are engaging and fit the brands' aesthetics. No matter how you achieve it, meshing an on-brand, engaging look with design elements that convert is how you win at web design.

Web design: what doesn't work

We've gone over what good design is. Now let's talk a bit about what it isn't.

As a general rule, visitors shouldn't have to do any work to use your website. The whole experience of using your website should be straightforward and intuitive.

Here are some examples: Clear calls to action are great web design; murky ones are bad web design. High contrast fonts are smart, effective web design; low contrast fonts that are hard to read are poor web design.

Here are a few other elements to avoid:

- Distracting images and backgrounds. As a general rule, stay away from tiled backgrounds. Though there are a few select instances where a tiled background could be a good choice, in most cases they're distracting.
- Non-responsive design. Nowadays your website simply needs to be mobile responsive.
- Unclear links and buttons. Visitors shouldn't have to hunt for links and buttons, they should be able to quickly see which images and pieces of text will take them

to new pages or confirm their choices. Similarly, users should be able to clearly recognize fillable fields.

- Generic or irrelevant stock photos and filler text without valuable information.

Certain web design elements, like grid layouts, aren't inherently good or bad choices. They can be used in effective and ineffective ways, so taking care to do them right is a must.

Another tricky web design element is animation. It's not 1999 anymore, you shouldn't have a comet tail trailing the user's cursor or make them scroll past a row of dancing hamsters to get to your content. But an animated exit pop-up that brings visitors' attention back to your site and gets them to convert? Yes.

How to get web design done

Whew, getting web design right is a complex process and there are lots of things to look out for. Thankfully, you don't have to do it alone. When you're working with a professional web designer you can rely on their skill to get the perfect result.

There are a few different ways you can get the website you need. The way that's right for you and your company depends on how complex of a website you need, how much you want to spend and how much of the work you can do yourself.

You can work directly with a freelance web designer. Simply browse designer portfolios and pick the designer you like best and who fits the style and look you're going for. A freelance designer can customize an existing template or design a completely fresh template for your website. If you want your website built from scratch, you can work with a freelancer who has the skills to make it happen.

If you need help coming up with ideas for your website design, host a contest. On a platform like 99designs you can host a design contest by providing a brief and having designers submit designs based on your specifications.

Creating your own site with a template-driven website builder (like Wix or Squarespace) is also an option. You'll need to be more hands on and if you're not a designer you will be limited to what these platforms offer, but you can always hire a designer to customize a template for you.

You can also work with an agency that builds custom websites. Pick this option if you need to build a complex website from the ground up, but be aware that this end-to-end solution will cost you more.

Be prepared to invest in high quality web design. Your web design could cost a few hundred to tens of thousands of dollars, depending on its complexity. What you'll spend is proportionate to what you need.

So how do you know if you need a custom-built website or if a template will do you just fine? That all depends on what you need your website to do and what you plan for it. If scaling is part of your business plan, get a custom website. If you need it to be search engine friendly, if you need to adapt it to various business needs, if you have

very specific ideas about the website that demand that it be built to your specifications, you need a custom website. When these aren't priorities for you and you don't have a large budget, a customized template is the way to go.

2. Find in the text the words which match the following definitions. The first letters of the words are given.

1	m____	shows what your future website will look like
2	web d_____	also sometimes called engineers or coders
3	w____	an application, or a component of an interface, that enables a user to perform a function or access a service.
4	s____	below a usual or normal level or standard
5	t____ signs	clearly show something has happened or exists
6	to c____	means to make the user take a specific action
7	n____ space	the space around and between the subject of an image. It may be most evident when the space around a subject, and not the subject itself, forms an interesting or artistically relevant shape
8	r____ design	resizes and reorients itself to the user's screen
9	h____	a system in which people or things are put at various levels or ranks according to their importance
10	s____ photography	refers to high-quality photos that are already created and made available for licensing, to use in multiple creative ways
11	t____	something that is used as a pattern for producing other similar things

3. Do the following statements agree with the information given in the reading passage?

TRUE if the statement agrees with the information
FALSE if the statement contradicts the information
NOT GIVEN if there is no information on this

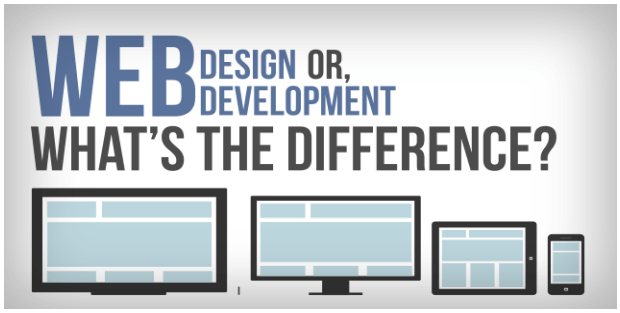
1. Using web technologies brings more advantages than disadvantages.
2. Website designers always work in teams.
3. The idea of modern web design is focused on user.
4. Web design deals with general layout of a web site not going into details like colours or fonts.
5. Web designer and UX developer can perform the same tasks.
6. The more you care about your business, the more money you should invest into your web site.
7. In effective web design, different fonts are used for decorative purposes.
8. In good design the amount of text and images should be balanced.

9. In web-design aesthetics is more important than functionality.
10. The brightness of fonts used in a web site matters.
11. Tiled backgrounds are always a bad choice.
12. Animation is always used as a design element.
13. The cheapest way to create your web design is to invite a freelancer.

4. Discuss the following questions.

1. What is web design?
2. What do you need to build a website?
3. What does a mock-up mean?
4. How can a mock-up be displayed on the web?
5. What does a well-designed website mean?
6. Is it worth using obvious stock photography to make successful website?
7. Are all web design elements effective?
8. What is better to hire a designer or to create your own site with a template-driven website builder?

Reading 3



1. In Part A, complete the sentences with extracts from the box.
In Part B, replace the highlighted words with their synonyms.

	to set a website's information hierarchy
	Designers look at contrasting sizes,
	Adobe Photoshop to create the layout and other visual elements of the website
	how the human brain visually organizes information
	by considering a client's website objectives
	in the intentional "highlighting" of certain important elements of the website layout
	Using the correct proportion of each
	the best user experience for your website visitors
	to achieve an aesthetically pleasing layout
	Web developers use HTML, CSS, Javascript, PHP

Part A

In essence, web design refers to both the aesthetic portion of the website and its usability. Web designers use various design programs such as __1__.

Web Developers on the other hand, take a website design and actually make a functioning website from it. __2__ and other programming languages to bring to life the design files.

Web Design – A Closer Look

Web designers must always begin __3__ and then move on to an Information Architecture (IA) __4__ and help guide the design process. Next, web designers can start creating wireframes and finally move to the design stage. Web designers may use several basic design principles __5__ which also offers excellent user experience.

Design Principles

Balance – It's important for web designers to create a balanced layout. In web design we refer to heavy (large and dark colors) and light (small and lighter colors) elements. __6__ is critical to achieving a balanced website design.

Contrast – In color theory, contrasting colors are ones placed opposite one another on the color wheel (see also complementary colors). Web design offers a few other areas where contrast is applicable. __7__ textures and shapes to define and draw attention to certain sections of the website.

Emphasis – We touched on this a bit when discussing contrast. Emphasis is a design principles founded __8__. It's important to note that if you emphasize everything on the page you end up emphasizing nothing. Imagine a page in a book where 80% of the content is highlighted in yellow…does anything really stand out?

Consistency – Also called repetition or rhythm, consistency is a critical web design principle. For example, clean and consistent navigation provides __9__.

Unity – Unity is the relationship between the various parts of the website layout and the composition as a whole. Based in the Gestalt theory, unity deals with __10__ how the human brain visually organizes information by grouping elements into categories.

Part B

Web Development – A Closer Look

Web developers, sometimes called programmers, take the design created and build a fully functioning website. To put it (very) simply, think of the design as a non-interactive "picture" of a website. Developers take that design and break it up into components. They then either use just HTML or a more dynamic approach incorporating programming languages such as PHP to develop the various website pages. More advanced web developers may choose to utilize a Content Management System (CMS) like WordPress or Joomla in order to streamline development and allow clients an easy way to maintain and update their website.

Web developers may convert a static layout into a dynamic website by using image and content sliders, active states for links and buttons, and other interactive elements. Small- and medium-sized companies looking for a website or a re-design of their existing website may be confused by the blurred lines surrounding the terms "Web Design" and "Web Development." Although there are individuals that are able to do both, many companies have dedicated designers who create the website layout and then hand the design files over to a programmer who completes the development stage. Hopefully this article will help clear up the common misconception that design and development are one and the same.

fully	*completely, totally, wholly, absolutely*
break it up	
incorporating	
utilize	
maintain	
convert	
companies	
confused	
dedicated	
clear up	

2. Formulate the tasks that Web designers and Web developers complete and the tools they use.

3. Match the words (1-9) with the definitions (A-I).

1	web design	a	choosing a website's visuals
2	coding	b	how easily you can find a website on a search engine
3	navigation	c	keeping all of the repeating elements of your website the same throughout the entire site
4	visibility	d	a short word for a slideshow
5	usability	e	a basic, two-dimensional visual representation of a web page
6	content	f	everything contained in a website
7	wireframe	g	moving around a website
8	consistency	h	a website's programming
9	slider	i	how easily a user can use a website

Listening 1
How to design a web site

https://www.youtube.com/watch?v=IbOyBIS57C0

Watch the video. For each step of the Web design process specify:

a) its name / purpose;

b) tasks;

c) tools they used

Reading 4

1. Read the passage about the importance of creative web design and then give your own viewpoint. While reading, though, you have to complete the text with the words from the boxes after each paragraph. Give your own titles to each paragraph (A - F).

Importance of creative website design

The average person might visit a dozen __(1)__ or more each day, and he or she doesn't realize the impact that each one has on the __(2)__. Each webpage can either grab readers' __(3)__ or immediately turn them off. Some pages are so __(4)__ in design that they leave no impression at all. In this highly __(5)__ market, it's __(6)__ to have a creative website design. A business's profit margins can depend on this factor.

attentions	webpages	neutral
critical	competitive	mind

A _____

Website design remains an important factor __(1)__ every business because __(2)__ defines the brand. Customers __(3)__ land on the page will be instantly transported to __(4)__ brand's perspective on the world. An athletic product might have visuals of mountains and roads as enthusiasts explore their workout options, for example. Colors, text choices and layout will create a memory for the customer as they move __(5)__ the pages. They might leave the site with a greater respect for the company or wonder about their management as they base their opinion __(6)__ the website's creative outlook.

that	it	around
who	on	for

B _____

Many studies __(1)__ performed on readers' behaviors as they read individual webpages. Currently, the consensus __(2)__ that website visitors often read in a rough "Z" pattern. They __(3)__ look to the top, left-hand corner for the logo or brand name. As they scan across and downward, readers __(4)__ to see key information about the brand. From product pictures to pricing, this information __(5)__ be within the same "Z" pattern or readers __(6)__ simply click away from the area. Understanding these mental shortcuts is part of successful web development.

will	must	may
have been	want	is

C _____

Clever website design doesn't overwhelm the person's senses as he or she lands on the page. Companies are often obsessed with filling every available __(1)__ with information that might lead to a __(2)__. However, white space is still a good __(3)__. When it's used in a creative way, the space actually directs the __(4)__. Every webpage should have some focal __(5)__ in order to keep readers' attentions on the core product or service. A reputable web development __(6)__ can create the right kind of white space, which will drive sales upward within just a few months.

sale	space	point
eye	team	thing

D _____

For simplicity's sake, creative webpage design keeps visitors __(1)__ with the site's material. The longer a customer remains on the website, the better chances there are of a sale __(2)__ in the __(3)__ future. People who remain on the page are making a mental commitment to that brand. To complete this commitment, they might feel better with a purchase. Without a __(4)__ design, visitors won't feel __(5)__ to stay or buy. A good website can be __(6)__ to a properly laid-out showroom floor.

compelled	occurring	engaged
smart	comparable	immediate

E _____

Although a company may be proud of their latest product-release __(1)__, it doesn't make them the center of attention on the home page. Creative __(2)__ also incorporates functionality. People want to complete their __(3)__ and move forward in a timely manner. Make the main __(4)__ or services visible on the home page with a quick __(5)__ for purchases. The contact __(6)__ should also be easy to access.

information	design	link

products	photos	business

F _____

A company __(1)__ already have their website designed and out to the public, but that doesn't mean some improvements __(2)__ be made. Consider a regular appointment with a web development company to assist in __(3)__ web site design improvements. Every few months, professionals can look at the site and decide if __(4)__ adjustments __(5)__ to be made. These tiny changes __(6)__ really make a huge difference for a business as customers see the improvements and add their orders to the webpage's list.

your	can't	can
any	may	need

2. Complete the sentences based on each paragraph (A -F).

1. Colors, text choices and layout is what ____.
2. What many studies analyse is how ____.
3. It is creative use of white space that ____.
4. What might make people purchase is ____.
5. What people want to do using your site is ____.
6. What can help improve your web site design is ____.

Discussion

1. Why do people have personal websites?
2. Have you visited anyone's personal home page? What was it like?

Listening 2

https://youtu.be/YazkL2UxdxE?t=545

1. Listen to a conversation between a web designer and a potential new client.

2.Complete the summary of the conversation below. Write no more than three words for each answer.

A web designer is going to have a call from her ___1___ .The client wants her to ___2___ for her ___3___. She realizes that it is a kind of ___4___ so feels very nervous

and scared. The web designer persuades the client that the idea of a business website is ____5____. During the call they converse about the ___6___, as well as a ___7___ to refer her business to. She also asks the lady if she has ___8___ for her website and adds that it's awesome to collaborate with ___9___ businesses. ___10___ of her business are discussed as well. The client needs a professional advice as for the advantages of the use of ___11___ and ___12___. The web designer prefers using ___13___ and thinks it's a ___14___ that has more ___15___ in terms of the application of special programs for creating websites.

Reading 5

Page Structure and Site Design

1. Following are the pictures which are taken from the text below. Suggest possible captions. Then check the captions in the text body.

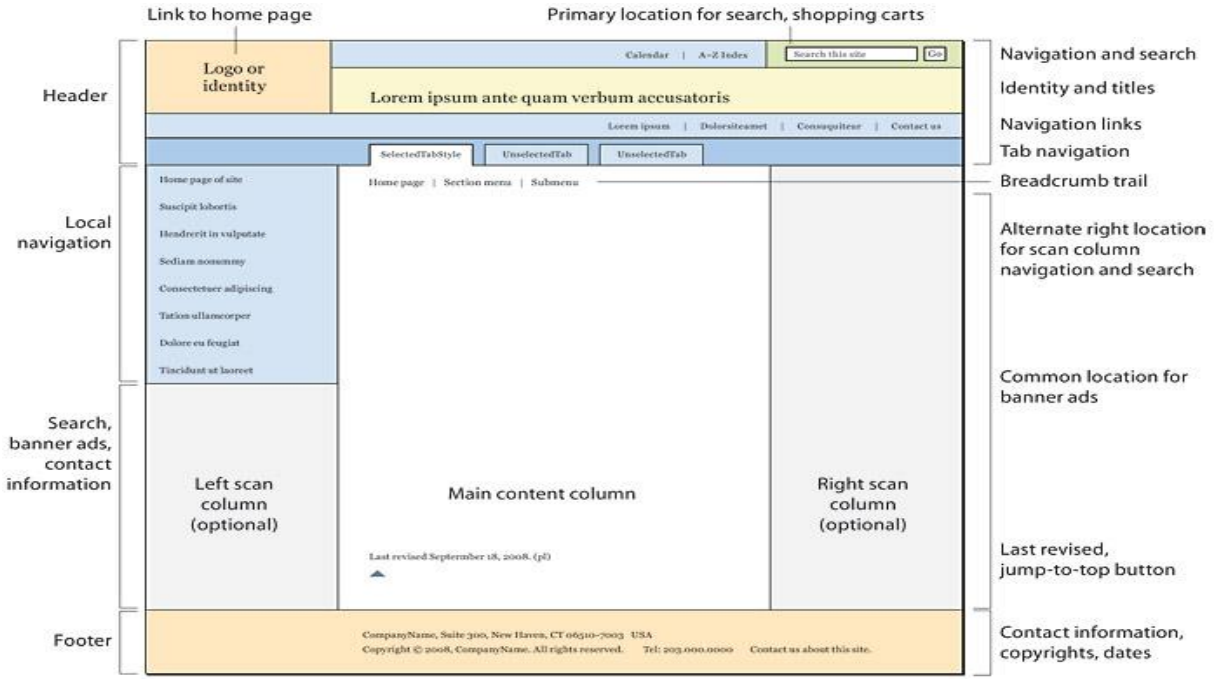


Fig. 1 _____

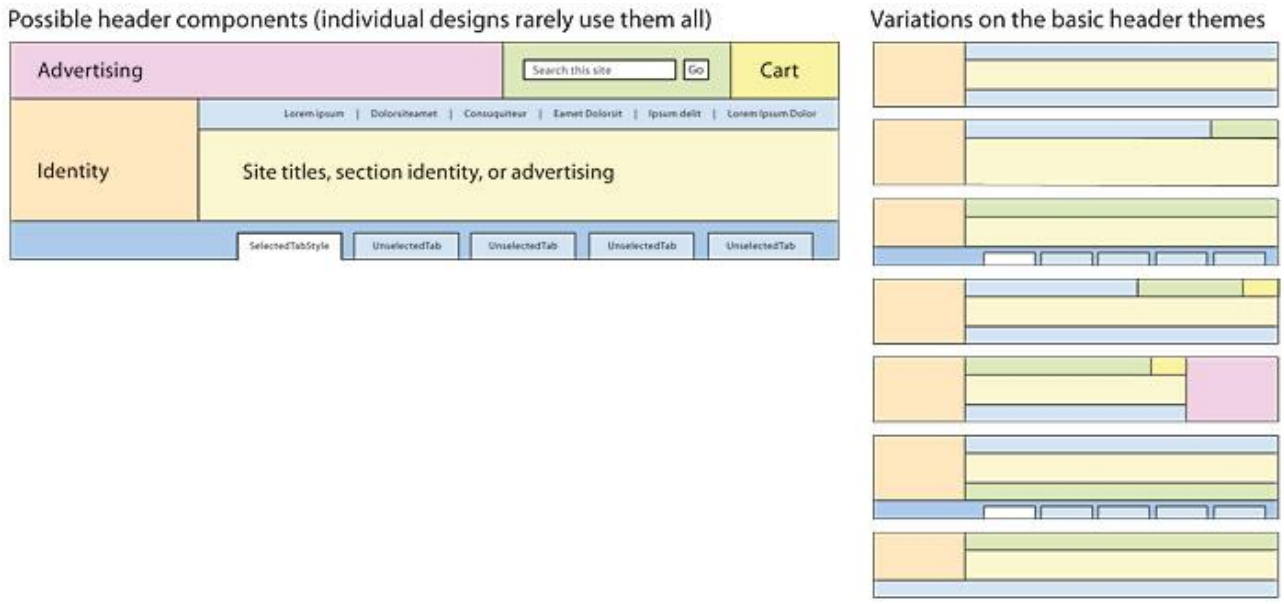


Fig 2 _____

Fig 3_____ _____

Fig 4_____

Fig 5_____

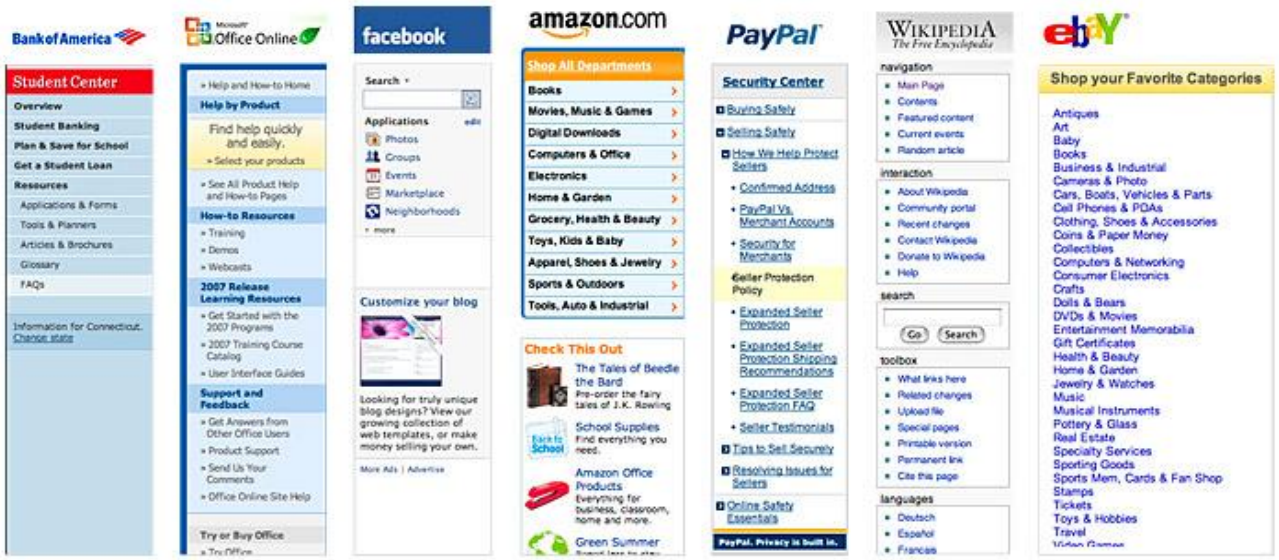


Fig 6 _____

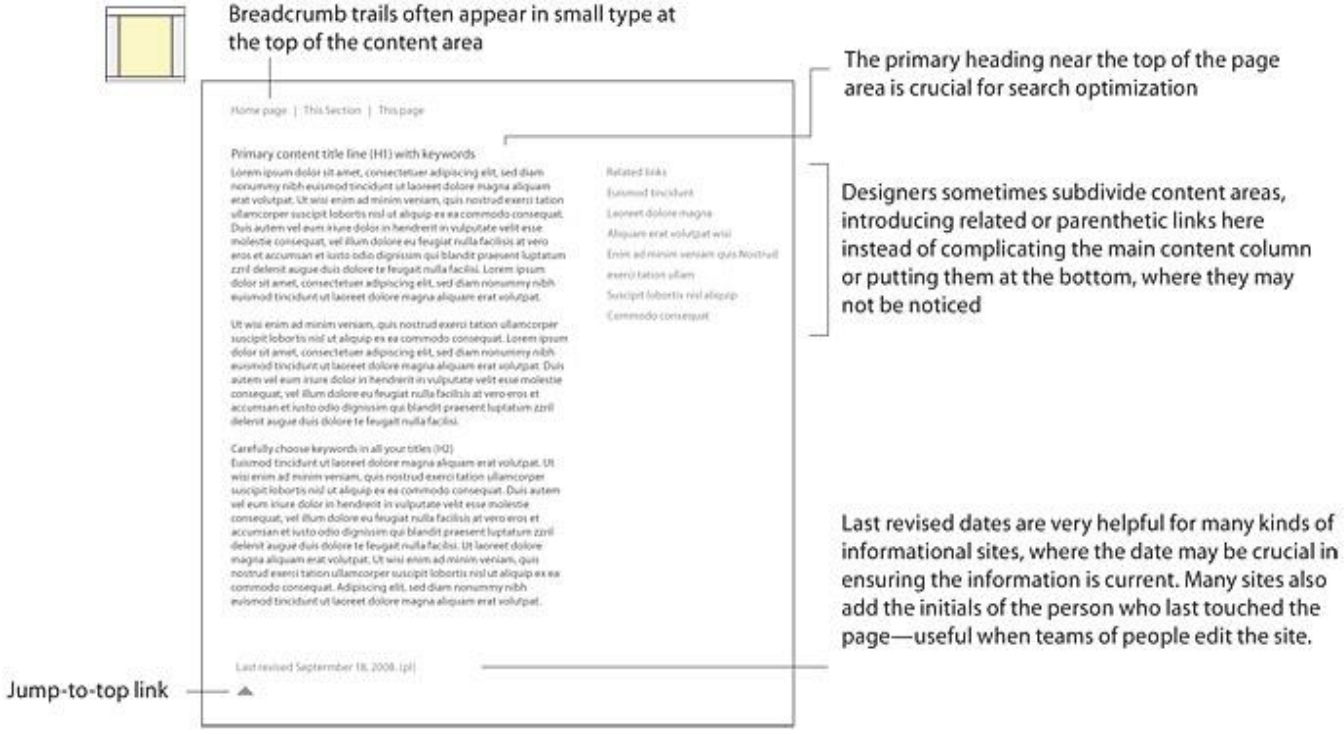


Fig 7 _____

2. The following text contains various types of mistakes in each section. Find and correct them.

A. In this section, there is an extra word in each sentence. Correct the sentences.

Web "sites" are complete abstractions – they don't exist, except in the our heads. When we identify a site as such, what we're really describing is a collection of *individual* linked pages that is share a common graphic and navigational look and feel. What do creates the illusion of continuity across a cohesive "site" is the design features that pages share. Individual HTML pages and how they are been designed and linked are the

atomic unit of web sites, and everything that characterizes site structure must appear in the page templates.

As the web has matured over the past decade, the structure of web pages in text-driven information sites has become of more uniform and predictable. Although not all web pages share the exact layout and features described here, most web pages incorporate some or all of these basic components, in never page locations that have become familiar to web users (fig. 1).

Figure 1 Canonical page design and major page elements.

Page headers

Page headers are like miniature versions of the home page who that sit atop each page and do many of the things that home pages do, but in a limited space. Headers provide you site identity and global navigation, with search and perhaps other tools. The exact location and arrangement of the components vary is from site to site, but the overall design pattern has become fairly consistent.

Headers which are the most visible component of site identity. What seems real is real: a collection of pages that share headers will be may perceived as a "site" even if the pages originate from very different technical sources (php/Perl, jsp, .net, blog software, portal systems, SharePoint, web applications, content management systems, and so on).

B. In this section, some of the letters in some words are mixed. Restore the correct spelling.

Home link

Placing your organization or site logo in the upper left corner of the page – and linking that logo to the home page – is a widely used (1) nvncoeito and one you should adopt. If you are not using a logo or graphic in your (2) eaedhr, at least put a "home" link near the upper left corner of the page, where 99 percent of users will expect to find it.

Global navigation

Headers are the most frequent location for global navigation links that span the site. The ideal arrangement is to use an HTML list of (3) snlki, styled with CSS to spread horizontally across a section of the header. This gives you:

- Usability: (4) blgola links where users most expect to see them
- Semantic logic: the collection of global links should be marked up as a list, because, well, it *is* a list
- Accessibility: the list format of links appears early in the code (5) iisgtln, where it should be
- Search visibility: a collection of your major navigation (6) dwyksoer, linked and at the top of the code listing, is ideal for search engine optimization

Tabs are another widely used, easily understood convention for global navigation. The best way to (7) mmnlptiee tabs is to style an ordinary HTML list with a more elaborate CSS treatment to form the "tab" graphic around each link. Be sure you get the remaining tabs should clearly be behind the selected tab. This type of "you are here" (8) arrmke is essential in orienting users within the site. Tabs can also be used to implement a two-tiered navigation scheme, in which a secondary horizontal list of links appears under the selected tab, again as a simple HTML list with CSS styling, to keep things semantic, accessible, and (9) harsce visible (fig. 2).

Figure 2 The canonical form of page headers is dominated by horizontal bands of links and tools, one or several identity graphics, and, in many sites, advertising. The cast of characters is fairly consistent, but the exact form of headers can vary quite a bit.

C. In this section, the verb "to be" in its different forms is missing in the sentences. Insert the necessary for of the verb to be.

Breadcrumb navigation

Breadcrumb navigation ____ a widely used, easily understood navigation device that ____ particularly useful in large sites with deep levels of content organization. Breadcrumbs integrated into the header ____ best at the top of the header, as in the Google and useit.com sites (fig. 3). Another popular location for breadcrumb navigation ____ just above the main page content.

Figure 3 Locations for breadcrumb trails.

Search

All sites with more than few dozen pages should offer local site search. The upper right area of the header ____ a popular location for search boxes, but a header search box must necessarily ____ simple to fit in this relatively small area (fig. 4). If you need more screen area to offer more controls and choices to the search user, consider locating your site search in the left or right scan columns of the page (see *Scan columns*, below).

Figure 4 A header-based search box.

D. In this section, the letters in some words (1-9) are mixed.

"Checkout baskets," online shopping "carts"

Long ago, Amazon put its "cart" link in the upper right of the header, and that is where virtually all other shopping sites it put now, too. Don't buck the trend; it is one of most the firmly rooted interface conventions on the web (fig. 5).

Figure 5 Put the shopping cart where Amazon puts it, because that's where most people will look for it.

Ad-supported sites reserve often a large area above other header components for banner advertising, and research shows that users commonly expect to see

banner ads in this area of the page. This layout convention has important implications, even if your site not does use banner ads, because of the widely observed phenomenon of "banner blindness." Readers commonly ignore areas of the screen that usually contain advertising, especially if the graphic content like looks a banner ad. Be sure your headers and other page graphics don't use the heavily boxed and graphically visual loud vocabulary of most banner ads, or your readers may ignore important elements of your user interface.

Scan columns

Subdividing the page field into functional regions is a fundamental characteristic of graphic modern design. Early in the web's history, designers began using narrow "scan" columns at the edge of the page to organize navigation links and other peripheral page elements, much as scan columns been have used in print publications for a century or more. Research on user web expectations now supports the common practice of locating navigational links – particularly section navigation – in the left column.

Scan columns also are useful as locations for web search boxes, mailing address and contact information, and other more minor but necessary page elements. Research shows that the left scan column under the local navigation links is the second place most users will look for search features, after look they in the right header area (fig. 6).

Figure 6 Beyond the superficial visual style variations, scan column designs have become remarkably consistent in major content and sales web sites.

E. In this section, all punctuation marks are missing and capital letters became small ones. Restore the sentences.

Left or right scan columns for navigation?

Extensive eye-tracking and user research says that it doesn't really matter whether you use left or right navigation columns users seem to do just fine either way as long as you are consistent about where you put things we favor the left column for navigation simply because that is the most common practice

Mailing address and contact information.

Basic "real world" information about who the company responsible for the site is *where* the company is and how to contact the company is often hard to find on otherwise well-designed sites if you sell a product or service don't hide from your customers display your contact information in a prominent location such as the scan column on every page.

Advertising and the scan columns.

Our advice about ads in the scan column is the same as with header ads (above) beware users often ignore content that looks like advertising when they see it in a scan column use formats that don't scream "ADVERTISING!" never make your scan column content or navigation look anything like a typical banner ad or users may never notice it.

F. In this section, some words are missing. Complete the sentences using the words from the box.

The content area

Web content is __(1)__ multifaceted that __(2)__ general rules apply, __(3)__ the following common practices (make) content areas easier to use:

- *Page titles.* Don't bury the lead. __(4)__ page needs a visible name near the top. For __(5)__ kinds of logical, editorial, accessibility, search visibility, __(6)__ *common-sense* reasons, use a heading at the top of the page to let users know what the page is about.

so	and	but
all	few	every

- *Breadcrumb navigation.* The top of the content __(1)__ is the most common __(2)__ for breadcrumb navigation.
- *Jump-to-top links.* Jump links are a nice refinement for long pages. These links don't need to be __(3)__ – just a top of page link will do, but a small up-arrow icon offers good reinforcement.
- *Rules.* These elements can easily be overused and lead to a __(4)__ design. Use CSS to keep page rules as __(5)__ as possible. When in doubt, skip rules and use a little white __(6)__ to create visual content groupings or separations.

elaborate	area	unobtrusive
location	space	cluttered

- *Paging navigation.* In multipage sequences it is convenient to __(1)__ simple text links __(2)__ the top and bottom of the page to __(3)__ the reader to the previous or next pages in the sequence. In longer sequences it is helpful to provide information describing where they are __(4)__ the series.
- *Dates.* Publication and update dates are useful __(5)__ assessing the currency and relevance of content. In news and magazine sites the publication date should __(6)__ at the top of the page. Other sites should display a last-updated date at the bottom of the content area (fig. 7).

at	in	for
move	appear	have

Figure 7 Typical content-area components.

Page footers

Page footers are mostly about housekeeping and legal __(1)__. These elements need to be on the page, but place them somewhere out of the __(2)__:

- Page __(3)__ or, in large enterprise sites, responsible party
- Copyright __(4)__
- Contact details, especially __(5)__
- Links to related __(6)__ or to the larger enterprise
- Redundant navigation links, for long pages

email	sites	matters
way	statement	author

3. Make a list of the main structural elements of a site and define their purpose. Use the phrases: X is used to + V; X is designed for + V-ing; The purpose of X is to + V etc.

4. Explain the meaning of the underlined words in the text. Use a dictionary if necessary.

Case study

Nick works as a contract Web site developer. He accepted a job developing an informational site for a small, independent shoe-repair business. His employer provided the written content he wanted on the site and a few photos of the store, and left the rest of the design up to Nick. As he was developing the site, Nick worried that his design would be very bland because he had so little content to work with. So he enhanced the site with a lot of multimedia, flashy effects, artistic enhancements of the photos, customer surveys, and humorous captions and quotations. Nick was pleased with the design because he felt it would dazzle the site users, increase interactivity, and make the shoe-repair business seem more interesting. However, Nick's employer was not happy with the design. He asked Nick to redesign the site; otherwise, he said, he would not pay the contract.

Consider this scenario and answer the following questions.

• What problems do you see with Nick's design for this site?

• Why do you think Nick's employer did not like Nick's design for the site?

• How do you think the site's intended audience would respond to the site Nick designed?

• Are there any aspects of the design that Nick, as a Web development professional, should try to persuade the employer to keep?

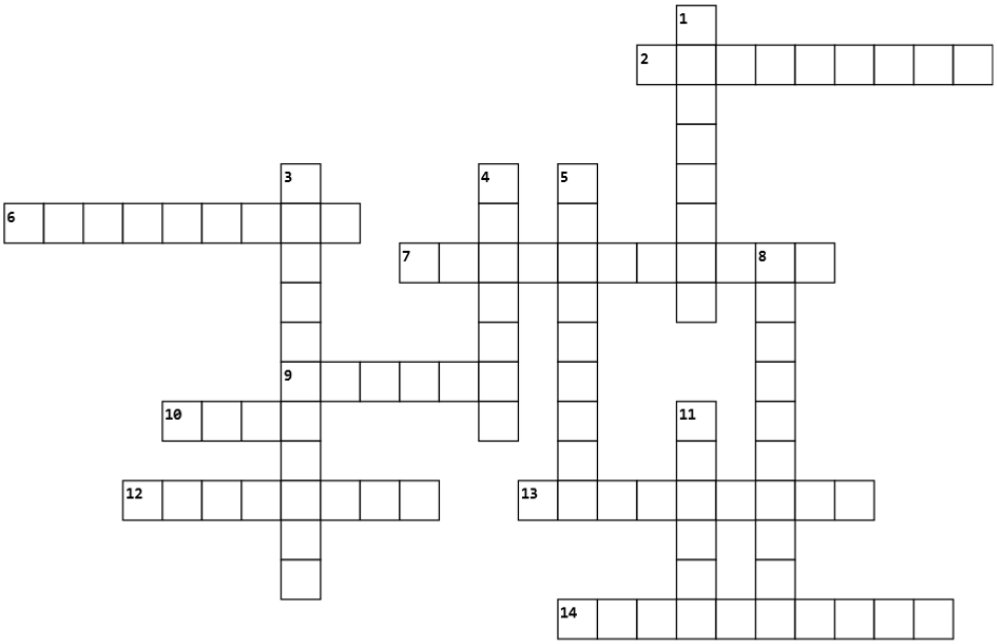
Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
mockup		
assembling components		
subpar		
to assign		
compelling use		
to span		
font		
breadcrumb		
conversion rate		
to buck the trend		
tiled background		
conventions		
responsive design		
unobtrusive		
inherently		
page footer		
template		
redundant links		
scratch		
page width		
aesthetic		
sidebar		
assumption		
stand alone		
consistency		
to embed		
navigation		
caption		
usability		
emphasis		
serif		
quotation		
accessibility		

unwarranted		
utility		
to anticipate		
to dazzle		
verification		
portrayal		
modified code		
adjustment		
input processing		
layout		
essence		
to enhance		
mutual work		
screep capture		
to transcend		
shocwave plug in		
zooming		

Complete the crossword using the keywords from the unit.



Across

2. also called a coder

6. motion of images

7. similar to opposite

9. short for slideshow

10. a set of letters and symbols in a particular design and size

12. in good agreement

13. similar to specialized

14. reacting quickly

Down

1. similar to pattern

3. repetition or rhythm

4. to make the user take a specific action

5. a basic plan for a website

8. moving around a website

11. the future looks of a website

Grammar Focus

A **cleft sentence** is a sentence that is cleft (split) so as to put the focus on one part of it.

IT-CLEFT SENTENCES

Pattern: It + be + highlighted word/phrase + that/who clause

Peer pressure at school is believed to influence youngsters' character in teen years.	
Subject as focus	**It is** peer pressure **that** is believed to influence youngsters' character in teen years.
Object as focus	**It is** youngsters' character **that** peer pressure at school is believed to influence in teen years.
Place as focus	**It is** at school **that** peer pressure is believed to influence youngsters' character in teen years.
Time as focus	**It is** in teen years **that** peer pressure at school is believed to influence youngsters' character.

OTHER CLEFT SENTENCES

Person	**The person who** traditionally has the breadwinning responsibility in families **is** father.
Thing	**The thing/all/something/one thing (that/which)** I fancy **is** wearing designer clothes.
Place	**The place where** memories come flooding back to me **is** Greece.
Time	**The year when** I graduated from university **was** the most difficult period of my life.
Reason	**The reason why** I fell out with her **was** her extreme rudeness.
Pseudo (what) cleft	**What parents need to do is** educate their children about gender issues to avoid unpredictable consequences in the future.

Example
"I like reading books in the evening".
Using cleft sentences we can emphasize different elements of the sentence:

- *It is I who likes reading books in the evening.*
- *It is in the evening that I like reading books.*
- *What (All) I like reading in the evening is books.*
- *What I like doing in the evening is reading books.*

Note: The verb ***to be*** which connects two parts of cleft sentences is mostly used in singular, i.e. ***is*** or ***was***

1. Complete the sentences in any appropriate way.

Example: _____ *connects people from all around the world is WWW. –* ***The thing*** *that connects people from all around the world is WWW.*

1. Web design ____ creates the overall look and feel when you are using a website.
2. ____ take your ideas and turn them into a mockup that shows what your future website will look like are web designers.
3. ____ really matters is first impression.
4. ____ effective web design brings a few different elements together is to promote conversions.
5. An animated exit pop-ups ____ brings visitors' attention back to your site and gets them to convert.

6. Every design choice ____ will affect your website's usability and conversion rate in some way.

2. Correct any mistakes you find in this passage and delete unnecessary words.

Most software will be change over time, and the anticipation of change drives as many aspects of software construction; changes in the environments in which software operate also affect software in a diverse ways. Anticipating change is helps software engineers build extensible software, and which means they can enhance a software product without disrupt the underlying structure. Anticipating change is supported by much specific techniques.

3. Rewrite the following sentences. Emphasize the bracketed part of each sentence. Example:

I want to know (how you developed your website).

What ***I want to know is how you developed your website.***

1. She (learned Pythone so that she could program it very easily when she needed).

What _____ .

2. (Applying external or internal development standards during construction) helps achieve a project's objectives for effciency, quality, and cost.

What _____ .

3. (The approach to construction) affects the project team's ability to reduce complexity, anticipate change, and construct for verifcation.

What _____ .

4. He went on a course to become a software developer (last year).

It _____ .

5. He quit (because he found an office closer to his home).

The reason _____ .

6. (She told her boss how she felt about the restructuring of the company).

What _____ .

4. Fill in the gaps with one of the options.

1. _____ I would do is wait for instructions.

a. That I said

b. What I said

c. It is what

d. What said

2. _____ liked most about the website was the content.

a. What

b. All I

c. What I
d. It’s what I
3. _____ everything started to fall apart.
a. It was 2010 when
b. 2010 it was
c. 2010 was where
d. Was 2010 when
4. David is _____ came up with the original idea.
a. the person that
b. that
c. the person who
d. the person
5. _____ is to protect the data.
a. The way they did it
b. The reason why they did it
c. Because they did it
d. It’s why they did it

5. Fill in the gaps with a suitable word.

1. A: Didn't you use his code for developing your website?
B: No, ____ was me who created the code.
2. A: You don’t understand me.
B: No, ____ I don’t understand is why you do this in such a way.
3. A: Didn’t you participate in the team-building event yesterday?
B: No, yesterday was the ____ when I was on a business trip.
4. A: Didn’t we meet at this video conference?
B: No, the ____ where we met for the first time was that meeting in Brooklyn. Don’t you remember?
5. A: I saw your product at the exhibition yesterday.
B: No, the product ____ you saw yesterday at the exhibition was the result of our mutual work.
6. A: You did it for the money.
B: No, the____ why I did it was to save the company.
7. A: What do you know about performance testing?
B: The only____ I know for sure is that performance testing verifies that the software meets the specified performance requirements and assesses performance characteristics – for instance, capacity and response time.

6. Paraphrase the sentence so that it emphasizes the underlined words.

1. I need one hour to fix the computer.
All ___ is one hour .
2. Tim spread the news.
____ the news was Tim.
3. We are not questioning your hard work.
___ that we are questioning.
4. I used to work in that office over there.
The place ___ is that office over there.
5. We considered all the software construction tools.
____ consider all the software construction tools.
6. We discussed everything except anticipating change.
The only ____ was anticipating change.
7. Most people are limited in their ability to hold complex structures and information in their working memories, especially over long periods of time.
What most people are limited in ____ .
8. I would never ask Peter about help.
The last ____ is Peter.

7. Fill in the gaps with a suitable word.

1. How old is she? That's what I'd like to know.
What _____.
2. He lost his job, so he started up his own business.
He lost his job, so what he _____.
3. What I enjoyed most about the film was the music.
It _____.
4. They got married in June, not in July.
It _____.
5. I didn't recognize him until he took his hat off.
It was only _____.
6. I only found out she had moved when I spoke to Jerry.
It wasn't until_____.
(It was not until = It was only in)
7. I don't know what that noise is. I will just close the window, that's all.
I don't know what that noise is. All _____ .
8. He thinks about his precious car and nothing else.
All _____.
9. In the mountains, the snow disappears completely from the ground at the end of April.

It is not _____.
10. KhPI received its status of National University in September 2000.
It was not _____.

8. Paraphrase the sentence so that it emphasizes the underlined words.

1. Software construction produces the highest number of configuration items that need to be managed in a software project.
2. Software construction is closely related to the Computing Foundations KA as it requires knowledge of algorithms and of coding practices.
3. Software construction fundamentals include minimizing complexity, anticipating change, constructing for verification, reuse and standards in construction.
4. Anticipating change helps software engineers build extensible software.
5. Systematic reuse can enable significant software productivity, quality, and cost improvements.
6. Reuse often transcends the boundary of projects.
7. Applying external or internal development standards during construction helps achieve a project's objectives for effciency, quality, and cost.

Unit 4

Internet of things

If you think that the internet has changed your life, think again. The Internet of Things is about to change it all over again!

by Brendan O'Brien

Warming Up

What are the pros and cons of these things being connected to the Internet? Complete this table with your partner(s). Share what you wrote.

	Possible uses	Pros	Cons
Your fridge			
Your car			
Your watch			
Your shoes			
Your sofa / pillow			
Your garden			

Start Thinking

What would you do if you couldn't use the internet for a week?

Listening 1

IoT explained simply

https://www.youtube.com/watch?v=uEsKZGOxNKw&t=7s

1. Following are some words from the transcript. Give as many synonyms to them as you can.

capabilities; outcomes; congestion; adjust; derive; insight; expanding (adj.)

2. Read the transcript of the recording and try to fill in the gaps with suitable words or word combinations.

3. Now watch and listen to the recording and fill in the gaps in the transcript with no more than 3 words.

IoT explained simply

By now you may have heard the term Internet of Things. Sounds interesting! But what does the Internet of Things actually mean? IoT is an evolution of mobile, home and 1 _____ applications that are being connected to the Internet integrating greater compute **capabilities** and using 2 ____ to extract meaningful information. Billions of devices will be connected to the Internet and soon hundreds of billions of devices. As related devices connect with each other, they can become an intelligent system of systems. And when these intelligent devices and systems of systems 3 ____ over the cloud and analyze it, they can transform our businesses, our lives and our world in countless ways: whether it's improving medical **outcomes**, creating better products faster with lower 4 _____, making shopping more enjoyable or optimizing energy generation and 5 ____. Here's an example of the big picture. Imagine an intelligent device such as a smart traffic camera. The camera can monitor the road for 6 ____, accidents and weather conditions and communicate that status to a 7 ____ that combines it with data from other cameras creating an intelligent citywide traffic system. Now imagine that intelligent traffic system connected to other citywide transportation systems which get data from their own intelligent devices creating an 8 ____ intelligent system of systems. The really big possibilities come from analyzing the 9 ____ across that system of systems. For example, let's say the city's intelligent traffic system detects massive congestion due to an accident. That 10 ____ can be sent to the citywide transportation system which can analyze the accidents impact on other city systems. Recognizing the accident is near the airport and two city schools, it could notify those systems so they can **adjust** flight and 11 ____. You can also analyze and **derive** optimal routes around the accident and send those instructions to the city's 12 ____ to guide drivers around the accident. And that's just one example of the potential benefits that can happen when intelligent devices share **insight** with other systems forming ever-**expanding** systems of systems.

Reading 1

Before reading.

1. In pairs / groups, talk about the given words from the following article. What associations do you have with these words? Do they have any relation to your own life? After reading the text, explain what the article says about them.

technology / ready / the next stage / technological revolution / research / decisions / potential / obstacles / infrastructure / data storage / consequences / explosion.

2. Read the article and do the exercises below.

The incoming step of the digital and technological revolution

A top technology analyst has warned that the world might not yet be ready for what is called the Internet of Things. This is the next stage of the digital and technological revolution. It will greatly transform our lives via the interconnectedness of all the devices, services and appliances we use in our daily life. The technology analyst of company IDC predicts that, in total, by 2025, nearly 41.6 billion devices will be on the Internet of Things.

All of these things will communicate with each other to make even simple decisions, like ordering a new carton of milk, a seamless experience. The fridge will simply contact the delivery service when it senses stocks need replenishing, and – hey presto – no need to go shopping.

The ComputerWorld magazine says that while the Internet of Things has "the potential to drive fundamental economic and social change", there are "serious obstacles" to ensuring the infrastructure of this technological revolution that is in place in time. These include the building of new data storage centres, data storage and management and data security. Gib Sorebo, a cyber-security expert, warns of the unforeseen. He says "the law of unintended consequences" on the Internet could pose problems with the explosion in the number of connected devices. He predicts that privacy will become a primary concern because of the huge number of things in our daily life that will be connected to the Internet.

3. Read the statements and mark them true (T) or false (F).

1. A tech expert said we will never be ready for the Internet of Things.
2. The Internet of Things will bring big changes to our life.
3. In the next 10 years, over 25 billion devices will be connected online.
4. A fridge will be able to re-order supplies that are running low.
5. The Internet of Things has infrastructure obstacles to overcome.
6. We have enough data storage facilities for the Internet of Things.
7. There will be unpredictably large number of interconnected devices.
8. The Internet of Things will not throw up any concerns about privacy.

4. Match the following words from the article with their synonyms.

1	warned	a	refilling
2	stage	b	smooth
3	greatly	c	ability
4	seamless	d	step

5	replenishing	e	propel
6	potential (n)	f	key
7	drive	g	cautioned
8	unforeseen	h	enormous
9	primary	i	unexpected
10	huge	j	considerably

5. Use some of them (or their forms) in the sentences to fill in the gaps.

1. Due to ____ circumstances, we have had to reschedule the meeting.
2. As more workers retire, new employees are needed to ____ the workforce.
3. Only by coming to grips with difficulty can you realize your full ____.
4. The ____ purpose of education is not to teach you to earn your bread, but to make every mouthful sweet.
5. And as I look to the past and the present, I see two phenomena that especially ____ my optimism.
6. This equipment is presently at the prototype ____.

6. Match the parts of the phrases (sometimes more than one choice is possible).

1	the next	a	devices
2	26 billion	b	replenishing
3	a seamless	c	storage
4	need	d	of things
5	hey	e	consequences
6	serious	f	experience
7	data	g	concern
8	unintended	h	presto
9	a primary	i	stage
10	the huge number	j	obstacles

7. Read the article above again and answer the following questions.

1. What did an analyst warn we might not be ready for?
2. What will the Internet of things change considerably?
3. How many devices will be on the Internet by 2025?
4. What kind of experience did the article say there could be?
5. What would be eliminated if our fridge took over ordering milk?
6. What is the name of the magazine mentioned in the second paragraph?
7. What is in the way of ensuring the infrastructure is in place?

8. Who is Gib Sorebo?
9. What did a cyber-security expert warn of?
10. What did the cyber-security expert predict would be a major worry?

Reading 2

Before reading.

1. Match the following words / phrases and their synonyms or definitions.

1	acquisition	a	deep understanding; ideas, information
2	precursor	b	a high-capacity transmission technique using a wide range of frequencies, which enables a large number of messages to be communicated simultaneously.
3	vending	c	following, keeping in sight, hunting
4	bulky	d	characterized by economy in the use of resources
5	frugal	e	the linking of computers to allow them to operate interactively
6	broadband	f	taking up much space, typically inconveniently
7	tracking	g	trade, sale, commerce, business
8	insights	h	predecessor
9	networking	i	the process of getting something
10	to feed into sth	j	to do something you did not have time to do earlier
11	to catch up with	k	to learn something or figure something out from a particular source
12	to glean from sth	l	to have an influence on the development of sth

2. Use some of them in the sentences.

1. For _____ crafters, origami is often appealing because it's very inexpensive.
2. Rhythm and blues was a _____ of rock music.
3. Watching the shoppers at the sales gave her a first-hand ____ into crowd psychology.
4. Language ____ begins in the first months of a baby's life.
5. ____ and heavy items will be collected separately.
6. He had to work harder to ____ the top students in his class.

3. Read the text below. For questions (1-25) choose the correct answer (A, B, C or D).

History of the Internet of Things

The concept of connected devices – particularly connected machines – **1**_____ around for a long time. For example, machines that **2**____ with each other since the first electric telegraphs **3**____ in the late 1830s. Other technologies that **4**_____ IoT were radio voice transmissions, wireless (Wi-Fi) technologies and supervisory control and data acquisition (SCADA) software.

1	A have been	B has been	C were	D was
2	A were communicating	B have communicated	C has been communicating	D have been communicating
3	A developed	B were developed	C was developed	D were developing
4	A fed into	B fed to	C fed on	D fed

Then in 1982, a modified Coke machine at Carnegie Mellon University **5**_____ the first connected smart appliance. Using the university's local ethernet or ARPANET – a precursor to today's internet – students **6**____ find out which drinks **7**_____, and whether they **8**_____.

The idea of adding sensors and intelligence to basic objects **9**____ throughout the 1980s and 1990s, but apart from some early projects – including an internet-connected vending machine – progress was slow simply because the technology wasn't **10**_____ . Chips were too big and bulky and there was no way for objects to communicate **11**____.

5	A becomes	B became	C has become	D had become
6	A can	B should	C had to	D could
7	A stocked	B were stocking	C were stocked	D have stocked
8	A cold	B were cold	C are cold	D was cold
9	A discussed	B were discussed	C was discussed	D was discussing
10	A ready	B readily	C readiness	D read
11	A effective	B effects	C effectiveness	D effectively

Processors that were cheap and power-frugal **12**____ were needed before it finally became cost-effective to connect **13**____ billions of devices. The adoption of RFID tags – low-power chips that **14**____ communicate wirelessly – solved some of the issues, **15**____ the increasing availability of broadband internet and cellular and wireless networking. The adoption of IPv6 – which, among other things, **16**____ provide enough IP addresses for every device in the world (or indeed this galaxy) – was also a necessary step for the IoT to scale.

12	A rather	B enough	C fairly	D quite
13	A at	B in	C up	D of
14	A can	B need	C must	D have to
15	A along	B along with	C with	D alone
16	A may	B must to	C need	D should

The term “Internet of Things” **17____** by entrepreneur Kevin Ashton, one of **18____** founders of the Auto-ID Center at MIT. Ashton was part of a team that discovered how to link objects to the internet through an RFID tag. He first used the phrase “Internet of Things” **19_____** a 1999 presentation, although it took at least another decade for the technology **20____** the vision.

Today, we **21_____** in a world where there are more IoT connected devices **22____** humans.

17	A coined	B were coined	C was coined	D to be coined
18	A -----	B the	C a	D an
19	A in	B at	C on	D under
20	A to catch on	B to catch with	C to catch up	D to catch up with
21	A is living	B are lived	C lives	D are living
22	A than	B then	C the	D this

23____ IoT connected devices and machines range from wearables like smartwatches to RFID inventory tracking chips. IoT connected devices communicate via networks or cloud-based platforms connected to the Internet of Things. The real-time insights **24_____** this IoT-collected data fuel digital transformation. The Internet of Things **25____** many positive changes for health and safety, business operations, industrial performance, and global environmental and humanitarian issues.

23	A that's	B these	C this	D that
24	A gleaned of	B gleaned from	C gleaned out	D gleaned in
25	A promise	B promised	C promises	D will promise

Discussion

1. What technologies affected and helped to appear the concept of connected devices?
2. Why was the process of connecting devices slow?
3. How did the term Internet of Things appear?
4. What kind of devices can be IoT-connected?
5. What spheres of our life are going to experience the impact of the IoT?

Listening 2
Plagiarism

https://drive.google.com/file/d/1N-uQjs_BZ_UdevRHtasYXuyeiLMNye29/view?usp=sharing

You will hear two students talking about a seminar paper that one of them is going to give.

1. Choose the correct letter A, B or C.

1. The dean of a university had to resign for committing plagiarism ____.

A when he was famous
B more than 20 years ago
C over a period of 20 years

2. A survey of US school students showed that in 1989 copying occurred among ___.

A 58% of them
B 69% of them
C 97% of them

3. A recent survey showed that cheating is most spread among _____.

A high school students
B undergraduate students
C postgraduate students

4. The main reason why plagiarism has become more common is that ____.

A students can cut and paste from the Internet
B the Internet contains a lot of information
C teachers are too busy to check for plagiarism

5. Using the computers program to detect plagiarism may cost a student ____.

A 30 c.
B 50 c.
C 60 c.

2. Complete the sentences below.

Write no more than three words for each answer.

6. The computer program to detect copying cannot tell whether students have copied from _____.
7. Every university in ____is now using this computer program.
8. The most common penalty for plagiarism is to ____.

9. A method now being used to reduce the occurrence of plagiarism among undergraduates is ____.
10. Universities prefer to _____ about plagiarism rather than catch students who have plagiarized.

Reading 3

1. Select all the words from the box that are similar in meaning to each of the words (1-8) below. Add more synonyms if possible.

band, arrangement, fusing, over, enlarging, silent, uniting, presence everywhere, pattern, speechless, expanding, outside, span, widening, combining, interconnected, mute, frame, availability everywhere, interlinked.

1	interrelated	
2	extending	
3	beyond	
4	range	
5	ubiquity	
6	dumb	
7	fabric	
8	merging	

2. Put the correct phrase from the box below in the text.

a) merging the digital and physical universes	b) it is about	c) refers to
d) that are provided	e) in other simpler words	f) connecting up g) thanks to

What IoT is

"The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people **1**____ with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction."

2____ the Internet of Things means taking all the things in the world and connecting them to the internet. **3**____ extending the power of the internet beyond computers and smartphones to a whole range of other things, processes, and environments.

The Internet of Things, or IoT, **4**____ the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. **5**_____ the arrival of super-cheap computer chips and the ubiquity of wireless networks, it's possible to turn anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. **6**____ all these different objects and adding sensors to them adds a level of digital intelligence to devices that would be otherwise dumb,

enabling them to communicate real-time data without involving a human being. The Internet of Things is making the fabric of the world around us smarter and more responsive, **7____**.

Discussion

1. What in your opinion do they mean saying that humans and animals can be a part of the Internet of Things?
2. What is any object required to have to be a part of the IoT?
3. Why has IoT become possible?
4. What does *digital intelligence* mean in terms of IoT?
5. Would you like your belongings or yourself be a part of the IoT?

Reading 4

1. Read the text below and answer the questions.

1. Why is IoT important for us?
2. What are the three categories the IoT can be put into?
3. What is understood under collecting and sending information?
4. What is meant under receiving and acting on Information?
5. What is meant under "doing both"?

Why IoT Matters

When something is connected to the internet, this means that it can send information or receive information, or both. This ability to send and / or receive information **makes** things smart, and smarter is better.

Let's use smartphones again as an example. You can listen to any song in the world, but not because your phone has every song stored on it. It's because every song in the world is stored somewhere else (that place is known as "the cloud"), and your phone can request a song, and receive information to stream it.

To be smart, a thing **doesn't** need to have super storage or a supercomputer inside of it. All a thing has to **do** is connect to super storage or to a supercomputer. Being connected is awesome.

In the Internet of Things, all the things can be put into three categories:

1. Sensors that collect information and then send it.
2. Computers that receive information and then act on it.
3. Things that **do** both.

And all three of these have enormous benefits that feed on each other.

1. Collecting and Sending Information

This means sensors. Sensors can measure temperature, motion, moisture, air quality, light, and almost anything else you can think of. Sensors, when paired with an internet connection, allow us to collect information from the environment which, in turn, helps **make** better decisions.

On a farm, automatically getting information about soil moisture can tell farmers exactly when crops need to be watered. Instead of watering too much or too little (either of which can lead to bad outcomes), the farmer can ensure that crops get exactly the right amount of water.

Just as our senses allow us to collect information, sensors allow machines to **make** sense of their environments.

2. Receiving and Acting on Information

We're all very familiar with machines acting on input information. A printer receives a document and then prints it. A garage door receives a wireless signal and the door opens. It's commonplace to remotely command a machine to act.

So, the real power of IoT arises when things can both collect information and act on it.

3. Doing Both

Let's go back to farming. The sensors collect information about the soil moisture. Now, the farmer could activate the irrigation system, or turn it off as appropriate. With IoT-enabled systems, you don't actually need the farmer for that process. Instead, the irrigation system can automatically act as needed, based on how much moisture is detected.

You can take it a step further too. If the irrigation system receives information about the weather from its internet connection, it can also know when it's going to rain and decide not to water the crops when they are going to be watered by the rain anyway.

And it doesn't stop there! All this information about the soil moisture, how much the irrigation system is watering the crops, and how well the crops actually grow can be collected and sent to supercomputers in the cloud that run algorithms to that analyze all this information, leading to models that could be used to predict future conditions and prevent losses.

And that's just one kind of sensor. Add in other sensors like light, air quality, and temperature, and these algorithms can learn much much more. With dozens, hundreds, thousands of farms all collecting information, these algorithms can create incredible insights into how to **make** crops grow the best, helping to feed the world's growing population.

2. Look at the words "do" and "make" in the text and define their meaning and function. Consider the use of these words in set expressions.

How to use MAKE

The verb **make** is used when talking about **creation** or **production** in a process. In other words, it is used to refer to the **result of an action**. For example: '**Make** a cup of tea', '**Make** plans for the future' or '**Make** a model boat out of wood'.
Made can be used to indicate the material of a product. For example, we can say that a spoon is **'made of steel'**. In this case, we would say **made**, as in the past tense of make. The **creation** has already taken place and now the spoon is **made** of steel.

How to use DO

The verb 'do' is used when we talk about **tasks, duties, obligations and routine work.** It refers to the **process** of carrying out these actions. This verb is similar to the formal words **perform or execute** (as in: execute a command). For example: **'I did my homework** yesterday evening.' (completed task).

Make a demand (= Ask for something in an authoritative manner)
Make an objection (= Complain or dispute something)
Make a complaint (= State unhappiness)
Make enquiries (= Ask about a subject, request information)
Make an offer (= Suggest, put forward a proposal)
Make an agreement (= Reach consensus, create legislation)
Make a comment (= Briefly give your opinion)
Make a remark (= Comment in a spontaneous manner)
Make a speech (= Speak publicly on a topic)
Make an excuse (= Justify an action)
Make a point (= State an argument, advocate an idea)
Make an observation (= Give your view on a topic, state what you have noticed)
Make a suggestion (= Put forward an idea, share an opinion to help others)
Make a noise/sound (= Produce a sound)
Make an exception (= Agree to break the rules in one instance)
Make a move (= Make a pass at someone, also 'leave' in slang)
Make a good impression (= Show your best side)
Make an example of (= Punish one person to discourage others from doing the same)
Make the best / most of (= Take advantage, seize the opportunity, tolerate)
A funny example of a confusing expression in English is **'to make do**'. This expression uses 'make' and 'do'! It means: to cope or manage with few resources or to get by with what you have.
Make a decision (= Decide, choose, come to a conclusion)
Make up your mind (= Decide on something, choose)
Make an exception (= Allow a rule to be broken due to special circumstances)
Make an attempt (= Try to do something)

Make an effort (= Work hard to achieve a goal, attempt)
Make progress (= Advance, develop)
Make time (= Set aside time for something / someone)
Make sure / certain (= Ensure something is as it should be)
Make sense (= Be sensible, reasonable, understood)
Make a discovery (= Find something new, invent, realise)
Make arrangements (= Organise or plan something)

Watch out for collocations that allow the use of 'make' AND 'do'. These are rare, but you should learn them. For example, 'Do a presentation' (conduct / perform) vs. 'Make a presentation' (same meaning, or emphasises its creation) or 'make the bed' (Standard English) vs. 'do the bed' (colloquial).

Do it yourself (= DIY, perform amateur repairs or renovation work yourself)
Do 60 miles per hour (= Drive or travel at 60 mph)
Do homework (= Complete tasks given by your teacher)
Do an exercise (= Complete a study or training task)
Do research (= Investigate a topic, study in depth).
Do some studying (= Learn something, revise)
Do a test/exam (= Evaluate, check knowledge)
Do a task (= Solve a problem, perform a job)
Do a course (= Attend a class or study programme)
Do exercise/ Karate/Judo/ Athletics / gymnastics/ballet/yoga (= Train physically)
NOTE: Football, rugby, cricket, basketball, tennis, etc. usually to take 'play' and not 'do'.
Do business (= Trade, buy or sell)
Do work (= Carry out a job or task)
Do a project (= Execute a planned set of tasks)
Do your job (= Perform your work-related tasks)
Do overtime (= Stay late to work more)
Do your best (= Try your hardest)
Do good (= Perform an act of kindness, be of benefit to your health)
Do a favour (= Help another person)
Do harm (= Hurt, injure)
Do damage (= Harm someone or something)
Do the (bare) minimum/ Do it to the max (= Put minimum effort into something/ Put maximum effort into something, enjoy to the full)
Do anything / Do everything / Do nothing (= Perform any action, sacrifice it all/ Complete all tasks, try your hardest Be idle, ignore)

3. Complete the gaps in the exercise with "make" / " do" expressions. You can use them more than once.

A.

1. My favourite hobby is____.
2. If anyone would like to ____, please raise your hand now.
3. I only learned _____ when I bought my first house. It needed a lot of work!
4. I'm thinking about joining a local company, but I still need to _____.
5. When I commute to London, I want to be _____70 (mph), but I'm usually stuck in traffic!
6. The journalist ____ a sarcastic ____ about the politician's personal fortune
7. I disagree with scientists ____ on lab rats. It's so cruel!
8. John ____ some good ____ in his presentation, but I didn't agree with everything he said.
9. I thought the dishwasher was broken because it was ____ a strange ____.
10. If I have time, I'd like to __do__ a Spanish __course__ abroad next summer.
11. _Doing__business_ internationally can be a real challenge.
12. We don't normally allow dogs in here, but I suppose we can _make an__exception_ this time.
13. Martin really likes Sally, but he's too shy to ____make a move.
14. British cancer specialists are currently ____ into cell regeneration.
15. If you _____ your ____ well, you can expect a nice bonus at the end of the year.
16. You need to _____ if you want to pass your exams this summer!
17. I know you didn't have enough time to revise for the exam, but just _____ your ____!
18. I really feel like I'm _____ with my book. It should be ready to publish soon!
19. Can you ____ me a big ____ and pick the kids up from school tomorrow?
20. I'd love to go to the gym, but I just can't _____ at the moment!
21. It wouldn't __do__you __harm__ to help me with the housework once in a while.
22. __Make sure__ you take your passport to the airport. Don't forget it like you did last time!
23. You should get out in the fresh air more. It would ____ you ____!
24. We don't usually allow babies in the pool, but I'll ask if we can _____.
25. 'I don't think it ____ to earn a lot of money if you then have no time to enjoy it.'
26. Politicians at the summit are eager to ____decision_ on climate change.
27. When it comes to tidying the office, my colleagues always ___!'
28. At British weddings, it is customary for the father of the bride to _____.
29. Our firm is ____a joint ____ a company from Holland.

B.

30. I would like to ____ on the issue of social housing.

31. When I was at school, all the kids used _____ their _____ on the bus in the morning!
32. The Biology teacher asked us ____from the textbook.
33. The boss ____ and left the meeting early.
34. Jon was late for school again so the teacher decided ____ him.
35. Ronaldo ____ the most of the defender's____ and rounded the goalkeeper to score.
36. I really need to ____because I'm behind on my uni work!
37. Following our exam results, the teacher ____ several ____ about our lack of progress!
38. Could I ____? Perhaps red curtains would go better with this wallpaper.
39. Are you ____ your exams_____ this week or next?
40. The teacher asked us to _____ on reading comprehension.
41. Michelle is still dating two different guys because she can't ____ her _____!
42. ' I would ____literally _____ to meet Brad Pitt!'
43. Mike _____ to look interested, but physics wasn't really his subject.
44. Our company mostly ____ with local suppliers.
45. Scientists from NASA have ____ a new _____on Mars!
46. Can you please stop distracting me? I really need to ____some _____ this afternoon!
47. Tomorrow's weather isn't great for our walk, but we'll just have ____ of it.'
48. Are you coming with us to Spain? You really need _____ by next weekend.
49. Julie is off sick so I have to _____all this week to cover for her.
50. 'Charities in Africa think they're _____, but perhaps that's not always the case.'
51. I've _____for the kids to stay with my parents over the weekend.
52. I promise to _____ I can to help.
53. The angry customer ____ to the company's head office
54. Did you have a bit to drink last night? You weren't ____on the phone!
55. The accident ____some serious ____ to the side of my car!
56. If you only go clubbing once a year, then you might as well ____ it _____!
57. Several bank staff are being held hostage and the robbers are now ____.
58. I was going to put my house on the market, but then a friend ____me____ I couldn't refuse.

4. Fill in the blanks with the appropriate forms of "do" and "make".

Stan Slade - Private Eye

My name's Slade, Stan Slade, private investigator. The story begins one Saturday morning in January. I hadn't been very busy. In fact, I hadn't had any jobs since Christmas and only one person had called this week _____ an appointment. At about

11:00, this guy came into my office. He looked rich, very rich, indeed - you know, fur coat, fat cigar. He threw $5,000 on the desk.

“That’s for one week,” he said. “You’re working for me.”

Well, I don’t usually _____ $5,000 a month, let alone in a week. “What do you want me to do?”- I asked. He sat down.

‘This is an important job, Slade. I don’t want you to ____ any mistakes, OK? I want you _____ arrangements to follow my wife. Here’s a picture of her. She’s much younger than me and, well, I want to know everything she _____, everything! I want to know what time she gets up, what kinds of exercise she ____, when she ____ chores, where she ____ her errands, and who she _____ them with. I want every detail. I want to know when she ____ a phone call, and who she calls. Can you ____ that?”

“Sure,” I said. Hey, for $5,000, I could _____ almost anything.

“By the way, let me ____ a suggestion,” said the man.

“Sure, you’re paying,” I said.

“_____ sure she doesn’t see you. If I find out she even suspects she’s being followed, well, let’s just say I could _____ a lot of trouble for you.”

“She’ll never know I’m there. I won`t _____ a sound”.

The man left my office. I looked in the photo he’d given me, and the address. “Well, “I thought to myself,” I suppose I’d better go out and _____ some work”.

It was pretty boring. I hoped that she would ____ something interesting, but nothing happened. On the third day, I parked outside her house as usual. I started ____ the crossword puzzle. I heard footsteps.

Suddenly, there was a tap on the window. I looked up. It was my old buddy, Lieutenant O’Casey of the 18th Precinct, Los Angeles Police Department.

“_____ me a favor, O’Casey,“ I said. “Go away.

I’ve got a job to ____.”

“So have I, Slade,“ he replied. “A lady has ____ a complaint. She says you’ve been following her. Have you been trying ____ a date with her or something?”

“OK, OK, O’Casey. I’m working for her husband.”

“Don’t _____ laugh, Slade! She isn’t married. Who’s paying you?” I described the rich cigar-smoker.

O’Casey laughed. “I suppose he asked you to _____ a report on all her movements?”

“Yeah. That’s right.”

“Well,“ O’Casey said slowly, “the lady is Laura Van Gelt, the millionaire. You remember, her father _____ a fortune in soybeans. Your man sounds like Pete Greenstreet, the international jewel thief!”

Listening 3

https://www.youtube.com/watch?v=6mBO2vqLv38

1. Listen to the recording

2. Answer the questions by choosing the correct option.

1. Thanks to IoT, what would you NOT do if at work you remembered that you haven't turned off your air conditioner?
a) drive home
b) check the status of the AC
c) turn off the AC
2. What devices were NOT connected to the internet until recently?
a) laptops
b) landline telephones
c) smartphones
d) home appliances
3. Through special applications, Smart home interconnects devices like ____ to share the information with the user. (Choose which is NOT mentioned)
a) heaters
b) alarms
c) water detectors
d) conditioners
4. In an example of what IoT can do for you in the morning, what is NOT the IoT's job?
a) make the light come in the house
b) turn on the heater
c) cook coffee
d) switch off the alarm clock
5. General devices include ____.
a) home appliances
b) sensors
c) actuators
d) gateways
6. Connectivity in IoT is provided by ___
a) sensors
b) servers
c) wired and wireless connection

d) data analysis
7. When IoT is used for watering a garden the report is sent including information on ___ (Choose which is NOT true)
a) how quickly the moisture of the soil reduces
b) the time of the day when watering was turned on
c) how cloudy it was
8. In 2018 there were _____ connected devices.
a) 23 million
b) more that twice as many as the population of the world
c) 18 billion
d) 25 billion
9. Which of the following technologies is NOT used as an interface for a network?
a) wi-fi
b) ethernet
c) zigbee
d) vpn

Reading 5

Before reading.

1. look at the highlighted words and expressions and explain their meanings. Use dictionary or the Internet if necessary.

boon	impending	RFID
flipped classrooms	uptime	beacon
supplant	asset	utility
complement	fleet (of cars)	sewer
HVAC systems	inventory	orderlies

2. Read the text about the IoT in different spheres of our life. Discuss pros and cons of the IoT in each one. Give more examples. Add audio or / and visual evidence.

IoT in Education

As in many other sectors, the Internet of Things (IoT) has been a boon for education. From so-called "flipped classrooms" and online courses to integrated mobile technology and more efficient teaching methods, IoT-enabled connectivity continues to supplant pencils, paper and chalkboards as instructional approaches and learning opportunities expand.
IoT in schools means a better-connected and more collaborative future for education. IoT devices give students better access to everything from learning materials to

communication channels, and they give teachers the ability to measure student learning progress in real-time.

Just as important, the IoT can improve things that complement a solid education – stuff like security via the use of smart cameras, climate control via the use of smart HVAC systems. Smart lighting systems are big, too, providing better and more energy efficient illumination.

As one education professional said of the IoT, "It is not about the technology; it's about sharing knowledge and information, communicating efficiently, building learning communities and creating a culture of professionalism in schools. These are the key responsibilities of all educational leaders."

What industries can benefit from IoT?

Organizations best suited for IoT are those that would benefit from using sensor devices in their business processes.

Manufacturing

Manufacturers can gain a competitive advantage by using production-line monitoring to enable proactive maintenance on equipment when sensors detect an impending failure. Sensors can actually measure when production output is compromised. With the help of sensor alerts, manufacturers can quickly check equipment for accuracy or remove it from production until it is repaired. This allows companies to reduce operating costs, get better uptime, and improve asset performance management.

Automotive

The automotive industry stands to realize significant advantages from the use of IoT applications. In addition to the benefits of applying IoT to production lines, sensors can detect impending equipment failure in vehicles already on the road and can alert the driver with details and recommendations. Thanks to aggregated information gathered by IoT-based applications, automotive manufacturers and suppliers can learn more about how to keep cars running and car owners informed.

Transportation and Logistics

Transportation and logistical systems benefit from a variety of IoT applications. Fleets of cars, trucks, ships, and trains that carry inventory can be rerouted based on weather conditions, vehicle availability, or driver availability, thanks to IoT sensor data. The inventory itself could also be equipped with sensors for track-and-trace and temperature-control monitoring. The food and beverage, flower, and pharmaceutical industries often carry temperature-sensitive inventory that would benefit greatly from IoT monitoring applications that send alerts when temperatures rise or fall to a level that threatens the product.

Retail

IoT applications allow retail companies to manage inventory, improve customer experience, optimize supply chain, and reduce operational costs. For example, smart

shelves fitted with weight sensors can collect RFID-based information and send the data to the IoT platform to automatically monitor inventory and trigger alerts if items are running low. Beacons can push targeted offers and promotions to customers to provide an engaging experience.

Public Sector

The benefits of IoT in the public sector and other service-related environments are similarly wide-ranging. For example, government-owned utilities can use IoT-based applications to notify their users of mass outages and even of smaller interruptions of water, power, or sewer services. IoT applications can collect data concerning the scope of an outage and deploy resources to help utilities recover from outages with greater speed.

Healthcare

IoT asset monitoring provides multiple benefits to the healthcare industry. Doctors, nurses, and orderlies often need to know the exact location of patient-assistance assets such as wheelchairs. When a hospital's wheelchairs are equipped with IoT sensors, they can be tracked from the IoT asset-monitoring application so that anyone looking for one can quickly find the nearest available wheelchair. Many hospital assets can be tracked this way to ensure proper usage as well as financial accounting for the physical assets in each department.

Case study. Role play

Role A – Privacy

You think privacy is the biggest problem the Internet of Things will cause. Tell the others three reasons why. What is your opinion can be the most and the least worrying problem with IoT.

Role B – Loss of jobs

You think a loss of jobs is the biggest problem the Internet of Things will cause. Tell the others three reasons why. What is your opinion can be the most and the least worrying problem with IoT.

Role C – Machines taking over

You think machines-taking-over is the biggest problem the Internet of Things will cause. Tell the others three reasons why. What is your opinion can be the most and the least worrying problem with IoT.

Role D – Lazy lifestyle

You think a lazy lifestyle is the biggest problem the Internet of Things will cause. Tell the others three reasons why. What is your opinion can be the most and the least worrying problem with IoT.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
assess		
breach		
collaboration		
contingency plans		
evaluate		
execution		
all into		
expertise		
fallout		
fire wall		
hurdles		
keep a close eye		
key performance metrics		
layout		
maintenance		
overlap		
oversee		
promptly		
remedy		
simultaneously		
sophisticated		
troubleshooting		
upkeep		
vulnerability		

Grammar Focus

Conditionals

Types of Conditional sentences

Name & Meaning	Structure & Examples	
	If-clause	**Main clause**
Zero Conditional General truths	if + present simple, *If you heat water to 100 degrees,*	present simple *it boils.*
1st Conditional Real condition & possible consequence in future	*if* + present simple (V, Vs) *If it rains tomorrow,*	will + infinitive (V) *we'll stay at home.*
2nd Conditional Imaginary or hypothetical & the consequence is unlikely to happen. Used to speak about present or future	*if* + past simple, (V-II) *If I had a lot of money,* *If I were you,*	*would* + infinitive (V) *I would travel around the world.*
3rd Conditional Unreal condition & unrealized consequences. Used to speak about the past.	*if* + past perfect, (had + V-III) *If you had come earlier,*	*would* + *have* + past participle (V-III) *we would have caught the train.*

Notes

- *If*-clause and main clause may change places. When *if*-clause starts the sentence, it is separated with the comma. Otherwise the comma is not used.
  Cf.: <If-clause> + **,** + <main clause>. and <Main clause> + <If-clause>.

- Instead of *if* some other conjunctions can be used (which will sound more formal):
  on condition (that), provided (that), providing (that), unless = if not

  E.g.: ***If*** *you come earlier, let me know. =* ***Provided*** *you come earlier, let me know.*

  You should hurry ***if you don't*** *want to be late. = You should hurry* ***unless*** *you want to be late*

- In 1st Conditionals, the predicate of *if*-clause can be expressed as ***should + V***. In this case the condition sounds **less confident**. E.g.:
  If the device fails, we will replace it. -> If the device should fail, we will replace it.

- In 2nd Conditionals in *if*-clause, the verb ***to be*** can take 2 forms: *was* or *were* irrespective of the number of Subject. E.g. *If he* ***were*** *here, we would discuss it.*
- In all Conditional sentences, other aspects (Continuous, Perfect) of the same tense and modals can be used as well. E.g.:
  1st: *If you* ***have finished*** *the test, you may be free. If you* ***are talking*** *on the phone, I'll wait. If you meet her,* ***could*** *you let me know?*

  2nd: *If I knew his address, I* ***might*** *go and see him. Why are we watching this film? If we* ***were watching*** *the news, it would be more interesting.*

  3rd: *If we had saved some money, we* ***might*** *have bought the house. If he* ***had been trying*** *harder, he* ***could*** *have achieved the desired results.*

Inverted conditionals (used when *if* or any other conjunction is not used):

The conditional clause in this case always starts with an **auxiliary verb.**

Name	**Structure & Examples**	
	Conditional clause	**Main clause**
1st Conditional	*Should* + Subject + Verb (V) *If it rains tomorrow, ->* *If it should rain tomorrow, ->* *Should it rain tomorrow,*	*will* + infinitive (V) *we'll stay at home.*
2nd Conditional	*Was / were / had* + Subject + … *If I had a lot of money, ->*	would + infinitive (V) *I would travel around the world.*

	Had I a lot of money, *If I were richer ->* *Were I richer,*	
3rd Conditional	*had* + Subject + V-III *If you had come ->* *Had you come earlier,*	*would* + *have* + past participle (V-III) *we would have caught the train.*

Mixed conditionals (combine the parts of the second and third conditional)

if-clause	main clause
2nd conditional *If I were you,*	3rd conditional *I would have started your own business long ago.*
3rd conditional *If I had taken the medicine,*	2nd conditional *I would feel better now.*

1. Complete the sentences with the corresponding form of the verbs in brackets. (0 and 1st conditionals)

1. If she ____ a new washing machine, she ____ less money in the laundromat. (buy / spend)
2. Please, ____ Suzan to meet me in the restaurant if you ____ her. (tell / see)
3. If you ____ water, it ____ into ice. (freeze / turn)
4. If anyone ____ the car, the alarm ____ off. (touch / go)
5. If you don't ____, I ____ the police. (leave / call)
6. If it ____, we ____ home. (rain / stay)
7. He ____ the test if he ____ harder. (pass / study)
8. She ____ to sell the car if she ____ a job. (have / not find)
9. He ____ late for the train unless he ___ a taxi. (be / take)
10. If something ____ after the manufacturer's warranty expires, you might still ____ the right to get it fixed. (break / have)

Practice. ***Work in groups. Invent a situation when a new object becomes a part of IoT, especially something unexpected. Describe its functionality using conditional sentences.***

2. Fill in the missing word.

1. If they come, we ____ be very happy indeed.
2. She would do her work if she ____ able to do so.
3. If you ____ in my place, you would ____ the same.
4. If I ____ there, I would answer the questions.
5. Alice could ____ written this essay if she had ____ given enough time.

6. Could I have solved this problem if I ____ asked?
7. They would ____ discussed the film if they ____ seen it yesterday.
8. ____ you buy this book, read it very carefully.
9. We will all be in much trouble ____ this happens next week.
10. You would ____ bought this watch if it had been less expensive.
11. If I had ____ enough knowledge, I would ____ done my papers well.
12. Could you build a big house if you ____ rich?
13. The crop ____ be very fine if it rains.
14. If she missed these classes she ____ miss a lot of interesting things.
15. If I ____ been present there I ____ have heard the news.
16. ____ they visited us, we ____ have welcomed them.
17. If she had ____ busy, we could not ____ asked her for help.
18. If the weather ____ fine, we ____ start on foot.
19. You would have ____ more satisfied if you ____ had a challenging task?
20. They would ____ helped him if he ____ asked them.

3. Make up conditional sentences.

1. (First conditional) If we ____ (not / work) harder, we ____ (not pass) the exam.
2. (Third conditional) If the students ____ (not be) late for the exam, they ____ (pass).
3. (Third conditional) If the weather ____ (not be) so cold, we ____ (go) to the beach.
4. (Second conditional) If she ____ (have) her laptop with her, she ____ (email) me.
5. (First conditional) If she ____ (not go) to the meeting, I ____ (not go) either.
6. (Third conditional) If the baby ____ (sleep) better last night, I ____ (not be) so tired.
7. (First conditional) If the teacher ____ (give) us lots of homework this weekend, I ____ (not be) happy.
8. (Second conditional) If Lucy ____ (have) enough time, she ____ (travel) more.
9. (First conditional) If the children ____ (not eat) soon, they ____ (be) grumpy.
10. (First conditional) If I ____ (not go) to bed soon, I ____ (be) tired in the morning.
11. (Second conditional) If I ____ (want) a new car, I ____ (buy) one.
12. (Second conditional) If José ____ (not speak) good French, he ____ (not move) to Paris.
13. (First conditional) If John ____ (drink) too much coffee, he ____ (get) ill.
14. (Third conditional) If we ____ (tidy) our flat, we ____ (not lose) our keys.
15. (Third conditional) If Luke ____ (not send) flowers to his mother, she ____ (not be) happy.
16. (Second conditional) If the children ____ (be) in bed, I ____ (be able to) have a bath.
17. (Second conditional) If you ____ (not be) so stubborn, we____ (not have) so many arguments!

18. (Third conditional) If Julie ____ (not go) to Sweden, she ____ (go) to Germany.
19. (First conditional) If she ____ (go) to the library, she ____ (study) more.
20. (Third conditional) If we ____ (not have) an argument, we ____ (not be) late.
21. (Second conditional) If you ____ (arrive) early, it ____ (be) less stressful.
22. (Third conditional) If I ____ (not go) to the party, I ____ (not meet) Amanda.
23. (Second conditional) If Julie ____ (like) chocolate, I ____ (give) her some.
24. (Second conditional) If Luke ____ (live) in the UK, I ____ (see) him more often.
25. (Third conditional) If the children ____ (not eat) all that chocolate, they ____ (feel) sick.
26. (First conditional) If they ____ (not / arrive) soon, we ____ (be) late.
27. (Third conditional) If she ____ (study) Mandarin, she ____ (go) to Beijing.
28. (Second conditional) If we ____ (not be) so tired, we ____ (go) out.
29. (First conditional) If you ____ (buy) the present, I ____ (wrap) it up.
30. (First conditional) If Lucy ____ (not quit) her job soon, she ____ (go) crazy.

4. Write a sentence with if for each situation.

Example: *I wasn't hungry, so I didn't eat anything. – If I'd been hungry, I would have eaten something.*

1. The accident happened because the driver in front stopped so suddenly. – If the driver in front _____ so suddenly, the accident _____ .
2. I didn't know that George had to get up early, so I didn't wake him up. – If I _____, I _____ him up.
3. I was able to buy the car only because Jim lent me the money. – I _____ to buy the car if Jim _____ me the money.
4. Margaret wasn't injured in the crash because she was wearing a seat belt. – If she _____ a seat belt, she _____ injured in the crash.
5. You didn't have any breakfast — that's why you're hungry now. – If you _____ breakfast, you ____ hungry now.
6. I didn't get a taxi because I didn't have any money on me. – If I _____ any money on me, I ____ a taxi.
7. I didn't know you were in hospital. – If I ____ (know), _____ (go) to visit you.
8. Ken got to the station in time to catch his train. – If he _____ (miss) it, he ____ (be) late for his interview.
9. It's good that you remind me about Arm's birthday. – I ____ (forget) if you ____ (not / remind) me.
10. Unfortunately, I didn't have my address book with me when I was in New York. – If I ____ (have) your address, I ____ (send) you a postcard.
11. I took a taxi to the hotel but the traffic was very bad. – It____ (be) quicker if I ____ (walk).

12. I’m not tired. – If I _____ (be) tired, I’d go home now.
13. I wasn’t tired last night. – If I ____ (be) tired, I would have gone home earlier.

5. Paraphrase the following as conditional sentences.

1. *John didn’t leave early so he didn’t get there on time. – If John had left earlier he would have got there on time*. 2. She uses factor-12 suntan lotion as she gets sunburnt easily. If ____ 3. You’ll have trouble selling your house if you’re not prepared to accept a lower offer. Unless ____ 4. You need to study to pass this exam. Unless ____ 5. Many tickets were sold, that is why the concert wasn’t cancelled. If ____ 6. When the economy is booming, everyone seems to benefit. Providing ____ 7. Penniless students in large cities try to save money by living in squats. But for ____ 8. He was selected for a top job, which brought him into the public eye. But for ____ 9. When you drew my attention to Sue’s hair, I realized that it has an unusual colour. Unless ____ 10. Charlotte hoped for a quiet divorce without dispute. But her husband wanted to battle it out. If ____ 11. Since they take part in a dangerous sport, they are assumed to bear all the consequences. Providing ____ 12. The Wall street Journal ran the story about the Fedders. As a result John Fedder was forced to resign. If ____ 13. The older children all worked and contributed their money to the household. If ____ 14. The court accepted John’s plea and warded 25% of the proceeds. If ____ 15. In Italy the laws of criminal negligence apply. The cases of riders’ death are always investigated. If in England ____ 16. The accident on the railway happened when the children were playing chicken daring each other to cross in front of the train. If ____ 17. People’s perception of the risks they run engaged in everyday activities is quite low, and this often leads to inexplicable acts of sheer folly. Unless ____ 18. Someone had built a bump into the most critical point on the TT course and a disgusting fatal accident ensued. 19. I have a splitting headache because I had a sleepless night. 20. The boy is shivering. He isn't quite well. 21. I can’t knit another sweater as I’ve got no more wool. 22. Will you do it for me if I ask you? 23. He is beside himself with excitement, that is why he is speaking in a loud voice. 24. The ground was very soft. My horse didn’t win. 25. She didn’t listen to my directions. She turned down the wrong street. 26. With a bit more help, I would have finished it on time. 27. I’m sure they’d really enjoy going to Greece on holiday, but they just can’t afford it. 28. I’m glad you didn’t talk Matthew into doing it. He would have been furious. 29. I think Alison would apply for the job. She should make a very good managing director. 30. The problem is that she doesn’t work very hard. I know that she could do really well. 31. We are lucky it’s sunny today. It would be horrible sitting out here otherwise. 32. He will not be able to live on his own without the help of his neighbours. 33. We need to water these plants, otherwise they will fade. 34. It’s a good job you brought all those tables and chairs in from outside last night. The rain would have ruined them. 35. Larry should have told her the truth.

I'm sure she would have forgiven him. 36. Without the help of the Red Cross doctors, many more would have suffered. 37. With luck, we'll finish the puzzle by the end of today. 38. He is not sensible, or he will be working for this club.

6. Read the newspaper report "MUGGER MEETS LITTLE OLD LADY".

Jose Ramos is an experienced mugger, but he didn't know about little old English ladies. Now he does. 87-year-old Lady Vera Tucker was walking down New York's East 66th Street. She looked like an easy prey – small, grey-haired and expensively dressed, carrying a handbag over her shoulder. Ramos came up on his bicycle and grabbed the handbag. Lady Tucker hit him on the head with her umbrella, knocking him off his bicycle, and started screaming at the top of her voice.

The unfortunate mugger tried to get back onto his bicycle and escape, but Lady Tucker kept hitting him. A lorry driver, hearing her screams, came and joined in the fight. Holding his head, Ramos pushed the handbag at the driver and said, "Here it is. It's over, it's over." "The hell it's over," said the driver. They went on fighting, and Lady Tucker went on screaming, until a policeman arrived and took Ramos prisoner.

Lady Tucker refused medical help, saying that she felt fine. But she did allow the policeman to take her arm and escort her home.

7. Complete the sentences.

1. If the mugger ____ (know) what Lady Tucker was like, he ____ . 2. If Lady Tucker ... (not / hit) the mugger, ____. 3. ____ the lorry driver ____ (may not / come). 4. ____, the mugger ____ (get back) on his bicycle. 5. ____bicycle, he ____ (can / get away). 6. ____ if she (not / keep) screaming. 7. If Lady Tucker ____ (be) an ordinary old lady, the mugger might ____.

8. Answer the question.

What would you have done if you had been the lady / the mugger / the lorry driver?

9. Complete the following conditional sentences.

1. If I were free now____. 2. If I had taken my parents' advice____. 3. Unless this hotel gets a new cook____. 4. Unless it were a nice day____. 5. This clock wouldn't have run out____. 6. Unless the fire had been noticed____. 7. If he had any sense of humour ____. 8. The fence would look better____. 9. If the volcano starts erupting____. 10. Her life might have been saved____. 11. If I had never studied English____. 12. If I had not come to this University, ____. 13. If you dropped out of college, ____. 14. If I had been born sixty years ago, ____. 15. If I had been elected president of my country ten years ago, ____. 16. Only if you saved your money____. 17. Providing you had lent him the money____.

10. Modify the conditionals using NO conjunction if. E.g. If she comes, call me immediately. – Should she come, call me immediately.

1. If I find your key, I'll tell you.
2. Daniel would have been home on time if the bus had come.
3. She would be very happy if her friends were here.
4. My parents would have bought the house if it had been cheaper.
5. If you had done your homework, you could have written a better test.
6. If it rains, I'll wear a raincoat.
7. If it wasn't so late, I would go shopping.
8. If they had driven carefully, they wouldn't have crashed into the other car.
9. What would you do if you saw a robber?
10. If Lisa had got up earlier, she would not have been late for work.

11. Complete the sentences with the verbs in the brackets.

1. Had the weather been better, we ____ (to come) by bike.
2. Were you older, you ____ (to go) to the party.
3. Had Alice more money, she ____ (to go) to Africa.
4. John's mother ____ (to have) more time for him should he do the washing up.
5. Had Steven taken his camera, he ____ (to take) nice pictures.
6. They ____(to stay) longer in Paris should they find a cheap hotel.
7. Were Brian braver, he ____ (to ride) well.
8. Should Dan eat less junk food, he ____(to join) the school hockey team.
9. He ____(to write) good stories should he feel like it.
10. Had you listened more carefully, you ____ (to understand) everything.

12. Complete the Mixed Conditionals with the verbs in brackets.

1. If I didn't know you well, I _____ a word you said yesterday. (not believe)
2. If I were more responsible, I _____ that project before the deadline. (complete)
3. If Dave _____ from university, he would receive this job now. (graduate)
4. If I _____ that concert last Sunday, we wouldn't be enjoying it now. (not record)
5. I _____ to France next week if I had booked tickets two weeks before. (go)
6. Dan _____ in this concert if he had practiced playing the violin more. (participate)
7. Stella would have visited you yesterday if she ____ in the hospital. (not be)
8. We would go out tonight if we _____ it in advance. (plan)
9. Angela _____ that beautiful dress last week if she had some money. (buy)
10. Troy would have told you the truth if he _____ you better. (know)
11. If my children had done all their household chores, I _____ them to go for a walk tonight. (allow)
12. If Brian had joined us last night, he _____ so unhappy now. (not feel)

13. If the children _____ so much ice cream, they wouldn't have sore throats now. (not eat)
14. Tommy _____ there by train last week if he knew how to drive a car. (not go)
15. If we hadn't lost so much money last year, we _____ a new house these days. (buy)

13. Choose the sentence with the same meaning.

1. James is always lazy. He failed a test last week.
   a. If you weren't so lazy, you would pass that test.
   b. If you hadn't been so lazy, you would pass that test.
   c. If you weren't so lazy, you would have passed that test.
2. You forgot to bring a map, and now we are lost.
   a. If you remembered to bring a map, we wouldn't be lost now.
   b. If you'd remembered to bring a map, we wouldn't be lost now.
   c. If you'd remembered to bring a map, we wouldn't have been lost now.
3. Paul drove too fast. Now he's in trouble with the police.
   a. If Paul didn't drive too fast, he wouldn't be in trouble with the police.
   b. If Paul hadn't driven too fast, he wouldn't be in trouble with the police.
   c. If Paul hadn't drive too fast, he wouldn't have been in trouble with the police.
4. I don't have a degree, so I didn't get the job.
   a. If I had a degree, I would have got that job.
   b. If I have a degree, I would have got that job.
   c. If I'd had a degree, I would get that job.
5. You didn't fix the roof. Now it's leaking.
   a. If you fixed the roof, it wouldn't have leaked.
   b. If you'd fixed the roof, it wouldn't be leaking.
   c. If you'd fixed the roof, it wouldn't have been leaking.
6. Marie is unhappy because she gave up her career when she got married.
   a. Marry would have been happy if she hadn't given up her career when she got married.
   b. Marie would be happy if she hadn't given up her career when she got married.
   c. Marry will be happy if she didn't give up her career when she got married.
7. Nicole speaks Chinese fluently because she lived in China for ten years.
   a. Nicole wouldn't speak Chinese fluently if she had lived in China for ten years.
   b. Nicole wouldn't have spoken Chinese fluently if she would live in China for ten years.
   c. Nicole wouldn't speak Chinese fluently if she hadn't lived in China for ten years.

8. Frank is not going to the graduation ceremony because he broke his leg snowboarding last week.

a. If Frank wouldn't have broken his leg snowboarding last week, he would have come to the graduation ceremony.
b. If Frank had broken his leg snowboarding last week, he wouldn't have come to the graduation ceremony.
c. If Frank hadn't broken his leg snowboarding last week, he would come to the graduation ceremony.

9. I am unemployed because I had a disagreement with my boss and I was fired.

a. I would be unemployed if I had a disagreement with my boss and I had been fired.
b. I wouldn't be unemployed if I hadn't had a disagreement with my boss and I hadn't been fired.
c. I wouldn't have been unemployed if I had a disagreement with my boss and I had been fired.

10. Tom is not going to come to dinner tomorrow because you insulted him yesterday.

a. Tom would come to dinner tomorrow if you hadn't insulted him yesterday.
b. Tom would not come to dinner tomorrow if you had insulted him yesterday.
c. Tom hadn't come to dinner tomorrow if you would insult him yesterday.

14. These sentences are taken from Swebok – the "IT Bible". Read the sentences below, analyze them, translate into Ukrainian. Define if the words in bold refer to a condition or they have other function in a sentence.

1. Do not try to recover **unless** neither the cause of the error nor its effects affect any security considerations.
2. Additional information is also **provided** in the other references and further readings for this KA.
3. … a technical evaluation (also known as an impact analysis) is performed to determine the extent of the modifications that **would** be necessary **should** the change request be accepted.
4. Data on inadequacies and defects found by software quality control techniques may be lost **unless** they are recorded.
5. Results from trend analysis may indicate that a schedule is being met, such as in testing, or that certain classes of faults may become more likely to occur **unless** some corrective action is taken in development.
6. Initial estimation of effort, schedule, and cost is an iterative activity that should be negotiated and revised among affected stakeholders **until** consensus is reached on resources and time available for project completion

7. **If** a variable is measured in interval scale, most of the usual statistical analyses like mean, standard deviation, correlation, and regression may be carried out on the measured values.
8. In unstructured programming, a programmer follows his / her hunch to write the code in whatever way he / she likes **as long as** the function is operational.
9. **Providing** software maintenance effort, by categories, for different applications **provides** business information to users and their organizations.
10. It is generally counterproductive to apply formalization **until** the business goals and user requirements have come into sharp focus through means such as those described elsewhere in section 4.
11. Feedback can be **provided** by restating the user's input while processing is being completed
12. In general, engineers are licensed as a means of protecting the public from unqualified individuals. In some countries, no one can practice as a professional engineer **unless** licensed, or further, no company may offer "engineering services" **unless** at least one licensed engineer is employed there.
13. Some software processes may be regarded as less effective **unless** other software processes are being performed at the same time
14. Generally speaking, it **wouldn't** be smart to invest in an activity with a return of 10% **when** there's another activity that's known to return 20%.
15. However**, if** we have the null hypothesis that the population mean is equal to some given value, the alternative hypothesis **would** be that it is not equal and we would have a two-sided test (because the true value could be either less than or greater than the given value).
16. Response time is generally measured from the point at which a user executes a certain control action **until** the software responds with a response.
17. Surveillance requirements and the level of flexibility to be **provided** to the software engineer are important considerations in tool selection.
18. It grows more complex **unless** some action is taken to reduce this complexity.

Unit 5
Cybersecurity

The most likely way for the world to be destroyed, most experts agree, is by accident. That's where we come in: we're computer professionals. We cause accidents.

Warming Up

1. Analyze the vocabulary on Cybersecurity in two pictures (A, B). Which words are in common?

attacks

2. Analyze the words from the pictures and find not less than 3 examples of terms in the following categories. Add 2-3 words of your own.

Actions	**Types of malicious software**	**Characteristics (adjectives)**	**People**
attacks	*Trojans*	*safe*	*hackers*

Start Thinking

Work in pairs.

1. ***Which of the pictures gives more general and more specific understanding of what Cybersecurity is? Why? Give examples.***
2. ***Based on this vocabulary, how can you define Cybersecutity? Share your explanation with your group mates? Which of the definitions is the best?***

A.

B.

Reading 1

1. Match synonyms to the words from the following text.

1	sophisticated	a	blackmail
2	a victim	b	to increase
3	to amplify	c	to execute
4	prolific	d	to modify
5	to evade	e	complex
6	extortion	f	to avoid
7	to tailor	g	to overwhelm
8	legitimate	h	a prey
9	to implement	i	productive
10	to flood	j	valid

2. Match the words from the text and their definitions.

1	an assault	a	to break or act contrary to a law
2	malicious	b	a secret listener to private conversations
3	to remediate	c	to ask for or try to obtain something from someone

4	a ransom	d	wrongful or criminal deception intended to result in financial or personal gain
5	to breach	e	the sum or price paid or demanded
6	to encrypt	f	a sudden, violent attack
7	vulnerability	g	a sudden and great increase
8	a fraud	h	openness or susceptibility to attack or harm
9	a lure	i	intentionally harmful
10	eavesdropper	j	something that is used to tempt a person or animal to do something
11	to render	k	to encode
12	to solicit	l	to cause to become
13	a surge	m	to lessen the effect of

3. Scan the first section of the text. Without looking back into the text, explain the term Cyber attack and the action of the major types of cyber threats.

4. Choose one of the further sections devoted to different cybercrimes, analyze it and report to the class.

Cyber threats

What is a Cyber Attack?

A tiny "creeper" virus was the first to show the possibility to connect computers within the network back in early 1970s. Since then, a purely scientific experiment has turned into a criminal industry which has already affected nearly one-third of the world's computers. Hackers today attack people worldwide roughly every half a minute.

A cyber attack is an assault launched by cybercriminals using one or more computers against a single or multiple computers or networks. A cyber attack can maliciously disable computers, steal data, or use a breached computer as a launch point for other attacks.

The cyber threat landscape is constantly evolving. As cyberattackers become more skilled and organized, their attacks are becoming more sophisticated as well. In 2020, the most common forms of malware included:

• Cryptominers: Malware that uses the victim's computer to mine cryptocurrency and make a profit for the attacker.

• Mobile Malware: Malware targeting mobile devices, including malicious applications and attacks exploiting SMS and social media apps.

• Botnet Malware: Malware that infects a system and adds it to a botnet, where it participates in cyberattacks and other illegal activity under the command of the botnet controller.

• Infostealers: Malware that collects sensitive information from an infected computer and sends it to the malware operator.

• Banking Trojans: Malware that specifically targets financial information and attempts to steal banking website credentials and similar information.

• Ransomware: Malware that encrypts the files on a user's computer and demands payment for the decryption key.

Today, organizations face generation V and VI cyber threats. These attackers are aware of the improvements made in enterprise cybersecurity in recent years and have tailored their attacks to bypass and overcome traditional defenses. The modern cyber attack is multi-vector and uses polymorphic code to evade detection. As a result, threat detection and response is more difficult than ever before.

To add to the challenge, many organizations are facing a sudden and dramatic shift in how they perform "business as usual". The COVID-19 pandemic drove many organizations to adopt a mostly or wholly remote workforce, often without adequate preparation. For organizations whose security strategy depended on employees working from the office, adapting to this new way of life is a challenge.

Inside the top cyber threats

Ransomware

Ransomware is malware designed to use encryption to force the target of the attack to pay a ransom demand. Once present on the system, the malware encrypts the user's files and demands payment in exchange for the decryption key. Since modern encryption algorithms are unbreakable with the technology available, the only way to recover the encrypted files is to restore the data from a backup (if available) or to pay the ransom demand.

Ransomware has become one of the most visible and prolific types of malware, and the COVID-19 pandemic provided an environment in which this type of malware has thrived. In recent years, some ransomware variants have also evolved to perform "double extortion" attacks. Maze, Sodinokibi/REvil, DopplelPaymer, Nemty, and other ransomware variants steal copies of files before encryption, threatening to breach them if the user refuses to pay the ransom demand. While this trend began in late 2019 with Maze, it has continued to grow as more groups adopted it throughout 2020.

Fileless Attacks

Antivirus solutions commonly attempt to detect malware on a device by inspecting each file on the device for signs of malicious content. Fileless malware tries to bypass this approach to threat detection by not using a file. Instead, the malware is implemented as a set of commands to functions that are built into the infected computer. This enables the malware to achieve the same objectives, but can make it harder to detect for some defensive solutions.

The main differentiator of fileless malware is its lack of files; it performs many of the same functions as traditional malware. For example, FritzFrog – a fileless peer-to-peer (P2P) botnet malware detected in August 2020 – is designed to infect systems and mine cryptocurrency.

Phishing

Phishing is one of the most common methods that attackers use to gain access to a target system. In phishing scams, emails or text messages appear to be from a legitimate company asking for sensitive information, such as credit card data or login information. Often, it is easier to trick a user into clicking on a malicious link or opening an attachment than it is to locate and successfully exploit vulnerability in an organization's network. Phishing attacks can achieve a variety of goals, including credential theft, malware delivery, financial fraud, and theft of sensitive data.

Phishing has historically been the most common method for cyberattackers to launch a campaign due to its ease of use and high success rate. During the COVID-19 pandemic, this trend only accelerated as cybercriminals took advantage of employees working from outside the office and the climate of uncertainty regarding the virus.

The COVID-19 pandemic also amplified the effect of common phishing lures. For example, Black Friday and Cyber Monday are a commonly exploited pretext for phishers, and the rise in online shopping due to COVID-19 made it especially effective in 2020. As a result, the volume of phishing emails doubled in the weeks leading up to Black Friday and Cyber Monday compared to the beginning of the previous month.

Man-in-the-Middle (MitM) Attack

Many network protocols are protected against eavesdroppers by encryption, which makes the traffic impossible to read. A Man-in-the-Middle (MitM) attack bypasses these protections by breaking a connection into two pieces. By creating a separate, encrypted connection with the client and the server, an attacker can read the data sent over the connection and modify it as desired before forwarding it on to its destination.

MitM attacks can be defeated using protocols like HTTPS. However, the rise of mobile technologies makes this a more dangerous attack vector. Mobile apps provide little or no visibility to their users regarding their network connections and may be using insecure protocols for communication that are vulnerable to MitM attacks.

Malicious Apps

Many organizations focus their cybersecurity efforts on computers, but mobile devices are a growing threat to an organization's cybersecurity. As employees increasingly use mobile devices to do their work and access sensitive company data, malicious mobile applications have become a problem too serious to ignore. These applications can do anything that desktop malware can, including stealing sensitive data, encrypting files with ransomware, and more.

In 2020, mobile malware was the second most common type of malware worldwide. The most common mobile malware variants – including xHelper, PreAMo, and Necro – are all Trojans with additional functionality, including ad fraud and click fraud. Mobile malware commonly takes advantage of vulnerabilities in mobile operating systems, like the remote code execution (RCE) vulnerability fixed in a batch of 43 Android security patches in January 2021.

Denial of Service Attack

Organizations' IT infrastructure and services – like web applications, email, etc. – are critical to their ability to do business. The goal of Denial of Service (DoS) attacks is to deny access to critical services. This can be accomplished by exploiting vulnerability in an application (causing it to crash) or by flooding a system with more data or requests than it is able to manage (rendering it unable to handle legitimate requests). In some cases, attackers will perform a ransom DoS attack where a ransom payment is demanded to either stop an ongoing attack or prevent a threatened one.

During the remote work and learning driven by the COVID-19 pandemic, remote access solutions were a major target of DoS attacks. And during the 2020-2021 school year, Distributed DoS (DDoS) attacks against the education sector increased dramatically. These attacks attempted to render remote learning services unusable or solicited ransoms to prevent or stop the attacks.

Zero-Day Exploit

Software contains weaknesses and vulnerabilities, and many of these vulnerabilities reach production, where they are potentially exploitable by attackers. These production vulnerabilities are discovered internally at the company, by external security researchers or by cyberattackers.

In the third case, the cyberattackers can exploit these "zero day" vulnerabilities in the system. Until the organization manages to patch the vulnerability – rendering it safe – all users of the system are potentially vulnerable to attack.

In 2020, one of the most famous zero-day vulnerabilities was Zerologon, which affected Windows Domain Controllers (DCs). Attackers who exploited this vulnerability could gain complete control over the network managed by the vulnerable DC. Cybercriminals were actively exploiting this vulnerability before many organizations patched it, prompting emergency security directives from the US government for government agencies to apply the patch immediately.

Protecting Against the Top Cyber Threats

While these potential attacks do not make the list of the most common and dangerous cyber threats, they still pose a significant risk. Enterprise security solutions should include the ability to detect, prevent, and remediate attacks using these vectors as well.

Enterprise cybersecurity has grown more difficult with the surge in remote work driven by COVID-19. To protect employees working from home (potentially on personally-owned devices) is a new challenge for security teams.

These systems connected directly to personal networks and the public Internet are more vulnerable to attacks. As a result, endpoint security – on computers and mobile devices alike – is an even greater priority for enterprise cybersecurity than before.

With the wide range of potential cybersecurity threats, organizations require an endpoint detection and response solution how to effectively reveal and protect all of their employees' devices against top cyber threats.

Listening 1

Ransomware

https://www.bbc.com/news/av/technology-35091536

1. Scan the section of the text devoted to Ransomware to say whether the following information is TRUE (GIVEN) according to the text.

2. Now watch and listen to a similar material and complete the same task.

		Text	Video
1	Ransomware is a malicious programme	+	+
2	Ransomware criminals threaten to destroy the victim's files		
3	The attackers may encrypt different types of files		
4	No existing technology can help you decrypt your files		
5	The only way to get your files back is either to make sure you always have a backup or to pay ransom.		
6	The incidence of Ransomware has decreased during the COVID-19 pandemic		
7	After paying ransom the victims always get the decryption key to restore their files		
8	Some variants of ransomware can also steal your files		
9	Applying to the police may sometimes be helpful		

Listening 2
Phishing

https://www.bbc.com/news/av/technology-36981625

1. Watch and listen to the video on Phishing and fill in the gaps in the transcript with 1-3 words.

Phishing is an attempt to __(1)__ handing over their personal information such as bank details or passwords by posing as a __(2)__. Attackers may send out e-mails, text messages or make phone calls that __(3)__ from banks or service providers. Often the victim will be told they need to take part in a __(4)__ or account reactivation, and may even be told their account will be closed if they refuse. __(5)__ are taken to a fake web site, which can look just like real thing. They may be asked to enter personal information, which they can be used by criminals or the fake web site may __(6) __, which then can steal personal data. Tricking people into handing over their passwords or other private information is still one of the biggest ways criminals get hold of personal details. But there are ways you can protect yourself. __(7)__ of calls, emails or text messages from unknown sources, especially ones that don't address you by name. Big companies will never ask you to __(8)__ your personal information in an email or phone calls – and be suspicious of emails and text messages that ask you to __(9)__. If you are ever not sure whether the message is __(10)__, you could always call the company. Use the phone number printed on your bank statement, phone bill or on the back of your debit card.

2. Review the extract of the text devoted to Phishing.
Which of the sources – the Text (T), the Video (V) or Both (B) give the following information.

B	a definition of fishing
	ways a victim receives fishing requests
	actions that a victim should be asked to take by the attackers
	a comparison between fishing and other ways of cyber attacks
	rating of fishing among the methods cyberattackers can use
	tips on how to avoid a fishing attack
	influence of Covid pandemic on the frequency of phishing attacks
	advice to communicate with real companies

Listening 3

https://www.bbc.com/news/av/technology-35731734

1. Revise the section devoted to DDoS attacks and find the answers to the questions (if possible).

2. Now watch the video and try to find the answers to the questions which are not discussed in the text. Compare the answers. Are they similar?

1. What does DDoS stand for?
2. What are the ways to block the access to the web service?
3. Can genuine clients access the web service during the attack?
4. What other criminal activity can be combined with DDoS attack?
5. Can someone create DDoS without evil intend?
6. What sector was one of the major targets during the COVID-19 pandemic?
7. What is one of the ways to avoid blocking a web service?

3. Find in the Internet information on some of the most notorious of the latest attacks. Share the information with your group mates.

Grammar focus

1. Following are the examples from the text where the Infinitive is used in different functions. Find in the text other examples (if any) of the same function. In what function is the Infinitive most commonly used in this text?

Purpose	These attackers are aware of the improvements made in enterprise cybersecurity in recent years and have tailored their attacks <u>to bypass and overcome</u> traditional defenses.
A part of a complex Predicate (after the verbs ***be, appear, turn*** etc)	… the only way to recover the encrypted files <u>is to restore</u> the data from a backup (if available) or to pay the ransom demand.
After Adjectives	Ransomware is malware <u>designed to use</u> encryption to force the target of the attack to pay a ransom demand.

After Nouns and ***something, anything, nothing***	… the only way to recover the encrypted files is to restore the data from a backup (if available) or to pay the ransom demand.
After expressions with Quantifiers (***enough, too, much*** etc.)	As employees increasingly use mobile devices to do their work and access sensitive company data, malicious mobile applications have become a problem too serious to ignore.
After Question words: ***what, where*** etc.	...organizations require an endpoint detection and response solution how to effectively reveal and protect all of their employees' devices against top cyber threats.
After Superlatives and the words ***first, second, last***	A tiny "creeper" virus was the first to show the possibility to connect computers within the network back in early 1970s.
After Auxiliary and Modal Verbs	This enables the malware to achieve the same objectives, but can make it harder to detect for some defensive solutions.
After certain Verbs	The COVID-19 pandemic drove many organizations to adopt a mostly or wholly remote workforce.
As the Subject of a sentence	To protect employees working from home (potentially on personally-owned devices) is a new challenge for security teams.

2. Define the function of the Infinitive in the following sentences (P – Purpose, C – Complex predicate, A – after Adjectives, N – after Nouns, Q – after Quantifiers, W – after question Words, S – after Superlatives, M – after Modals, V – after Verbs, Su – SUbject of a sentence).

1. Hackers encrypt vital data and demand a ransom to get the information decrypted.	**P**
2. It's not illegal to pay hackers ransoms, although some think it should be.	
3. Phishing attacks remain the key way for criminals to access networks.	
4. A 1983 movie called War Games was the first to show the inner workings of hackers.	

5. Powerful botnets could enable attackers to unleash cyberattacks that impact human life in a way only natural disasters could.	
6. Anonymous, a vast network of users, often acts to protect the privacy of regular users.	
7. Saudi Aramco suffered the worst hack in world history in 2012. As a result, its ability to supply 10% of the world's oil was suddenly at risk.	
8. For the 21st century, data appear to be what electricity was for the 19th.	
9. Small and medium sized businesses are often too weak to combat the emerging cyber threat.	
10. Businesses need to use AI to protect themselves from cyberattacks.	
11. One of the biggest questions now is how to protect your business fronm hacking.	
12. To say that cyber threats may affect the functioning of life as we know it may not be an exaggeration at all.	
13. The best protection from cyberattack is to make sure you have good, reliable, tested, offline backups.	

3. Complete the following sentences, using the infinitive

a) as the Subject:

1. ___ would be unjust. 2. ___ was very pleasant. 3. ___ is the only thing to do. 4. ___ would be much more useful. 5. ___ is not an easy matter.

b) as a part of Complex Predicate:

1. Our task today is ___. 2. The best way to master a foreign language is ___. 3. The next thing to be done is ___. 4. Our aim was ___. 5. His only wish is ___. 6. The weather seems ___.

c) as object of a Verb:

1. He asked ___. 2. In the kindergarten children are taught ___. 3. I've absolutely forgotten ___. 4. Everybody promised ___. 5. Would you like ___? 6. Who has allowed you ___? 7. After long discussions we finally decided ___. 8. Teachers never let the students ___.

d) as attribute after Nouns and Pronouns:

1. This is the information ___. 2. We have nothing ___. 3. This is a chance ___. 4. Benny has no friends ___. 5. He is not the man ___. 6. She made an attempt ___. 7. Is there anybody ___? 8. He always finds something ___.

e) as Purpose:

I. He came immediately ___. 2. We'll stay after the lecture ___. 3. They stopped ___. 4. Write down this rule ___. 5. I've searched the Internet ___. 6. He stepped aside politely ___. 7. ___ you must work hard. 8. You should call your adviser ___.

f) after Adjectives:

1. I am so glad ___. 2. We are awfully sorry ___. 3. Without good knowledge of English it is impossible ___. 4. Sometimes it is difficult ___. 5. It is late ___. 6. It's so nice of you ___. 7. He was proud ___. 8. We were surprised ___.

g) after the first, the second …:

1. He was always the last ___. 2. It's my turn now. I'm the next ___. 3. Alexaner Bell and his assistant were the first ___. 4. Marie Curie was the first woman ___. 5. Italian astronomer Galileo Galilei became the first person ___. 6. Italian physicist Alessandro Volta was the first ___. 7. American astronaut Neil Armstrong was the first person ___. 8. Back in 1970, Douglas Engelbart and Bill English were the first ___. 9. A small firm named MITS was the first ____. 10. Ada Lovelace was the first person ____.

h) as Quantifiers:

I. She was too frightened ___. 2. The article is too difficult ___. 3. Your telephone number is easy enough ___. 4. The threat is too dangerous ___. 5. You have enough skills ___. 6. We are too busy ___. 7. She was grown-up enough ___. 8. He is strong enough ___.

i) after Modals and Auxiliary verbs:

1. Computers should ___. 2. All students must ___. 3. After school, young people can ___. 4. Twice a year all students have to ___. 5. In some companies employees are allowed to ___. 6. During the flight, the passengers mustn't ___. 7. Without enough information we cannot ___.

j) after Question Words:

1. Can you explain me how ___. 2. I have no idea what ___. 3. I don't know where ___. 4. In any career it's important to understand when ___. 5. The doctor explained me how many times a day ___. 6. The last question to discuss is why ___.

Listening 4
Big businesses under threat from cyber attacks

https://www.bbc.com/news/av/uk-36240802

1. Watch the video and complete the sentences with up to 2 words and / or number.

1. Cyber attacks can be the reason why some businesses lose their ____ and ____.

2. In the past year ____ of the UK's companies suffered from cyber-attacks.
3. Malware is another word for ____ .
4. Due to cyber-attacks, companies loose not only money but also ___ .
5. On average, the damage of a cyber-attack can cost more than ____.
6. TalkTalk is a ____, whose data were stolen last year.
7. Many big companies consider ____ to be the greatest threat to their operation.

2. In the following extracts from the video define the function of the Infinitive.

1. On-line attacks have the potential to cause businesses serious damage.
2. Computer experts say it's relatively easy to prevent these types of intrusion…
3. …ministers insist too many firms are still loosing money… and so are being urged to take action.
4. This research suggests … the bill in some cases can be much higher.

Reading 2

1. Read the text. Complete it with the missing sentences. One sentence is extra.

A. Attack vectors are contained.
B. Risks are well-known.
C. Complex Passwords Cannot Be Cracked.
D. Cybercriminals are outsiders.
E. My industry is safe.

Dangerous cybersecurity myths

The volume of cybersecurity incidents is on the rise across the globe, but misconceptions continue to persist, including the notion that:

__(1)__ In reality, cybersecurity breaches are often the result of malicious insiders, working for themselves or in concert with outside hackers. These insiders can be a part of well-organized groups, backed by nation-states.

__(2)__ In fact, the risk surface is still expanding, with thousands of new vulnerabilities being reported in old and new applications and devices. And opportunities for human error – specifically by negligent employees or contractors who unintentionally cause a data breach – keep increasing.

__(3)__ Cybercriminals are finding new attack vectors all the time – including Linux systems, operational technology (OT), Internet of Things (IoT) devices, and cloud environments.

__(4)__ Every industry has its share of cybersecurity risks, with cyber adversaries exploiting the necessities of communication networks within almost every government and private-sector organization. For example, ransomware attacks are targeting more

sectors than ever, including local governments and non-profits, and threats on supply chains, ".gov" websites, and critical infrastructure have also increased.

2. Find the words in the text that match the definitions.

1	an enemy or opponent (n.)	
2	in a definite and exact way (adv.)	
3	kept from going beyond certain limits (adj.)	
4	to select as an object of attention or attack (v.)	
5	failing to take proper care over something (adj.)	
6	a wrong or inaccurate idea (n.)	
7	to support by material or moral assistance (v.)	
8	a variable quantity that has size and direction (n.)	

3. Give your own explanation of the following words.

insider, hacker, vulnerability, unintentionally, cloud environment, non-profit, infrastructure.

4. Find out additional information on wrong beliefs about cybersecurity and report to the class.

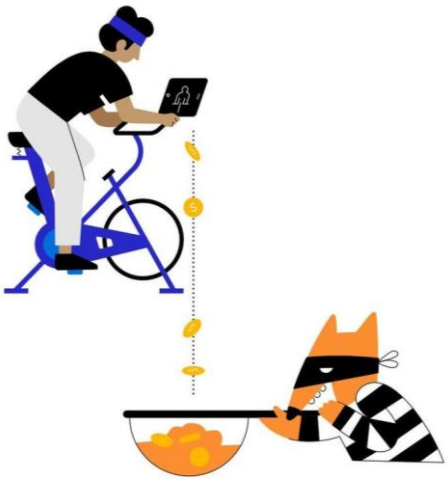
Brainstorming

What type of cyber attack is it? What really happens? What are the consequences? Have you ever been affected by it?

Reading 3

1. Read the text and complete the sentences with options listed below. One of the options is extra.

A. downloaded to smartphones
B. including ransomware and financial scams
C. the company's web address to seem legitimate
D. threats posed by malicious apps
E. cyber-security centre supports
F. various third-party app stores



Cyber-security chiefs warn of malicious app risk

A new report by the UK's National Cyber Security Centre (NCSC) has warned of the __(1)__.

While most people will be familiar with apps downloaded to smartphones __(2)__, devices from smart TVs to smart speakers now also have them.

The NCSC's technical director, Ian Levy, said there was "more for app stores to do" on security. Mr Levy added that cyber-criminals were "currently using weaknesses in app stores on all types of connected devices to cause harm".

Last year, the government noted, Android phone users downloaded apps which contained the Triada and Escobar malware from various third-party app stores __(3)__. "This resulted in cyber-criminals remotely taking control of people's phones and stealing their data and money by signing them up for premium subscription services," the report said.

The NCSC's report noted that apps "can also be installed on laptops, computers, games consoles, wearable devices (such as smartwatches or fitness trackers), smart TVs, smart speakers (such as Alexa devices), and IoT (internet of things) devices". It includes an example of a security company demonstrating how it could create a malicious app for a popular tracker from a fitness firm, that could be downloaded from a link using the company's web address to seem legitimate __(4)__.

The app contained "spyware / stalkerware capable of stealing everything from location and personal body data". The company moved to fix the problem after the security firm alerted it.

A new code

The NCSC report noted that the appetite for apps had grown during the pandemic, with the UK app market now worth £18.6bn ($23.2bn).

The cyber-security centre supports __(5)__ the government's proposals to ask app stores to commit to a new code of practice setting out minimum security and privacy requirements. "Developers and store operators making apps available to UK users would be covered. This includes Apple, Google, Amazon, Huawei, Microsoft and Samsung," the government said.

A proposed code of practice would require stores to set up processes so that security flaws can be found and fixed more quickly.

2. Rearrange the letters to receive the words from the text

1	rwmleaa	
2	ramiclin	
3	vraycip	

4	reyistuc	
5	pasewyr	
6	afwl	
7	rmlyeeto	
8	alnodwdo	
9	sculoiima	
10	ratteh	

3. How well do you understand the text?

1. What is meant by the underlined word in the fragment "devices from smart TVs to smart speakers now also have them"?
2. What malicious software was mentioned in the NCSC report?
3. How did cyber-criminals steal money from people's phones?
4. What is a general term for e.g. smartwatches?
5. Why a "fitness firm" was mentioned?
6. What happened after a security company warned the fitness firm about possible breaches in their app security?
7. The word "code" has various meanings in English, e.g., according to https://www.merriam-webster.com/dictionary/, they are *instructions for a computer; a systematic statement of a body of law; a system of signals or symbols for communication; a system of principles or rules; system of symbols (such as letters or numbers) used to represent assigned and often secret meanings*. In what meaning do you think the word "code" is used in this text, as in the subtitle *A new code*? Make example sentences where all the meanings of the word "code" would be clearly understood.
8. Why the names of big companies like Apple or Google are listed?

Reading 4

1. Match the selected words with their meanings.

1	encrypted	a	an exchange or transfer of goods, services, or funds
2	time-consuming	b	requiring hard and sustained effort
3	permutation	c	depleted or emptied
4	harvested	d	converted into a code
5	transaction	e	the process of making less severe or painful
6	drained	f	changing the lineal order of an ordered set of objects
7	precaution	g	danger or hazard
8	mitigation	h	gathered, caught or hunted

9	peril	i	a measure taken beforehand to prevent harm
10	laborious	j	taking up a great deal of time

2. Read the text and complete the task.

What is quantum apocalypse?

Imagine a world where encrypted, secret files are suddenly cracked open – something known as "the quantum apocalypse".

Put very simply, quantum computers work completely differently from the computers developed over the past century. In theory, they could eventually become many, many times faster than today's machines.

That means that faced with an incredibly complex and time-consuming problem – like trying to decrypt data – where there are multiple permutations running into the billions, a normal computer would take many years to break those encryptions, if ever.

But a future quantum computer, in theory, could do this in just seconds. Such computers could be able to solve all sorts of problems for humanity. The UK government is investing in the National Quantum Computing Centre in Harwell, Oxfordshire, hoping to revolutionise research in the field. But there is also a dark side.

Data thieves

A number of countries, including the US, China, Russia and the UK, are working hard and investing huge sums of money to develop these super-fast quantum computers with a view to gaining strategic advantage in the cyber-sphere.

Every day vast quantities of encrypted data – including yours and mine – are being harvested without our permission and stored in data banks, ready for the day when the data thieves' quantum computers are powerful enough to decrypt it.

"Everything we do over the internet today," says Harri Owen, chief strategy officer at the company PostQuantum, "from buying things online, banking transactions, social media interactions, everything we do is encrypted. But once a functioning quantum computer appears that will be able to break that encryption ... it can almost instantly create the ability for whoever's developed it to clear bank accounts, to completely shut down government defence systems, Bitcoin wallets will be drained."

It's a prognosis echoed by Ilyas Khan, chief executive of the Cambridge and Colorado-based company Quantinuum. "Quantum computers will render useless most existing methods of encryption," he says. "They are a threat to our way of life."

Quantum-proofing

Seriously? That does sound completely apocalyptic, so why haven't we heard more about this?

The answer is that yes, OK, this would indeed be the case if no precautions were being taken. "If we weren't doing anything to combat it then bad things would happen," says a Whitehall official who asked not to be named.

In practice, mitigation efforts are already in train and have been for some years. In the UK, all government data classified as "top secret" is already "post-quantum" – that is, using new forms of encryption which researchers hope will be quantum-proof.
Tech giants like Google, Microsoft, Intel and IBM are working on solutions, as well as more specialist companies like Quantinuum and Post-Quantum.
Most importantly, there is currently something of a post-quantum cryptography "beauty parade" taking place at the US National Institute for Science and Technology (NIST) just outside Washington DC. The aim is to establish a standardised defence strategy that will protect industry, government, academia and critical national infrastructure against the perils of the quantum apocalypse.
All of this will not be cheap. Quantum computing is expensive, laborious and generates large amounts of heat. Developing quantum-safe algorithms is one of the major security challenges of our time.
But experts say the alternative – doing nothing – is simply not an option.

3. Explain the expressions underlined in the text in other words: *cracked open, put very simply, if ever, with a view to, echoed by, to render useless, to be the case, in train.* ***Use them in the following sentences. Sometimes you have to change the form of the verb.***

1. Shoppers 'dial out' inflation by opting for cheaper options: ___, if the price of rice doubles, shoppers are more likely to choose pasta.
2. If nothing changes, all our efforts will be ____.
3. The testing of the prototype machine is complete and modifications are ____.
4. Such radical opinions have rarely, ____, been heard here before.
5. He studied hard ____ receiving a scholarship.
6. First, nobody believed that the cause of the fault was a hardware problem, but a closer analysis revealed that this ____.
7. The report ____ a number of serious breaches and allegations in the hierarchy of the company.
8. This view has been ____ many computer experts lately.

4. Answer the questions.

1. What are quantum computers compared with?
2. What process is usually used in decrypting data?
3. What institution in UK supports the research in the field of quantum computing?
4. Why so many countries are investing in quantum computer programmes?
5. What happens to our data when we go in the internet?
6. What areas will be most affected if or when cyber criminals use quantum computers to decrypt internet customers' data?

7. What is done in UK with secret government data to prevent their decryption?
8. What famous companies are working on similar problems?
9. What is meant by "beauty parade" in the text?
10. What can programmers do to contribute to solving the quantum apocalypse problem?

Use of English

Collocations with the verb TAKE

1. Look at some examples of the word "take" given in the texts and audio materials of this unit. Try to explain the meaning of the highlighted collocations in other words.

- Mobile malware commonly **takes advantage** of vulnerabilities in mobile operating systems...
- Often the victim will be told they need to **take part** in a security check or account reactivation ...
- Online victims are **taken to a fake web site**, which can look just like real thing.
- ... **actions** that a victim should be asked **to take** by the attackers.
- A distributed denial of service or DDoS attack is an attempt to **take a website offline** by overloading it with Internet traffic from many different sources.
- ... a normal computer would **take many years** to break those encryptions.

2. Try to remember the use of this verb in other contexts, e.g.: take a train, take two hours etc. In two teams, write down as many sentences as you can with the word "take" in different meanings.

3. Review some collocations with the word take and then complete the sentences in examples.

Collocation	**Meaning**	***Example***
take into account / consideration	to consider or remember something when judging a situation	*A good architect **takes into account** the building's _____.*
take action	to act in order to get a particular result	*We must **take action** to cut vehicle _____.*
take advantage of sth	to make good use of sth; to profit by sth	*Many schools don't **take** full **advantage** of ____.*
take advice	obtain information and guidance	*We shouldn't **take advice** from ____.*

take sth apart	purposely break into pieces	*He **took** the car brakes **apart** and found ____.*
take an exam / a test / a course	attend an exam / a test / a course to complete it	*Do you have to **take an exam** in _____?*
take charge of sth	to accept responsibility for something and have control over it	*She **took charge of** the project and made sure ____.*
take care of	to be responsible for sb or sth	***Take care of** the pence and the pounds will take care of ____.*
take for granted	to believe something to be the truth without even thinking about it	*I **took** it **for granted** that I would find ____.*
take a day / two days / a week off sick	to decide not to work during particular time because of health problems	*If you catch the flu, you may **take** several days **off sick** to recover and ____.*
take the floor	start speaking	*Professor Reeves was the ____ to **take the floor**.*
take hold	become established	*The ____ is just beginning to **take hold** now.*
take the lead	to take a position that is ahead of others	*Sue wanted to **take the lead** in this project to ____.*
take notice	to observe or treat sth or sb with special attention	*This news made us all ____ and **take notice**.*
take sth on	to accept a particular job or responsibility	*Secretaries are now far more able to **take on** a more ____.*
take over	to get control of something	*She **took over** management of this ____ last winter.*
take part	to be involved in some activity	*He will **take part** in ____.*
take place	happen	*The conference will **take place** in ____.*
take sth literally	to misinterpret the meaning of something	*That was meant to be ____, but he **took** it **literally**.*
take turns	do the same thing, one after the other	*We **take turns** to answer the ____.*
take up (space / time)	to fill an amount of space or time	*Too much of this report is **taken up** with ____.*

take your time	spend as much time as you need in doing something	*Whatever you do,____ and* ***take your time****.*

4. Fill in the gaps in the sentences with the given words.

hold	hours or days	seriously	on	over
advantage	place	charge	measures	action

1. Third-party app connections typically take ____ outside the view of the security team, are not vetted to understand the level of risk they pose.
2. As digital transformation takes ____ and businesses become increasingly reliant on digital services, it has become more important than ever to secure applications and APIs.
3. While known malware families are more predictable and can be detected more easily, unknown threats can take ____ a variety of forms, causing a bunch of challenges for their detection.
4. When analyzing known malware families, researchers can take ____ of existing information about the malware, such as its behavior, payloads, and known vulnerabilities, in order to detect and respond to it.
5. Another great application for machine learning (ML) quickly understands which users and patterns appear to be behaving maliciously. This is something that often takes application providers ____ to identify. With ML, this can be done in minutes, allowing those application providers to quickly take ____ and block / mitigate.
6. Take ____ of your computer's security and shield yourself from the escalating risk of cyber-attacks!
7. Apple is urging macOS, iPhone and iPad users to install updates that include fixes for vulnerabilities that allow attackers to execute arbitrary code and ultimately take ____ devices.
8. The alerts published by CISA and other U.S. government agencies, and cyber-officials in other countries, should be taken ____ and the recommended defensive and resilience ____ should be taken – especially by government agencies and critical infrastructure enterprises.

5. Find the explanation of the following expressions. Make sentences where these expressions can be used for the other students to complete them.

E.g.: take a look – Just ___ at this photo and you can immediately remember this person.

take it easy	
take its toll	
take sb under one's wing	

take the plunge	
take it out on sb	
(you can) take it from me	
take a powder	
take heart	

Writing A cover letter

1. Have you ever thought of becoming a cybersecurity engineer? What in your opinion this activity involves? Discuss in groups and share your ideas. Compare your understanding with one of the definitions. Do they match?

Cyber security analysts *protect computer networks and systems from cyberattacks. They work for businesses, governments, and other organizations to identify and prevent cybercrime. In order to be successful in this field, you need to be able to think on your feet and have a strong understanding of computer security.*

2. Scan the advertisement of PGP program at Careerera and try to explain the meanings of the underlined words by asking your group mates or consulting the dictionary.

comprehensive	enhanced	boost
prodigiously	agency	dedicated
caliber	cluster	to mitigate
compliance	domain	to thwart

3. Read the text again and find out the contents of the course and the skills and abilities which a cyber security specialist is expected to have after graduating the program. Try to give information in your own words. Can you add anything else useful?

Post graduate program in cyber security with Careerera.

Have you ever thought about what malware, spyware, ransomware, and other viruses and worms can do to your IT and cyber web system? It's time you think about it and obtain enough knowledge to fight cyber-attacks with our Post Graduate Program (PGP) in Cyber Security certification!!

The PGP in Cyber Security program is designed to educate the new learners about comprehensive approaches for securing and protecting data that can prodigiously and with considerable effect harm and devastate the whole base of an IT structure. Time taken will be – just a few seconds, the damage will be – unrecoverable costing millions and even billions to the businesses and their owners! Thus, here, we understand how

seriously the course is growing in popularity, coping with the demands of unskilled employees in the domain of Cyber Security.

The Cyber Security online training program, at Careerera, is developed to emphasize building skills and caliber that suit the Cyber world outside. It centers on safeguarding data, analyzing potential risks, reduction of risks, cloud-based security, and compliance. The course offers an escalating scope of skills for its learners and professionals. Here, we start with the basics and reach advancing skills for a better, updated, enhanced, and superiorly finer knowledge building like none other. In this Cyber Security certification, you get to learn with Cyber experts and mentors who have a pool of knowledge, valued experience, and practical agency. They guide you in the right way – to cluster all the information, allowing you to learn, and understand data which will help you solve the toughest problems in the domain of Cyber Security. Are you ready to give your career a real boost in the domain of Cyber Security? Read more here about what we are offering to you in this Cyber security training online, join us and the dedicated team of mentors at Careerera, and find the real you!

On the completion of this program, you will:

- Be able to secure data and information by using advanced strategies, techniques, and tools
- Mitigate risk by using advanced security policies and processes
- Have extensive coverage of the topic on security under cloud computing architecture
- Understand legal requirements, audit processes and privacy issues in the cloud environment
- Know how to better adapt the enterprise IT framework to thwart threats
- Be able to master many tools such as Nmap Hacking Tool, Burp Suite Hacking Tool, Netsparker, Acunetix, Metasploit and many more

4. Read an example of Cyber Security Analyst Cover Letter. Complete the letter with the words from the box.

security measures	team player	schedule	experience
mitigate	résumé	confident	skills
motivated	responsibilities	position	threats

Dear Sir / Madam,

I am writing in regards to the Cyber Security Analyst opening that **I saw on your website**. I believe that my background and ____ **make me an excellent candidate** for this ____.

I have been working as a Cyber Security Analyst for the past three years at a major financial institution in New York City. My primary ____ include monitoring network

activity, identifying potential ____, and developing strategies to ____ those threats. I also work closely with IT personnel to develop new ___***security measures***___ and improve existing ones.

I am a highly ____ and results-oriented individual, and I am ____ that I can exceed your expectations in this role. I am passionate about cyber security and I am always looking for new ways to improve my ____ and knowledge. I am also a ____ and I am confident that I can be an asset to your team.

I have attached my ____ for your review. Please feel free to contact me if you would like to ____ an **interview** or if you have any questions about my qualifications.

Sincerely,

John Walsh

5. Find in the Internet an advertisement of a cyber security job vacancy. Use the example of a cover letter and the following tips to write your own cover letter that will show the hiring managers that you're a perfect candidate for the job. Remember that the description of your skills and work experience should match the requirements of the advertisement.

Cover Letter Writing Tips

1. Highlight your experience

When applying for a job, you need to show employers that you have the experience and skills required for the role in your cover letter. Talk about your specific skills. You can also mention any awards or recognition you have received for your work in this area.

2. Show your passion for the job

In your cover letter, you should also show hiring managers your passion for taking this position. One way of doing this is by talking about your experience in the field. For example, you can mention how you became interested in the profession and what motivated you to pursue a career in this area.

You can also highlight your experience in related fields, such as information technology or computer science. This will show employers that you have the necessary skills and knowledge to be successful in the role.

3. Tailor your cover letter to the job description

To make sure your cover letter is tailored for the job, you need to read the job description carefully and make sure you include all the relevant skills and experience they are looking for. You can also mention how your past experiences have prepared you for this new role.

4. Proofread your cover letter

Proofreading your cover letter is one of the most important steps in ensuring that you make a good impression on hiring managers. Make sure to spell-check and double-

check that there are no errors in your resume or cover letter. Otherwise, you risk being disqualified from the job before they even see your qualifications.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
attacks		
trojan		
hackers		
spyware		
payloads		
phishing		
ansomware		
evade		
an assault		
«creeper» virus		
cyberattackers		
Mobile Malware		
Botnet Malware		
Banking Trojans		
cryptominers		
encrypt		
cyber threats		
polymorphic code		
Man-in-the-Middle (MitM) Attack		
Denial of Service Attack		

Grammar Focus

Infinitive (to + V) vs Bare Infinitive (V)

Bare Infinitive is used in the following contexts

After auxiliary modal verbs: (*will, shall, would, could, can, may, might, must, should, needn't*)	*You **needn't go** on a diet but you **must eat** healthy food.*
After the causative verbs (*make, have, let* and *help)*	*She **made** the children **do** their homework.*

After verbs of perception: (*see, watch, notice, observe, feel, hear…*)	*He **heard** the teacher **call** his name.*
After expressions *would rather* and *had better*	***You'd better call** a doctor.*
After prepositions such as e*xcept, but* and *than*	*I'll do anything **except cook.***
After *why* when making suggestions	***Why wait** until later when we can do it now?*

1. Choose the proper form of the Infinitive from the brackets with or without the particle to.

1. You'd better (to eliminate / eliminate) the threat of the computer virus infection by installing the antivirus program. 2. My colleague stopped what he was doing (to answer / answer) the phone. 3. He promised (to help / help) me with webcam. 4. I could (to play / play) computer games when I was four. 5. After the incident in the lab our teacher made us (to learn / learn) all the safety rules by heart. 6. The captain is usually the last person (to leave / leave) the ship on fire. 7. It is important (to know / know) several computer languages if you want (to be / be) a good programmer. 8. They are not qualified enough (to work / work) on this project on their own. 9. He might (to deal / deal) with the leakage of information to competitors. 10. I would prefer (to become / become) a specialist in the field of cyber security. 11. They will be able (to fill in / fill in) the job application form in a month after their graduation from the university. 12. He has got the computer program (to complete / complete).

2. Put to before the Infinitives where necessary.

1. The teacher made me ___ repeat it all over again. 2. You needn't ___ ask for permission, I let you ___ take my books whenever you like. 3. Will you help me ___ move the table? 4. He is expected ___ arrive in a few days. 5. You seem ___ know these places very well. 6. You had better ___ make a note of it. 7. I heard the door ___ open and saw a shadow ___ move across the floor. 8. He told me ___ try ___ do it once again. 9. I'd rather ___ walk a little before going to bed. 10. There is nothing ___ do but ___ wait till somebody comes ___ let us out. 11. You ought not ___ show these messages to anyone. 12. Why not ___ wait a little longer? 13. I felt her ___ shiver with cold. 14. We should love you ___ stay with us. 15. I'll have ___ go there and check everything myself. 16. There doesn't seem ___ be anything wrong with you. 17. The lorry was seen ___ make a sudden turn and stop. 18. What made you ___ think so? 19. He was not able ___ explain anything. 20. The train is expected ___ come in half an hour.

Forms of the Infinitive

	Active	Passive
Simple refers to the same time as that of the main verb	*(to) write*	*(to) be written*
Continuous refers to the same time as that of the main verb and expresses an action in progress or happening over a period of time	*(to) be writing*	-
Perfect refers to a time before that of the main verb	*(to) have written*	*(to) have been written*
Perfect Continuous refers to a time before that of the main verb and expresses an action in progress or happening over a period of time	*(to) have been writing*	-

Modals + have + Past Participle (V-III)

3. Revise the meanings of modal verbs with Perfect Infinitive. Fill in the gaps with modal verbs to match the meanings

Regret or criticism of someone's actions in the past	_____ *or ought not to + have + V-III*
Absence of necessity in the past (something wasn't necessary but it was done)	_____ *+ have + V-III*
Possibility in the past (perhaps something happened but we are not sure)	*may or* _____ *+ have + V-III*
Unfulfilled possibility in the past (it was possible for something to happen)	_____ *+ have + V-III*
Positive deduction in the past (we are almost sure that something happened)	_____ *+ have + V-III*
Negative deduction in the past (we are almost sure that something didn't happen)	_____ *or couldn't + have + V-III*

4. Fill in the gaps with a suitable modal verb. Sometimes more than one option is possible.

1. A: I phoned you at nine this morning but got no answer.
B: I'm sorry. I ____ have been in the garden.
2. A: I've opened another bottle.
B: You ____ have done that. We haven't finished this one yet.
3. A: Perhaps he swam across.
B: He ____ have done that. He can't swim.
4. A: I saw Ann in the library this morning.
B: Are you sure? You ____ have seen someone else.
5. A: I had to get down the mountain in a very thick fog.
B: Really! It ____ have been pretty difficult.
6. A: Joe returned home with a tiger cub in his hands.
B: His wife ____ have been very pleased about that. She's fond of animals you know.
7. You ____ have made two copies. One would also have been enough.
8. You two went to that party and didn't even tell me. You ____ have called me at least.
9. You ____ have informed the company's accountant much earlier. The boss will surely get crazy on learning this.
10. Look! It's raining now. You ____ have watered the garden at all.

5. Complete each sentence B so that it has a similar meaning to sentence A. Use the correct form of the verb in brackets.

1. A: I'm sure schools in 50 years won't be the same as they are nowadays.
B: Schools in 50 years must ____ very different from nowadays. (be)
2. A: It's possible Josef went to school by bus .
B: Josef may ____ the bus to school. (take)
3. A: I'm sure their holiday wasn't very nice because the weather was so bad.
B: With such terrible weather, they must ____ not a very nice holiday. (have)
4. A: It was unnecessary for us to take a taxi. There is plenty of time left.
B: We needn't ____ a taxi. There is plenty of time left. (take)
5. A: It would be good if you helped Chloe to find her watch.
B: You should ____ Chloe to find her watch. (help)
6. A: We are going in the wrong direction
B: Yes, we must ____ a turning. (miss).
7. A: Shakespeare and Voltaire weren't alive at the same time, so they definitely never met.
B: Shakespeare and Voltaire weren't alive at the same time, so they can't ____ each other. (know)

8. A: Alison looks happy about her exam results, so she's certainly done well.
B: Alison looks happy about her exam results, so she must ____ well. (do)
9. A: I'm not sure its right to scold Ray for mistakes.
B: We shouldn't ____ Ray for mistakes. (scold)
10. A: Joe can't open the door . Maybe he can't remember where he put the key.
B: Joe can't open the door. He may ____ the key. (lose)

6. Use the words in brackets as Passive Infinitive (to be + V-III).

1. The little boy likes _____ by his mother. (hold)
2. He doesn't want _____ back home. (send)
3. The landlord asked _____ on time. (pay)
4. The new workers need _____ how to use the machines. (show)
5. The passenger will _____ off of the plane as soon as it arrives. (escort)
6. Customers expect _____ when they are in the store. (help)
7. Dinner is _____ at 7 p.m. (serve)
8. The prisoners are soon _____ by their captors. (release)
9. _____ for advice by the President was a great honor. (ask)
10. They don't want _____ when they buy the car. (cheat)

7. Complete the second sentence using Passive Infinitive.

1. She wants a doctor to see her. / She wants _____.
2. I need you to give me more time. / I need _____.
3. John hopes that company hires him. / John _____.
4. Runners in the street want the drivers to see them. / Runners _____.
5. They're going to sell the car at an auction. / The car _____.
6. The store will fix the computer for free. / The computer _____.
7. The government plans to release the information. / The information _____.
8. Bob asked someone to pick him up at the airport. / Bob asked _____.
9. They don't want anyone to disturb them. / They don't want _____.
10. You need to wash this by hand. / This _____.

8. Use the verb in brackets as Active or Passive Infinitive.

1. I have _____the bill. (pay) – I have to pay the bill.
2. The bill has ____ (pay). – The bill has to be paid.
3. There is no need for the governments ____ the internet. (regulate)
4. The suspects are going ____ by the police. (question)
5. She needs ____. (guide)
6. She is going ____ a lesson. (learn)
7. The solution should ____. (find)

8. You will have ____ my conditions. (accept)
9. She likes ____ by her first name. (call)
10. She expects ____ a higher position. (give)
11. He is going ____ tomorrow. (interview)
12. His greatest ambition is ____ to take part in the Olympics. (choose)
13. I didn't want ____ you so late. (disturb)
14. I don't like ____ at. (laugh)
15. This rule must ____ without exceptions. (follow)
16. The answer to that mystery was not likely ____ anytime soon. (reveal)
17. She wants ____ a more difficult task. (give)
18. Temporary employees were hired ____ the seasonal work. (do)
19. The company promised ____ him a pay-rise next month. (give)
20. He was hoping ____ on the computer engineering course. (accept)

Complex Object

Subject + Predicate + Complex Object

Complex Object = Noun (*Tom / the car*) / Pronoun (*me / him / them*) + Infinitive.

The Infinitive can be used **with** or **without** the particle ***to***.

- I want you to know that it doesn't matter.
- I saw the boy help his mother with heavy bags.
- I heard her sing in the garden.

1. After the verbs *to want, to expect, to know, to suppose, to consider, to believe* the Infinitive is used **with** the particle ***to*** before it.
   - I consider Bob to be Jack of all trades.
   - Granny expected her grandson to come back home earlier.
2. After the verbs *to hear, to see, to watch, to feel, to let, to make* the Infinitive has **NO** particle ***to***.
   - I heard him describe the new computer game to his friends.
   - Father made his children put all their toys into the box.

9. Rewrite the sentences using the Complex Object instead of the Subordinate Clause.

1. The teacher wanted that the students should learn the rule. 2. He saw that she had burst into tears. 3. The nurse watched that the little boy was crying. 4. The woman wanted that her son should study mathematics. 5. He expected that they would understand his problem. 6. I consider that he will become a great scientist. 7. We heard that a man pulled the door loudly open. 8. We know that he is a talented musician. 9. I

expect that the letter will come tomorrow. 10. The boss felt that his new employee's hand shook. 11. We suppose that she will be invited to the conference. 12. We believe that he will be given all the necessary equipment.

10. Change the complex sentences into simple ones using complex objects.

Model: *I think that the flat is very cozy. – I think the flat to be very cozy.*

1. I think that a shower is a most important convenience.
2. I think that our water supply is not good.
3. I saw that he crossed the street.
4. I did not expect that they would come in time.
5. I watched how he spoke to his neighbour.
6. He heard that the telephone rang.
7. I saw that he took out his mobile phone.
8. She believed that he had stolen her money to pay his debts.
9. He wants that this work will be done.
10. He wanted that the work would have been done by Friday.

11. Practise using Complex Object after make or let. Change the sentences according to the models.

Model 1: *Mother advised her daughter **to buy** a new dress. – Mother made her daughter **buy** a new dress.*

Model 2: *His mother allowed him **to go** for a walk with his friends. – His mother let him **go** for a walk with his friends.*

1. Father advised his son to give up smoking.
2. His elder brother advised him to get a new job.
3. The doctor allowed the patient to do morning exercises.
4. Jerry's dance teacher advised her to take part in the dancing contest.
5. The boss allowed the subordinate to leave 2 hours earlier.
6. Her parents advised her to move to London.

12. Read the extract from the poem pointing out complex objects. Learn the extract by heart.

The Wind

(by R. L. Stevenson)

I saw you toss the kites on high
And blow the birds about the sky.
And all round I heard you pass
Like ladies' skirts across the grass.
Oh, wind, a-blowing all day long,

Oh, wind, that sings so loud a song!
I saw the different things you did.
But always you yourself you hid.
I felt you push, I heard you call,
I could not see yourself at all.
O wind, a-blowing all day long!
O wind, that sings so loud a song !

Complex Subject

Complex Subject = **Noun / Pronoun** + Predicate + **Infinitive**

He *is said* ***to be*** *a good cyber security engineer.*

The students of this group *are known* ***to have*** *passed their exams well.*

The **Predicate** of sentences with a complex subject can be expressed either by **Passive** or **Active** forms:

1. The verbs of sense perception: *to see, to hear…*, verbs of mental activity: *to know, to suppose…*; verbs of inducement: *to order, to cause, to allow…*, verbs of saying: *to say, to report, to announce...* are usually used in the **passive voice**.

He ***was supposed*** *to bring this book from London.*

They ***are he****ard to have come from the South.*

This article ***is expected*** *to be published next month.*

The construction of the new hostel ***is reported*** *to be over.*

2. The verbs *to seem, to appear, to prove, to happen, to turn out, to chance* are used in the **active voice**.

The telephone ***happened*** *to be out of order.*

The young man ***proved*** *to know everybody.*

The house ***seems*** *to have been damaged by the earthquake.*

3. Compound predicate: *to be likely, to be unlikely, to be sure, to be certain, to be bound* is also used.

They ***are likely*** *to return on Sunday.*

Their team ***is certain*** *to win.*

He ***is sure*** *to miss this train.*

This house ***is likely*** *to have been built many centuries ago.*

Note. – As part of a complex subject the infinitive is **always** used with the particle ***to***.

13. Translate the following sentences into your native language paying attention to the Complex Subject with the Infinitive. Define the forms of the Infinitive in these sentences.

1. She was heard to argue with Howard. 2. He is considered to be an experienced lawyer. 3. The annual output of personal computers is expected to reach millions in the near future. 4. She is believed to be studying Dutch. 5. Our present-day life seems to be quite impossible without telephone, radio and television. 6. Margaret was known to have her own opinion on the matter. 7. We are expected to do the job right away. 8. The construction of the plant was stated to have been completed. 9. The optical equipment for transmitting stations is reported to have been produced. 10. Intensive research on optical-electronic computer is said to be going on in a number of US companies. 11. Lasers are likely to be used in our everyday life soon. 12. Superconductivity is certain to bring about new discoveries in science and technology. 13. Lasers appeared to be highly useful for solving the problem of controlled thermonuclear reaction and communication. 14. Optical technology has been found to be cost-effective.

14. Rewrite the sentence using Complex Subject with the Infinitive.

1. It seems to me that he is looking for something. He seems to be looking for something,

2. It seems to me that she knows something about it. 3. It seems to me that they have forgotten everything. 4. It seems to me that his report has not been translated yet. 5. It seems to me that this man has been waiting here for 3 hours. 6. I am sure that he will find your keys. 7. It is reported that the Prime Minister has just returned from abroad. 8. It is known that he is a good specialist. 9. It is considered that his work is of great importance. 10. It is believed that this book was written 200 years ago. 11. It is supposed that he is working on his new invention. 12. It is said that the weather on our planet in the next 100 years will be extremely hot. 13. It is likely that she will take her sister with her. 14. It is likely that the article will appear in the next issue of the magazine.

15. Use Active or Passive forms of the Predicate using the verbs in brackets.

1. The refrigerator ____ to work well. (expect)
2. She ____ to be looking for the job of a computer designer. (seem)
3. A new student in our group ____ to like computer games. (appear)
4. A washing machine ____ to save much time. (consider)
5. The antivirus program ____ to be new. (suppose)
6. He ____ to have lost his new smartphone. (seem)
7. She ____ to damage her file with assignments on Physics. (happen)

8. Potted plants ____ to take much light. (know)
9. He ____ to have a new version of Windows. (happen)
10. The expedition ____ to have reached its destination. (believe)
11. Mark and Daisy ____ to go home together. (see)
12. The vacuum-cleaner ____ to be broken. (prove)
13. New novels ____ to be published next week. (expect)
14. Denis ____ to be writing a course project. (say)
15. Andrew ____ to have used another person's student card. (appear)
16, The new computer program ____to have been created by the second year students. (turn out)

16. Make up correct sentence with Complex Subjects.

Model: *the guests, to arrive, tomorrow, to expect – The guests are expected to arrive tomorrow.*

1. to seem, in this, the kitchen, two-bedroom apartment, to be too small
2. the new jeans, to be torn, to happen
3. to be sure, my friends, to come to my place on the birthday party
4. the shelf, to prove, to be shaky
5. the vase, to be made, 100 years ago, to know
6. to come in time, to expect, everybody
7. people, to suppose, to wash hands before meals
8. at that time, to happen, my brother, to be out of village
9. to seem, the house, by the earthquake, to have been damaged
10. not to seem, he, to have returned
11. not to be likely, to come on time tomorrow, Julia.

17. Answer the following questions using Complex Subject.

1. Did he prove to be a successful businessman?
2. You don't happen to have lost your mobile phone, do you?
3. Did your mathematical calculations prove to be too complicated to do them without special knowledge?
4. Is your university computer center supposed to work 24 hours?

For + Object + Infinitive

a) after Adjectives

It is important (difficult / easy / impossible / …)	for me (him / students / …)	to understand this

Note: *It is important for him to be here. = It is important that he should be here. = It is important that he be here.* (more formal)

b) after Nouns

It is time	for me (him / students / …)	to join the group.
The support the idea		
It took some time		

c) after *too* and *enough*

The coffee is too strong	for me (him / children / …)	to drink.
The milk is not cold enough		
There is not enough water		

18. Paraphrase the sentences using constructions with for + Object + Infinitive.

Model. *It is important that the meeting be a success. – It is important for the meeting to be a success.*

1. It is unusual that people should call after ten. – It is unusual ____.
2. We cannot finish the work on time. – It is impossible ____.
3. He is going to quit his job. We think it is unnecessary. – It is unnecessary ___.
4. It already late. Everybody should go to bed. – It's time ____.
5. She is too talkative today. It is strange. – It is unusual ____.
7. You speak too quickly. I cannot understand you.– You speak too quickly ___.
8. There is a plan: the city should become zero-waste. – There is a plan ____.
9. Students often use the Internet to get information. – It is common ____.
10. It is too cold. I will not go swimming. – It's too cold ____.
11. The test was not difficult. All students have completed it. – The test was easy enough ____.
12. The lift is too small. All the furniture cannot be loaded. – There is not enough room ____.
13. We would be pleased to see you again. – It would be a pleasure ____.
14. They needn't reboot the computer. – It's not necessary ____.
15. He should stop smoking. It's not good. – It's better ____.
16. It is essential that we have a first-aid kit in the car. – It is essential ____.
17. It is too late. The children shouldn't go for a walk. – It is too late ___.
18. She hasn't come to work today. I am surprised. – It is unusual ____

Unit 6
Virtual reality

VR is a way to escape the real world into something more fantastic. It has the potential to be the most sociable technology of all time.

by Palmer Luckey,
Founder of Oculus Rift

Warming Up

1. What developments in computer technology have changed the way people live and work?
2. How have some home entertainments such as television, video recorders, and video games affected people's life?
3. How will further advances in computer technology continue to change the world?
4. It has been said that technology is a double-edged sword. What does that statement mean?

Start Thinking

Vocabulary focus

Virtual (adj.) – a) almost but not exactly;
b) temporary simulated by computer software.

In what meaning is the word virtual used in the sentences?

1. It is a clear sign of just how much crime has moved from the real world into the *virtual* one.
2. What sort of dog owner would lend her dog to a *virtual* stranger?
3. Argentina came to a *virtual* standstill while the game was being played.
4. *Virtual* visiting was rendered even more appealing by the difficulties of travel.
5. Even after twenty years living on the same street the reclusive man was still a *virtual* stranger to his neighbors.
6. The *virtual* world and the material world cannot be designed any more in isolation from each other.

Reading 1

Don't know much about VR? Don't be embarrassed; following are the answers to some of the most common virtual reality questions that will help you understand the virtual experience.

1. In the text, replace the words in bold with their synonyms.

2. Match the questions on virtual reality (1 – 12) and the answers (A – M). One letter is extra.

1. What is virtual reality?
2. How does virtual reality work?
3. What's a virtual reality headset?
4. What do people use virtual reality for?
5. Is it working?
6. Hasn't VR been around forever?
7. Why are people excited now?
8. Does virtual reality make people sick?
9. Just how big is virtual reality market going to be?
10. Who's interested in virtual reality?
11. What is augmented reality?
12. How do you create a virtual reality experience?

A That depends. A virtual reality artist can make a virtual world using specially designed software. For example, YouVisit specializes in capturing real-world content, so they utilize a variety of specialty video cameras to achieve a real environment. They then **stitch** individual images together to create a 360-degree experience that is viewable on browsers, mobile, and in VR.

B A virtual reality headset is what you use to enter virtual reality. These devices are lightweight devices that you place over your eyes. There are two main types: mobile and computer. A mobile virtual reality headset like Google Cardboard or Samsung Gear VR works with a smartphone. You pull up your favorite VR app, lock your smartphone in the headset, and start enjoying. A computer virtual reality headset is significantly more powerful (and expensive) than a mobile headset. This type of VR headset hooks up to a high-performance computer, which allows for better graphics, among other things.

C Virtual reality **replicates** or simulates an environment. This environment could be real or imaginary; it also could be created using photography, videography, computer animation, or a combination of the three. When someone enters a virtual experience, the user has a full 360-degree view of what is happening around them.

D The most **straightforward** answer is that virtual reality "tricks" your brain into thinking you're someplace else. A virtual reality headset shows you an image, and

when you move, the device modifies the image to make it appear as if you're actually inside a different environment.

E Anything and everything. Virtual reality is utilized for education, research, entertainment, and more. Businesses and institutions use virtual reality to increase brand awareness and drive **conversions**. About 75 percent of Forbes World's Most Valuable Brands have created some virtual reality or augmented reality experience.

F Absolutely. Virtual reality is more engaging than traditional content, meaning that people are more likely to interact with it longer. These engagements lead to more conversions. British travel group Thomas Cook reported a 190 percent increase in tours booked to New York City after offering a virtual reality experience of the city in their stores. Amnesty International reported a 16 percent increase in direct-debit donations brought on by its VR campaign.

G Two industries that have been quick to **adopt** virtual reality are travel and education. Travel destinations like Visit Houston and Visit London Museum of science created VR experiences that enable anyone to see the destinations and get a glimpse of what it's like to visit in person. Colleges and universities are doing the same. Numerous schools have created virtual reality experiences of their campuses to use in recruiting efforts.

H Not forever, but for a while. There was a boom in virtual reality technology in the 1980s and 1990s. Unfortunately, VR technology at the time didn't live up to the hype, which **alienated** consumers and added to the tech's demise. Another factor in VR's early bust was the creation of the internet and a massive shift in interest to this new technology.

I Because in every way possible virtual reality is better than it was the first time around. Both the hardware and software have improved to the point where the hype is appropriate. Not only this, but mobile virtual reality is leading to the democratization of VR. Many industry experts are comparing today's VR industry to the smartphone industry of eight or nine years ago, right before smartphones **exploded**.

J Not any more. This change is one way technology has improved. In the '80s and '90s, there could be a slight **lag** between when some turned their head and the image they'd see. This lag caused some people, but not all, to feel sick. Today's technology has advanced to a smoother experience, allowing viewers to enjoy VR without worry.

K Big. Real big. Bigger than you're thinking. By 2020, augmented reality and virtual reality is predicted to be a $150 billion industry, according to Digi-Capital's 2015 Augmented / Virtual Reality Report. This would account for an audience in the tens of millions.

L Who isn't? About 73 percent of United States internet users are interested in VR, according to a study by Greenlight VR and Touchstone Research. The most passionate VR demographic is Generation Z, according to the survey. But other

generations aren't disinterested. The study also reported that 64 percent of Baby Boomers said they have positive feelings about VR.
M Augmented reality is when you overlay a digital image onto the real world. The two technologies are similar.

3. Double negation is sometimes used as a way of softening or downtoning the meaning of the adjective. Paraphrase the sentences making them affirmative.* E.g. *But other generations aren't disinterested. – But other generations are also quite interested.

1. It's not uncommon for those types of things to happen.
2. He is not indifferent to music.
3. It is not unusual for some people to have exotic animals as pets.
4. He is not without sense of humour.
5. He wasn't irresponsible about his duties.
6. This year's rise in inflation to 3% was not unexpected.
7. The repair costs $50. – Ok, that's not unreasonable.

Listening 1

VR

https://youtu.be/Z_0iFPRYAbI

1. Watch the video and formulate the definition of VR (virtual reality).

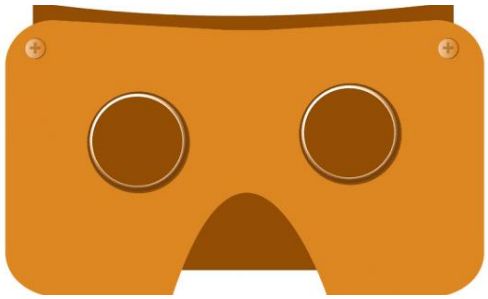
2. Listen to the recording again and write down the words which mean the same as the following.

1. increasing	2. restriction	3. imitated	4. completely
5. investigate	6. deceive	7. landscape	8. imitate
9. significantly	10. remote / unknown	11. regardless	12. handle

Reading 2

Match the key elements of Virtual reality experience by reading the information below.

a) Immersion
b) Interactivity
c) Virtual world
d) Sensory feedback



Even though virtual reality has been around for more than 20 years in high-tech organizations such as space agencies, only recently did it really take off among the general public. While not **being** exactly mainstream yet, it appears that its applications are **becoming** more and more accessible. We can now ask ourselves – what is the added value of VR and how it can impact our lives.

In their book, ***Understanding*** *Virtual Reality, Interface, Application, and Design*, William R. Sherman, and Alan B. Craig, define 4 key elements of virtual reality experience:

_____1_____

An imaginary space that independently exist from the real world. The medium used to create this space is of course a simulation made of visual elements rendered with computer graphics. Relations and interactions between these elements are defined by rules set by the creator.

_____2_____

The users are placed in a virtual space, cut from the real world on a sensory level. VR headsets allow this by **occupying** their whole field of vision, while headphones achieve the same results with sounds, thus fully **immersing** the users in another world.

_____3_____

VR headsets track the position of the users within a given space so that the computer renders the changes of positions. Users moving their heads or bodies will be given the illusion that they are **moving** in the virtual world. The input here is as close to reality as possible, to move around users don't press a button, they actually move around.

_____4_____

To feel real, a simulated environment should include virtual elements we can interact with: **picking** up an item, **swinging** a sword to kill a goblin, **breaking** a mug, **pushing** the ignition button of the plane in a flight simulator, etc.

Reading 3

1. Grammar Focus. Read the essay and choose the correct options.

2. In what other spheres can VR be used? Research and report to the class.

VR could revolutionize education by **enable / enabling** students to **learn / learning** in an immersive, experiential way, from anywhere in the world. VR provides the opportunity to **democratize / democratizing** education by **open / opening** up

opportunities to students of all backgrounds, which may not have been possible before. For example, Victory XR has partnered with Engage to **provide / providing** digital twin campuses to **enable / enabling** students to **learn / learning** in live, interactive classes from the brightest minds in the world.
Other companies like Tech Row enable students to **go / going** on a space mission to Pluto, explore Antarctica, and **experience / experiencing** the wonders of Machu Picchu. Field trips to the Colosseum and Ancient Rome can be completed from the classroom, and **be / being** taken on a journey of the human body as a white blood cell is not an impossibility any more!
Since VR enables individuals to **meet / meeting** in places virtually, it's no surprise that the pandemic brought a rise in VR events, conferences and meetings. Platforms such as Glue, Arthur and Meeting Room can be used to **hold / holding** collaborative, interactive meetings with colleagues from anywhere in the world.
You can put on your headset in London, and meet virtually with your colleagues in New York and Madrid, and connect and work with them as if you were all in the same room. With collaboration tools such as whiteboards and freehand 3D drawings, they help remote or hybrid meetings **become / becoming** as good as face-to-face meetings, without the time and cost needed to **travel / travelling**.

Reading 4

Work individually or in pairs. Read some examples of VR applications and present the information to your group-mates. Compare the VR experience with that obtained through usual activities. Use the expressions: compared to; in comparison with (to); unlike; not so ... as; (much / significantly / a little) <comparative> than; ... while ... etc.

Sports

The way that we watch sports is already changing, with several VR companies specializing in watching live sports events. You can now watch the NBA, NFL, and other events in VR. BT Sport broadcasted the UEFA Champions League final in 360 degree VR via YouTube and the BT VR app, all for free. You could watch the game from several viewpoints in the stadium, as if you were actually there.
Companies such as Big Screen VR enable people to watch the Superbowl together in VR, and NBC announced it will live stream the opening and closing ceremonies of the Beijing Olympics in VR, as well as provide highlights for some of the events in VR. You can even host a 'virtual Olympics watch party' if that's your kind of thing. This is a great way of opening up live sports events to people who can't travel to the venue or can't afford tickets to watch the sports in person. Instead, they can get a sense of atmosphere and presence from VR.

Law enforcement

As with the military, police forces are using AR and VR tools from companies like VirTra to train personnel in simulated scenarios complete with visual, auditory, and physical stimuli (ranging from barking dogs and street noise to the recoil of discharging a weapon).

The technologies even enable police forces to escalate or de-escalate trainees' simulated interactions with individuals inside the virtual training environments, helping learners practice making judgment calls and critical decisions under stress.

A group of University of Alabama researchers had collaborated with law enforcement officials to measure brain waves during VR police training. One of the lead researchers said the work may “improve training of officers and positively affect the hiring process.”

Recruitment

Lloyds Banking Group became the first organization in the UK to introduce VR exercises to assess graduates for its 2017 intake. In the future, VR could be used to assess key skills required for a job such as decision making, for job interviews, and could even replace assessment days altogether by bringing candidates together in the Metaverse.

This would save both the employer and potential employee time and cost in the interview process, and even attract higher quality candidates, as Deutsche Bahn has found.

Learning and development

The training industry has started to embrace the opportunities VR learning brings, with companies like Bank of America sourcing 10,000 headsets, and Walmart offering VR training to it's 1mn employees.

With VR, people can learn through experience in a risk-free space; it's consistent, affordable and scales. Virtual Speech, for example, provides VR training for soft skills such as public speaking, active listening, and sales. They blend e-learning with practice in VR and online simulations, enabling learners to build their confidence and skills in VR environments, from meeting rooms to auditoriums.

With the experiential learning VR brings, VR training significantly increases learning retention levels PwC infamously did a study on the effectiveness of VR learning for soft skills, and found people learnt up to 4 times faster in VR.

Tourism

There's nothing like a global pandemic and lockdowns to make you miss the freedom to travel to different countries, visit world-famous landmarks, and experience a glimpse into another culture.

Imagine being able to experience a guided tour of Barcelona or Budapest from your home in California or Singapore. With VR, you can do just that. You can even take a Harry Potter tour of Edinburgh from anywhere in the world!

In the post-Covid era, the developments in VR for tourism enable you to try a holiday before you buy it. Thomas Cook launched their 'Try Before You Fly' VR experience back in 2015, where potential holidaymakers could visit stores in various countries to experience the holiday in VR before booking it. As a result, there was a 190% uplift in New York excursions bookings after people tried the 5-minute version of the holiday in VR.

VR Expeditions 2.0 is another way tourism can become more accessible, with hundreds of virtual field trips available. From Rome's Colosseum to coral reefs, and the surface of Mars, users can travel the world from the comfort of their own home.

Video games

Nowadays, video games are without a doubt the most popular and well-known types of VR applications. VR offers new gameplay possibilities to developers and game designers alike. Some devices simulate hands so players can interact with objects: grabbing, drawing, throwing, etc. VR gears appear especially suited for first-person games. For instance, some games put players in a room they can physically move around in, pick up and look at items to solve a mystery. The immersive nature of VR is also a good fit for atmospheric games and driving simulators.

Social apps

Facebook launched the beta version of Social Spaces in May 2017, its new VR app. As Mark Zuckerberg puts it, “Virtual Reality puts people first”. Social Spaces gives its users the opportunity to sit at a virtual table and chat, play games, draw, exchange pictures and share media. I imagine, the app’s goal is to give people a level of interaction with other people that goes beyond simply talking through a video.

Vehicle simulators

Caterpillar crafted simulators for product development as well as training purposes. It simulates all the aspect of driving a Caterpillar vehicle with the addition of haptic feedback, which makes the drivers experience physical contacts with the virtual world. This method makes the virtual experience even more realistic and generates more precise feedback. This in turn allows to spot problems early in the development phase. It also reduces the need for building prototypes which takes time and can be costly.

When it comes to learning how to operate a vehicle, Caterpillar states that with their simulators, future drivers can train at a lower cost and no matter what the weather conditions are.

Education in medicine

One of the two main applications of VR in medicine is training. Doctors and healthcare personnel don't always have the opportunity to practice enough to fully master a procedure or a technique, which can result in errors and potential deaths. It is particularly true when it comes to surgery. VR simulations allow for an almost unlimited amount of repetitions and pose no threats to patients. This additional training would lower the number of errors and deaths.

Car design

Seymourpowell created a software to draw 3D sketches. It is now possible for a car designer to draw full-scale sketches. Car designers get a clear idea of what the final product will look like at an early stage of the project. Thanks to its flexible nature, designers can quickly make assessments, adjust and iterate. This technology along with other 3D and CAD software are likely to reduce the need for clay models. Ford's FIVE (Ford Immersive Vehicle Environment Lab) is a tool designers use to create HD, realistic rendering of a car's interior and exterior design. By putting on a VR headset anyone have a very clear idea of the physical appearance of a car before physical prototypes are made.

Listening 2
Timeline of VR

https://www.youtube.com/watch?v=01uYO8kqiVs

Watch and listen to the program and attribute the dates to the events.

Timeline of VR

No	Event	Date
1	Three-dimensional photos appeared	
2	A fiction story about virtual reality was published	
3	VR headset display was invented	
4	The first VR travel was organized	
5	The term Virtual reality was coined	
6	The game Virtual Boy was released	
7	Street View was introduced by Google	
8	A prototype of Oculus Rift was presented	
9	The PlayStation VR was released by Sony	
10	Cardboard DIY headset was created by Google	

11	The Sword of Damocles headset was invented by Ivan Sutherland	
12	VPL Research Pioneers sold the first VR headsets and datagloves	
13	NASA developed VR for training astronauts	80s
14	The company Oculus was launched	

Reading 5

1. Complete the gaps in the text (1-8) with extracts (a-h):

a) so that those people could see each other and share the world as a means of communication

b) that this new technology would make the games more thrilling than ever

c) to stir excitement about virtual reality once again

d) which would allow two users to share a computer-generated environment

e) Lanier's term has remained most popular

f) to make VR illusions really convincing

g) as they set up companies to manufacture virtual reality hardware and software

h) about virtual reality began appearing

Virtual Reality's Boom and Bust

Jaron Lanier **coined the term** *virtual reality* in the late 1980s to describe a new system he called RB2, or "Reality Built for Two," __1__. Lanier stressed in a 2002 interview that he had been "interested in having more than one person **at a time** in the computer-generated world, __2__. To me, the term 'world' refers to what's out there outside of you, but the term 'reality' refers to what you share with other people ... and have to interact with." Although several other terms with more or less the same meaning as virtual reality including *artificial reality*, *virtual worlds*, and *immersive computing* were created and are sometimes still used, __3__.

Media stories __4__ everywhere in the early 1990s. Video gamers and fans of fantasy games such as *Dungeons and Dragons* hoped __5__. Scientists and engineers **looked forward to** studying and manipulating virtual objects**, ranging from** houses and cars **to** molecules, in ways that had never been possible before. Business people dreamed of instant wealth __6__. To all these groups, and an excited public as well, Ivan Sutherland's Ultimate Display seemed **just around the corner**. Virtual reality devices, however, remained bulky, expensive, and unreliable, and the computers **of the day** lacked the speed and power __7__.

When the true state of virtual reality technology became obvious, people lost interest in the field, and many companies and organizations devoted to it went bankrupt. As late as 2000, VR pioneer Frederick Brooks complained that the technology still **"barely worked**." In the first years of the new century, however, advances in computers and VR devices have begun __8__.

2. Use the <u>underlined</u> word combinations** to coin (the term), at a time, to look forward to, to range from ...[to], [just] around the corner, ... of the day, barely ... in **the sentences below. Change the verb form where necessary.

1. After completing the university she _____ finding her dream job.
2. This small hotel can accommodate not more than 20 guests ____.
3. It's cold today, but spring is just ____.
4. The pizza toppings ____ old favorites like pepperoni to exotic options like asparagus.
5. We read the old newspapers to better understand the issues ____.
6. According to Norbert Wiener, the word "cybernetics" ____ by a research group involving himself and Arturo Rosenblueth in the summer of 1947.
7. The project has ____ started, we cannot expect any results yet.

Listening 3
Pros and Cons of Virtual Reality

https://youtu.be/6Sw7ut7-SVs

Watch a video on pros and cons of Virtual Reality and complete the table below.

Pros	**Cons**
Better than reality	High cost

Listening 4
VR programmes for space and Earth exploration

https://www.eslecollege.com/wp-content/uploads/h5p/content/143/audios/files-5fe8648d80a6a.mp3

You will hear a news report on how NASA is using high schools to develop new virtual reality (VR) programmes for space and Earth exploration. Listen to the report and do the exercises below.

1. There are 3 people taking part in the programme. Who says the following?

a) Rebecca Hersher b) Jackson Ames c) Thomas Grub

1. Who said the VR Headset should not be too tight?
2. Who became dizzy when looking up while using the headset?
3. Who has no time for video games any more?
4. Who can't remember a time when he didn't use computers?
5. Who wants NASA scientists to be using VR headsets
6. Who thinks VR is an improvement over 2D screens?

2. Below are sentences from the report with words missing. Fill in the gaps.

1. A lot of games involve ___1_____ and ____2_____ .
2. 'Onward' makes players feel like they're soldiers ____3_____ a _____4_____ .
3. Ames landed in an _____5_____ over the summer at NASA.
4. High-school students were valuable because they _____6_____ what _____7_____ and doesn't in the virtual world.
5. Herscher found the virtual lava tube highly _____8_____.

Reading 6

1. Read the text choosing the correct options. How does NASA use virtual reality technology?

2. Match the person and the action

Thomas Grubb; Brent Garry; Jackson Ames; Stewy Slocum;

1) researches volcanoes and their activity;
2) plays video games using VR;
3) manages the program of developing a suite of virtual reality environments ;
4) studies in a college;
5) involves non-professionals to the research;
6) wants to use VR technology to plan real trips;
7) thinks that VR technolgy can be really useful for scientists;
8) is not interested in video games any more;
9) says that working with VR technology requires dexterity;
10) describes applications that help repair satellites;
11) still studies at school.

Virtual Reality Technology

NASA has big hopes for virtual reality technology. The agency is developing a suite of virtual reality environments at Goddard Spaceflight Center in Maryland, that could be used for everything from geological research to repairing orbiting satellites.

One displays fiery ejections from the Sun. In another, scientists can watch magnetic fields pulse around the earth. A virtual rendering of an ancient lava tube in Idaho makes scientists **feel / to feel** like they're standing at the bottom of an actual cave.

"I think, and I hope, this can be extremely useful for NASA scientists, " explains NASA engineer Thomas Grubb, who manages the program.

The goal, he says, is **to scale up / scaling up** the use of virtual reality technology in NASA labs, and **go / going** beyond public applications like the Mars immersion program that allows users **exploring / to explore** the Martian surface. For example, NASA volcanologist Brent Garry is hoping that virtual visits to a rock formation in Idaho can help him **planning / plan** research trips in real life. That same VR environment also allows users **to measure / measuring** distances and leave notes in the landscape.

"You know, it's cheaper to have people **go / to go** to a lava tube in VR than to actually fly them out there for two weeks," says Grubb.

Another application in development could allow technicians to repair satellites. People on earth could watch in real-time as they manipulate actual tools in space. If the repairs are successful, satellites that would have died when their batteries did could keep **working / to work** instead. "All of these things can save a lot of money or time, or just enable new things, " says Grubb.

And Grubb has stumbled upon a new talent source to help develop the pilot programs: young students, some of them still in high school.

"I went into this [thinking] 'I'll take a couple of interns or whatever,'" he says, imagining he'd get a single college student to help with some coding. But he says when he posted the job, "I got all these amazing students coming back. And I was like 'I want more than this.' I ended up with five [interns]."

One of them was a high school senior Jackson Ames. In addition to taking some computer science classes in school, Ames plays video games. "A lot of the games require strategy and teamwork. One of my favourites is called 'Onward'," he explains. Onward is a war simulation game. It's supposed **to make / making** players **to feel / feel** like they're soldiers fighting a battle. You play with a VR headset covering your eyes and a controller in each hand.

"It's much more realistic than anything else," says Ames. "It adds a whole new layer."

Ames plays the game many times a week, which gives him an intuitive sense of what works, and what doesn't, in VR.

Young people also bring certain ease with learning new technologies. Stewy Slocum, a 17-year-old college freshman who worked on the lava tube simulation, says video games got him interested in virtual reality programming too. But he's not that into gaming anymore – that was more of a high school thing – and he hadn't had much experience with VR technology before he arrived at NASA.

Still, he quickly learned how to use the VR system he was working with. That is often not the case for some more experienced researchers.

"There were definitely some older people who tried [the virtual reality system] and struggled at first, because they're not used to **have / having** all ten fingers working at once," says Garry. "They're like 'Am I going to fall? Am I going to trip on something?"

Once people navigate the initial learning curve, **exploring / to explore** virtual reality can go from alarming to fun pretty quickly. The growing popularity of virtual reality systems like the HTC Vibe and Oculus Rift for video games and education has made virtual reality technology more mainstream, but that can actually act as an obstacle to **use / using** VR technology for research, Grubb says.

"People think 'This is too cool and too much fun. How can this be work?'," he laughs. "We're trying **to show / showing** scientists that, 'Hey, this technology has a lot to offer".

Use of English

1. Read about one more of the applications of Virtual Reality and complete the gaps by choosing the correct options.

Virtual reality makes users want to exercise

Businesses are (1) ____ more uses for Virtual Reality (VR) as the technology develops. VR is no longer only for gaming or enjoyment. An American company (2) ____ Blue Goji is using VR to improve health by making exercise more fun. (3) ____ company demonstrated its workout machine, called the Infinity treadmill, at the recent event in Austin. A person (4) ____ the treadmill wears a virtual reality headset when exercising. Before starting, the user is connected to a belt to prevent falls. Then, the user plays a VR game (5) ____ running on the machine. The game can transport the user into the virtual world, (6) ____ he or she can be racing against (7) ____ people.

1	A. found	B. finding	C. founding	D. find
2	A called	B. which called	C. calling	D. cold
3	A ----	B. an	C. a	D. the
4	A using	B. who using	C. used	D. was using
5	A before	B. after	C. and	D. while

6	A where	B. which	C. that	D. who
7	A really	B. reality	C. virtually	D. virtual

The cost of the hardware and computer software program is $12,000. That is a lot of money for most people. But the virtual reality treadmill is ideal (8) ____ places where people go to exercise, like a **high-end** gym or recreation center. It can also be used for physical therapy or rehabilitation.

Users who tested the treadmill while wearing the VR headset (9) ____ different experiences. Very often the first time users feel lost, but the more you do it, the more you get used to it.

After carefully studying the (10) ____ experiences, Blue Goji plans to begin selling the Infinity treadmill to the public in 2019.

8	A from	B. into	C. for	D. of
9	A had	B. has	C. having	D. has had
10	A. users's	B. users'	C. user'es	D. users'es

2. Put these words into the spaces in the paragraphs below.

a) overtake	b) giant	c) devices	d) order
e) twice	f) reality	g) yet	h) creatures

The Japanese games (1) _____ Nintendo has released an app that is taking the world by storm. The next big thing, and new Internet sensation, is an augmented (2) _____ game called Pokemon Go. Players must physically move around the real world in (3) _____ to capture mystical (4) _____ called Pokemon (short for pocket monsters). It was only officially released last week, in the USA, New Zealand and Australia. It is about to (5) _____ Twitter in the number of daily active users and it hasn't even been launched globally (6) _____. Analysts report that in just 48 hours, Go was installed on 5.6 per cent of all Android (7) _____ in the USA. On average, users are spending (8) _____ as much time on Go than on apps like Snapchat.

i) impact	j) burgle	k) spots	l) top
m) unsuspecting	n) fix	o) infect	p) tracks

Pokemon Go has already jumped to the (9) _____ of the App Store and Google Play Store. It is also having an unprecedented social (10) _____. Hackers have targeted illegal copies of the app to (11) _____ millions of smart phones. Other criminals have used the game to lure (12) _____ players to go to a location to collect a Pokemon character and then rob them or (13) _____ their empty house. The app (14) _____ your location via GPS as you walk around looking for Pokemon. The website PCmag.com advised: "Don't go walking around neighborhoods late at night for your Pokemon (15)

_____ . If you can, collect Pokemon in public, crowded areas, we recommend doing that instead of shady (16) _____ at two a.m."

3. Look at these examples from the Unit. What word do they have in common?

Instead, they can get a sense of atmosphere and presence from VR.

Car designers get a clear idea of what the final product will look like at an early stage of the project.

... he'd get a single college student to help with some coding.

Very often the first time users feel lost, but the more you do it, the more you get used to it.

Climb up something high and look down, and you're likely to get a sense of vertigo.

... video games got him interested in virtual reality programming.

The verb GET

1. Complete the sentences in examples.

Get + adjective (to become)

	Example
Get angry	My dog gets angry when ____.
Get dark	It gets dark when _____.

Get + comparative

	Example
Get better	I got better when I ____.
Get safer	It has gotten safer to _____.

Get + a place (to arrive)

	Example
Get home	I got home before ____.
Get to work	My manager gets to work _____.

Get (buy / obtain)

	Example
Get a job	He got a new job and ____.
Get a flat	We finally got a new flat after ____.

Get (receive)

	Example
Get an email	I got an email that ____.

Get a phone call	The businessman got a phone call from ____.

Get + particles (phrasal verbs)

	Meaning	**Example**
Get up	to rise to one's feet	It's time to get up.
Get back	to return	We'll get back to this question later.
Get back at sb	to revenge	I think he's trying to get back at her for what she said in the meeting.
Get through	to succeed in sth; to come to a destination	Once we get through exams, we'll have three weeks off.
Get along	to be friendly; to cope, to manage	How are you getting along with your job?
Get over	to recover from sth; to overcome	It took him a long time to get over the operation.
Get away with	to succeed in avoiding punishment	She thought she could get away with cheating on her taxes.
Get at sb	to irritate or annoy; to criticise	He keeps getting at me, I don't really know what I've done wrong.
Get by	to manage to exist in a situation when sth is lacking	When we were students, we got by on very little money.
Get into sth	to enjoy sth	I really got into yesterday's performance. It was great!

2. Complete the sentences with phrasal verb "get".

1. The teacher doesn't seem to notice that Peter never does his homework. I don't know how he ____ with it.
2. She doesn't earn a lot of money but she earns enough to ____.
3. She doesn't get along with her dad, so she only sees him at Christmas.
4. Sandra doesn't seem able to ____ the loss of her job.
5. I stopped listening to jazz music for many years, but I've ____ to it again recently.
6. I never liked it when my parents told me what to do, so I used to ____ them by staying out late with my friends.
7. Developing countries were able to ____ the last recession because their banks still had money.
8. Jim was fired last month and since then he has been trying to ____ his old boss.

3. Try to give your own explanations of the meaning of the idiomatic expressions.

Get idioms

	Example
Get short shrift	Employees' complaints got short shrift.
Get one's teeth into sth	I'm getting my teeth into the new project at work.
Get to the bottom of sth	We'll get to the bottom of why the money has disappeared.
Get the nod	Peter got the nod for the job.
Get the hang of sth	Driving feels awkward at first, but it's easy when you get the hang of it.

4. Complete the sentences using these idioms. Change the verb form if necessary.

1. It's really fun to ride a tandem bicycle when you ____.
2. I'm so bored at work. I wish they'd give me something I could really ____.
3. Unfortunately, some of the recent scientific findings have ____ compared to the events in show business.
4. I am not sure what is causing the problem, but I am determined to ____.
5. The company was waiting to ____ from the city authorities to start the project.

Listening 6

What is Metaverse?

https://youtu.be/StW2bLOqbkQ

1. Watch and listen and say whether the statements are TRUE or FALSE?

1. Metaverse is being much discussed now.
2. Using Metaverse we can control the Internet.
3. The user of Metaverse can change their virtual appearance.
4. Some characters of video games are avatars.
5. You don't need any special equipment to get into Metaverse.
6. Ariana Grande and Justin Bieber are characters of a new video game.

2. Complete the sentences with one of the words from the list. Please, note that one word is not to be used.

vivid	*immersed*	*face to face*	*avatar*	*headset*
enable	*grip*	*a leap*	*hype*	*buzzword*

1. Have you ever created an _____?
2. The metaverse has already made _____ from plans to reality.
3. Some people think we are already _____ in virtual reality.
4. VR goggles will make you have a _____ experience.
5. Do you prefer _____ or virtual meetings?
6. Social distancing is a _____ these days.
7. The metaverse will _____ you to interact with people as if you were face to face.
8. There's a lot of marketing ____ (and money) in selling the idea of "the metaverse."
9. In a virtual world you'll lose _____ on reality.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
artificial reality		
augmented reality		
blackout		
burgle		
compassion		
computerized tomography		
computer-aided design		
computer generated world		
conversion		
constraints		
cyberspace		
desensitization		
eliminate		
emerging technology		
empathy		
haptic device		
head-mounted display		
heads-up display		
ignition button		
injustice		
immersive computing		
immersive theatre		
impair		

light pen		
mirror		
magnetic resonance imaging		
multiuser dimension		
nausea		
panorama		
polarized glasses		
polygon		
predisposition		
preliminary		
rendering		
replicate		
retention		
seizures		
sensorama		
shutter glasses		
simulator sickness		
stereoscope		
staggering images		
surpass		
sublime		
to go astray		
to take a ride		
ultrasound		
unprecedented		
virtual community		
virtual reality		
virtual reality headset		
virtual reality sickness		

Grammar Focus

Infinitives vs Gerunds

	Tenses of the Infinitive		Tenses of the *-ing* form	
	Active voice	**Passive voice**	**Active voice**	**Passive voice**
Present	(to) offer	(to) be offered	offering	being offered
Present Continuous	(to) be offering	–	–	–
Perfect	(to) have offered	(to) have been offered	having offered	having been offered
Perfect Continuous	(to) have been offering	–	–	–

The present infinitive refers to the present or future. *I'd like* ***to go*** *for a walk.*

The present continuous infinitive is used with *appear*, *claim*, *seem*, *pretend*, *must*, *can't*, *happen*, *should*, *would*, etc. to describe an action happening now.
He must ***be working*** *in the garden now.*

The perfect infinitive is used with *appear*, *happen*, *pretend*, *seem*, *believe*, *claim* and the modal verbs to show that the action of the infinitive happened before the action of the verb.
He claims ***to have met*** *the Queen.* (First he met the Queen, then he claimed he had met her.)

The perfect continuous infinitive is used with *appear*, *seem*, *pretend*, etc. and the modal verbs to put emphasis on the duration of the action of the infinitive, which happened before the action of the verb. *She looks tired. She seems* ***to have been working*** *all morning.*

The simple *-ing* form refers to the present or future. *She enjoys* ***dancing****.*

The perfect *-ing* form shows that the action of the *-ing* form has happened before the action of the verb. We can use the simple *-ing* form instead of the perfect *-ing* form without a difference in meaning.
He denied ***having stolen*** *the money.* or *He denied* ***stealing*** *the money.*

Subject of the infinitive / *-ing* form

The subject of the infinitive or of the *-ing* form is omitted when it is the same as the subject of the verb. ***They*** *want to buy a new house.* ***She*** *left without saying goodbye.*

When the subject of the infinitive or of the *-ing* form is different from the subject of the verb, then an object pronoun (*me*, *you*, *him*, *her*, *us*, *you*, *them*), a name or a noun is placed before the infinitive or the *-ing* form. The subject of the gerund can also be a possessive adjective (*my*, *your*, etc.), an object pronoun, a possessive case or a name.
I want ***him to leave*** *now. (=* ***He*** *should leave.)* **BUT** ***I*** *want to leave now. (=* ***I*** *should leave.)*
I remember ***his*** */* ***him*** */* ***Tom's*** */* ***Tom*** *complaining about the poor service in this hotel.*

The *to* infinitive is used:

- **to express purpose**
  She went out **to buy** *some milk.*
- **after certain verbs (*advise*, *agree*, *appear*, *want*, *decide*, *expect*, *hope*, *promise*, *refuse*, etc.)**
  He promised **to be** *back at 10 o'clock.*
- **after certain adjectives (*angry*, *happy*, *lucky*, *glad*, etc.)** *She was glad* **to see** *him.*
- **after question words (*where*, *how*, *what*, *who*, *which*, but not after *why*)**
  Has she told you where **to meet** *them?*
  BUT *I don't know why he left so early.*
- **after *would like* / *would love* / *would prefer* (to express specific preference)**
  I'd love **to go** *for a walk.* (specific preference)
- **after nouns** *It's a pleasure* **to work** *with you.*
- **after *too* / *enough* constructions**
  He's **too** *short* **to reach** *the top shelf.*
  He isn't tall **enough to reach** *the top shelf.*
- **with *it* + *be* + adjective (+ of + object)**
  It was nice of him **to remember** *my birthday.*
- **with 'only' to express unsatisfactory results**
  He called me only **to say** *that he'd be late.*

The infinitive without *to* is used:

- **after modal verbs (*must*, *can*, *will*, etc.)**
  You must **be** *back at 12 o'clock.*
- **after *had better* / *would rather***
  I'd rather **have stayed** *in last night.*
- **after *make* / *let* / *see* / *hear* / *feel* + object**
  Mum **let** *me* **watch** *TV. I* **made** *him* **apologise**.
  BUT in the passive form: *be made* / *be heard* / *be seen* + *to* infinitive
  He **was made to apologise**.

The *-ing* form is used:

- **as a noun** ***Swimming*** *is good for your health.*
- **after certain verbs (*admit* (*to*), *avoid*, *consider*, *continue*, *delay*, *deny*, *enjoy*, *escape*, *excuse*, *fancy*, *finish*, *forgive*, *imagine*, *insist on*, *involve*, *keep* (= continue), *look forward to*, *mention*, *mind*, *miss*, *object to*, *postpone*, *practise*, *prevent*, *report*, *resist*, *risk*, *save*, *stand*, *suggest*, *understand*, etc.)**
  He admitted (to) **stealing** *the painting.*
- **after *love*, *like*, *dislike*, *hate*, *enjoy*, *prefer* (to express general preference)**
  He likes **cooking** (in general).
  Note: *like* + *to* infinitive = find enjoyable
  I like **to eat** *a healthy breakfast.*
- **after *I'm busy*, *it's no use*, *it's (no) good*, *it's (not) worth*, *what's the use of*, *can't help*, *there's no point (in)*, *can't stand*, *be/get used to*, *be/get accustomed to*, *have difficulty (in)*, etc.**
  It's no use **complaining**.
- **after 'go' for physical activities**
  They **go skiing** *every winter.*
- **after *spend* / *waste time***
  He wasted his time **playing** *video games.*
- **after prepositions**
  He entered the room without **knocking**.
- **after *see*, *hear*, *listen*, *watch* to express an incomplete action, an action in progress or a long action** *I saw Kate* **painting** *the kitchen.* (I saw Kate in the middle of painting. I saw part of the action in progress. I didn't wait until she had finished.)
  BUT *see*, *hear*, *listen*, *watch* + infinitive without *to* to express a complete action, something that one saw or heard from beginning to end
  I watched Kate **paint** *the kitchen. It took her two hours.* (I saw the whole action from beginning to end.)

Note: *help* is followed by a *to* infinitive or an infinitive without *to*.
She helped me **(to) wash** *the dishes.*

Note: If two infinitives are joined by 'and', the 'to' of the second infinitive can be omitted.
I want **to eat** *something and* **have** *a rest.*

Verbs taking *to* infinitive or *-ing* form without a change in meaning

- ***begin*, *start*, *continue*** **However, we never have two *-ing* forms together.**
  She began **dancing** / **to dance**. **BUT** *It's beginning* **to get** *cold.* (NOT: ~~*It's beginning getting cold.*~~)
- ***advise*, *allow*, *permit*, *recommend*, *encourage* when followed by an object or in the passive form take a *to* infinitive. They take the *-ing* form when not followed by an object.**
  She **doesn't allow us to eat** *here. They* **aren't allowed to eat** *here. They* **don't allow eating** *here.*
- ***it needs* / *it requires* / *it wants* take the *-ing* form. *It needs* can also be followed by a passive infinitive.**
  The house **needs** / **requires** / **wants painting**. *The car* **needs repairing** / **to be repaired**.

Verbs taking *to* infinitive or *-ing* form with a change in meaning

• **forget + *to* infinitive = not remember to do sth** *I'm sorry, I **forgot to buy** milk.* **forget + *-ing* form = not remember a past event** *He'll never **forget flying** over the Alps.*	• **try + *to* infinitive = to make an effort or attempt** *The firemen are **trying to put out** the fire.* **try + *-ing* form = do sth as an experiment** *Why don't you **try adding** some pepper to the sauce? It might taste better.*
• **remember + *to* infinitive = not forget to do sth** ***Remember to turn off** the cooker before leaving.* **remember + *-ing* form = recall a past event** *I don't **remember staying** in this hotel before.*	• **want + *to* infinitive = wish** *I **want to spend** my holidays in Spain.* **want + *-ing* form = to require** *This room **wants painting** again.*
• **go on + *to* infinitive = finish doing sth and start doing sth else** *After finishing the report, she **went on to type** some letters.* **go on + *-ing* form = keep on doing (sth)** *She **went on talking** for hours.*	• **stop + *to* infinitive = pause temporarily** *She **stopped to get** some petrol before continuing on her journey to Leeds.* **stop + *-ing* form = finish; end** ***Stop talking**, please!*
• **mean + *to* infinitive = intend to** *He **means to find** a job abroad.* **mean + *-ing* form = involve** *Finding a job **means attending** many interviews.*	• **be sorry + *to* infinitive = apologise for a present action** *I'm sorry to hear they fired him.* **be sorry for + *-ing* form = apologise for a earlier action** *I'm sorry for being / having been unfair to you.*
• **regret + *to* infinitive = feel sorry to do sth** *I **regret to tell** you that there is no money left in your account.* **regret + *-ing* form = have second thoughts about sth one has already done** *I **regret buying / having bought** this dress; it doesn't look nice on me.*	• **be afraid + *to* infinitive = unwilling to do sth because of fear** *I'm afraid to climb up the ladder.* (I don't want to do it.) **be afraid of + *-ing* form = frightened; feeling fear that sth might happen** *She won't climb up the ladder; she **is afraid of falling**.* (She is afraid because she might fall.)

List of verbs + to + infinitive

Example: He *refused* <u>to pay</u> the bill.

afford, agree, aim, appear, arrange, attempt, be determined, beg, choose, claim, consent, dare (also without "to"), decide, demand, deserve, determine, endeavor, expect, fail, guarantee, happen, have, help (also without "to"), hesitate, hope, learn, long, manage, mean, need (also without "to"), neglect, offer, ought, plan, prepare, pretend, proceed, promise, refuse, resolve, seem, stop, swear, tend, threaten, volunteer, vow, want, wish, would hate, would like, would love, would prefer.

List of verbs + object + to + infinitive

Example: She ***got me*** <u>to wash</u> the dishes.

advise, allow, ask, beg, cause, enable, encourage, expect, forbid, force, get, help, invite, mean, order, permit, persuade, recommend, remind, teach, tell, want, warn, would hate, would like, would lov, would prefer.

List of verbs + gerund

Example: I *enjoy* cooking.

admit, advise, allow, appreciate, avoid, can't help, can't stand, consider, delay, deny, dislike, enjoy, escape, fancy, finish, go (e.g. in "go swimming"), imagine, involve, keep (e.g. in "keep going"), mention, mind, miss, permit, postpone, practice, reject, resist, risk, stop, suggest, understand, waste time/money.

List of verbs + preposition + gerund

Example: I'm *looking forward to* seeing you again soon.

accuse of, adjust to, agree with, apologies for, approve of, ask about, ask for, begin by, believe in, be used to, blame for, care for, carry on, complain about, concentrate on, congratulate on, consist of, cope with, decide against, decide for, depend on, die of, dream about/of, escape from, feel like, forgive for, give up, insist on, keep on, look forward to, object to, pay for, prevent sb. from, protect from, put off, rely on, spend money on, spend time on, succeed in, suspect of, take part in, talk about/of, thank for, think of, use for, warn against, worry about.

List of adjectives + preposition + gerund

Example: I am ***interested in*** visiting the museum.

afraid of, angry about/at, bad at, busy, clever at, crazy about, disappointed about, excited about, famous for, fond of, glad about, good at, impressed by, interested in, keen on, like, near, proud of, sick of, sorry about, tired of, worried about, worth.

List of nouns (with / without preposition) + gerund

Example: There's **no *point in*** waiting any longer.

advantage of, alternative of, chance of, choice between, danger of, difficulty in, doubt about, experience in, fun, hope of, idea of, interest in, opportunity of, place for, pleasure in, point in, possibility of, problem, reason for, trouble, trouble in, use, way of, waste of money, waste of time.

1. Fill the gaps with the verb in brackets in the appropriate form.

1. A lot of people are worried about _____their jobs. (lose)
2. He agreed _____ a new car. (buy)
3. The question is easy _____ (answer)
4. Not everybody can afford _____ to university. (go)
5. I look forward to _____ you at the weekend.(see)
6. Are you thinking of _____ London? (visit)
7. He apologized for _____ so late. (arrive)
8. Stop _____ noise, please; I'm studying. (make)

9. She doesn't mind _____ the night shift. (work)
10. I learned _____ the bike at the age of 5.(ride)

2. Gerund or Infinitive.

1. We decided _____ a new car. (buy)
2. I regret _____ you we won't lend you the money. (tell)
3. Peter gave up _____. (smoke)
4. He'd like _____ an aeroplane. (fly)
5. I enjoy _____ picture postcards. (write)
6. He offered _____ with the cleaning. (help)
7. Avoid _____ silly mistakes. (make)
8. My parents wanted me _____ home at 11 o'clock. (be)
9. I dream about _____ a big house. (build)
10. He advised me _____ so much money. (not spend)

3. Fill the gaps with the verb in brackets in the appropriate form.

1. I can't stand ____ in queues. (to wait)
2. I wouldn't like ____ in his shoes. (to be)
3. Jim loves ____ in Thailand. (to work)
4. I hate ____ the shopping on Saturday. (to do)
5. Blast! I forgot ____ milk. (to buy)
6. In the end we decided ____ in. (to stay)
7. I need ____ some information about Portugal. (to find)
8. My parents like ____ for long walks at the weekend. (to go)
9. Tony gave up ____ years ago. (to smoke)
10. I wanted ____ and see Troy but no one else was interested. (to go)
11. Mrs Leith offered ____ us to the airport. (to take)
12. Clare refused ____ clean up after the party. (to help)
13. I tried ____ him to come but it was no use. (to persuade)
14. Do you mind not ____ ? (to smoke)
15. Everybody really enjoyed ____ the cha-cha-cha. (to dance)
16. Lionel admitted ____ my chocolate mousse. (to eat)

4. Use the verbs in brackets to fill the gaps.

1. We arranged ____ under the station clock at half nine. (to meet)
2. I always try to avoid ____ him whenever I can. (to see)
3. I long ____ in Scotland again. (to be)
4. My Mum demanded ____ the manager. (to see)
5. My brother denied ____ my chocolate mousse. Maybe his hamster ate it. (to eat)

6. I tried ____ but I just couldn't. (to understand)
7. In the end I gave up ____ to persuade her. (to try)
8. Charlie was pretending ____ very busy. (to be)
9. They chose ____ in a cheap hotel but spend more money on meals. (to stay)
10. We like Galicia so much that we keep ____ back there. (to go)
11. He deserves ____ severely punished. (to be)
12. When we visit my aunt, they expect me ____ on my best behaviour. (to be)
13. I didn't mean ____ her feelings. I'm really sorry. (to hurt)
14. I always put off ____ my homework until the last possible moment. (to do)
15. He goes on ____ me the same thing over and over again. (to tell)
16. I can't stand ____ in the queue at the baker's. (to wait)
17. The firemen managed ____ the fire pretty quickly. (to put out)
18. I never risk ____ through that part of town. (to go)
19. Clare offered ____ me to the airport, which was very kind of her. (to take)
20. Dad threatened ____ my pocket money if I didn't do my homework. (to stop)

5. Fill each space with either the gerund or the infinitive form of the verb that is given in brackets after each gap.

1. We had worked hard all morning, so at midday we stopped _____ (have) a coffee and a sandwich.
2. Did you remember _____ (buy) that bag of apples I asked you to get? We need those apples for the cake this evening.
3. If you are getting so many headaches, you should try _____ (see) a specialist at the hospital. It could be something serious.
4. We regret _____ (inform) you that you have failed the first part of the test. You can go home now if you wish.
5. If you go on _____ (listen) to music that loud, you'll be deaf before you're twenty!
6. You should stop _____ (go) to that biker club. It's taking up too much of your time.
7. It's strange that I remember _____ (go) to school the first time when I was five but I don't remember when we moved house a year later.
8. I tried _____ (stop) the thieves but they were both on motorbikes and it was useless running after them.
9. You must regret _____ (tell) your sister about her husband now. She has never been the same since.
10. I meant _____ (phone) you last night but I completely forgot. So sorry!
11. After graduating in law from Cambridge, she went on _____ (become) a famous lawyer.
12. I want to work abroad but not if it means _____ (have to learn) another language. I am terrible at learning languages!

6. Choose a correct preposition that goes with the verb at the end of the sentence and put them into the gaps.

1. Thank you ____ me from my most powerful enemy. (**SAVE**)
2. Please let me apologize ____ so impolite to you. (**BE**)
3. Can you eat an apple ____ your hands ? (**USE**)
4. Many young girls dream ____ a model (**BECOME**).
5. We thought ____ to another place next year (**MOVE**).
6. The young man was charged ____ goods over the border. (**SMUGGLE**)
7. There are many advantages ____ your own flat. (**HAVE**)
8. Please concentrate ____ the basic words in your book. (**LEARN**)
9. The teacher insisted ____ to my parents. (**SPEAK**)
10. He thanked us ____ him in so late at night .(**LET**)
11. The manager succeeded ____ the deal. (**MAKE**)
12. The group of technicians specialize ____ on difficult problems. (**WORK**)
13. Let me begin ____ you a short introduction of what we do. (**GIVE**)

7. Rewrite the sentences using a form of gerund or infinitive so that they mean the same.

1. I'm tired of people telling me what to do. ⇒ I'm tired of __being told ____ what to do.
2. He said he didn't take the money. ⇒ He denied ____ the money.
3. It is believed that he has been stealing money since he was hired 2 years ago. ⇒ He is believed ____ money since he was hired 2 years ago.
4. I wish I had travelled more in my university years. ⇒ I would like ____ more in my university years.
5. It seems that they are having fun. ⇒ They seem ____ fun.
6. He is angry because he has been criticised by the commentators. ⇒ He resents ____ by the commentators.
7. I would have preferred to stay at home. ⇒ I'd rather ____ at home.
8. The new boss fired Terry a minute ago. ⇒ Terry is the last employee ____ by the new boss.
9. People think they are looking for solutions. ⇒ They are thought ____ for solutions.
10. He wishes he hadn't alerted the police. ⇒ He regrets ____ the police.

8. Gerund or Infinitive – Fill in the correct form.

1. They are likely ____ up at any time. (show)
2. The man denied ____ the crime. (commit)
3. Their memories of ____ in Africa will stay with them forever. (travel)

4. He has always been afraid of ____. (fly)
5. ____ is good for your health. (swim)
6. Would you mind ____ me the sugar. (pass)
7. She promised ____ the report as soon as possible. (read)
8. I had a hard time ____ the situation to my husband. (explain)
9. She had some problems ____ without glasses. (read)
10. Paul gave up ____ five years ago. (smoke)
11. What about ____ to the zoo tomorrow? (go)
12. Barry ____ in winning the Spanish championship. (succeed)
13. They had fun ____. (ski)
14. My friend was happy ____ me at the party. (see)
15. He was ashamed ____ that he had lied. (admit)
16. It was very kind of you ____ me. (help)
17. She always wastes her time ____ bad books. (read)
18. We had no problem ____ from the airport to the train station. (drive)
19. She hadn't expected this task ____ so difficult. (be)
20. It's no use ____ a taxi. We'll be late anyway. (take)
21. Don't forget ____ the document as soon as you are finished. (sign)
22. She made me ____ like a real man. (feel)
23. ____ video games all the time is very boring. (play)
24. She is fond of ____ comics. (read)
25. Alvaro admitted ____ during the English test. (cheat)
26. The teacher reminded us ____ irregular verbs. (learn)
27. The boy refused ____ what his mother said. (do)
28. Brenda really hates ____. (study)
29. I used ____ basketball during my college years. (play)
30. How long does it take you ____ to the university? (walk)

9. Gerund or Infinitive – Fill in the correct form.

1. I can't imagine ____ at home. (work)
2. We have decided against ____ a new car. (buy)
3. She seems ____ her new job. (like)
4. The students hope ____ the exam. (pass)
5. He won't go by plane. He is afraid of ____ . (fly)
6. I am lazy. I don't feel like ____ any work. (do)
7. Remember ____ the letter. Otherwise they won't get it by Saturday. (post)
8. Have you ever learned how ____ such a plane? (fly)
9. They were too lazy ____ out with us. (go)
10. I always enjoy ____ to my grandfather. He always tells me great stories. (talk)

11. I’m very interested in ____ French. (learn)
12. My pen friend is coming next Friday. I’m really looking forward ____ her. (meet)
13. Don’t you mind ____ away from your family for such a long time? (be)
14. The children promised ____ back by nine. (be)
15. I wanted to go alone but Joe insisted on ____ with me. (come)
16. Tom offered ____ me home. (bring)
17. Why not ____ a weekend in Scotland? (spend)
18. I’m sorry I can’t come to your party but thank you for ____ me. (invite)
19. Our neighbors apologized for ____ such noise. (make)
20. Paris is always worth ____ to. (travel)
21. I’m sure I gave him back the money. I remember ____ it back to him. (give)
22. She eventually managed ____ her bike. (repair)
23. Would you like ____ a cup of coffee? (drink)
24. There’s no point in ____ the matter. He has already made his decision. (discuss)
25. I prefer ____ to skiing. (snowboard)
26. Do you mind ____ Anita to the doctor? (bring)
27. It is difficult ____ him. (understand)
28. We had difficulties ____ your house. (find)
29. They decided ____ Tennis in the afternoon. (play)
30. We expect him ____ us on Sunday. (join)

10. Gerund or Infinitive – Fill in the correct form.

1. ____ is not allowed here. (fish)
2. I heard the TV set ____ . (explode)
3. She appeared ____ very nervous. (be)
4. I keep ____ you - it was an accident. (tell)
5. Jack is good at ____ ceilings. (paint)
6. She wondered who ____ . (ask)
7. It is difficult ____ him. (understand)
8. She did not know what ____ from them. (expect)
9. My wife warned us ____ the table. (not touch)
10. He refused ____ me what all the fuss was about. (tell)
11. There’s no sense in ____ him. He’s not at home. (visit)
12. Elephants are known ____ a fantastic memory. (have)
13. I let her ____ on with her work. (get)
14. Colin had no idea of how ____ into the house. (get)
15. I’d rather ____ in bed than go to work. (be)
16. I crossed the road without ____ . (look)
17. We advised her ____ a year abroad. (not spend)

18. I always dreamed of ____ in a small house by the seaside. (live)
19. She made us ____ for hours. (wait)
20. She learned ____ pupils with respect. (treat)
21. I couldn't help ____ when I saw the bride in the beautiful white dress. (cry)
22. My uncle has given up ____ and now he prefers ____ . (smoke, eat)
23. He wasn't used ____ on the right side of the road. (drive)
24. Would you rather ____ to a restaurant or eat at home. (go)
25. He didn't let anyone ____ his notes. (read)
26. I agreed ____ him if he is in trouble. (help)
27. I'm too old ____ my habits now. (change)
28. Please stop ____ . You're making me nervous. (whisper)
29. He was silly enough ____ into the pond without ____ first. (dive, look)
30. I enjoy ____ alone. I never feel lonely. (be)

11. Gerund or Infinitive – Fill in the correct form.

1. We encouraged her ____ (succeed) in ____ (become) a top player.
2. It's no good ____ (force) him to go with us.
3. I promised ____ (care) for the cat but I'm not much good at ____ (babysit).
4. The people thanked me for ____ (offer) ____ (help) them.
5. I begged her ____ (not accuse) me of ____ (ruin) her hairstyle by ____ (try) ____ (kiss) her.
6. It is not worth ____ (help) him ____ (do) the job.
7. I let him ____ (choose) between ____ (fly) and ____ (take) the train.
8. The film was really worth ____ (see) so we made Mary ____ (go) to the movies with us.
9. He forced us ____ (accept) his offer by ____ (raise) it by 5 %.
10. Normally I enjoy ____ (go) out but today I'd prefer ____ (stay) indoors.
11. She promised ____ (not object) to his ____ (smoke).
12. They continued ____ (eat) after the interruption.
13. I am not in the habit of ____ (smoke) in the car.
14. Ann reminded me ____ (finish) my work on time.
15. He'd better ____ (get) used to ____ (work) harder.
16. I am capable of ____ (stand) on my head and ____ (play) the saxophone.
17. You'd better ____ (start) ____ (dig) the garden.
18. I expected someone ____ (pick) up these papers.
19. The Romans were quite happy about Hannibal ____ (not attack) Rome.
20. It was interesting ____ (watch) our cat ____ (play).

12. Choose the correct answer.

1. The new students hope _____ in many of the school's social activities.
a) including b) being included c) to include d) to be included
2. The owner of the building supply store doesn't mind _____ his customers discounts when they buy large quantities.
a) giving b) being given c) to give d) to be given
3. Tom got into trouble when he refused _____ his briefcase for the customs officer.
a) opening b) being opened c) to open d) to be opened
4. Derrick appears _____ some weight. Has he been ill?
a) having lost b) having been lost c) to have lost d) to have been lost
5. Dan made a bad mistake at work, but his boss didn't fire him. He's lucky _____ a second chance.
a) having given b) having been given c) to have given d) to have been given
6) Dr. Perkins is a brilliant and dedicated scientist who had expected to be selected as the director of the institute. She was very surprised not _____ the position.
a) having offered b) having been offered c) to have offered d) to have been offered
7. We would like _____ to the president's reception, but we weren't.
a) having invited b) having been invited c) to have invited d) to have been invited
8. The stockbroker denied _____ of the secret business deal.
a) having informed b) having been informed c) to have informed d) to have been informed
9. Alice didn't expect _____ to Bill's party.
a) asking b) being asked c) to ask d) to be asked
10. Sam always remembers _____ in the garage so that the driveway is free of other cars.
a) parking b) being parked c) to park d) to be parked
11. They were fortunate _____ from the fire before the building collapsed.
a) rescuing b) to have rescued c) to rescue d) to have been rescued
12. Even though he was much younger than the other children, Alan demanded _____ in the game they were playing.
a) including b) being included c) to include d) to be included
13. Marry's children are used to _____ after school every day. They don't have to walk home.
a) picking up b) being picked up c) be picked up d) pick up
14. Frank mentioned _____ in an accident as a child, but he never told us the details.
a) having injured b) having been injured c) to have injured d) to have been injured
15. The Jetsons wanted to give their son every advantage. However, they now regret

_____ him by providing too many material possessions.
a) having spoiled b) having been spoiled c) to have spoiled d) to have been spoiled
16. Sally gave such a good speech that I couldn't resist _____ loudly when she finished.
a) applauding b) being applauded c) to applaud d) to be applauded
17. The spy admitted _____ some highly secret information to enemy agents.
a) having given b) having been given c) to have given d) to have been given
18. The nurse suggested _____ two aspirins.
a) taking b) being taken c) to take d) to be taken
19. Paul really didn't mind _____ by the party to celebrate his fortieth birthday although he told his friends that they shouldn't have done it.
a) surprising b) being surprised c) to surprise d) to be surprised
20. The mouse avoided _____ by coming out only when the house was empty and the two cats were outside.
a) catching b) being caught c) to have been caught d) to be caught
21. I'm sure it's not my fault that Peter found out what we were planning. I don't remember _____ anyone about it.
a) having told b) being told c) to tell d) to be told
22. Our mechanic says that he expects _____ the brakes on the car before we pick it up.
a) fixing b) being fixed c) to have fixed d) to have been fixed
23. We were shocked to hear the news of your _____.
a) having fired b) having been fired c) to be fired d) to have been fired

13. Using the verbs REMEMBER / FORGET / TRY / STOP / REGRET

Complete the sentences with the gerund or the infinitive using the verbs given in brackets.

1. I remember ____ Hawaii when I was very young. (visit)
2. Please remember ____ the door on your way out. (lock)
3. Did you remember ____ Kim last night? (phone)
4. I will never forget ____ taken to see what happened behind the scenes. (be)
5. Don't forget ____ how many are coming on Saturday. (find out)
6. I forgot ____ to the chemist's on my way home. (go)
7. We all tried ____ him but he wouldn't listen to any of us. (stop)
8. If you want to stop coughing, why don't you try ____ some water? (drink)
9. She got annoyed because her husband stopped ____ in every shop window. (look)
10. Just stop ____ and listen for a moment. (talk)
11. I regret ____ you that there's been an accident. (tell)
12. He regretted ____ in the same job for so long. (stay)

Unit7
Gaming

Video games are a waste of time for men with nothing else to do. Real brains don't do that.

Ray Bradbury

Warming Up

1. Consider NATIONAL VIDEO GAME DAY FAQS (frequently asked questions) and discuss them in small groups.

What is the №1 game in the world?
What is the most successful video game?
What is the most downloaded game of all time?

2. Scan the information from the survey gained from a top Entertainment Marketing Agency, conduct a similar survey among your group mates and compare the results.

National today: national video game day survey

Info gained from a top Entertainment Marketing Agency (Survey of 1,000 Americans)

What's the best gaming console?

#1: Playstation (38%)
#2: Xbox (38%)
#3: Nintendo (21%)

What's the best video game franchise?

#1: Super Mario (47%)
#2: Call of Duty (21%)
#3: Donkey Kong (19%)
#4: Grand Theft Auto (19%)
#5: Pokemon (16%)
#6: Zelda (13%)
#7: Sonic the Hedgehog (13%)
#8: Final Fantasy (9%)
#9: Halo (9%)
#10: Crash Bandicoot (7%)

How often do you play video games?
#1: Everyday (31%)
#2: Rarely (31%)
#3: 2-3x a week (23%)
When do mobile gamers like to play games on their phones?
#1: Whenever I'm bored (66%)
#2: When I'm watching TV (41%)
#3: Before I go to sleep (39%)
#4: When I'm on the toilet (34%)
#5: During my breaks at work (21%)
#6: Whenever I'm eating (20%)
#7: Before I leave for work (12%)
#8: On my commute to work (8%)
https://nationaltoday.com/video-game-day/

Start Thinking

Give your own definition of the game (including traditional ones). Discuss in the group: what are the main features of a game that distinguish it from any other activity.

Listening 1
A brief history of video games

https://www.youtube.com/watch?v=x24KoVNliMk

Watch and listen to the recording and complete the tasks.

1.Continue the sequence of devices mentioned in the recording:
The evolution of video games has spread across arcades, _____
2.What was the name of the first video game device patented in 1948?
3.When did Baer's idea to get video games into the living room led to the release of a game console?
4.What device was called Odyssey?
5.Who of the scientists is known as "father of video games"?

a) Ted Debney
b) Nolan Bushnell
c) Ralph Baer

6.What's the name of the first commercially successful video game?

a) Space Invaders
b) Pong
c) Asteroids

7.What game is considered to start the Golden Age of Arcade Games?
8.What video game was the first to have a story line?
9.When did the Golden Age of arcade games come to an end?

Reading 1

1. Match the underlined words from the text with their equivalents.

1. invigorate	a) risky
2. perilous	b) odd
3. sustained	c) violation
4. testimony	d) inspire
5. elaborate	e) accusation
6. rendition	f) stable
7. infringement	g) thorough
8. lawsuit	h) success
9. breakthrough	i) proof
10. geeky	j) interpretation

2. Use these words in the sentences below.

1. To achieve a scientific ____ in this area more efforts and funding is needed.
2. Although scientific observation and analysis were ____ by their success in specific debates, their wider impact was limited.
3. Last year the company won a ____ on exactly this kind of crime.
4. Our manager showed great leadership in extremely ____ circumstances.
5. Global challenges need ____ global action.
6. A substantial part of this success was due to the unusually ambitious and ____ design of the show, which created a number of production challenges.
7. A ____ is basically a copy of the document in a different format, for example, it can be useful for users who don't have the client application of a document or file.
8. All the ____ science guys will be disappointed if this experiment is stopped.
9. Any other use constitutes ____ and is punishable under the Intellectual Property.
10. The continued popularity of this game is the ____ of clever marketing.

3. Read the text and compare the information given in the video above to the information from the text below. Complete the table after the text specifying the source of the fact: Text (T), Video (V), Both (B).

History and traditions of national video game day

Primarily used for recreational purposes (although professional gaming leagues do, in fact, exist), video games have exploded in popularity over the last few decades. Being exciting and invigorating, they aren't just for kids. The very first video game ever invented involved simple table tennis. Today, there are over five million games in existence. From high-speed racing adventures to perilous virtual dueling matches, there's a genre for everyone to enjoy.

Gaming is a serious business. In spite of having been one of the biggest hobbies sustained since its creation, many gamers have made a livelihood from playing video games. The world's number one YouTuber, PewDiePie, is a testimony to this. Having definitely come a long way from its humble beginnings of old-school arcade games to entire universes created with elaborate digital storylines, gaming has become an integral part of modern life. There are video games out there with better stories than actual live-action movies. The "Batman: Arkham" series is considered the best superhero game of all time, and the story has received more appreciation than some of the recent "Batman" Hollywood productions.

Developed in universities, the earliest video games came into existence in the 1950s. Experimental games included virtual renditions of paper games like tic-tac-toe. Dr. Edward Uhler Condon unveiled what is considered the first example of a gaming machine in 1940 at the New York World's Fair. The game showcased was based on the mathematical game "Nim," and was played by more than 50,000 people during its time on display. The computer algorithm won more than 90% of all games played.

The first breakthrough for gaming occurred three decades later in 1967, when the father of gaming, Ralph Baer, developed the 'Brown Box,' the first-ever game system intended for commercial use. This inspired Atari to create the now-classic game "Pong." A copyright infringement lawsuit followed this, but Atari came out the other side with the release of their Atari 2600, leading to the era of iconic games like "Donkey Kong" and "Pac-Man."

When the gaming scene crashed in 1983, Japan-based Nintendo had their breakthrough. They released some of the most popular gaming franchises like "Super Mario Bros.," and "The Legend of Zelda" and smashed records with them. The competition also grew as Sega hit the market, driving towards 3D gaming.

The modern era of games in the early 21st century kicked off with the Sony PlayStation 3, Xbox 360, and the Wii. Ever since, video games have stormed all digital platforms, with video game apps ranging across all stores. This also led to the birth of the online gaming community. The rising popularity of smartphones since 2007 has also evolved

the way games are developed, with some of the most popular game titles belonging strictly to the mobile platform.

What's next in gaming is virtual reality. Big companies like Sony, Microsoft, and Nintendo are all aiming for breakthroughs in VR gaming.

It is a big day for gamers and game developers worldwide, and as geeky as gamers may seem to some, they sure know how to celebrate in style! Gaming marathons and conventions are held all over the world, with competitions, cosplays, and a chance to get exclusive gaming merchandise. Streaming of both classic and new games is higher than ever on websites like YouTube and Twitch.

Most gamers enjoy their favorite games on their smartphones and computers. Childhood favorites like "Super Mario" and "Sonic the Hedgehog" games are revisited and even introduced to the next generation who didn't grow up with them. Popular games are featured on Apple and Android stores and many games have special features and sales.

N	Information	Source
1	A definition of the video game	
2	Video game carriers	
3	The number of existing video games	
4	The first video game patent	
5	The best superhero game of all times	
6	Video game Tennis for Two	
7	One of the first games based on a mathematical game	
8	Ralph Baer as a father of commercial video games	
9	The first Atari game Pong	
10	Video game Space Invaders	
11	The appearance of first colour games	
12	The appearance of first 3D games	
13	A TV show devoted to the computer game Pac-Man	
14	The character of the game Donkey Kong – Mario – at first had another name	
15	The end of the Golden Age of arcade games	
16	VR gaming	

Reading 2

1. Answer the questions.

1. Have you ever heard about Winter-een-mas?
2. What words does the name of this holiday consist of?
3. How do people celebrate these holidays?

2. Explain the meaning of the words from the text and give as many synonyms to them as possible.

obsessive	
to plug in	
an outlaw	
a grudge	
a protagonist	
to mash together	
to evolve	
to gain traction	
hard and fast (*idiom*)	
countless	
to overlook	
laidback	
courteous	

3. Read the text and complete the gaps with one word.

Happy, jolly, merry winter-een-mas!

"We may have a ton of other differences, but for at least a week we can all come together and appreciate that we live in a time were technology like this exists and offers us these amazing stories / experiences."

If you've __(1)__ looking for an excuse to spend the week of January 25-31 playing video games while indulging in your favorite snack, Ctrl+Alt+Del webcomic creator Tim Buckley __(2)__ to your rescue way back in 2003 with the creation of Winter-een-mas. The holiday runs January 25-31 and is a celebration of all things in gaming: from the friendships you forge with fellow gamers to obsessive frustration over the games you just can't beat, to the escapism of __(3)__ able to plug in and become an outlaw in the Wild West or a plumber with a grudge against an anthropomorphic turtle.

Buckley didn't set out with the intention of inventing a gaming holiday out of thin __(4)__ . At the time, he'd been working on Ctrl+Alt+Del for about two years when he introduced the holiday as a storyline for the webcomic. Buckley's protagonist Ethan mashed together the __(5)__ "winter," "Halloween" and "Christmas" and came up

with Winter-een-mas. The next year Buckley decided to make Winter-een-mas an annual celebration of gaming.

"I describe the holiday simply as a celebration of video games," Buckley explained. "It's a week in January, in the middle of winter when we're mostly staying indoors anyway, and it's after the crazy and stressful __(6)__ season, and it's also usually a pretty quiet time in the games industry. It's a moment where we can relax and catch up on some games we missed, or pull out an old favorite."

Throughout the history of its existence Winter-een-mas has evolved and gained traction within the gaming community. __(7)__ are no hard and fast rules for how to celebrate. The Winter-een-mas season runs the entire month of January, but January 25-31 marks the peak of Winter-een-mas festivities. There are countless ways to celebrate: from hosting a LAN party, starting a new game, wearing your favorite game-inspired clothing and accessories, writing letters or emails of appreciation __(8)__ game developers, eating themed food or playing an old favorite.

One major point of differentiation from more traditional holidays __(9)__ that Buckley discourages exchanging gifts with the exception of homemade presents. "I believe that some holidays (I'm looking at you, Christmas) get so commercialized and become so stressful because __(10)__ the expectation of gift-giving," Buckley explained. "And giving gifts can be a lot of fun, but it also tends to become the focus. I just didn't want that for Winter-een-mas. It should be about enjoying the game you're playing, either __(11)__ or with friends, and relaxing."

What would a holiday, or gaming session, be without the food? Snacks are a key component of Winter-een-mas and should not be overlooked in your planning. While there's __(12)__ traditional food, snacks or drinks specifically associated with Winter-een-mas, Buckley does have one __(13)__ of advice to gamers planning their menu: avoid greasy foods that will inevitably result in slippery controls.

Despite Buckley's laidback approach to Winter-een-mas, there is one vital rule that he believes should apply to the holiday: be kind.

"I always encourage people to try and be mindful of how they're playing during Winter-een-mas – how they're interacting with their fellow gamers if they're playing online. Gaming can get a little toxic at times, and we can all get competitive, so I think Winter-een-mas is a good opportunity to __(14)__ a conscious effort to be more courteous to each other. Compliment a good play, help out with some advice, etc. It's a small thing, but if there's one thing I'd like the focus on the holiday to be, it's remembering __(15)__ this is something we all have in common; we love video games. We may have a ton of other differences, but for at least a __(16)__ we can all come

together and appreciate that we live in a time where technology like this exists and offers us these amazing stories / experiences."

4. According to the text say whether these sentences are true (T) or false (F). Underline the part of the text that gave you your answer.

1. Winter-een-mas is a national holiday in the USA.
2. Americans have a week off from 25 to 31 January.
3. All gaming community in the USA celebrates this holiday.
4. Winter-een-mas has been celebrated since 2003.
5. People don't usually exchange gifts during this holiday.
6. Winter-een-mas has become a commercialized holiday.
7. There are special rules for celebration.
8. The creator of this holiday expects that the participants of the holiday will follow a very important principle during gaming sessions.

Listening 2

https://www.youtube.com/watch?v=MJ3cwL9SFUA

Listen to the recording and complete the tasks.

1. What is the name of fictitious character in Tim Buckley's webcomic Control-Alt-Delete who crowned himself the king of winter? Describe this character.
3. Read the following types of video games and choose the names of the games which are NOT mentioned in the video.
adventure games, fighting games, real time strategy games, shooting games, racing games, puzzles, flight simulators, role-playing games.
3. Complete the sentence according to the information given in the video:
Winter-een-mas has grown beyond the screen in gaming and has expanded out to ____.
4. What kinds of gifts are encouraged by Buckley? What is one of the reasons?

Reading 3

1. Read a part from the book Game Programming Patterns by Robert Nystrom.

2. Complete the gaps with one of the extracts

a	because it's perfect and complete

b	some cleanup to do
c	leaving not the slightest ripple on the placid surface of the code
d	who never leaves the starting line
e	what the existing code is doing
f	picking the right gaming engine platform for their needs
g	paging it into a simian cerebrum over a pair of optical nerves

3. What are the tips the author gives the readers? Formulate each tip in one or two sentences.

What is a good software architecture?

For me, good design means that when I make a change, it's as if the entire program was crafted in **anticipation** of it. I can solve a task with just a few choice function calls that slot in perfectly, __(1)__.

That sounds pretty, but it's not exactly actionable. "Just write your code so that changes don't disturb its **placid** surface." Right.

Let me break that down a bit. The first key piece is that architecture is about change. Someone has to be modifying the codebase. If no one is touching the code – whether __(2)__ or so wretched no one will sully their text editor with it – its design is irrelevant. The measure of a design is how easily it accommodates changes. With no changes, it's a runner __(3)__.

How do you make a change?

Before you can change the code to add a new feature, to fix a bug, or for whatever reason caused you to fire up your editor, you have to understand __(4)__. You don't have to know the whole program, of course, but you need to load all of the relevant pieces of it into your primate brain.

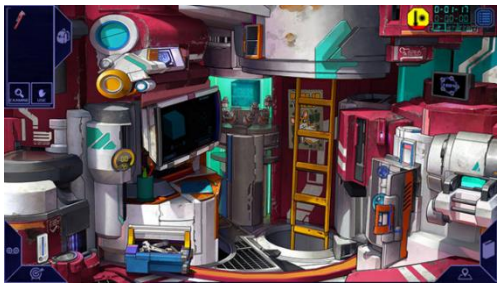
We tend to gloss over this step, but it's often the most time-consuming part of programming. If you think paging some data from disk into RAM is slow, try __(5)__.

Once you've got all the right context into your **wetware**, you think for a bit and figure out your solution. There can be a lot of **back and forth** here, but often this is relatively straightforward. Once you understand the problem and the parts of the code it touches, the actual coding is sometimes trivial.

You beat your meaty fingers on the keyboard for a while until the right colored lights blink on screen and you're done, right? Not just yet! Before you write tests and send it off for code review, you often have __(6)__.

You jammed a bit more code into your game, but you don't want the next person to come along to **trip** over the wrinkles you left throughout the source. Unless the change is minor, there's usually a bit of reorganization to do to make your new code integrate seamlessly with the rest of the program. If you do it right, the next person to come along won't be able to tell when any line of code was written.
Gaming developers and managers have to make the right decision when it comes to __(7)__ despite the large variety of solutions available today.

Reading 4



1. What do you know about Unreal Engine, Unity and Godot? Have you used them?

2. Match the words and their explanation.

1	occlusion culling	a	to make available for use
2	rendering engine	b	to mention or to talk about sb / sth
3	to bottleneck	c	to give sb official permission to do sth
4	to deploy	d	discarding objects which are hidden from a certain point of view
5	to license	e	an attempt to do something
6	to release	f	to organize and send out (people or things) to be used for a particular purpose
7	to refer to	g	subcomponent of a game engine focused on the 2D or 3D presentation of the game's graphics
8	to drag	h	to hinder
9	endeavour	i	a tool that uses a graphical interface to help the developer create programs based on visual representations of logic
10	visual scripting	j	to move sth on a computer screen using a mouse

3. Fill the gaps in the summary about the Godot Game Engine with the words above in appropriate forms.

What is the best game engine: is Godot right for you?

Godot started its life in 2007, the pet project of Argentinian developers Juan "reduz" Linietsky and Ariel "punto" Manzur. It didn't launch until 2014, however, and the long

term aspect of the project was one of the reasons for its name, a reference to Samuel Beckett's famous play, Waiting for Godot.

Godot is a free open source engine relying on donations via its Patreon page.

Godot uses its own language, GDScript but it also supports ____1____, C# and C++. With Godot, you can ___2____ games on desktop platforms such as Windows, macOS, Linux, UWP, and Haiku, as well as mobile platforms iOS and Android. You can learn more about Godot's features on this page.

Godot has been going from strength to strength these past few years and should continue to rise as the next build of the engine due to be ____3____ this year will provide better 3D support and a lot of new features.

What are the advantages of Godot?

Godot is versatile

Godot won't limit your creative ____4____, as it's capable of handling almost every project you can think of.

"Godot is an incredibly versatile engine whose limits in terms of ____5_____ and 3D performance are likely not more than a few months from being negligible," says Ryan Hewer, project director at Little Red Dog Games, ___6___ the release of Godot 4.0 later this year.

"At present, there's very, very little where I would say 'Godot is not best for that', with the exception of possibly very detailed first and third-person shooters. But with Godot 3.2 and more importantly Godot 4.0 you're going to see parity with most any other mainstream engine out there. Godot is advanced enough that I'm comfortable saying that most developers will be ____7____ by their own skills rather than the tools in front of them."

Godot excels at 2D games

While it can handle all types of projects, 2D is where Godot clearly reveals its strengths, making it comparable to GameMaker, MonoGame and Construct. Godot actually comes with separate 2D and 3D engines.

Godot has a visual scripting system using blocks that you can connect, making it an accessible tool even for beginners. You can just ___8____ and drop all sorts of information using nodes and scenes.

What are the disadvantages of Godot?

Godot isn't ready for complex 3D projects

As already touched upon, 3D is not where Godot shines, as its level design tools and ____9____ are not as powerful as other technology.

Godot has a small community

As often when dealing with smaller game engines, having a limited community can be an issue. With something as popular as GameMaker, for instance, all of your questions will often be answered on forums already.

Godot doesn't support consoles

Because Godot is an open source project, you can't develop games for consoles with it. The engine would need to be ___10___ as a company to do so something that's not on the road map for its lead developers.

Godot lacks features

Some features found in bigger engines like Unity and Unreal have not yet been implemented in Godot. For instance, there's no built-in sprite editor.

Listening 3

https://youtu.be/KjX5llYZ5eQ

1. Listen to the description of Godot Game Engine.

2. Answer the questions.

1. Where can you release games created using Godot engine?
2. What can prevent you from creating a good game?
3. What is meant by “a scene” in Godot?
4. What are the building blocks in Godot?
5. What programming languages are used to create the code in Godot?
6. Does the author present the advantages and disadvantages based on research?
7. What tools in Godot does the author characterise as “not fantastic”?
8. Is GDscript a difficult language?
9. How “heavy” is Godot’s full editor?
10. How long does it take to download Godot?

3. Answer some more questions.

- What do you think about such an open source?
- Would you like to use Godot for your projects?
- What is the difference in the use of Godot engine by beginners and by professionals?

Discussion

For each question suggest some supporting and opposing arguments. Make a discussion in pairs.

Do you agree that…

1) video games can influence social opportunities and form problem-solving skills?
2) students who spend much time on video games can earn high grades?

3) playing video games could be beneficial for the most excellent students?
4) video games can act for students as a self-reward scheme?

Reading 5

1. Before reading the text, look through the list of stages to create a video game. In what order do you think these stages should come?

2. Now skim the article and match paragraphs and their titles. Do you agree with the sequence of steps suggested by the author? Can you add anything?

a	Choose an engine	
b	Test your game	
c	Design a prototype	
d	Start marketing	
e	Develop a concept	
f	Refine your ideas	
g	Work on your design	

How to make a video game: step-by-step

We'd love to give you a detailed breakdown of how to build your ideal game here, but sadly, there are just too many variables. The exact process depends on the type of game you're going to make, the scope of the project, your resources, and the amount of time you have.

However, we can give some general guidance on the kinds of things you should be doing, thanks to our open step on making **indie** games. These steps of the game development life cycle can help you understand some of the challenges you must address when making a game:

___1___

First things first – you'll need to come up with a basic **premise** for your game. Think about the type of genre you want it to fall into, what platform people will play it on, and what sort of mechanics it will **feature**.

If you're entirely new to the process, then a course on an introduction to game programming could come in useful here, giving you some of the **essentials** of how the process works. It's a good idea to start small with your first game, keeping your scope and mechanics simple.

___2___

The next step in making a video game is to start fleshing out your design. Here, you can think about what you want it to look like, as well as the skills and resources you need to achieve that goal.

___3___

Depending on the scale of your game and your programming skills, you'll likely want to use specialist software to create your video game. The current choice among indie developers is Unity, an engine that newcomers can use for free. However, there are plenty of others to choose from depending on your ambitions.

Game engines like Unity can help you find elements such as pre-made character models and environments, as well as **a host of** tools that can help bring your ideas to life.

___4___

This early stage is where you will try to build test scenarios and systems that can help you see how gameplay might work. The aim here is to figure out if the player's main actions and decisions in the game are fun over a significant period of time.

You might want to add some art and animation into some small elements of your prototype to see if it matches your expectations and vision.

___5___

Once you're happy with your prototypes, you can start focusing on the main production of your game. At this stage, you'll create and test the different features that will make up your game.

Your game being in production, you'll create the levels, narrative, audio, and mechanics. Whether you focus on perfecting one element at a time or creating a first **rough** draft is entirely up to you.

___6___

At the end of your production, you should have a playable 'alpha' version of your game. The first iteration of your project having been created, you can start testing and **refining**. Alpha projects will often change significantly, especially if there are elements that don't quite work or look right, or significant bugs.

The aim is to eventually get to a 'beta' version of your game, which is when it's at the stage for external testing and feedback. Again, at this stage, you can still make refinements and improvements to your game.

___7___

Your aim being to distribute your game to others (rather than have it as a project for yourself), you might want to consider how to market it. Ideally, you want to **foster** a community of players that are enthusiastic about your game.

In reality, you can start this process fairly early on in the game development process. You can use social platforms such as Discord and Reddit to reach people who might be interested in your game and even offer them the chance to play early builds of your title.

Once you're happy with your game, you can even think about launching it on the appropriate platform. Of course, you'll then have to think about fixing any new bugs that are found, as well as potentially adding more content.

3. Vocabulary focus. Explain the meaning of the highlighted words in the text (indie, premise, to feature, essentials, a host of, to foster, rough, to refine) and use them in the sentences.

1. These TV programs also ____ presenters who use sign language.
2. Reading together can help ____ strong bonds and good communication, which only becomes more important as kids grow older.
3. Many ____ stores also offer you the opportunity to sell DVDs you own that you don't want anymore.
4. Even the most famous writers in history relied on great editors to help them ____ their words.
5. Special seat back holders allow you to stash away all the ____ for the journey.
6. It is impossible to give more than a ____ estimate as to the age of this painting.
7. It is important to acknowledge the importance of the central ____ of this book.
8. There is ____ reasons why he didn't get the job.

4. Vocabulary focus. In the text find phrasal verbs and verb expressions that mean the following.

1	to find the solution to a problem after a lot of thought	
2	to add more details or information to something	
3	to suggest or think of an idea or plan	
4	to combine parts of sth to make a whole	
5	to make something more real or exciting	
6	to help someone to do or achieve something	
7	to be the person who makes a decision	
8	to refer to a certain group, category, part, etc.	

5. Grammar focus. Find Absolute Participle constructions and define their function – time, cause, attending circumstances.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
Beta version		
bug		
to drag		

to elaborate		
endeavour		
feature		
fictitious character		
invigorating		
laidback		
prototype		
to refine ideas		
rendering		
refinement		
testimony		
wetware		
versatile		
VR (virtual reality)		
multiplayer online battle arena (moba)		
real-time strategy (RTS)		
role-playing game (RPG)		
sandbox		
shooter		
shooters (FPS/TPS)		
simulation		

Grammar Focus

The Participle	Active Voice	Passive Voice
Present Participle	**V + ing** *(writing)*	**being + V3** *(being written)*

Perfect Participle	**having + V3** *(having written)*	**having been + V3** *(having been written)*
Past Participle	**-**	**V3** *(written)*

Participle Clauses

- Participle clauses ~ subordinate clauses (relative, time, reason, condition, manner or attendant circumstances)
- Have **no* their own subject**. The subject of the action = the subject from the main clause.
- Present participle – the action **simultaneous** with the action of the verb in the main clause
- Perfect participle – the action **preceding** the action of the verb in the main clause (used only in **adverbial** clauses)
- Adverbial clauses can start with *when* or *while*
- When they start the sentence, they are separated by **comma**
- Used manly in **writing**

Function	Example
As an adjective	
As a single adjective	A **rolling** stone gathers no moss.
	Forbidden fruit is sweetest.
As a relative clause	Fear the Greeks **bearing gifts**. (who bear gifts)
	Advice **most needed** is least heeded. (which is most needed)
As an adverbial clause	
Time	**Walking down the street**, I saw David. (when I was walking)
	Having read the first two pages, he put the book aside. (after he had read the first two pages)
	Having been checked, the paper was returned to the author. (after it had been checked)
Cause	**Knowing** a little French, I had no difficulty making myself understood. (As I knew a little French)
	Having read the book before, he knew how the film would end. (as he had read the book before)
	Being impressed by the painting, John praised the artist. (As he **was impressed** by the painting.)

	Having been offered a promotion, she decided to stay in the company. (Since she had been…)
Condition	**Reading a lot**, one can enlarge their vocabulary. (If one reads a lot)
	Being regularly watered, the flowers can live longer. (If the flowers are watered regularly)
Manner or attendant circumstances	**Sitting comfortably in the armchair**, she was reading a novel. (She was sitting ... and reading...)

*Absolute Participle Clause

- Has its **own Subject**
- Can be used as adverbial clause (similar to usual Participle clauses)
- Can start with preposition *with*

***Example**:*

Weather permitting, we will start tomorrow. (If the weather permits)
The question being settled, we went home. (As the question was settled)
Our reservations having been made, we started on our vacation in spite of the predicted storm. (As our reservations had been made)

1. Change the relative clauses into Participles or Participle clauses.

1. Passengers *who wanted to go to Liverpool* had to change in Manchester. – Passengers *wanting to go to Liverpool* had to change in Manchester.
2. The girl *who was picked up by her brother* was very nice.
3. The house *that stands at the end of the road* will soon be sold.
4. The conference *which was planned by non-governmental organisations* was about globalisation.
5. Irish people *who live in Great Britain* have the right to vote in British elections.
6. A triangle *that has two sides of equal length* is called an isosceles triangle.
7. A picture *that shows the image of a person* is a portrait.
8. The problems *that were discussed* will be essential for your exam.
9. Animals *that eat plants* are called herbivores.

Note: *The person who **wrote** this book **is** my friend.* – ***Cannot be changed into Participle clause***

2. Use Participle 1 or 2 of the verbs in brackets.

1. ___ for her gloves, she dug through the entire wardrobe. (search)
2. ___ to the bus stop, she lost her shoe. (run)
3. The cup ___ with milk stood on the table. (fill)

4. ___ each other for ages, they had a lot to talk about. (know)
5. ___ into a rich family, she got everything she wished for. (take)
6. ___ with pride, he walked towards the stage. (fill)
7. Peter found a ____ treasure in the garden. (hide)
8. The scientists showed us the new energy-____ technology they had invented. (save)
9. The kids found the _____ diamonds in a rubbish bin. (steal)
10. We need an English-_____ secretary for our office. (speak)
11. Emma tried to read the _____ instructions; she couldn't understand anything. (confuse)
12. The party was held in a beautifully ____ room. (decorate)

3. Choose the correct Present participle, Past participle or Perfect participle to complete the participle clauses.

1. These scientists have designed a car *powered / powering* by solar energy.
2. *Having started / started* preparing for my final exam, I realized that there are many gaps in my knowledge.
3. The police arrested a man who was flying the drone *taken / taking* pictures of the military base.
4. *Checked / Having checked* the data very carefully, he still couldn't find the error.
5. *Realizing / realized* that air pollution had become very high, the city authorities banned the movement of cars in the city center.
6. He also recorded videos *included / including* classified information about the project.
7. *Having decided / deciding* to carry on the experiment, we continued our research.
8. Not *wanting / wanted* to waste time, they even worked without a lunch break.
9. *Treating / treated* with case, our pottery can last for generations.
10. *Spending / Having spent* his childhood in Denmark, he could speak Danish perfectly well.
11. *Persuaded / Having persuaded* by their optimism, we invested a lot in this company.
12. *Having been / Being* unemployed for so long, he had lost all hope.

4. Match participle clauses from the first column and main clauses from the second column.

1.	Having been made redundant,	a	the engineer decided to stop the experiment.
2.	Having read the instructions twice,	b	I can't really give you my opinion.
3.	Not having experienced it myself,	c	he still couldn't understand how to use the device.

4.	Being disappointed with the results,	d	they tried to achieve maximum realism and interactivity.
5.	When translated,	e	he did not realize how tired he was.
6.	Working on the project,	f	the article was considerably abridged.
7.	Having finished their training,	g	she started looking for a new job.
8.	Working non-stop,	h	they will be fully qualified programmers.

5. Rewrite the sentences using Participle clauses.

1. As he was very tall, he decided to become a basketball player. – Being very tall, he decided to become a basketball player.

2. Once we'd reached the top of those, we saw the much higher peaks ahead.

3. After another hour, because we were feeling hungry, we stopped for a snack.

4. The books which were sent to us are for my aunt.

5. We didn't want to waste time, so we walked up the steep valley which led to the foothills.

6. The picture which was stolen from a museum was offered on Ebay.

7. We had great fun at the party. We played silly games.

8. He had saved a little money. He travelled to Australia.

9. As they were chatting along, they didn't see the car coming.

10. The reception had been prepared carefully and was a great success.

11. He was picked up by his mother and didn't have to wait for the bus.

12. She had finished her degree and started to work for an international company.

6. Rewrite the sentences using Participle clauses.

1. Since he had never been there before, he was stunned.

2. Before he left the house, he switched off the lights.

3. As she was on holiday, she couldn't go to the party.

4. When I travel around Ireland, I always stay in youth hostels.

5. Since she didn't hear the doorbell, she missed the delivery.

6. As the house is made of stone, it is always cool in summer.

7. While they were talking on the phone, they forgot everything around them.

8. When they go to London, they always did a sightseeing tour.

9. He told me the news and then went away.

10. The river burst its banks and flooded many nearby villages.

11. The company closed for a year and left its employees looking for work.

12. As the surface is regularly cleaned, it maintains its original appearance.
13. After I had dropped him at the station, I drove straight to the supermarket.

7. Choose the appropriate subject and finish off the sentences.

the mobile phones; Ann; the dog; the scientists; the lemon trees; the aircraft; the nurse; the robber; I; John.

1. Travelling with the speed of sound, _____.
2. Not knowing where I was, _____.
3. Having been caught at the crime scene, _____.
4. Having been punished for chewing the shoes, _____.
5. Making an injection, _____.
6. Grown in the right conditions, _____.
7. Being produced in China, _____.
8. Parking her car in a side road, _____.
9. Having finished his bachelor courses, _____.
10. Doing research on stem cells, _____.

8. Use the correct form of the participle.

1. You will also get a cap and a backpack _____ (include) in the price of the holiday.
2. There are several hotels in the area _____ (offer) luxurious accommodation.
3. There were lots of people after the concert _____ (complain) about the sound quality.
4. Not ____ (feel) too well, Mary left work early.
5. ____ (impress) by Lily's work, the manager extended her contract for a year.
6. Not ____ (want) to offend him, we said nothing about his paintings.
7. ___ (carry out) for several weeks, the road repairs significantly delay traffic.
8. ___ (damage) in the storm, the building will be demolished.
9. ___ (buy) their tickets in advance, they headed straight into the cinema.
10. ___ (search) for an hour, I found my glasses.

9. Define the functions of Absolute Participle Constructions in the following sentences: time, cause, condition, attendant circumstances.

1. Any moving object is able to do the work, the quantity of kinetic energy depending on its mass and velocity.
2. The equipment being configured in English, there were several problems with translation.
3. Circumstances permitting, we'll start the project tomorrow.

4. He sat motionless with his eyes fixed on the screen.
5. It being now pretty late, our team leader decided to stop the discussion.
6. This task completed, he started to think about the next one.
7. The bulb having burnt out, we had to postpone the experiment.
8. The experience in installing and maintaining operating systems and office programs having been obtained, he received the position of company system administrator.

10. Rewrite the sentences below using the Absolute Participial Construction.

1. As the car tire was punctured on the road, I had to use a spare.
2. As the new highway had been laid, the communication between two settlements became unimpeded.
3. As disposable tableware is made from non-degradable plastic, customers should reduce its use.
4. When the article had been corrected, the authors sent it to the publisher.
5. When the results of the study had been published, the scientists working on this project received positive feedback.
6. As electricity is cut off without warning, consumers often have to do without light and heat.
7. As the miners had gone on strike, management agreed to raise wages
8. As the limit of all resources was exhausted, the researchers had to look for non-traditional reserves
9. As the supplier called to confirm the order, the purchasing manager informed the terms and conditions of payment, and the warehouse to which the receipt was planned.
10. As the contract was concluded on time, the contracting parties were fully satisfied.
11. When the production equipment was installed, the whole structure underwent safety and stress tests.
12. As the project was very difficult, my teammate panicked.

Unit 8

IT Jobs

The spread of computers and the Internet will put jobs in two categories. People who tell computers what to do, and people who are told by computers what to do."

Marc Andreessen

Warming Up

1. Name as many devices, gadgets as you can, which are developed on the basis of AI.
2. If possible, name the company, factory and country of production.
3. Try to give a short overview.

Start Thinking

What IT professions do you know and think about what skills and knowledge they require?

Reading 1

Types of IT jobs: Common focus areas

Information technology is a broad subject that houses a lot of specialized roles and expertise. These can be broken down into a few sub-groups:

Cyber Security: This area focuses on keeping the data of organizations and users secure, as well as the preventative measures taken to reduce harm in the event of a breach.

Software development: This programming-focused branch of IT revolves around building or modifying software applications to meet users' needs.

IT infrastructure: This focus area refers to the design, planning and implementation of IT-related hardware, usually done on an organization-wide scale.

IT support: This refers to the professionals who assist end users (or other IT support specialists) with day-to-day technical issues.

Data management:Professionals in this area focus their work on the design of structured database systems, creating data-loss contingency plans and the analysis of gathered data.

It should be noted that the dividing lines between these focus areas aren't always clear-cut, and many roles in IT may have significant overlap with multiple categories. For example, the programming skills used in software development can be applied to

data analysis roles and knowledge of cyber security best practices is a key consideration for IT infrastructure planning.

1. Work out the meaning of the underlined words / phrases using the text.

2. Match the words and their explanations to check your ideas:

1. specialized roles 2. expertise 3. a breach 4. scale 5. contingency plan 6. clear-cut 7. overlap

A The expected function of a member of a particular profession.
B An act of breaking or failing to observe a law, agreement, or code of conduct.
C A plan designed to take account of a possible future event or circumstance.
D Expert skill or knowledge in a particular field.
E IT jobs: A closer look at 9 common IT roles.
F To cover something partly by going over its edge.
G Sharply defined; easy to perceive or understand.

Reading 2

Now that we've covered some of the broader focus areas found under the domain of information technology, let's dive into some of the specific job roles profiled by the Bureau of Labor Statistics that you could potentially find yourself in as an IT professional.

Read the passages: discuss and add any relevant information; work out the meaning of the underlined words / phrases.

1. Software developer

Software developers (as well as the closely related quality assurance analysts and testers) are the tech professionals tasked with creating and modifying computer programs. They use a mix of programming and logical planning skills to write the code guiding how these programs work. Some may focus more on writing individual code components while others focus their time on the big picture work like mapping the needs of users and determining the core functionality needed to meet them. Additionally, they may spend time troubleshooting code and performing regular maintenance of a program. This career requires a mix of coding skills, logical planning ability, collaboration skills and creativity.

Typical duties: 1

Analyzing user needs and creating computer programs that meet those needs
Analyzing and recommending possible improvements or fixes to existing programs and systems

Planning and mapping out how individual pieces of an application or system will work together
Developing and implementing testing plans to ensure functionality
Monitoring and addressing application functionality through maintenance and testing
Creating reference documentation

2. Computer network architects

Computer network architects (sometimes called computer network engineers) design and build networks including local area networks (LANs), wide area networks (WANs) and Intranets. These sorts of networks might be small connections between offices or large enterprise-scale networks. Someone in this role also works on any issues that arise within the network and anticipate future networking needs.

Typical duties:1

Creating plans and layouts for data communication networks
Communicating plans and network needs to management or other stakeholders
Assessing security needs and creating plans to address them
Upgrading hardware as needed
Researching new network technologies to determine future needs

3. Computer support specialists

Computer support specialists are on the front lines of IT as they assist users with a wide variety of day-to-day issues − for example, trouble connecting to Wi-Fi, configuring a new workstation or troubleshooting issues connecting to the new printer. Additionally, they may assist network and systems administrators with larger-scale software or hardware rollouts. They are natural problem solvers and strong communicators who troubleshoot and evaluate computer problems promptly and efficiently, serving a critical role within any organization.

Typical duties:1

Listening to users' descriptions of computer problems, asking questions and evaluating their needs
Walking users through steps to solve their problems
Setting up and repairing computer equipment and devices
Training users on how to use computer hardware and software

4. IT project managers

IT project managers play a unique role in this field. They're responsible for the planning, initiation and execution of complex IT projects and initiatives. To do this, they must serve as a bridge between the technical teams carrying out the work and the organizational stakeholders setting the overall vision and goals of a project. They help both sides understand the potential hurdles facing a project, create overall project plans for how this work will be completed and hold teams accountable for meeting deadlines

and budgets. IT project managers have a strong blend of technical knowledge, organization ability and planning, problem-solving and communication skills.

Typical duties: 2

Meeting with organizational stakeholders to determine scope and timing of IT projects

Working with technical teams to identify potential barriers or issues and determining options for how to overcome them

Conducting regular check-ins to monitor project progress and address unexpected issues

Creating overall IT project work rollout plans

Conferring with technical teams to identify what resources are needed for a project

5. Web developers

Web developers and digital designers design, create and maintain websites. This role often falls into one of three categories: back-end developers, who work mainly with the technical construction of the website, front-end developers, who are responsible for the look and design of a website, and webmasters, who maintain and update websites − though many of these roles may blend together depending on the organization. This career calls on excellent coding, creativity and communication skills in order to create websites that meet the needs of users and organizations alike.

Typical duties: 1

Meeting with clients and assessing their website needs

Creating and testing web applications

Writing code for the website

Collaborating with website stakeholder teams

Creating user-friendly, functional and accessible layouts

Monitoring site traffic or other key performance metrics

6. Information security analysts

A constantly evolving and critical position, an information security analyst protects an organization's network and systems from security breaches and the potential fallout from them. These analysts work to create disaster recovery plans, conduct assessments of security threats, create plans remedying potential threats and keep a close eye on new and emerging threats in the industry. This role requires extensive knowledge of how hardware and software interface, their potential weaknesses and the ability to drive proactive change within an organization to address information security concerns.

Typical duties:1

Monitoring for security breaches or potential weaknesses

Overseeing the organization-wide implementation of protective measures such as firewalls and antivirus programs

Creating reports documenting any security breaches and providing guidance on what can be done to prevent them going forward

Testing for potential vulnerabilities in systems
Developing security best practices for an organization and creating training documentation

7. Computer systems analysts

Computer systems analysts, or systems architects, create new systems and procedures to optimize an organization's computer needs. Computer systems analysts often have both a sophisticated understanding of IT and a strong background of industry-specific knowledge like healthcare, finance or marketing. For example, in a healthcare setting, a computer systems analyst may be tasked with modifying or designing a system used for storing and sharing patient medical records. That information may require special legal considerations, so analysts who understand the laws governing patient information and how this system will be used by providers are critically important.

Typical duties:1

Working alongside managers and other subject matter experts to assess an organization's IT needs
Researching and analyzing the potential benefits and drawbacks of new technologies
Choosing and configuring new hardware and software to meet organizational needs
Managing the installation of new computer systems
Training end users and creating instruction manuals or other key documentation

8. Database administrators and architects

Businesses and organizations generate and collect a massive amount of data in order to fuel their daily operations. Database administrators are the professionals who help store, secure and organize that data. They are tasked with building databases that logically store information in a way that works well with the systems that may access this information. They may also be responsible for data recovery efforts and creating data backups.

Typical duties:1

Creating back-ups of data and recovering lost data
Ensuring user permissions for data use are valid and up to date
Merging existing databases into new databases
Identifying user needs in order to create new databases
Maintaining proper function of all databases

9. Network and computer systems administrators

Network and computer systems administrators are responsible for the upkeep of an organization's networks. While a computer network architect's work is typically more focused on designing an organization's network, a network system administrator is more responsible for the day-to-day operation of those networks and ensuring they're working as intended. Network systems administrators may provide direct user support or supervise computer support specialists. This role is often a logical next step in the

career ladder for user support specialists, and their work typically focuses on a larger scale or more complex network issues.

Typical duties:1

Making upgrades and repairs to networks
Securing network and computer systems
Adding users to a network
Training users on hardware and software
Troubleshooting user problems

Listening 1

https://www.youtube.com/watch?v=0FFLFcB9xfQ

Employers look for two kinds of skills: soft skills and hard skills. When used correctly in your resume, they work together and provide the hiring manager with a glimpse into the job seeker.

Listen to the recording and answer the questions.

1. What two types of skills are mentioned?
2. How are hard skills defined? What examples are given?
3. How are soft skills characterized? Which ones are mentioned?
4. How are hard skills learned?
5. How can you develop soft skills?
6. How are hard skills measured?
7. How can your soft skills be assessed?
8. Why do you need both hard and soft skills?

Reading 3

Now let's look carefully and summarize the information. Read the text and fill in the gaps in the paragraphs with the words from the boxes.

What are Hard Skills?

Hard skills are __1__ skills. They are quantifiable and are often learned in school, through earned certifications, or in previous work __2__. Hard skills are specific to each job and are often the basis of job requirements.

Recruiters look for hard skills on your __3__ to gauge how well you'd be able to perform job __4__. Hard skills are especially important because of the applicant tracking systems (ATS) used by most large companies that rank and filter __5__. Hard skills can also be considered "resume keywords," which are words __6__ use to search

for applicants. Each resume should use the exact hard skills found in the job description.

resume	recruiters	experience
applications	taught	duties

What are Soft Skills?

Soft skills are non-__7__, subjective skills that are not specific to one job or career. They typically speak to how well a person __8__ with others. Soft skills are "people" skills.

These skills are personality traits that help define character but offer less proof of experience than hard skills. Soft skills revolve around __9__, communication, and work ethic.

What's the Difference Between Soft Skills vs Hard Skills?

Hard skills are teachable and measurable abilities, such as writing, reading, math or ability to use computer programs. By contrast, soft skills are the __10__ that make you a good employee, such as etiquette, communication and listening, getting along with other people.

Hard Skills vs. Soft Skills

A combination of hard skills and soft skills forms a well-rounded job applicant. While hard skills are quite different than soft skills, together, they create a good __11__ between hard knowledge and interpersonal attributes. Hard skills show __12__ and proficiency while soft skills show communication and relational abilities.

balance	measurable	teamwork
interacts	mastery	traits

Hard Skills List

Tech Hard Skills:

Data mining
Analytics
HTML
Data analysis
SaaS in cloud
Coding
AI
Machine learning

Sales & Marketing:

SEO/SEM marketing
Marketing
Social media

Big Data Engineering:

Python
JavaScript
Java
Apache Hadoop
Apache Spark
Excel
Computer science
Data visualization

Accounting & Finance:

Mathematics / IT
Bookkeeping
Quickbooks

Outreach
Inside sales
Outbound calling
Strategy
Forecasting
CRM
GAAP
Analytics
Auditing
Cash flow management
Microsoft Office
Risk Analysis

How to Find Hard Skills for Your Resume

Hard skills must be reexamined for each job opening. __13__ to find skills that will help get you past ATS, job seekers should analyze the job description, looking specifically for skills that are mentioned __14__ or listed more than once, __15__ those are likely high-priority to the hiring manager.

__16__ choosing hard skills to include, bear in mind that tense matters to ATS. Be sure to use the exact form of the word used in the job description.

Analyzing each job description can be time consuming, __17__ it is important. Jobscan can help by automating the process of locating hard skills. __18__ upload or copy and paste your resume beside the job description of your choice and Jobscan will do the rest.

when	first	just
in order	as	but

Soft Skills List

Strong communication
Leadership
Adaptability
Problem-solver
Listening
Team-oriented
Team player
Strong work ethic
Decision maker
Strategic thinker
Skilled Collaborator
Time management
Self-motivated
Multitasker
Conflict resolution
Responsible
Flexible
Organized
Work well under pressure

For example:

a software engineer may have the following skills on their resume:

Javascript
Java
CASE
Linux

They may also have the following soft skills on their resume:

Detail-oriented
Superior time management
Work well under pressure

Competitive
Entrepreneurial
Integrity
Hands-on
Innovation
Consistent
Creative
Energetic
Enthusiastic
Driven
Attention to detail

You'd think hard skills matter most. You'd be wrong. The truth is that demand for soft skills has been growing since at least 1980. Another study, by LinkedIn, actually suggests that 57% of employers value soft skills more than hard skills.

Listening 2

https://www.ted.com/talks/michelle_r_weise_4_tips_to_future_proof_your_career/

Pre-listening

1. Make sure you understand the words and expressions you are going to hear. Match then with their explanations.

1	to take into account	a	to be anxious about not having the knowledge, experience or skills to deal with a particular subject or situation
2	spotlight	b	the ability to share another person's feelings and emotions as if they were your own
3	stint	c	to control the direction of movement
4	empathy	d	
5	prospective	e	making you feel frightened or nervous
6	to feel out of depth	f	a period of time spent doing some job or activity

7	picky	g	to consider or remember sth. when judging a situation
8	to be committed to	h	possible
9	to steer	i	to be willing to give your time and energy to sth.
10	intimidating	j	attention

2. Fill in the gaps in the following sentences with some of the vocabulary above. Sometimes you have to change the verb form.

1. During his one-year ____, he worked at the university's radio station.
2. It is expected that all the employees ____ to the company's goals and policies.
3. Obvious talent will always remain in the ____.
4. When his ____ employers heard his history, they said they wouldn't hire him.
5. When it comes to working environment, safety should always be ____.
6. When I first started my new job, I ____, but now I love it.
7. I'd like to ____ our discussion back to our original topic.

While listening

3. Say whether the statements are TRUE or FALSE according to the recording.

1. In the future, people may change their jobs not so often as now.
2. Dr. Michelle Weise is a career adviser.
3. Mentioning human skills is required in all resumes.
4. Working as a barista may help develop your patience.
5. Skills translation has nothing to do with translation skills.
6. Communication skills may be important in crisis management.
7. When you feel discomfort at work, the advice is to quit as soon as possible.
8. Never ask during the interview about the possibilities of professional and career growth.

Reading 4

1. Match the words and expressions <u>underlined</u> in the following text with their explanations.

1	head-on	a	to have or own something
2	wear lots of hats	b	to grow, develop, or be successful
3	liaison	c	perfect, with no problems or bad parts
4	to leverage	d	communication between people or groups who work with each other
5	to telecommute	e	to develop or become clear

6	to possess	f	directly
7	to assess	g	to work at home and communicate with your office by phone or email
8	to unfold	h	to use something that you already have in order to achieve something new or better
9	top-notch	i	excellent
10	impeccable	j	very modern and with all the newest features
11	to come to fruition	k	to have different roles or tasks to perform
12	to thrive	l	to succeed and produce the results that were intended or hoped for
13	cutting-edge	m	to decide the quality or importance of something

IT Specialist job summary

We need a subject matter expert to serve as our in-house IT Specialist in a long-term position. The successful candidate will serve two functions within the company. First, he or she must coordinate between the company and external vendors and contractors about IT-related infrastructure and development; and second, the IT Specialist will consult with our IT department on any issues that might come up and advise about potential fixes or efficiency controls. We're looking for a responsive, highly productive professional who can work with numerous IT employees and vendors to ensure continued success through corporate projects.

IT Specialist responsibilities:

- Assess infrastructure on a regular basis to ensure it continues to meet necessary demands.
- Manage daily operations of the IT department. Develop new strategies and IT procedures to increase efficiency.
- Enhance workflow and improve customer satisfaction.
- Coordinate the needs of in-house IT experts and remote employees, vendors and contractors.
- Protect customer data from outside infiltration through encryption, secure data storage and other necessary means.
- Assist with the installation of new hardware and software and help train employees on its use.
- Manage and oversee departmental quotas.
- Offer suggestions for possible upgrades and changes within the IT department.

IT Specialist skills:

- Bachelor's Degree in Information Technology, Computer Science or related field required.

- Industry certifications and memberships **A +** .
- Excellent IT, communication, leadership and management skills.
- Ability to fill multiple roles simultaneously.
- Proven track record of maintaining IT structural integrity.

System Administrator job summary

Our insurance company needs a capable, motivated System Administrator to take over all aspects of the configuration and maintenance of our computer systems. Do you love tackling problems head-on? Do you enjoy coming up with creative solutions to a business's pain points? Are you constantly updating your knowledge of hardware and software trends and advancements? If you can answer "yes" to those questions, you'll fit in well with our company. We run a fast-paced but casual office in a supportive atmosphere. As the only IT staff member on our team, you'll wear lots of hats and gain plenty of valuable experience.

System Administrator responsibilities:

- Provide technical support for both hardware and software issues our users encounter.
- Manage the configuration and operation of client-based computer operating systems.
- Monitor the system daily and respond immediately to security or usability concerns
- Create and verify backups of data.
- Respond to and resolve help desk requests.
- Upgrade systems and processes as required for enhanced functionality and security issue resolution.
- Administrate infrastructure, including firewalls, databases, malware protection software and other processes.
- Review application logs.
- Install and test computer-related equipment.

System Administrator skills:

- 2+ years' experience in system administration.
- Associate or higher degree in a related field.
- Extensive experience with VM ware.
- Advanced knowledge of system vulnerabilities and security issues.
- Basic understanding of insurance goals and practices.
- Ability to respond to help desk requests after hours on a limited basis.

Data Architect job summary

Our company is interested in hiring an experienced Data Architect to work closely with our software and application development teams to recommend database structures based on the data storage and retrieval needs within each department. The Data Architect will be responsible for constantly monitoring our database and immediately addressing database issues and problems. The successful candidate will also submit reports to management that outline the changing data needs of the company and come up with related solutions.

Data Analyst job summary

Our growing technology firm is looking for an experienced Data Analyst who is able to turn project requirements into custom-formatted data reports. The ideal candidate for this position is able to do complete life cycle data generation and outline critical information for each Project Manager. We also need someone who is able to analyze business procedures and recommend specific types of data that can be used to improve upon them.

IT Business Analyst job summary

Our financial services firm needs an IT Business Analyst to join our growing team. We are looking for a professional with experience in both information technology and business administration. The successful applicant will serve as the liaison between the executive and IT departments of our company, leveraging the data the IT team extrapolates while also overseeing the selection and implementation of software programs and hardware resources. The ideal candidate for this position is detail-oriented and highly innovative. He or she will also be responsible for translating business needs to IT solutions, and vice versa, with current programs, projects and initiatives in mind.

Computer Engineer job summary

We are looking for a Computer Engineer who is able to maintain and enhance our current operating platforms and work with our application development team to integrate new applications into the network. The successful candidate will be responsible for collaborating with the Network Architect to work out the details involved with developing and implementing new network segments. He or she will also be asked to occasionally offer support to the executive staff for internal network issues and mobile computing challenges as well.

Computer Programmer job summary

We have an immediate opening for a Computer Programmer to create and maintain internal software programs for our business. The ideal candidate has a strong background in software development and programming. He or she will have an enhanced facility with the Windows operating system and associated hardware. The

ideal candidate is a hard-working individual who has a creative but analytical mindset. He or she should be self-motivated and self-supervised, as telecommuting is encouraged for at least part of the work week. The position comes with opportunities for advancement within the IT department for the right candidate as well as exceptional benefits and a competitive salary.

Computer Operator job summary

Our company is in need of a talented and focused Computer Operator to monitor and control our computer systems. Since we're currently expanding, we need a strong candidate who is excited about the opportunity to manage and improve the performance of an increasingly large network. Applicants should be ready to quickly troubleshoot hardware and software problems. The ideal candidate will possess the ability to analyze system problems from a variety of angles in order to find the root cause and fix it quickly. The Computer Operator should also possess great verbal and written communication skills and the willingness to learn everything about our computer system.

Network Engineer job summary

Our company is searching for a Network Engineer who can implement equipment installation plans based on the Network Administrator's specifications, maintain each component of the network and troubleshoot issues. The Network Engineer will be responsible for monitoring the network firewall, assessing the functionality of the network routers, ensuring all Internet security software is updated regularly, developing and implementing company email policies in accordance with the IT Manager and maintaining the company phone system.

Software Engineer job summary

Do you get a kick out of watching software unfold before your eyes? Do you dream about code every night? If so, we'd love to talk to you about a new product we're developing in the social media space. We're looking for a top-notch Software Engineer who always sweats the small stuff and cares about impeccable code. If you see glitches as an enjoyable challenge rather than a hardship and if you are willing to put in long hours to see a project come to fruition, get in touch with us today.

Software Architect job summary

Our HR applications firm is currently seeking an experienced Software Architect. The successful candidate will be responsible for designing, developing and implementing software solutions to address complex business issues, and providing technical leadership within the IT department. The ideal applicant will able to thrive in a highly collaborative workplace and actively engage in the development process. This is an excellent career opportunity for a professional with an impressive architectural design background and excellent interpersonal skills.

Software Developer job summary

Our company creates some of the world's most cutting-edge software products, and we want you to be a part of our team. We are currently in search of an experienced Software Developer to create and maintain software, in-house hardware and network systems. The successful candidate will also help to develop critical products for our clients, and offer excellent technical support. This is a fantastic opportunity to engage in a positive and creative work environment that offers excellent benefits and flexible schedules.

IT Project Manager job summary

Our growing company is currently seeking an experienced IT Project Manager. In this role, the IT Project Manager will be responsible for the administration of network and server infrastructure within all departments, planning of technology projects, managing our team of IT professionals, implementing technology security and the execution of all technology-related tasks and initiatives. The successful candidate will also be the liaison with telecommunications providers, and will support our company's telecommunications infrastructure.

2. Using the information above and examples below work out responsibilities and skills (hard and soft) in response to IT job summaries.

Vocabulary

Work out the meaning of the vocabulary below. Memorize them. Complete example sentences.

Word	Meaning	Example sentence
assess		
breach		
collaboration		
contingency plans		
evaluate		
execution		
all into		
expertise		
fallout		

fire wall		
hurdles		
keep a close eye		
key performance metrics		
layout		
maintenance		
overlap		
oversee		
promptly		
remedy		
simultaneously		
sophisticated		
troubleshooting		
upkeep		
vulnerability		

Grammar Focus

Take revision TEST 1

Each sentence can be completed using one or more of the alternatives (A, B, C etc.). In some sentences more than one alternative is possible.

Present and past

1. At first I didn't like my job, but _____ to enjoy it now.

A l'm beginning B I begin

2. I don't understand this sentence. What _____ ?

A does mean this word B does this word mean C means this word

3. Robert _____ away two or three times a year.

A is going usually B is usually going C usually goes D goes usually

4. How ... now? Better than before?

A you are feeling B do you feel C are you feeling

5. It was a boring weekend _____ anything.

A l didn't B I don't do C I didn't do

6. Matt _____ while we were having dinner.
A phoned B was phoning C has phoned

Present perfect and past

1. Jim is on holiday. He _____ to Italy.
A is gone B has gone C has been
2. Everything is going well. We _____ any problems so far.
A didn't have B don't have C haven't had
3. Sarah has lost her passport again. It's the second time this _____ .
A has happened B happens C happened D is happening
4. You're out of breath _____ ?
A Are you running B Have you run C Have you been running
5. Where's the book I gave you? What _____ with it?
A have you done B have you been doing C are you doing
6. "_____ each other for a long time?" "Yes, since we were at school."
A Do you know B Have you known C Have you been knowing
7. Sally has been working here _____
A for six months B since six months C six months ago
8. It's two years _____ Joe.
A that I don't see B that I haven't seen C since I didn't see D since I last saw
9. It _____ raining for a while, but now it's raining again.
A stopped B has stopped C was stopped
10. My mother _____ in Scotland.
A grew up B has grown up C had grown up
11. _____ lot of sweets when you were a child?
A Have you eaten B Had you eaten C Did you eat
12. Ian _____ in Scotland for ten years. Now he lives in London.
A lived B has lived C has been living
13. The man sitting next to me on the plane was very nervous. He _____ before.
A hasn't flown B didn't fly C hadn't flown D wasn't flying
14. Cathy was sitting in an armchair resting. She was tired because _____ very hard.
A she was working B she's been working C she'd been working
15. _____ a car when you were living in London?
A Had you B Were you having C Have you had D Did you have
16. I _____ tennis a lot, but I don't play very often now.
A was playing B was used to play C used to play

Future

1. I'm tired. _____ to bed now. Goodnight.
A l go B I'm going
2. _____ tomorrow, so we can go out somewhere.

A l'm not working B I don’t work C I won't work
3. That bag looks heavy. _____ you with it.
A l'm helping B l help C I'll help
4. I think the weather _____ be nice this afternoon.
A will B shall C is going to
5. ‘Ann is in hospital.’ ‘Yes, I know. _____ her this evening.”
A l visit B I'm going to visit C I'll visit
6. We're late. The film _____ by the time we get to the cinema.
A will already start B will be already started C will already have started
7. Don’t worry _____ late tonight.
A if I'm B when I'm C when I'll be D if I'll be

Modals

1. The fire spread through the building very quickly, but fortunately everybody_____ .
A was able to escape B managed to escape C could escape
2. I'm so tired. I _____ for a week.
A can sleep B could sleep C could have slept
3. The story _____ be true, but I don’t think it is.
A might B can C could D may
4. Why did you stay at a hotel when you were in Paris? You _____ with Julia.
A can stay B could stay C could have stayed
5. "I’ve lost one of my gloves." "You _____ it somewhere."
A must drop B must have droppe C must be dropping D must have been dropping
6. "I was surprised that Kate wasn’t at the meeting yesterday." "She _____ about it."
A might not know B may not know C might not have known D may not have known
7. What was the problem? Why _____ leave early?
A had you to B did you have to C must you D you had to
8. We've got plenty of time. We _____ hurry .
A don’t need to B mustn’t C needn’t
9. You missed a great party last night. You _____ . Why didn’t you?
A must have come B should have come C ought to have come D had to come
10. Jane _____ a car with the money I'd won in the lottery.
A suggested that I buy B suggested that I should buy
C suggested me to buy D suggested that I bought
11. You're always at home. You _____ out more often.
A should go B had better go C had better to go
12. It’s late. It’s time _____ home.

A we go B we must go C we should go D we went E to go
13. _____ a bit longer, but I really have to go now.
A l'd stay B I'll stay C l can stay D I'd have stayed

If and wish

1. I'm not tired enough to go to bed. If I _____ to bed now, I wouldn't sleep.
A go B went C had gone D would go
2. If I were rich, _____ a yacht.
A l'll have B l can have C I'd have D I had
3. I wish I _____ have to work tomorrow, but unfortunately I do.
A don't B didn't C wouldn't D won't
4. The view was wonderful. If _____ a camera with me, I would have taken some photographs.
A l had B l would have C I would have had D I'd had
5. The weather is horrible. I wish it _____ raining.
A would stop B stopped C stops D will stop

Passive

1. We _____ by a loud noise during the night.
A woke up B are woken up C were woken up D were waking up
2. A new supermarket is going to_____ next year.
A build B be built C be building D building
3. There's somebody walking behind us. I think _____ .
A we are following B we are being following C we are followed D we are being followed
4. 'Where _____? 'In London.'
A were you born B are you born C have you been born D did you born
5. There was a fight at the party, but nobody _____ .
A was hurt B got hurt C hurt
6. Jane _____ to phone me last night, but she didn't.
A supposed B is supposed C was supposed
7. Where _____ ? Which hairdresser did you go to?
A did you cut your hair B have you cut your hair
C did you have cut your hair D did you have your hair cut

Reported speech

1. Paul left the room suddenly. He said he _____ to go.
A had B has C have
2. Hello, Joe. I didn't expect to see you today. Sonia said you _____ in hospital.
A are B were C was D should be
3. Ann _____ and left.
A said goodbye to me B said me goodbye C told me goodbye

Questions and auxiliary verbs

1. ‘What time_____ ?' ‘At 8.30.'

A begins the film B does begin the film C does the film begin

2. ‘Do you know where _____ ?' ‘No, he didn’t say.’

A Tom has gone B hasTom gone C has gone Tom

3. The police officer stopped us and asked us where _____ .

A were we going B are we going C we are going D we were going

4. ‘Do you think it will rain? ‘ '_____ .'

A I hope not. B I don’t hope. C I don’t hope so.

5. 'You don’t know where Karen is, _____ ?' ‘Sorry, I have no idea.'

A don’t you B do you C is she D are you

-ing and the infinitive

1. You can’t stop me_____ what I want.

A doing B do C to do D that I do

2. I must go now. I promised _____ late.

A not being B not to be C to not be D I wouldn’t be

3. Do you want _____ with you or do you want to go alone?

A me coming B me to come C that I come D that I will come

4. I know I locked the door. I clearly remember _____it.

A locking B to lock C to have locked

5. She tried to be serious, but she couldn’t help _____ .

A laughing B to laugh C that she laughed D laugh

6. Paul lives in Berlin now. He likes _____ there.

A living B to live

7. It’s not my favorite job, but I like _____ the kitchen as often as possible.

A cleaning B clean C to clean D that I clean

8. I'm tired. I'd rather _____ out this evening, if you don’t mind.

A not going B not to go C don't go D not go

9. ‘Shall I stay here?' ‘I'd rather _____ with us.'

A you come B you to come C you came D you would come

10. Are you looking forward _____ on holiday?

A going B to go C to going D that you go

11. When Lisa came to Britain, she had to get used _____ on the left.

A driving B to driving C to drive

12. I'm thinking _____ a house. Do you think that’s a good idea?

A to buy B of to buy C of buying

13. I had no _____ a place to live. In fact it was surprisingly easy.

A difficulty to find B difficulty finding C trouble to find D trouble finding

14. A friend of mine phoned _____ me to a party.

A for invite B to invite C for inviting D for to invite
15. Jim doesn't speak very clearly. _____ .
A It is difficult to understand him. B He is difficult to understand.
C He is difficult to understand him.
16. The path was icy, so we walked very carefully. We were afraid _____ .
A of falling B from falling C to fall D to falling
17. I didn't hear you _____ in. You must have been very quiet.
A come B to come C came
18. _____a hotel, we looked for somewhere to have dinner.
A Finding B After finding C Having found D We found

Articles and nouns

1. It wasn't your fault. It was _____ .
A accident B an accident C some accident
2. Where are you going to put all your _____ ?
A furniture B furnitures
3. 'Where are you going?' 'I'm going to buy _____ .
A a bread B some bread C a loaf of bread
4. Sandra is _____ . She works at a large hospital.
A nurse B a nurse C the nurse
5. Helen works six days _____ week.
A in B for C a D the
6. There are millions of stars in _____ .
A space B a space C the space
7. Every day, _____ begins at 9 and finishes at 3.
A school B a school C the school
8. _____ a problem in most big cities.
A Crime is B The crimeis C The crimes are
9. When _____ invented?
A was telephone B were telephones C were the telephones D was the telephone
10. Have you been to _____ ?
A Canada or United States B the Canada or the United States
C Canada or the United States D the Canada or United States
11. On our first day in London, we visited _____ .
A Houses of Parliament B a Houses of Parliament C the Houses of Parliament
12. What time _____ on television?
A is the news B are the news C is news D is the new
13. It took us quite a long time to get here. It was _____ journey.
A three hour B a three-hours C a three-hour
14. This isn't my book. It's _____ .

A my sister B my sister's C from my sister D of my sister E of my sister’s

Pronouns and determiners

1. What time shall we _____ tomorrow?

A meet B meet us C meet ourselves

2. I’m going to a wedding on Saturday. _____ is getting married.

A A friend of me B A friend of mine C One my friends

3. They live on a busy road. _____ a lot of noise from the traffic.

A lt must be B lt must have C There must have D There must be

4. He’s lazy. He never does _____ work.

A some B any C no

5. ‘What would you like to eat?” ‘I don’t mind. _____ whatever you have.”

A Something B Anything C Nothing

6. We couldn’t buy anything because _____ of the shops were open.

A all B no-one C none D nothing

7. We went shopping and spent _____ money.

A a lot of B much C lots of D many

8. _____ don’t visit this part of the town.

A The most tourists B Most of tourists C Most tourists

9. I asked two people the way to the station, but _____ of them could help me.

A none B either C both D neither

10. _____ enjoyed the party. It was great.

A Everybody B All C All of us D Everybody of us

11. The bus service is excellent. There’s a bus _____ ten minutes

A each B every C all

Relative clauses

1. I don’t like stories _____ have unhappy endings.

A that B they C which D who

2. I didn’t believe them at first, but in fact everything _____ was true.

A they said B that they said C what they said

3. What’s the name of the man _____ ?

A you borrowed his car B which car you borrowed

C whose car you borrowed D his car you borrowed

4. Colin told me about his new job, ... very much.

A that he’s enjoying B which he’s enjoying C he’s enjoying D he’s enjoying it

5. Sarah couldn’t meet us, ... was a pity.

A that B it C what D which

6. George showed me some pictures _____ by his father.

A painting B painted C that were painted D they were painted

Adjectives and adverbs

1. Jane doesn't enjoy her job any more. She's _____ because every day she does exactly the same thing.

A boring B bored

2. Lisa was carrying a _____ bag.

A black small plastic B small and black plastic C small black plastic D plastic small black

3. Maria's English is excellent. She speaks _____ .

A perfectly English B English perfectly C perfect English D English perfect

4. He _____ to find a job, but he had no luck.

A tried hard B tried hardly C hardly tried

5. I haven't seen her for _____ , I've forgotten what she looks like.

A so long B so long time C a such longtime D such a long time

6. We haven't got _____ on holiday at the moment.

A money enough to go B enough money to go

C money enough for going D enough money for going

7. Sally is doing OK at the moment. She has _____ .

A a quite good job B quite a good job C a pretty good job

8. The exam was fairly easy — _____ I expected.

A more easy that B more easy than C easier than D easier as

9. The more electricity you use, _____ .

A your bill will be higher B will be higher your bill

C the higher your bill will be D higher your bill will be

10. Patrick is a fast runner. I can't run as fast as _____ .

A he B him C he can

11. The film was really boring. It was _____ I've ever seen.

A most boring film B the more boring film C the film more boring D the most boring film

12. Ben likes walking. _____ .

A Every morning he walks to work. B He walks to work every morning.

C He walks every morning to work. D He every morning walks to work.

13. Joe never phones me. _____.

A Always I have to phone him. B I always have to phone him.

C I have always to phone him. D I have to phone always him.

14. Lucy _____. She left last month.

A still doesn't work here B doesn't still work here

C no more works here D doesn't work here any more.

15. _____ she can't drive, she has bought a car.

A Even B Even when C Even if D Even though

Conjunctions and prepositions

1. I couldn't sleep ..... very tired.

A although I was B despite I was C despite of being D in spite of being

2. You should insure your bike _____ stolen.

A in case it will be B if it will be C in case it is D if it is

3. The club is for members only. You _____ you're a member.

A can't go in if B can go in only if C can't go in unless D can go in unless

4. Yesterday we watched television all evening _____ we didn't have anything better to do.

A when B as C while D since

5. 'What's that noise?' 'It sounds_____ a baby crying."

A as B like C as if D as though

6. They are very kind to me. They treat me _____their own son.

A like I'm B as if I'm C as if l was D as if I were

7. I'll be in London next week. I hope to see Tom _____ there.

A while I 'll be B while I'm C during my visit D during I'm

8. David is away at the moment. I don't know exactly when he's coming back, but I'm sure he'll be back _____ Monday.

A by B until

Prepositions

1. Goodbye! I'll see you_____.

A at Friday morning B on Friday morning C in Friday morning D Friday morning

2. I'm going away _____ the end of January.

A at B on C in

3. When we were in Italy, we spent a few days _____Venice.

A at B to C in

4. Our flat is _____ the second floor of the building.

A at B on C in D to

5. I saw Steve _____ a concert on Saturday.

A at B on C in D to

6. When did they _____ the hotel?

A arrive to B arrive at C arrive in D get to E get in

7. I'm going _____ holiday next week. I'll be away for two weeks.

A at B on C in D for

8. We travelled _____ 6.45 train, which arrived at 8.30.

A in the B on the C by the D by

9. 'Have you read anything _____ Ernest Hemingway?' 'No, what sort of books did he write?

A of B from C by
10. The accident was my fault, so I had to pay for the damage _____ the other car.
A of B for C to D on E at
11. I like them very much. They have always been very nice _____ me.
A of B for C to D with
12. I'm not very good _____ repairing things.
A at B for C in D about
13. I don't understand this sentence. Can you _____ ?
A explain to me this word B explain me this word C explain this word to me
14. If you're worried about the problem, you should do something _____ it.
A for B about C against D with
15. 'Who is Tom Hart?' 'I have no idea. I've never heard _____ him.'
A about B from C after D of
16. 'Whar time will you be home?' 'I don't know. It depends _____ the traffic.'
A of B for C from D on
17. I prefer tea _____ coffee.
A to B than C against D over

Phrasal verbs

1. These shoes are uncomfortable. I'm going to _____ .
A take off B take them off C take off them
2. We're playing a game. Why don't you _____ ?
A join in B come in C get in D break in
3. Nobody believed Paul at first, but he _____ to be right.
A worked out B came out C found out D turned out
4. We can't _____ making a decision. We have to decide now.
A put away B put over C put off D put out
5. 'Have you finished painting the kitchen?' 'Nearly, I'll _____ tomorrow.'
A finish i tup B finish it over C finish it off
6. You can always rely on Pete. He'll never _____ .
A put you up B let you down C take you over D see you off
7. Children under 16 _____ half the population of the city.
A make up B put up C take up D bring up
8. I'm surprised to hear that Sue and Paul have _____ . They seemed very happy together when I last saw them.
A broken up B ended up C finished up D split up
9. I parked in a no-parking zone, but I _____it.
A came up with B got away with C made off with D got on with

Take revision TEST 2

Choose the correct answer, A, B or C, for each question.

1. Most university students _____ on campus in their first year.
A lives B live C are living
2. From this graph we can see that the economy _____ at the moment.
A improves B improve C is improving
3. They ... personal computers when my father was a student.
A hadn't B didn't have C weren't having
4. I _____ want to be a practising doctor but now I'm more interested in research.
A was used to B used to C would
5. The teacher _____us how to do the experiment when the fire bell rang.
A showed B shown C was showing
6. I finished my essay yesterday but _____ it to the tutor yet.
A I've given B I haven't given C I didn't give
7. _____ the experiment three times now with different results each time!
A We've done B We did C We've been doing
8. When I arrived the lecture _____ I didn't find it easy to follow.
A started B had started C had been starting
9. She _____ well at school but that changed when she became friends with a different group of girls.
A did B had done C had been doing
10. _____ the doctor at 2.00 this afternoon so I can't go to the lecture.
A I'm seeing B I see C I will see
11. My sister _____ economics and politics when she goes to university.
A is going to study B studies C will study
12. While we're working on the project our boss _____ on a beach in Greece!
A will sit B will have sat C will be sitting
13. If the trend continues, the average income _____ by 107% by 2020.
A will increase B will have increased C will be increasing
14. There aren't once places left on the course so you'd better apply soon.
A much B many C lots of
15. I don't know whether to accept the job offer. It's _____ .
A a difficult decision B the difficult decision C difficult decision
16. For those of you new to the company, this leaflet is full of _____ .
A a valuable information B the valuable information C valuable information
17. The manager interviewed _____ candidates in turn.
A each of the B each C every
18. I know it's not much of a present but I
A me B myself C by myself

19. You should visit Bath. It's_____ city.
A a historical and interesting B a historical interesting C an interesting historical
20. The government has released some _____ data showing how schools are not providing an adequate education to our children.
A shocking B shock C shocked
21. You really should go to Namibia. The scenery is _____ stunning and the people are very friendly.
A very B fairly C absolutely
22. This factory produces some of _____ cameras in the world.
A best B the best C the most best
23. _____ people live in the countryside than 100 years ago.
A Less B Few C Fewer
24. The bookshop _____ the end of the road is excellent.
A at B on C in
25. There were millions of people around the world _____ the football match live on television.
A watched B watching C were watching
26. Scientists finally _____find a cure for the disease after years of research.
A managed to B can C could
27. She got a terrible mark in the exam so she _____very hard at all.
A mustn't have worked B can't have worked C didn't work
28. What_____ in order to get a permit to work in your country?
A do I need to do B must I do C ought I do
29. When you write your essays you _____ copy ideas from books without referencing them properly.
A mustn't B don't have to C have to
30. Doctors have 'us to cut down on salt in our diets if we want to reduce the risk of getting heart disease.
A insisted B suggested C advised
31. _____ this newspaper report, more women smoke than men nowadays.
A Apparently B According to C Supposedly
32. My parents encouraged _____ this course.
A me to do B me doing C me do
33. What will you do if _____ .
A. you don't get a good IELTS score? B you didn't get a good IELTS score?
C you won't get a good IELTS score?
34. A recent government report has warned that _____ we act immediately to reduce pollution, there will be serious consequences for the planet.
A provided that B in case C unless

35. If didn't have to work tonight, _____ .
A I'd be able to relax now. B I'm able to relax now. C I'll be able to relax now.
36. I wish that man _____ tapping his fingers on the table. It's really annoying me.
A stopped B had stopped C would stop
37. I'm aming _____a band 7 in IELTS.
A on B for C to
38. Do you have any knowledge _____ how our education system works?
A of B on C for
39. The minister _____ is responsible for education has just resigned.
A which B who C what
40. The University of St Andrews _____ is the oldest university in Scotland.
A. which was founded in 1413 B , which was founded in 1413, C ,that was founded in 1413,
41. Many children these days do not have a healthy diet. _____ is possible that this is because less healthy foods are cheaper than healthy ones.
A What B That C It
42. The charity is trying to find ways to save and _____ the world's endangered animal species.
A the charity is erying to find ways to protect B to find ways to protect C protect
43. In the past we threw a lot of our kitchen waste away, but today many items such as plastic bottles and newspapers _____.
A are recycled B recycle C need recycling
44. I can't pick you up from the station on Wednesday because _____ on that day.
A I'm fixing my car B I'm having my car fixed C Ineed my car fixed
45. These drugs are the best medicine available as a treatment at the moment, _____ they are expensive, unfortunately.
A although B because C so
46. Learning a foreign language is important because it helps you to understand other cultures better. _____ it can be a useful skill in many areas of work.
A However, B Despite this, C In addition,
47. I can't go to the conference as I've got to go to Sydney on business.
A Frankly B Unfortunately C Personally
48. _____ I think it's useful to write an outline of your essay before you start to write the first draft.
A Interestingly, B Definitely, C Personally,
49. The _____ of dark red spots is one of the first signs of the disease.
A appearance B appearing C appear
50. By this time next week, _____ we our exams and we'll be on holiday!
A 'll be finishing B 're going to finish C 'll have finished

EXTRA READING SECTION

The Future of IT in a New Covid-19 Reality: 5 Technology Trends

In this article we are going to outline the increasing tech trends for 2020 and look at how they can influence business and our lives. We will also review the instruments (tech skills and tools) which may be handy in adapting to these uprising trends. During the recent months, the humankind has been fighting the outbreak of COVID-19. Thus, we should keep in mind that it will inevitably make a visible impact on the development of tech trends.

Business and IT are tightly interrelated and to a decent point, each and every company is a technology company. In running day-to-day operations most organizations rely on digital technologies. Therefore, to stay competitive on the marketplace companies should integrate the emerging technologies with their business strategies and outline which technologies can be a source of business innovation. As a result of the economical crisis caused by the pandemic, the investment would be focused on reliable and well-known technologies. Supposedly, as a consequence of a lockdown, a number of employees would like to continue working remotely. It will encourage the growth of the technologies optimizing remote work. So, let's take a closer look at tech trends of 2020, as they have a significant effect on informational technologies.

In multiple lists of technology trends for this year you'll find Internet of Things (IoT), autonomous driving, Extended Reality, cloud computing, quantum computing, Artificial intelligence as a service (AIaaS – service for companies that are unwilling or incapable to build their own clouds and maintain their own artificial intelligence systems), personal profiling /consumer analytics, personalized and predictive medicine, blockchain technology, cybersecurity, cryptocurrency, reskilling human workforce, and 5G Network. Some of the strategic technology trends even may be divided into the following groups – People-Centric (Hyperautomation, Multiexperience, Democratization, Human Augmentation, Transparency and Traceability) and Smart Spaces trends (Empowered Edge, Distributed Cloud,

Autonomous things, Practical Blockchain, AI Security) (according to Gartner IT Symposium/Xpo).

We have chosen the trends, that are the most frequent in media and are likely to shape the technology landscape in 2020.

Artificial Intelligence

The term Artificial Intelligence (AI) is not all that new for the information technology sphere, and it's still increasing its impact. Generally, AI refers to the usage of algorithms to solve specific tasks by studying large amounts of data to make generalizations and/or some statistic estimations. These algorithms enable a computer to "behave" just like a human brain. AI technologies are already used by 77% of consumers, daily appear new applications. According to PwC analytics, one of the leading consulting companies, by 2030 AI Products will contribute more than $15.7 trillion to the global economy. A number of technological innovations such as data processing, and face and speech recognition have become possible due to AI.

AI software is a vast area to which one can include AI platforms, chatbots, machine learning (algorithm category consisting of various libraries and frameworks) and deep learning (using artificial neuron networks), and analytics tasks for financial services. It's expected that in 2020 more tailored applications and services for specific or specialized tasks will be offered.

Acceptance of AI chatbots by service is growing in such areas as online retail, healthcare, telecommunications, banking, financial advice, insurance, dealership and government. One of the chatbots' specific purposes for business is automation, which also makes jobs simpler for employees (but won't cause job shortening as it's sometimes considered). Within AI trend can be outlined embedded AI and Machine learning as a service (AIaaS and MLaaS) sub-trends, which include such types as bots and digital assistance, cognitive computing APIs, machine learning frameworks, and fully-managed machine learning services. As-a-service platforms will be used for the creation of AI applications because of the high cost of AI-based systems. They will enable feeding in our own data and paying for the algorithms or compute resources as we use them. Among well-known AIaaS are Amazon Web Services (AWS), Microsoft Azure, Google Cloud, and IBM Cloud.

Under conditions of COVID-19 spreading all over the world, AI may contribute to the forecasting of consumers' wishes, which became hardly predictable, and to help

businesses organize effective logistics. Chatbots may provide clients' support 24/7, one of the 'must-have' during the lockdown. The popularity of machine learning may grow due to the necessity of the improvement of algorithm-moderators of posts and visual content in social networks (which sometimes block reliable sources of information about coronavirus and don't detect fakes).

AI may be included to long-lasting trends due to its efficiency, amazing speed and accuracy, less inclined to make errors in comparison with a human, as well as the ability to work 24/7 in dangerous and risky situations. It also has some threats, such as cost, restriction because of the code limits, and machine dependency.

Internet of Things

Internet of Things (IoT) devices enable internet connection beyond computers and smartphones with the possibility of remotely control. They are integrated with various sensors, inbuilt technologies, and functional software. IoT devices are mostly parts of smart homes, wearable technologies, safety monitoring and waste management in smart cities. This technology will enable us to predict and treat health issues in people even before any symptoms appear. What is more, much more personalized approaches concerning prescribing medicines and applying treatments will appear (also referred to as precision medicine).

In 2019 there were about 26 billion IoT devices and it's estimated by statista.com that their number will increase to 30.73 billion in 2020 and to 75.44 billion in 2025. The market value is about $ 150 billion with estimated 15 IoT devices for a person in the US by 2030.

IoT also fuels edge computing, thus data storage and computation become closer to the businesses, enabling saves in bandwidth and shortage of response times. IoT will transform the user experience profoundly, providing opportunities that weren't possible before. Gaining this experience may be forced by the pandemic, when people are spending almost all their time at home. IoT devices, that make life quality better and daily life more comfortable can become quite trendy. Telemedicine and IoT devices helping to monitor people's health indicators may increase their popularity.

Some of the key threats of this trend are security, absence of international compatibility standard, and possible reduction of the employment of manual tasks. At the same time, IoT provides good control and automation, saves money and time, and may provide a better quality of life.

The best examples of IoT based applications are the following: IoT sensors, data analytics, tracking and monitoring system, connected factory, smart supply chain management, smart barcode readers, smart grids, connected healthcare systems, and smart farming.

Cybersecurity

Together with the evolvement of new technologies and the growth of a number of devices, the amount of possible cyber threats continually increases. Usually, the main goal of cyberattacks is accessing, changing, or destroying sensitive information, and extorting money from users or interrupting normal business processes. These attacks are ceaseless with growth in their frequency and sophistication. Protection of computers, networks and clouds is commonly provided by the means of next-generation firewalls, DNS filtering, malware protection, antivirus software, and email security solutions.

Cybersecurity is one of the key trends for organizations, whose business processes are based on data-driven technologies. Much more attention is being paid to privacy and data protection since the European Union's General Data Protection Regulations (GDRP) has been signed. The latest cybersecurity threats are phishing, ransomware, cryptojacking, cyber-physical attacks, state-sponsored attacks, and IoT attacks. Data breaches are the biggest cybersecurity concern, and trading personal data remains quite lucrative at the black market. According to the report of cybersecurity unit ElevenPaths of the multinational communications company Telefonica, in 2020, such main technologies as Ransomware attacks, Cloud Computing, Machine Learning, Phishing attacks, Open Banking and Mobile Malware, 5G will be related to cyberattacks.

One of the ways to provide security, especially for IoT devices is blockchain. This technology was initially launched for storage and sending the first cryptocurrency, Bitcoin. Blockchains are distributed networks that can be used by millions of users throughout the world. Data is managed by a cluster of computers not owned by any single entity, thus data can be only added, not changed or copied. All data is secured through cryptography. During 2019 FedEx, IBM, Walmart, and Mastercard continued investment in blockchain and it is likely to start to show real-world results, encouraging its adoption.

On these days, when thousands of people are forced to work remotely, volumes of private data may become totally vulnerable or at least not protected in a proper way.

This emerging issue may give another impetus to the development of this technology. Cybersecurity may also be applied in crowdfunding, governance, supply chain auditing, file storage, prediction markets, protection of intellectual property, IoT, neighborhood microgrids, and stock trading.

Extended Reality

Extended Reality (XR) technologies aren't groundbreaking at this point, but since recently they are actively adopted in entertainment to create more immersive digital experiences (Snapchat filters, Pokemon Go-style games). XR most commonly includes virtual, augmented, and mixed reality.

Virtual reality (VR) is the use of computer technology to create a simulated environment using headsets that blend out the real world, instead of watching on a display, immersing a person in a digital 3D environment. Unlike VR, augmented reality (AR) overlays digital objects onto the real world via smartphone screens or displays, it does not create the whole artificial environments to replace real with a virtual one. Mixed reality (MR) is an extension of AR, which means users can interact with digital objects placed in the real world (think playing a holographic piano that you have placed into your room via an AR headset).

The influence of virtual and augmented reality will grow in training and simulation, as well as offering new ways to interact with customers, providing new shopping experience (especially during the lockdown, when thousands of people are shopping online). In 2020, the workplace will become smaller with the growth of virtual collaboration tools (Slack, Zoom), which began replacing the need for costly office space. AR and VR in 2020, however, will bring workers virtually into the physical space.

5G Network

5G is acknowledged as the future of communication and the cutting edge for the entire mobile industry. According to a Huawei Technology vision, deployment of 5G networks will emerge between 2020 and 2030, making possible zero-distance connectivity between people and connected machines. This type of mobile internet connectivity will provide us super-fast download and upload speeds (five times faster than 4G capabilities) as well as more stable connections.

While 5G mobile data networks became available for the first time in 2019, they were mostly still expensive and limited to functioning in confined areas or major cities. It is

likely 5G will have more affordable data plans and greatly improved coverage. It may become more usable even than the wired networks running into our homes and businesses. The increased bandwidth will give possibilities for growth in the area of the IoT and smart machinery enabling collection and transfer huge volumes of data. During the pandemic, when people are staying home, access to 5G mobile internet may become a vital necessity in regions with no internet connection or low coverage.

As you may have noticed, tech trends will not develop separately, but in a synergic way. Development of 5G and edge computing will provide growth of computing power and become a basement for the new-generation IoT platforms. The Integration of blockchain technology with AI, big data, IoT, and edge computing, will contribute to resolving issues concerning the online and offline mapping of data and assets. The growth of quantum computing will add vitality to AI and cloud computing. A combination of AI and IoT will result in artificial intelligence of things (AIoT). This will enable IoT devices to analyse data, make decisions and act on that data without human involvement. This combo may contribute do the development of applications for smart retail, drone traffic monitoring, smart office buildings, fleet management, autonomous driving, and autonomous delivery robots.

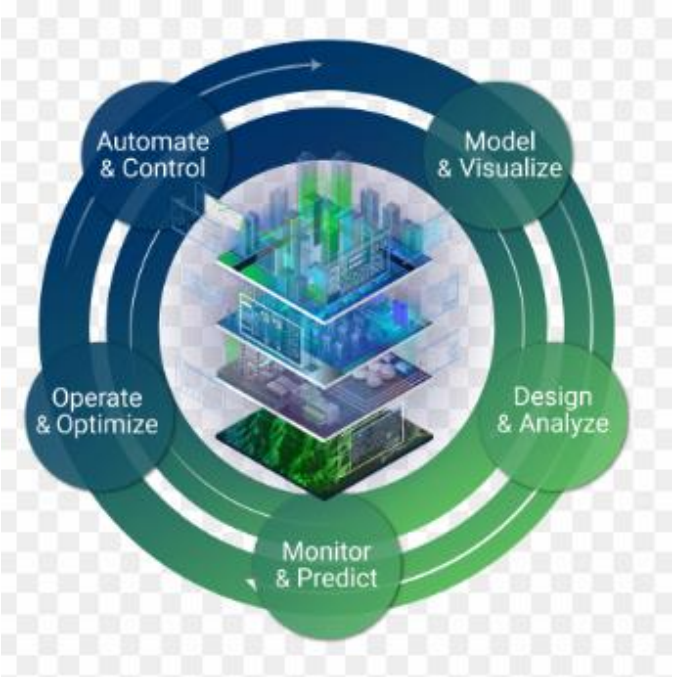
These were the most promising of the tech trends in our opinion. But upcoming trends demand tools for implementation, as well as human resources also need to be reskilled, and, as we have promised at the beginning of the article, we are going to look at them more closely.

Tech skills which popularity increased from 2016 to 2019 (Udemy research)	Top 10 most popular technology skill for 2020	Top 10 most popular technology skill for 2020
TensorFlow	Python	Gatsby.js (web framework)
Chatbot	React (web)	AWS Big Data
Microsoft Azure architecture	Angular	React Hooks
OpenCV (computer vision/AI)	Machine learning	Microsoft Azure Architecture
Neural networks	Docker	Next.js (web framework)
LPIC- Linux	Django	Apache Airflow (data processing)
Ethereum (blockchain)	CompTIA	SwiftUI (Apple apps)
Splunk (data)	Amazon AWS	Pegasystems (digital process automation)
QGIS (open-source GIS software)	React Native (mobile)	ESP32 (internet of things)
Kotlin		Quantum computing

The first column demonstrates technical skills whose popularity increased from 2016 to 2019 according to the Udemy research. They mostly represent AI, Cybersecurity, and Cloud computing areas. The second and third columns represent the most popular and emerging technology skills for 2020. The lists point to the high demand for expertise in Machine Learning, Cloud computing, the backend programming language, and various frontend frameworks. By looking at the common points we note, that AI and Cloud computing don't lose their popularity. So, we can see which tool may contribute to the evolvement of tech trends this year.

Thus, seeing the appearing tech trends, which are tightly interrelated, the businesses can adjust their strategies to reality, anticipate the needs of society and suggest solutions to the upcoming problems taking into account the circumstances that we all live and work under today.

The Digital Twin Drives Smart Manufacturing



Multiple technologies have emerged in recent years that are instrumental in driving the advancement of smart manufacturing and the Industrial IoT. These include Big Data, advanced analytics, artificial intelligence (AI) and machine-learning (ML), operational intelligence, advanced robotics, cyber-physical systems, next-generation material science, and generative design for additive manufacturing. However, while all these technologies are changing the face of manufacturing today, ARC Advisory Group research suggests that the Industrial IoT, connected smart assets, and especially the digital twin are having the most immediate and significant impact on how companies implement smart manufacturing.

The basic concept of the digital twin is not new. This involves merging virtual engineering models with the physical product or equipment in an environment that allows for change and optimization of the as-designed and as-built product. However, due to the advancement and evolution of enabling technologies, we're seeing renewed focus on the implementation of the digital twin and associated benefits that could be gained. Using digital twins that represent the product and production systems, manufacturers can reduce the time and cost associated with assembling, installing, and

validating factory production systems. Additionally, implementing digital twins for asset management typically provides quantifiable benefits for maintaining equipment in the field.

In manufacturing, the digital twin is a virtual representation of the as-designed, as-built, and as-maintained physical product; augmented by real-time process data and analytics based on accurate configurations of the physical product, production systems, or equipment. This is, in essence, the operational context of the digital twin needed to support performance optimization. While virtual models are conceptual in nature, the real-time and operational data is a digital representation of real physical events. CAD models represent the virtual fit, form, and function of the digital twin's physical counterpart. However, real-time operational and asset data are required to execute analytics applications that define the state and behavior of the performance-based digital twin and allow optimization and process improvement.

Based on real-world implementations, manufacturers are considering new business models where they sell service in lieu of the product itself and then utilize the digital twin to monitor and optimize its availability and performance. Customers are offered the use of the product/equipment along with complete maintenance and operational optimization based on the predictive/prescriptive capabilities of the digital twin. The manufacturer maintains ownership of the equipment while providing the service of maintenance based on a digital twin as a more manageable and profitable business model.

How the Digital Twin Is Being Implemented Today

One of the initial areas of focus for implementation of the digital twins has been asset lifecycle management (ALM). Maintaining assets in the field has traditionally been a time-consuming and costly task, but critical to equipment and system uptime. Today, maintenance technicians can leverage technologies like augmented reality (AR) where they can access virtual engineering models and overlay these models over the physical equipment on which they are performing maintenance using specialized AR goggles or glasses. This enables them to use the most accurate and up-to-date engineering, helping ensure that the correct maintenance and performance specifications are performed efficiently. These same maintenance methods, based on merging of virtual and physical environments, can be applied to factory production systems, machines, and work cells.

Today's advanced virtual simulation technology is an integral component of the digital twin. Comprehensive simulation platforms can simulate and validate the functionality of product design concurrently, enabling the designers to validate their designs as they go. In the context of the digital twin, real-time sensor data can be used to populate simulation applications that then emulate the physical product and enable design improvements.

The World of Flying Cars Just Got A Huge Injection

The Lilium Jet taxi seats seven and is projected to cruise at 175mph.

News that Germany's air mobility startup Lilium is to go public in a deal said to be worth around $830 million has the aeronautics and automobile industry buzzing today. The world of flying cars just got another major injection. According to a source at Lilium, the funds are to complete certification procedures, start production and launch commercial operation of its pilot-operated seven-seater Lilium Jet taxi in 2024.

The Munich-based company announced the IPO merger with Qell Acquisition Corporation, an acquisition company spearheaded by former president of General Motors North America, Barry Engle.

In line with its merger announcement, Lilium also revealed a futuristic design that has been recalibrated to seven seats from a five seat prototype vehicle which completed an unmanned test flight in 2019. The aircraft employs ducted fan vectored thrust for electric vertical takeoff and landing (eVTOL) with vertical and forward flight made possible by 36 wing mounted fans. The vehicle is rumored to fly at up to 175 mph at 10,000 ft and have a range of over 155 miles.

The SkyDrive SD-03 is the first flying car to have completed a manned test flight.

However, in Japan, they are somewhat ahead of the game. The Japanese government wants flying cars in practical use by 2023 and to achieve that goal, it is fast-tracking a set of guidelines that will allow testing to start in the public domain by March 2022.

For the last several years, the government under former prime minister Shinzo Abe, has been promoting the development of flying cars and passenger drones as short distance transportation in city and rural areas, and lifelines in disaster relief zones affected by typhoons and earthquakes, both of which frequently hit Japan.

The SD-03 at present can fly for up to 10 minutes, but the goal according to Fukuzawa is to develop a flying car capable of cruising at 40 mph for up to 30 minutes, a fact that would enhance its marketing potential in places like China. One early route planned to start in 2023 is a short flight ferrying passengers around Kansai Airport in central Japan.

When compared to planes and helicopters, eVTOLs would deliver speedy point-to-point personalized travel. One of the main ideas behind them is to alleviate the hassles of airports, traffic jams and pilot's fees by making vehicles like the SD-03 self-flying. One image in the SkyDrive virtual video showed a flying car lifting off from a convenience store carpark near Tokyo revealing the versatility of the vehicles to get in and out of tight spaces.

While battery size and weight, flight time, range, air traffic control regulations and other infrastructure and safety hurdles must all be cleared before SkyDrive takes to the skies in earnest, flying car makers as a whole must work hard to win over the public's hearts and minds to accept aerial transportation in the same way that it took years for smart phones and autonomous driving cars to gain acceptance.

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