МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ДНІПРОВСЬКА ПОЛІТЕХНІКА»

АНГЛІЙСЬКА МОВА ДЛЯ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ

Навчальний посібник

Дніпро
НТУ «ДП»
2026

УДК 811.111:378.147
А61

Рекомендовано вченою радою НТУ «Дніпровська політехніка»
як навчальний посібник для здобувачів ступеня бакалавра
галузі знань F Інформаційні технології
(протокол № 6 від 30.01.2026)

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А61 **Англійська** мова для інформаційних технологій [Електронний ресурс] : навч. посіб. / О.В. Хазова, Л.В. Павленко, В.В. Заболотнікова, Н.М. Нечай ; М-во освіти і науки України, Нац. техн. ун-т «Дніпровська політехніка». – Дніпро : НТУ «ДП», 2026. – 77 с.

Посібник призначений для студентів галузі знань F Інформаційні технології, які вивчають дисципліну «Іноземна (англійська) мова професійного спрямування». Посібник сприяє розвитку іншомовної комунікативної компетентності, формує навички роботи з фаховими текстами й автентичними матеріалами, а також розвиває базові гнучкі навички (soft skills): критичне мислення, здатність до командної роботи, міжкультурну комунікацію. Видання підходить для аудиторного та самостійного навчання відповідно до вимог бакалаврських програм.

УДК 811.111:378.147

ЗМІСТ

ПЕРЕДМОВА

У сучасних умовах глобалізації, стрімкого розвитку цифрових технологій і зростання вимог до кваліфікації фахівців особливої актуальності набуває володіння англійською мовою як засобом професійного спілкування. Для майбутніх фахівців галузі інформаційних технологій англійська мова є необхідним інструментом професійної діяльності в широкому діапазоні: від вивчення технічної документації до ефективної комунікації з міжнародними партнерами та участі в глобальних проєктах.

Доцільність видання цього навчального посібника зумовлена потребою забезпечення студентів бакалаврських програм галузі знань F Інформаційні технології навчальним матеріалом, що відповідає специфіці їхньої майбутньої професійної діяльності. Посібник розроблено з урахуванням актуальних комунікативних потреб, сучасної термінології та реальних ситуацій професійного спілкування в ІТ-сфері.

Метою навчального посібника є формування та розвиток іншомовної комунікативної компетентності студентів у професійному контексті, а також підготовка їх до практичного використання англійської мови в академічному та професійному середовищі.

Основні завдання такі:

- розширення лексичного запасу здобувачів вищої освіти в галузі інформаційних технологій;
- формування навичок читання, письма, аудіювання та усного мовлення на професійну тематику;
- розвиток умінь працювати з автентичними джерелами професійної інформації англійською мовою;
- удосконалення навичок перекладу спеціальних текстів;
- формування здатності до міжкультурної комунікації в професійному середовищі.

Крім розвитку іншомовної професійної компетентності, навчальний посібник сприяє формуванню низки гнучких навичок (soft skills), що є важливою складовою професійної підготовки майбутніх фахівців. Зокрема, укладені в текстах орієнтованих на розвиток критичного мислення, комунікативної компетентності, здатності до міжкультурної взаємодії, навичок командної роботи, умінь ефективного вирішення проблем, а також організації самостійної навчальної діяльності.

Навчальний посібник може бути використаний як у процесі аудиторного навчання, так і під час самостійної роботи здобувачів освіти. Його зміст відповідає вимогам освітніх програм першого (бакалаврського) рівня вищої освіти, що сприяє інтеграції мовної підготовки у фахову освіту.

Unit 1 Operating Systems

Reading and Vocabulary

Task 1. *Read the article about the operating system. Pay attention to the words and phrases marked* ***in bold****. Find the answers to the following questions:*

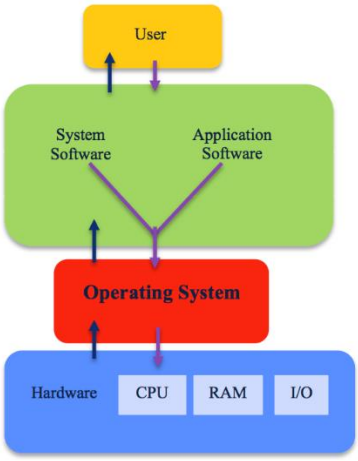
1) What are the key functions of an operating system?
2) What does the idea of a two-way transaction mean?
3) What are the most common operating systems?
4) What are the key differences between three main operating systems?

Operating System

An operating system is a program that **acts as an interface** between the computer user and computer hardware and **controls the execution** of programs.

The operating system (OS) **manages** all the software and hardware on the computer. It **performs basic tasks** such as file, memory and process management, **handling input and output**, and **controlling peripheral devices** such as **disk drives** and printers.

Most of the time, there are several different computer **programs running** at the same time, and they all need **to access** your computer's central processing unit **(CPU), memory** and **storage.** The operating system coordinates all of this to make sure each program gets what it needs.



In the image above, a user **interfaces** with the **System & Application software**. The System & Application software interfaces with the operating system. The

Operating system interfaces with the hardware. Each of these interfaces is a two-way transaction, with each sending and receiving data.

Operating systems usually come **pre-loaded** on any computer you buy. However, it is possible to **upgrade** or change the initial operating system **to suit your preference**.

Different operating systems will work in different ways. They may appear visually different, have different **terms for common functions** and organise programs in different ways.

There are many operating systems that are **available**; however, the three most common operating systems are Microsoft's **Windows**, Apple's **macOS** and **Linux**. In the table below, we will **outline** a few of the key differences between each system.

	Microsoft Windows	Mac OS	Linux
Pre-loaded Devices	Microsoft Windows is pre-loaded on all computers except Apple products.	Mac OS is the pre-loaded OS on all Apple Mac computers.	Linux is not pre-loaded on many computers, but is free to download.
Customisability	Minimal changes.	Minimal changes.	Highly customisable as it is open source. Huge collaborative community building a range of applications.
Icon	 Windows icon. This is the Start Menu and is located in the bottom left hand corner of the screen it allows you to access your '**Control Panel**', '**Computer**', programs, folders and more. You can also shut down your computer using this menu.	 Apple icon. It is located in the top left hand corner of the screen and it is where you can access your '**System Preferences**', '**Software Update**', '**About This Mac**' and more. You can also shut down your computer using this menu.	 **Different icons** depending on what software interface you are using e.g. **Redhat** has a redhat symbol. **Ubuntu** has the Circle of Friends symbol. These symbols are located in the top left hand corner of the screen and it is where you can access all your computer applications.

Task Bar	Located at the bottom of the screen. It contains shortcuts to applications, the date and time, and more.	Located at the bottom of the screen. It contains shortcuts to applications, files and folders. Referred to as a '**Dock**'.	Located on the left hand side of the **screen** with applications running in a vertical manner. It contains shortcuts to applications, files and folders.
Finding Programs	Start Menu. An application where you can view and organise files and folders.	Finder. An application where you can view and organise files and folders.	Dash. The dashboard of Ubuntu where you can view all applications and files.
Default Browser	Internet Explorer. (Now known as Microsoft Edge for Microsoft Windows 10 version and later)	Safari.	Firefox.

https://www.uow.edu.au/student/support-services/academic-skills/online-resources/technology-and-software/operating-systems/

***Task 2**. Match the verb with the noun to make a collocation. There is more than one option in some cases. Make up your own sentences with each collocation.*

1) to suit 2) to control 3) to handle 4) to act as 5) to upgrade 6) to perform 7) to run 8) to access 9) to receive *10)* to outline	a) output b) input c) peripheral devices d) the difference e) execution f) smbd's preference g) tasks h) a program i) a memory j) an operating system k) data

Task 3. *Choose the best word from the list* (**kernel, multitasking, update, device driver, security, file system**) *to complete each sentence. Then explain* **why** *that word fits.*

1. A hacker tried to break into the company's network, so the IT team improved the _____.

2. Without a proper _____, your computer cannot organize data on the hard drive.
3. The OS released a new _____ that fixed several bugs and improved performance.
4. The _____ is responsible for connecting the operating system with physical hardware.
5. Modern systems allow _____, which is why you can browse the web while listening to music.
6. The _____ acts like the "brain" of the operating system.

***Reading*.**

Task 4. *Read the article and match the paragraph with its name**.** Explain your choice.*

A) ***MEMORY MANAGEMENT***

B) ***SECURITY MANAGEMENT***

C) ***USER INTERFACE***

D) ***MULTIPROCESSING***

E) ***PROCESS MANAGEMENT***

F) ***FILE MANAGEMENT***

The word *operating system* is self-explanatory: a system that helps operate the computer. Some popular operating systems are Windows, Apple OS X, and Linux. These popular operating systems are also among the best OS for programmers.

It is important to know the features of an operating system in general before we compare the best OS for programmers.

The key features of operating systems include:

1) _____An operating system must have it so that a user can interact with the computer components. It can reduce errors and increase the usage of the computer.

2)_____ An operating system also allocates memory blocks to the computer applications and programs. Memory blocks are spaces that are assigned to the applications. Besides managing and allocating memory, the OS also ensures that the main memory has enough capacity for running programs at all times. The operating system also keeps track of how much memory is utilised. The best OS for programmers always has one of the best memory management systems.

3)_____ The operating system provides mechanisms for process communication and synchronisation. An operating system also schedules, resumes, and suspends processes.

4)_____ An operating system provides three levels of data protection to users. These are file access level, system level, and network level. Operating systems like Mac OS are well known for their safety, that is why Mac OS is among the best OS for programmers.

5)_____ An operating system manages folders, and directories on the computer using some common techniques. These are Next-Generation File System (NTFS), ext2(Linux), and File Allocation Table (FAT).

6) _____ This is one of the main features of any operating system. For any single job on the computer, an operating system has two or more processors. This feature ensures that the speed of execution of any task on a computer is high. This feature of OP saves time for the programmer.

Task 5. *There are different types of operating systems. Read this article to understand how a* ***Mobile OS*** *is different from a* ***Desktop*** *and* ***Server OS***.

Desktop Operating System

Desktop OS connect users to computer hardware, facilitating a range of personal and professional tasks on desktops and laptops. They provide an interactive user interface, have to store lots of complex data, manage hardware operations, and support numerous application software. Windows dominates in this segment with the largest market share of 64.18%, while Apple's macOS maintains a stable presence of 25.35%. Linux distributions are popular among niche user groups due to their flexibility and open-source nature. More space is required for these OS as they support multiple applications. They take more time to reboot and to run a process. Desktop operating systems can also be used in super computers that function as servers. The OS that is used in these servers are Linux, Unix etc. Desktop OS are written in C, C++ and assembly languages. Some of them are pre-installed while others are installed later. This software can be available for free or paid services are also available for some of them.

Mobile Operating System

Optimized for smartphones and tablets, mobile operating systems prioritize touch interfaces, power efficiency, and wireless connectivity features. Their user interface is much more about simple moves—things you can do with your fingers or voice. In this segment, Google's Android and Apple's iOS compete aggressively

with pricing and various technological updates. It is predicted that the demand in this segment will continue to show growth due to the increase in the usage of smartphones worldwide. Mobile OS is also the fastest growing segment in the industry. They are usually written in high level languages like C, C++, Java, Swift etc.

Server Operating System

Server operating systems are specialized in managing and running server hardware. They include features for networking, data storage, and system management. As they run critical business applications, they are required to be highly stable and secure. The ability to provide high level of security and data privacy differentiates companies in this segment. Key players include Windows, and Red Hat Linux. Additionally, VMware is also a significant player in the server operating system space, although not through traditional operating systems. VMware is best known for its virtualization products, particularly VMware ESXi, which enables multiple operating systems to run on a single physical server as virtual machines.

Discussion.

Task 6. Statement:
"Mobile operating systems (Android, iOS) are now more important than desktop operating systems."

- Group A: Argue ***for*** the statement.
- Group B: Argue ***against*** the statement.

Your arguments should include at least **three points from the list:** *update, interface, security, multitasking, file system, device driver.*

Task 7. *Discuss with your partner the answers to the questions below:*

1. Which operating system do you use?
2. What are its advantages and disadvantages?
3. If you could design your own OS, what features would it have?

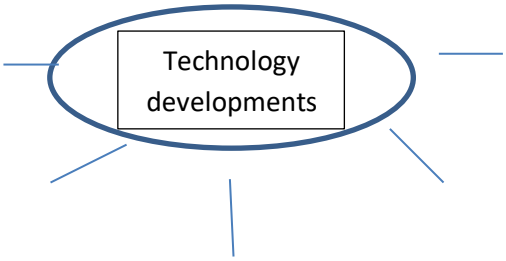
Task 8. **Problem-Solving Project**

Imagine your computer is running very slowly. Identify **three possible OS-related reasons** (e.g., missing updates, corrupted drivers, low security, etc.). Write a short recommendation for how to fix each problem.

Unit 2 Technology Trends

Lead-in

Task 1. *Look at the picture above. What do you see there? What is the key idea described by the author? Complete the mind map below with the technology developments you can find in this picture.*



Reading

Task 2. *Look through the article below and find:*

a) a technology which is necessary for other innovation developments
b) a technology which is able to advance revolution in science
c) industries which were predicted to develop at the fastest pace
d) two types of AI
e) the meaning of R+
f) the expected number of items connected to the Internet by 2020
g) a technology that was expected to be integrated into the business environment

Task 3. *Read the article once again and fill in the gaps with the following sentences:*

A) How far humans should go with this development is still a subject of controversy.
B) The intelligent digital mesh is going to include interconnected humans, robots, devices, content, and services all driven by digital transformation.

C) With the impressive computational power, it will most likely be a cloud service in the near future rather than on-premise machines.

D) R+, which once was only found in video gaming, has been quickly advancing to become a useful tool in industries such as engineering design, manufacturing, healthcare, space exploration, and many others.

E) As long as you connect something to the Internet, it immediately becomes vulnerable.

F) The most innovative corporations will start using this technology as a way to improve collaboration.

G) And with the rise of the Internet of Autonomous Things (IoAT) there is a good chance that many of them will show a certain level of weak security.

5 Technology Trends

Technology trends will accelerate and transform many industries at a rapid pace throughout the year. They will shape the world and the future and will be present on the horizon of business owners and investors alike. **1)_____** Technology trends are going to propel the future where innovation leaders must evolve and change really fast, or they could be left behind and ***suffer a*** slow ***mass extinction***.

Perhaps the obvious technology to watch closely in 2019 will be 5G. Without 5G, none of the technologies mentioned below would be possible. Autonomous vehicles, drones, the Internet of Things (IoT), and supercomputers could not be possible without 5G networks, as it is going to improve processing speeds by more than 10 times in 2019. This is the technology that can make possible, for instance, the much-expected remote surgery in rural areas. Robot surgeons powered by AI are bringing new innovations and accuracy to the operating room.

Machine Learning (ML) will advance Artificial Intelligence (AI)

Artificial Intelligence innovations will continue to bring scientific breakthroughs, in part, thanks to the vast amounts of data that new technologies have been collecting and is now available. In 2019, Machine Learning and Artificial Intelligence will be embedded in the business platform, creating and enabling smart business operations. China is going ***to leave*** the U.S. ***behind***, emerging as a leader in AI developments and applications.

Advances in Machine Learning technology and algorithm training will ***result in*** new and more advanced AI. Autonomous vehicles and robotics are the two industries that will see the most rapid developments during 2019.

In 2019, there is going to be a convergence of AI, ML, and Deep Learning in business applications. As AI and learning technologies get to work together in order to reach better results, AI will have greater accuracy at all levels.

So far, humans have only developed Narrow Artificial Intelligence. A superior AI, though, is in the future of mankind. **2)_____.** Is this really going to be mankind's last invention?

Quantum Computing (Supercomputing)

Quantum Computing, still an emerging technology, is one of the most fascinating things researchers, organisations, and governments have been working on in this century so far. The race toward building the first fully working quantum computer (also called a supercomputer) is on. The first quantum computer is going to have a significant advantage over the others.

3)_____. IBM is already offering cloud-based quantum computing services. In 2019, the competence to achieve supercomputer supremacy will intensify. **As a consequence**, the last mile in the race will remain mostly secretive, for obvious reasons.

Augmented Reality (AR) and Virtual Reality (VR)

Advances in Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), all of which can be summarised in R+, will continue to be at the forefront of attention**. 4) _____.** In 2019, Virtual Reality is going to open up to innovative industrial applications that will change how people work and collaborate across geographies. AR has been rising in the Virtual Reality's shadow for the past year. But in 2019, AR is set to grow exponentially.

Global Internet of Things security breach

Hackers never sleep. Everyone in the cybersecurity industry knows that. **5)_____.** The great number of security breaches that occurred during 2018

should serve as an alert of what can happen at a global scale in 2019 if organisations don't **take the necessary precautions**.

Analyst firm Gartner forecasts that 20.4 billion connected things will be in use worldwide by 2020. **6) _____.** In 2019, it will be paramount for IoT manufacturers and all of their supply chain to dramatically increase the security in all the products that **come out to market**. It can be a connected refrigerator, a robot, a drone, a vehicle, or a health tracker. Manufacturers must implement a level of security that **keeps hackers at bay**. Otherwise, there is a good chance we are going **to witness** a global IoT security breach in 2019.

Blockchain technology

In 2019, **to the delight of** organisations, Blockchain is going to bring enterprise applications into **active use. 7)_____.** It may become an integral part of the business platform as it enables transactional transparency across a variety of business functions. In 2019, Blockchain will be present in many industries at the core of business innovation.

(Internet source)

Task 4. *Fill in the following table (columns 1 and 2) with the information from the article. Add your own ideas to the column describing potential threats.*

Technology	**Expected achievements**	**Potential threats**
1. 5G		
2. AI		
…		

Vocabulary

Task 5*. Write the synonyms / definitions for the words on the left. Look at the examples:*

Word(s)	**Definition or synonym**
computation	
to advance	
to predict	*to forecast*
to integrate	
to develop	
controversy	
tool	
vulnerable	

to accelerate	
to evolve	
autonomous vehicle	
IoT	*Internet of Things*
remote surgery	
breakthrough	
available	
to emerge	
application	
convergence	
breach	

Discussion

Task 6. *Compare the prediction with the current achievements. Which predictions were precise, and which were not?*

Project

Task 7. *You are a group of analysts. Make your own predictions of the nearest technology innovations. Present your ideas to the class in the form of infographics.*

Video

Task 8. *Watch the video on YouTube https://www.youtube.com/watch?v=llvtxNiveCE and create a mind map based on the information from the video. Compare your team's predictions with the presenter's point of view.*

USE OF ENGLISH

Task 9*. Write* ***Participle 1*** *and* ***Participle 2*** *forms of the following verbs:*

Verb	**Participle 1**	**Participle 2**
serve	*Serv**ing***	*serv**ed***
require		
improve		
become		
make		
do		
set		

integrate		
implement		
advance		
install		
modify		

Task 10*. Read the first part of the article to get the general idea. Read again, paying attention to the words before and after each gap, and fill in the blank spaces 1-10 with the correct choice.*

Technology trends you need to know to work in any industry

With things like machine learning and touch commerce **1)** _____increasingly popular across every industry from banking to healthcare, technology is revolutionizing the way we **2)**_____ business and making high-tech approaches an integral part of our lives. The team at Deloitte explains how these trends are reshaping the career space.

One of the biggest tech trends to emerge in recent years is the Internet of Things (abbreviated IOT). IOT is the idea that all technological devices can be connected to the internet and to each other in a(n) **3)**_____to create the perfect marriage between the physical and digital worlds. How will this impact the industry? For example, for those who work in marketing, advertising, media or business management, IOT could provide a wealth of information on how consumers engage **4)**_____ products by tracking their **5)** _____with digital devices. In turn, this data could be used to optimise marketing campaigns and user experiences.

Another emerging technology is machine learning, which is a computer's ability to learn **6)** ____ its own by analysing data and tracking repeating patterns. For example, social media **7)**_____use machine learning to get a better understanding of how you're connected with those in your social network. They do this by analysing your likes, shares and comments and then prioritising content from your closest connections, **8)**____you that content first. In addition to shaping your day-to-day interactions with friends on social media, machine learning is reshaping the way businesses interact with their customers in a big way by helping them anticipate and **9)**____ customer needs more **10)** _____.

1) becoming	is becoming	became	will become
2) make	do	making	doing
3) desire	attempt	achievement	try
4) with	on	by	in
5) cooperation	relations	interactions	collaboration
6) on	in	by	at
7) researchers	platforms	sites	developers
8) being served	served	serving	serves

9) meet	require	demonstrate	observe
10) easily	easier	easy	easiest

Task 11. *Make the possible derivatives from the words given in the table:*

Verb	**Noun**	**Adjective**	**Adverb**
secure	*security*	*secure / insecure*	*secure**ly***
develop			
	application		
			*accurate**ly***
evolve			
		advanced	
	prediction		
immerse			
improve			
like	-		
effect			
market			
merge			
		commercial	
purchase			
recognize			
	automation		

Task 12*. Read the second part of the article. Decide how to change the word in each gap. Think of possible prefixes and suffixes.*

Remember watching movies about virtual reality and thinking how cool it would be if it was actually like that in real life? Well, it's about to be. Until recently the technology wasn't able to deliver the fully **1)_____** digital experience users have been craving. That's about to change with recent **2)_____** to both hardware and programming, and the effects are going to be felt across almost every industry from retail to education. VR has been a popular component of video games for several years and this trend is continuing to expand. In addition, VR is **3)_____** to affect companies across the board as they adopt the technology to help them engage customers more **4)_____** and optimise their sales and **5)_____** efforts. It's also a potentially useful tool for learning. Being able to buy anything you want with the touch of a finger may have seemed like a fantasy a few years	**IMMERSE** **IMPROVE** **LIKE** **EFFECT** **MARKET**

ago, but it's now a reality. **6)_____** touchscreen technology with one-click shopping, touch **7)_____** allows consumers to buy products easily from their phones. After linking their payment information to a general account and enabling the feature, customers are able to buy everything from clothes to furniture with just a fingerprint. According to Deloitte, this is one of the biggest things to hit eCommerce in recent years with **8)_____** of this type expected to increase by 150% this year alone. Cognitive technology is in the same vein as machine learning and VR, except that it's a broader concept. For example, the cognitive technology umbrella includes things like natural language processing (NLP) and speech **9)_____**. Combined, these different technologies are able to **10)_____** and optimise a lot of tasks that were previously done by people, including certain aspects of accounting and analytics. Deloitte predicts that the industry sector most affected by this trend initially will be the software sector with 95% of enterprise software companies projected to adopt these technologies by 2020.	**MERGE** **COMMERCIAL** **PURCHASE** **RECOGNIZE** **AUTOMATION**

Task 13*. *Find the phrases from the box in the article and check their meanings. Fill in the sentences below using the correct form of the phrases.*

as a consequence	in active use	on a global scale
to suffer mass extinction	to keep hackers at bay	to leave behind
to improve collaboration	to refresh the memory	to serve as an alert
to take the necessary precautions	to come out	to the delight of

1) Planet Earth has already _____five _____ events in prehistoric times.

2) If we don't invest in research and development, we will be _____by the rest of the world.

3) His departure was totally unexpected and, _____, no plans had been made for his replacement.

4) They failed _____ _____ to avoid infection.

5) Perhaps a few more details about the evening will _____ your _____.

6) We've recorded a new album, and it _____ in the spring.

7) Here are 11 ways _____ between team members.

8) _____ all her fans, she won the game easily.

Unit 3 Programming Languages

Lead-in

Task 1 *Work in groups:*

1. Brainstorm the names of the programming languages which are widely used nowadays.
2. Rank them from top 1 to the least popular.
3. Compare your list with your partner's. Explain your choice, providing the criteria for ranking.

Task 2: Look at the logos and write the name of the programming language under each *logo.*








Task 3. *Watch 2 videos about the top 10 programming languages in 2023 and 2024.* https://www.youtube.com/watch?v=myDjzsPzWdY, https://www.youtube.com/watch?v=xy-hbUr-Ru4

1. Rank the languages according to the info in the videos.
2. Note the key features of each language.
3. Compare two ranking lists. Are they similar or different? Why?
4. Be ready to discuss if you agree / disagree with the speakers' rankings.

Reading and Vocabulary

Task 4 *Read a small article about the TIOBE Index. Fill in the blank spaces with the correct words from the box.*

deployment	**claims**	**handled**	**indicator**	**meets**
programming skills	**surge**	**third-party vendors**	**updated**	**up to date**

For the first time since the start of the TIOBE index nearly 20 years ago, Java and C don't make up the top 2 positions anymore. C is still number one, but it is Python that **1)** _____ the second position now. Some say that Python's recent **2)** _____in popularity is due to booming fields such as data mining, AI and numerical computing. But I believe that Python's popularity has to do with general demand. In the past, most programming activities were performed by software engineers. But **3)** _____are needed everywhere nowadays and there is a lack of good software developers. As a consequence, we need something simple that can be **4)** _____ by non-software engineers, something easy to learn with fast edit cycles and smooth **5)** _____. Python **6)** _____all these needs.

Some time ago I had a flat tire and called the road patrol to help me out. The mechanic asked about my living and when I used the word "software" in my answer, he smiled and started talking very enthusiastically about his own passion: programming in Python. From that moment on, I knew Python would become ubiquitous - *Paul Jansen CEO TIOBE Software*

The TIOBE Programming Community index is a(n) **7)** _____ of the popularity of programming languages. The index is **8)** _____ once a month. The ratings are based on the number of skilled engineers world-wide, courses and **9)** _____**.** Popular search engines such as Google, Bing, Yahoo!, Wikipedia, Amazon, YouTube and Baidu are used to calculate the ratings. It is important to note that the TIOBE index is not about the *best* programming language or the language in which *most lines of code* have been written. The index can be used to check whether your programming skills are still **10)** _____or to make a strategic decision about what programming language should be adopted when starting to build a new software system.

(Adapted from the Internet)

Discussion:

Task 5*. Think about the following questions.*

Why is Java losing its rating and Python is getting popular? Is this trend still going to continue? *Express your ideas.*

Vocabulary

Task 6*. Match a professional term with its definition. When you match the term and the definition correctly, you can read an extra sentence about this notion. Make up your own sentence when the cell is empty.*

Term	*Definition*	*Sentence*
1. in-demand	a) making available	*A deployable software package can be made available before the end of an iteration of an application.*
2. mainstream	b) a basic structure	*It can be used as a template that can be selectively modified by adding code.*
3. circuitry	c) program lifecycle phase, duration	
4. library	d) a sudden and important discovery or development	
5. CPU	e) a collection of pre-written code that you can use to perform specific tasks.	*It is often used to reduce the amount of code a programmer needs to write by providing reusable functions or classes that can be called upon as needed*
6. breakthrough	f) central processing unit	*It is the brain of a computer, containing all the circuitry needed to process input, store data, and output results.*
7. release	g) a symbol, indicator	
8. runtime	h) a payment received for some work for a month	*When you are paid per hour, you receive a wage.*
9. survey	i) an investigation of the opinions or experience	
10. salary	j) a group of people who work or are interested in the same field	
11. community	k) needed or wanted by many people	
12. framework	l) a part that is added to something	
13. sign	m) something that you can gain in result of doing job or activity	
14. extension	n) used broadly, popular	

15. experience	o) the components of an electric circuit	*The primary circuit board in a computer is called the motherboard.*
16. feature	p) able to use different programming styles	*These programming languages offer more flexibility to solve different kinds of problems in various ways.*
17. multi-paradigm	q) a characteristic	
18. cross-platform	r) designed to work on various operating systems or devices	

Reading

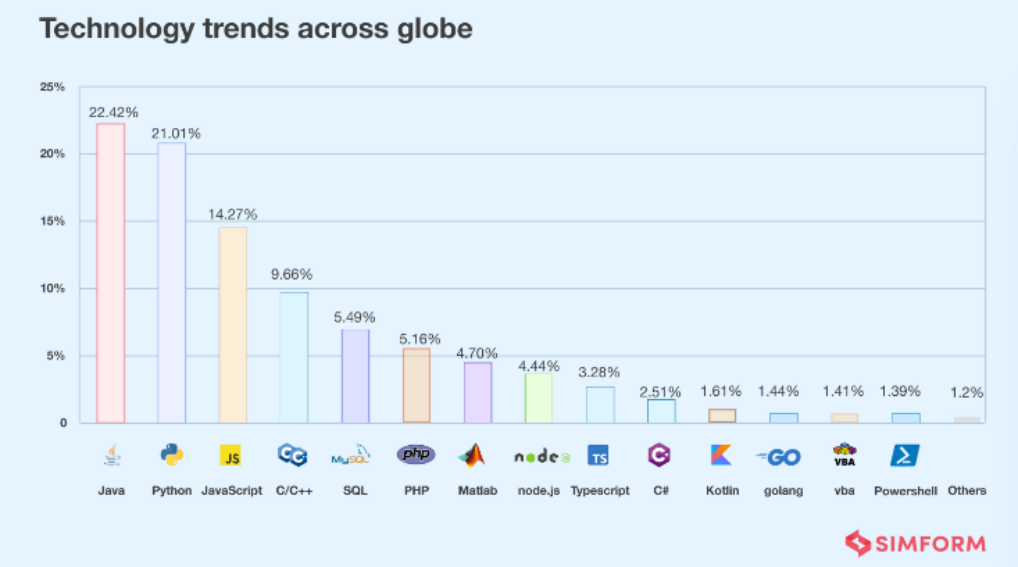
Task 7*. Read the article about top programming languages and fill in the table below. Decide which programming language is the best to learn and why.*

Programming language	*Advantages*	*Disadvantages*	*Area of usage*

Top in-demand programming languages

Learning a new language is always an investment of your time and brainpower. If you are a seasoned developer or if you already know several programming languages, then you can learn a niche, modern one. But if you are starting your programming career or if you want to learn your first or second programming language, then it is wise to learn one of the mainstream and established programming languages. Here is a list of programming languages based on the following criteria:

- *Already mainstream and firmly established in the Software Development industry.*
- *Top-ranked in the renowned programming languages ranking websites.*
- *Popularity is increasing or stable and not sharply decreasing.*
- *They have a large set of libraries, frameworks, and tooling support, and have a large community.*
- *They are in demand in the job market with a good salary.*



https://www.simform.com/blog/top-programming-languages/

1. Java

Java is one of the most **disruptive** programming languages to date. Back in the ’90s, business applications were mainly developed using C++, which was quite complicated and platform dependent. James Gosling and his team in Sun offered a much simpler, object-oriented, interpreted programming language that also supports **multi-threading** programming.

Java achieved Platform independence by developing Java Virtual Machine (JVM), which abstracted the low-level Operating System from developers and gave the first “Write Once, Run anywhere” programming language. Also, JVM offered generation garbage collection, which manages the Object life cycle.

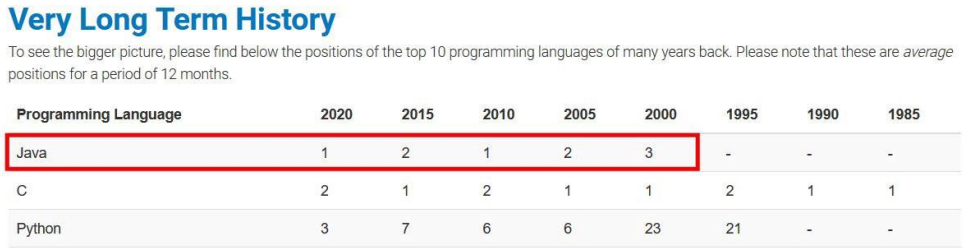
In recent years, Java has lost some of its markets to highly **developer-friendly** languages, especially Python, JavaScript. Also, JVM is not quite **Cloud friendly** because of its **bulky** size.

Fortunately, Java is working on its **shortcomings** and trying to make Java **fit for** Cloud via the GraalVM initiative. Java is still #1 programming language for enterprises.

Key Features:

- Java offers a powerful, feature-rich, multi-paradigm, interpreted programming language with a moderate learning curve and high developer productivity.
- Java is strictly backward compatible, which is a crucial requirement for business applications.
- Java’s runtime JVM is a masterpiece of Software Engineering and one of the best virtual machines in the industry.

Only after five years of its release, Java became the 3rd most popular programming language and always remained in the top 3. Here is the long-term history of Java in the TIOBE ranking:



Very Long Term History

To see the bigger picture, please find below the positions of the top 10 programming languages of many years back. Please note that these are *average* positions for a period of 12 months.

Programming Language	2020	2015	2010	2005	2000	1995	1990	1985
Java	1	2	1	2	3	-	-	-
C	2	1	2	1	1	2	1	1
Python	3	7	6	6	23	21	-	-

Main Use Cases: Enterprise Application Development, Android App Development, Big Data, Web Development

2. Python

When Guido van Rossum developed Python in the 1990s as his **side project**, nobody thought it would be the most popular programming language one day. Python has not seen a **meteoric rise in popularity** like Java or C/C++. But from the very beginning, Python has focused on developer experience and tried **to lower the barrier to** programming so that school kids can also write code. In 2008, Python went through a massive improvement introducing significant changes. Today, it is omnipresent and used in many areas of software development, with no sign of slowing down.

Key Features:

- The USP of Python is its language design. It is highly productive, elegant, simple, yet powerful.
- Python has first-class integration with C/C++ and can seamlessly offload the CPU heavy tasks to C/C++.
- Python has a very active community and support.

In the last years, Python has seen enormous growth in demand with no sign of slowing down.

StackOverflow developer survey has shown that Python developers earn a high salary with relatively low experience compared to other mainstream programming languages. **The Main Use Cases** include Data Science, Data Analytics, Artificial Intelligence, Deep Learning, Enterprise Application, Web Development.

3. JavaScript

During the first browser war, Netscape had assigned Brendan Eich to develop a new programming language for its browser. He developed the initial prototype in only ten days, that is why it was often ridiculed because of its poor language design and lack of features. Over the years, JavaScript has evolved into a multi-paradigm, high-level, dynamic programming language. The first significant breakthrough of JavaScript came in 2009 when Ryan Dahl released cross-platform JavaScript runtime Node.js and enabled JavaScript to run on Server Side. The other breakthrough of JavaScript came around 2010 when Google released a JavaScript based Web development framework AngularJS. Today, JavaScript is one of the most widely used programming languages in the world and runs on virtually everywhere: Browsers, Servers, Mobile Devices, Cloud, Containers, Micro-controllers.

Key Features:

- JavaScript is the undisputed king in Browser programming.
- Thanks to Node.js, JavaScript offers event-driven programming, which is especially suitable for I/O heavy tasks.
- JavaScript has gone through massive modernization and overhaul in the last years.

Main Use Cases: Web Development, Backend Development, Mobile App Development, Serverless Computing, Browser Game Development

4. C

During the 1960s, every cycle of the CPU and every bite of memory was expensive. Dennis Ritchie, a Bell engineer, developed a general-purpose programming language that was compiled directly into machine language during the 1969–1973. It offers low-level access to memory and gives full control over the underlying hardware.

Over the years, C has become one of the most used programming languages. Besides, C is arguably the most disruptive and influential programming language in history and has influenced almost all other languages in this list. But it is often criticized for its accidental complexity, unsafe programming, and lack of features. Also, C is platform-dependent. But if you want to make the most use of your hardware, then C/C++ or Rust is your only option.

Key Features:

- As C gave low-level access to memory and compiled to Machine instructions, it is one of the fastest and most powerful programming languages.
- C gives full control over the underlying hardware.
- C is one of the "Programming languages of the Language," i.e. compilers of many other programming languages like **Ruby, PHP, Python** have been written in C.

C is the oldest language in the list and has dominated the industry for 47 years:

Very Long Term History

To see the bigger picture, please find below the positions of the top 10 programming languages of many years back. Please note that these are *average* positions for a period of 12 months.

Programming Language	2020	2015	2010	2005	2000	1995	1990	1985
Java	1	2	1	2	3	-	-	-
C	2	1	2	1	1	2	1	1
Python	3	7	6	6	23	21	-	-

Main Use Cases: System Programming, Game Development, IoT and Real-Time Systems, Machine Learning, Deep Learning, Embedded Systems

5. C++

C++ was first created as an extension of C by Bjarne Stroustrup, adding Object-Oriented features. Over time, C++ has evolved into a multi-paradigm, general-purpose language. Like C, C++ also offers low-level memory access and directly compiled to machine instructions.

C++ also offers full control over hardware but with the cost of accidental complexity and does not provide language-level support for memory safety and concurrency safety. Also, C++ offers too many features and is one of the most complicated programming languages to master. For all these factors and its platform dependency, C++ lost its popularity to Java in especially enterprise software development and Big Data domain in the early 2000s.

C++ is once again gaining popularity with the rise of GPU, Containerization, Cloud computing, as it can quickly adapt itself to take advantage of Hardware or Ecosystem changes. Today, C++ is one of the heavily used programming languages in the industry.

Key Features:

- C++ is constantly modernizing and adapting itself with changes in Hardware or Ecosystem.

- C++ also gives full control over the underlying hardware and can run on every platform and take advantage of every kind of hardware, whether it is GPU, TPU, Container, Cloud, Mobile devices, or Microcontroller.
- C++ is fast and used heavily in performance-critical and resource-constrained systems.

C++ is the second oldest programming language in this list and ranked 4th in the TIOBE programming language ranking. Although C++ is facing massive competition from modern programming languages like Rust or Go, it is still generating stable interest in the last years.

Main Use Cases: System Programming, Game Development, IoT and Real-Time Systems, Machine Learning, Deep Learning, Embedded Systems, Distributed Systems

6. C#

In 2000, Tech giant Microsoft decided to create their Object-Oriented C like programming language C# as a part of their .NET initiative. Anders Hejlsberg designed C# as a part of Microsoft's Common Language Initiative (CLI) platform where many other (mainly Microsoft's) languages compiled into an intermediate format which runs on a Runtime named Common Language Runtime (CLR).

During the early days, C# was criticized as an imitation of Java. But today, C# is a multi-paradigm programming language that is widely used not only on the Windows platform but also on the iOS/Android platform (thanks to Xamarin) and Linux platform.

Key Features:

- C# has large ecosystems of libraries and frameworks.
- Like Java, C# is also platform independent (thanks to CLR) and runs on Windows, Linux, Mobile devices.

Main Use Cases: Server-Side programming, App development, Web Development, Game Development, Software for Windows Platform

USE OF ENGLISH

Task 8. *Read the article about the PHP programming language and put the verbs in brackets in the correct grammatical form.*

Like Python, PHP is another programming language developed by a single developer as a side project during the ’90s. Software Engineer Rasmus Lerdorf initially ***1)_____(to create)*** PHP as a set of Common Gateway Interface binaries written in C to create dynamic Web Applications. Later, more functionalities were added to the PHP product, and it organically ***2)_____(to evolve)*** into a fully-fledged programming language. At present, PHP **3*)___ (to be)*** a general-purpose, dynamic programming language mainly used to develop server-side Web applications.

With the rise of JavaScript-based client-side Web application development, PHP is currently 4)____ (to lose its appeal and popularity. PHP will not die soon, although its popularity ***5)_____ (to diminish)*** gradually.

Key Features:

- PHP is one of the highly productive Server-Side Web development programming languages.
- As PHP is used in Web development for the last 35 years, there are many successful and stable PHP frameworks in the market.
- Many giant companies are using PHP (Facebook, Wordpress), which leads to excellent tooling support for it.

Job Market: TIOBE ***6)____ (to rank)*** PHP as the 8th most popular programming language in 2020. Although the long-term ranking history of PHP ***7)_____ (to show)*** that PHP is part of its prime and losing its appeal. Indeed ranked PHP as the 7th most demanding programming language in the USA job market with 18 K positions. Also, PHP developers can **8)_____(to expect)** a reasonable salary of $90 K. StackOverflow survey shows PHP as the lowest-paid programming language in 2019.

Main Use Cases: Server-side Web Application Development, Developing CMS systems, Standalone Web Application Development.

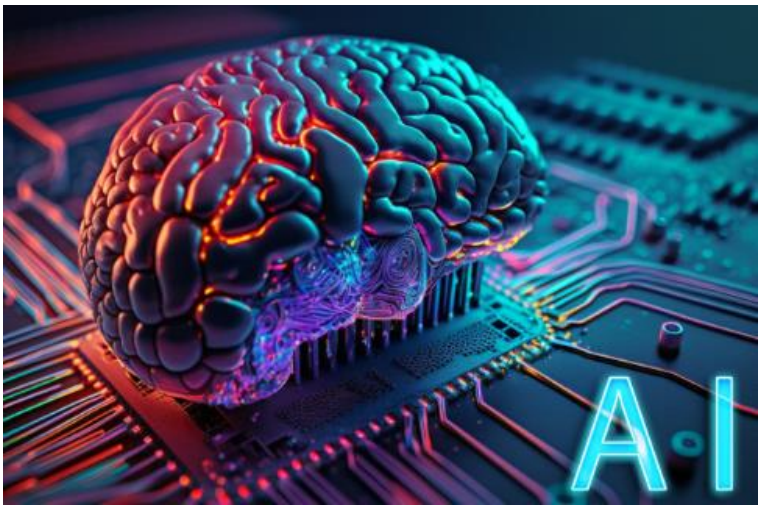
(Internet sources)

Project

Prepare a small presentation about one of the questions below.

1) What programming language is taught as the language of the first choice in different countries?
2) What programming language is the best choice for game development? Why?
3) What programming language is the best choice for mobile apps? Why?
4) What programming language is the best choice for desktop apps? Why?

Unit 4 Artificial Intelligence



Lead-in

Task 1 *Discuss the following questions*.

1) What do you feel looking at the picture above? Why?
2) What is AI? Where is it used nowadays?
3) What is the difference between AI and Machine learning?
4) Do you know anything about the history of AI development?
5) What is NLP?

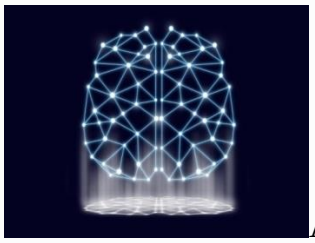
Reading

Task 2 *Read the article below and find the answers to the following questions:*

1) What is the main difference between AI and ML?
2) What developments provoked the change in the early concept of AI?
3) What is the difference between applied and general AI? Give examples.
4) What advancements contributed to the development of ML?
5) What is a neural network? What theory is it based on?
6) What is NLP and where is it used?

Artificial Intelligence and Machine Learning

By Bernard Marr

 Artificial Intelligence (AI) and Machine Learning (ML) are two very hot buzzwords right now, and often seem to be used interchangeably. They are not quite the same thing, but the perception that they are can sometimes lead to some confusion. So, what is the difference? In short, the best answer is that AI is the broader concept of machines being able to carry out tasks in a way that we would consider "smart". And ML is a current application of AI based around the idea of giving machines access to data to learn for themselves.

Early Days

Very early computers were conceived as "logical machines" and by reproducing capabilities such as basic arithmetic and memory, engineers saw their job as attempting to create mechanical brains. As technology and our understanding of how our minds work have progressed, the concept of what constitutes AI has changed. Rather than increasingly complex calculations, work in the field of AI concentrated on mimicking human decision-making processes and carrying out tasks in more human ways.

Artificial Intelligence is often classified into one of two fundamental groups – applied or general. Applied AI includes systems designed to intelligently trade stocks and shares or manoeuvre an autonomous vehicle. Generalised AIs – systems or devices that can, in theory, handle any task – are less common.

The Rise of Machine Learning

Two important breakthroughs led to the emergence of Machine Learning as the vehicle that is driving AI development forward. One of these was the idea – credited to Arthur Samuel in 1959 – that rather than teaching computers everything they need to know about the world and how to carry out tasks, it might be possible to teach them to learn for themselves.

The second, more recent, was the emergence of the internet, and the huge increase in the amount of digital information being generated, stored, and made available for analysis.

Once these innovations appeared, engineers realised that rather than teaching machines how to do everything, it would be far more efficient to code them to think like human beings and then plug them into the internet to give them access to all the information in the world.

Neural Networks

The development of neural networks has been a key to teaching computers to think and understand the world in the way we do. A Neural Network is a computer system designed to work by classifying information in the same way a human brain does. It can be taught to recognise, for example, images, and classify them according to the elements they contain. Essentially, it works on a system of probability – based on data fed to it, it is able to make statements, decisions or predictions with a degree of certainty. The addition of a feedback loop enables "learning" – by sensing or being told whether its decisions are right or wrong, it modifies the approach it takes in the future.

Machine Learning applications can read text and work out whether the person who wrote it is making a complaint or offering congratulations. They can also listen to a piece of music, decide whether it is likely to make someone happy or sad, and find other pieces of music to match the mood. In some cases, they can even compose their own music.

These are all possibilities offered by systems based around ML and neural networks. Thanks to science fiction, the idea has also emerged that we should be able to communicate and interact with electronic devices and digital information as naturally as we would with a person. To this end, another field of AI – Natural Language Processing (NLP) – has become a source of hugely exciting innovation in recent years, and one which is heavily reliant on ML.

NLP applications attempt to understand natural human communication, either written or spoken, and communicate in return with us using similar, natural language. ML is used here to help machines understand the vast nuances in human language and to learn to respond in a way that a particular audience is likely to comprehend.

Adapted from the Internet

Vocabulary

Task 3 *Give a definition or a synonym to the words in the box. If it is necessary, the Ukrainian equivalent can also be added.*

Word	*Definition / Synonym*	*Ukrainian equivalent*
Concept		
Data		
neural network		
brain		
possibility		
basic		
capability		
smart		
applied		
general		
field		
nuance		
approach		
buzzword		

Task 4. *Match the words to make collocations. Write 5 sentences using these collocations*.

Ex. **to carry out tasks**

To carry out, to give, degree of, classify, to learn, decision making, theory of, to make, human, natural language	**tasks**, process, for itself, available, probability, access to data, language, certainty, information, processing

Task 5. *Fill in the table with the correct noun forms.*

Verb	**Noun**
To store	Storage
To generate	
To increase	
To reproduce	
To respond	

To lead	
To recognize	
To contain	
To offer	
To modify	
To add	

Reading

Task 6. *Read the article below and match the paragraphs with the correct beginnings*.

A) *AI adapts through progressive learning algorithms.*
B) *AI achieves incredible accuracy through deep neural networks.*
C) *AI gets the most out of data.*
D) *AI adds intelligence to existing products.*
E) *AI analyses more and deeper data.*
F) *AI automates repetitive learning and discovery through data.*

Why is artificial intelligence important?

1)_____ AI is different from hardware-driven, robotic automation. Instead of automating manual tasks, AI performs frequent, high-volume, computerised tasks reliably and without fatigue. For this type of automation, human inquiry is still essential to set up the system and ask the right questions.

2)_____ In most cases, AI will not be sold as an individual application. Rather, products you already use will be improved with AI capabilities, much like Siri was added as a feature to a new generation of Apple products. Automation, conversational platforms, bots and smart machines can be combined with large amounts of data to improve many technologies at home and in the workplace, from security intelligence to investment analysis.

3)_____AI finds structure and regularities in data so that the algorithm acquires a skill. The algorithm becomes a classifier or a predictor. So, just as the algorithm can teach itself how to play chess, it can teach itself what product to recommend next online. And the models adapt when given new data. Back

propagation is an AI technique that allows the model to adjust, through training and added data, when the first answer is not quite right.

4) _____It uses neural networks that have many hidden layers. Building a fraud detection system with five hidden layers was almost impossible a few years ago. All that has changed with incredible computer power and big data. You need lots of data to train deep learning models because they learn directly from the data. The more data you can feed them, the more accurate they become.

5)_____ For example, your interactions with Alexa, Google Search and Google Photos are all based on deep learning – and they keep getting more accurate the more we use them. In the medical field, AI techniques from deep learning, image classification and object recognition can now be used to find cancer on MRIs with the same accuracy as highly trained radiologists.

6)_____ When algorithms are self-learning, the data itself can become intellectual property. The answers are in the data; you just have to apply AI to get them out. Since the role of the data is now more important than ever before, it can create a competitive advantage. If you have the best data in a competitive industry, even if everyone is applying similar techniques, the best data will win.

USE OF ENGLISH

Task 7. *Read the article about the history of AI and fill in the gaps with the appropriate words.*

Artificial Intelligence

Artificial intelligence (AI) makes it possible for machines **1)** _____ from experience, adjust to new inputs and perform human-like tasks. Most AI **2)** _____that you hear about today – from chess-playing computers to self-driving cars – rely heavily **3) _____** deep learning and natural language processing. Using these technologies, computers can be **4) _____**to accomplish specific tasks by processing large amounts of data and recognizing patterns in the data.

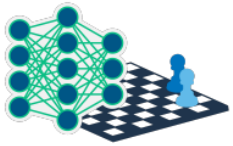
The term artificial intelligence was coined in 1956, but AI has become more popular today thanks to increased data volumes, advanced algorithms, and improvements in computing power and **5) _____.**

Early AI **6) _____** in the 1950s explored topics like problem solving and symbolic methods. In the 1960s, the US Department of Defence took an interest in this type of work and began training computers to mimic basic human reasoning. For example, the Defence Advanced Research Projects Agency (DARPA)

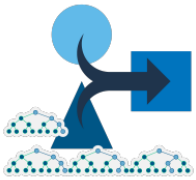
completed street mapping projects in the 1970s. And DARPA produced intelligent personal **7) _____**in 2003, long before Siri, Alexa or Cortana were household names.

This early work paved the way for the automation and formal reasoning that we see in computers today, including decision support systems and smart search systems that can be designed **8) _____** and augment human abilities.

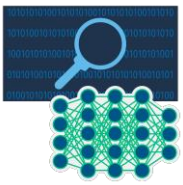
While Hollywood movies and science fiction novels depict AI as human-like robots that take **9) _____**the world, the current evolution of AI technologies isn't that scary – or quite that smart. Instead, AI has evolved to provide many specific **10)_____** in every industry.



1950s–1970s
Neural Networks
Early work with neural networks stirs drive AI boom.
excitement for "thinking machines."



1980s–2010s
Machine Learning
Machine learning becomes popular.



Present Day
Deep Learning
Deep learning breakthroughs

1.	to learn	learning	learned	learns
2.	situations	examples	cases	patterns
3.	in	at	on	by
4.	educated	learnt	specified	trained
5.	storage	size	volume	resistance
6.	investigation	research	description	method
7.	assistants	assistant	assisting	assisted
8.	to change	to modify	to complement	to demonstrate
9.	in	up	over	down
10.	drawbacks	benefits	ads	reasons

Video

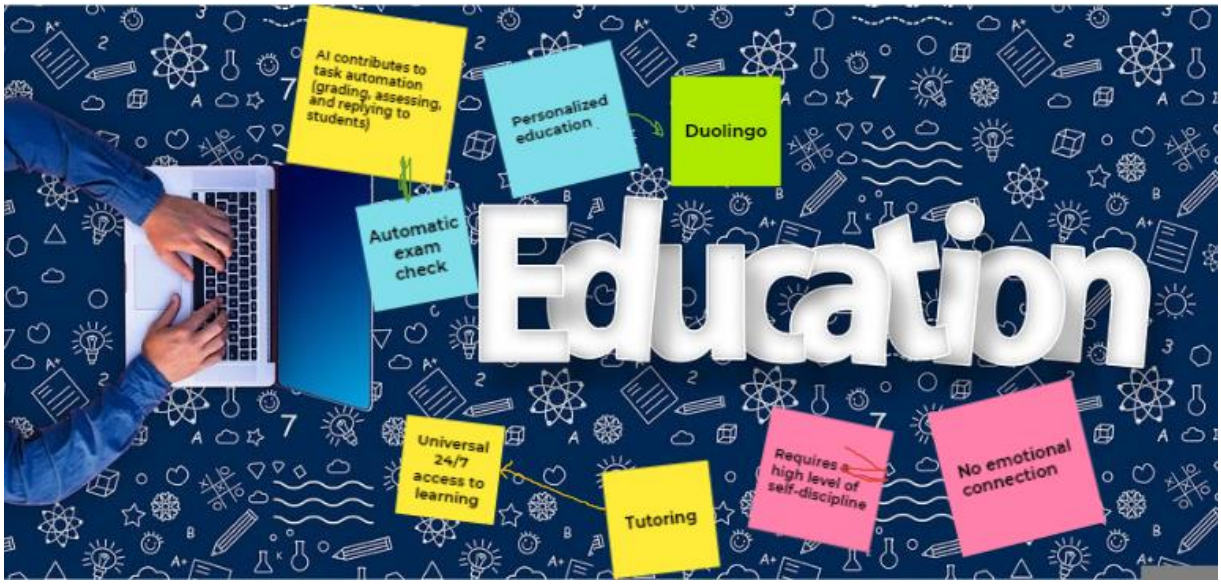
Task 8. *Watch a TED talk about the influence of AI on jobs in the future* https://www.ted.com/talks/anthony_goldbloom_the_jobs_we_ll_lose_to_machines_and_the_ones_we_won_t?referrer=playlist-what_happens_when_the_robots_take_our_jobs

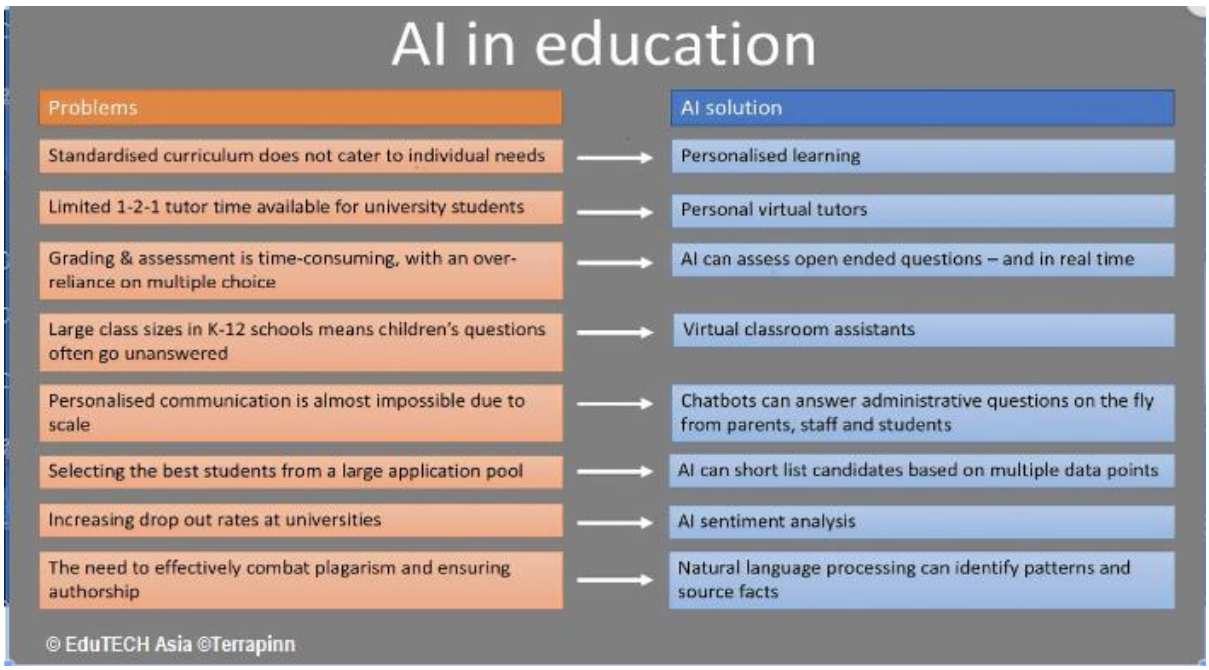
Analyse the talk according to the plan below:

1. The topic of the presentation.
2. The type of the presentation.
3. The key message the speaker wanted to express.
4. Was the introduction captivating? Why? Why not?
5. What is the main part of the talk about? How many parts does it consist of?
6. What is used for the visual support of the talk (slides, props, apps, video, etc)?
7. Is the talk delivery effective? Why? (emotions, body language, humour..)
8. Is there any conclusion? What does a conclusion contain?

Discussion

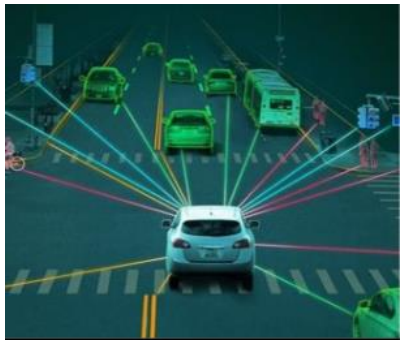
Task 9. *Applied AI is widely used in many spheres of our life: in education, military forces, science, medicine, transportation, art etc. Look at the pictures below. Analyze the information about the use of AI in education. What ideas you agree or disagree. Why?*





Team project

Task 10. *Choose any field of AI application you are interested in. The pictures below can put some ideas into your head. Build the teams according to your interests and prepare a presentation about the use of AI in the area of your choice. To support your talk, you should make some visuals in the form of a table, a mind map, a poster, a slide, etc*



Unit 5 Internet of Things

Lead-in

Task 1. *In 2 minutes make up a list of as many technological appliances as you can think of. Exchange your lists with a partner and complete the sentences below with the words from your partner's list:*

I can't imagine my life without…because….

I can easily live without …because….

Task 2*. Look at the picture below and try to explain how the devices from your list can be connected with IoT****.***

Vocabulary

Task 3. *Read a small article explaining what the IoT is. Put the words into the blank spaces using the correct form where necessary. Give your own examples of IoT use.*

chips	**device**	**driverless**	**environment**	**involve**	**switch**
connect	**digital**	**efficient**	**intelligence**	**share**	**turn**

The Internet of Things refers to various physical **1)** _____ around the world that are **2)** _____ to the Internet, all collecting and **3)**_____ data. Thanks to the arrival of super cheap computer **4)** _____ and the ubiquity of wireless networks, it's possible **5)** _____ anything, from something as small as a pill to something as big as an aeroplane, into a part of the IoT. Connecting up all these different objects and adding sensors to them adds a level of digital **6)**_____ to devices that would be otherwise dumb, enabling them to

communicate real-time data without **7) _____** a human being. The Internet of Things is making the world around us smarter and more responsive, merging the **8) _____** and physical universes.

Almost any physical object can be transformed into an IoT device if it can be connected to the internet to be controlled or communicate information.

A lightbulb that can be **9) _____** on using a smartphone app is an IoT device, as is a motion sensor or a smart thermostat in your office or a connected streetlight. An IoT device could be as fluffy as a child's toy or as serious as a **10) _____** truck. Some larger objects may themselves be filled with many smaller IoT components, such as a jet engine that's now filled with thousands of sensors collecting and transmitting data back to make sure it is operating **11) _____.** At an even bigger scale, smart city projects are filling entire regions with sensors to help us understand and control the **12) _____.**

Task 4. *Make the bare infinitive and gerund forms of the following verbs.*

To-infinitive	**Bare infinitive**	**Gerund**
to exist	exist	existing
to require		
to transfer		
to improve		
to centralize		
to affect		
to recognise		
to ensure		
to synchronise		

USE OF ENGLISH

Task 5. *Read about the example of a smart device used at home. Use the verbs in brackets in the correct form.*

Imagine you wake up at 7 am every day 1) ___ (**get**) to work on time. Your alarm clock does the job of 2)_____**(wake**) you just fine. That is, until something goes wrong. Your train is cancelled and you have 3**)_____(drive)** to work instead. The only problem is that it takes longer to drive, and you would have needed **4)_____(get up**) at 6.45 am to avoid **5)_____ (be)** late. Oh, and it's pouring with rain, so you'll need **6)_____ (drive**) slower than usual. A connected or IoT-enabled alarm clock would reset itself based on all these factors**,**

7)_____(ensure) you got to work on time. It could 8)_____(**recognise)** that your usual train is cancelled, calculate the driving distance and travel time for your alternative route to work, check the weather and factor in slower travelling speed because of heavy rain, and calculate when it needs to wake you up so you're not late. If it's super-smart, it might even **9)_____(synchronise)** with your IoT-enabled coffee maker, to ensure your morning caffeine's ready **10)____ (go)** when you get up.

Vocabulary

Task 6*. Match the synonyms.*

To impact, to handle, to enhance, to reduce, to increase, to manufacture, to accomplish, to capture	*to take, to deal with, to improve, to cut, to grow, to complete, to produce, to influence*

Task 7. *Match the words with their definitions. Make 5 sentences using any words from the left column.*

1. ***data center***	a) the ability to hold something
2. ***capacity***	b) a specified stage of development
3. ***reliability***	c) a method
4. ***generation***	d) profit
5. ***well-being***	e) the state of being healthy
6. ***intervention***	f) a place where organisations keep their apps and data
7. ***data science***	g) the degree to which the result of a calculation can be accurate
8. ***technique***	h) process of intervening
9. ***gain***	i) the field of study that combines programming skills and knowledge of mathematics and statistics to extract meaningful insights from data.
10. ***transaction rate***	j) amount of information
11. ***data volume***	k) speed of data exchange

Reading

Task 8. *1) Read the article about the role of 5G in IoT. Write a list of spheres where 5G can be crucial for IoT and a list of industries where IoT can work efficiently without 5G. Is 5G needed for the further development of IoT? 2) Pay attention to the grammar forms of the words* ***in bold****.*

5G IMPACT ON IOT

Some sectors are likely to be affected more than others by the emergence of 5G. "Much business-oriented IoT will happen without the need for 5G, or is already happening **utilising** existing 4G services. It is in areas **requiring** low latency, such as autonomous vehicles or remote robotic surgery, that 5G really comes into its own", says Paul Bevan, a research director of IT Infrastructure at advisory and consulting firm Bloor.

The biggest impact for business will be in the ability of 5G to handle massive data volumes with high transaction rates from remote and/or mobile locations. The ability to capture data from remote sensors, transfer it to large data centres, and apply both AI and **machine learning** and data science techniques to it for near real-time analysis is where enterprises are likely to see the biggest early gains.

For example, in healthcare, they could contribute to improving well-being in the population, through predicting potential individuals' health problems and organising early medical interventions. Remote robotic surgery can improve patient outcomes and reduce costs.

In **manufacturing**, the technologies will enable automation and coordination of manufacturing processes across geographically dispersed units. This will be accomplished via **connected** factories, **reducing** costs and **increasing** agility.

In the public sector, such as municipal governments, 5G and IoT can help hasten the development of smart cities.

Theoretically, all industries will benefit from 5G technology for IoT, as they will be able to independently design or co-design networks based on their unique needs related to latency, capacity, and reliability.

Just because 5G might enhance some aspects of IoT doesn't mean IoT will be dependent on the next generation of wireless network capability. It needs to be stressed that not all IoT devices need 5G. "Probably less than half of all the data

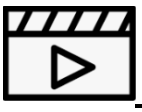
generated by IoT devices will need to be transferred to centralised data centres," says Bevan.

Case studies

Task 9. *Read the cases below and offer a solution using the IoT technology. Make a small presentation of your idea.*

Case 1: The company wants to optimise the amount of products being supplied. But keeping track of and predicting product demand can be tricky, and mistakes have a cost either through over-supply (*and therefore wastage*), or under-supply (*missed sales opportunities*). Offer a solution on how a smart device or system can deal with this task.

Case 2: City council wants to optimise transportation systems in dense, urban environments to deal with traffic jams and busy parking facilities. How can IoT systems help in this case?



Video

Task 10. *Watch a video https://www.youtube.com/watch?v=fuZhnrHIGAo describing pros and cons of IoT. Fill in the table below using the information from the video.*

IoT advantages	IoT disadvantages
…..	
…….	

USE OF ENGLISH

Task 11. *Read the article, opening the brackets and putting the verbs in the correct grammatical form –* ***infinitive, gerund, participle 1 or participle 2.***

IoT devices, with their smart connectivity, enhance processes and boost efficiency. However, they also have security issues that can make networks vulnerable to cyberattacks, **1) _____ (pose)** a significant risk to industries and the economy.

IoT devices are mainly at risk due to inadequate in-built security measures **2) _____ (fight)** threats. This vulnerability arises from their_____ **(restrict)** settings and their **3) _____ (limit)** processing power. Given that IoT devices typically

operate on low power, they have limited functionalities. Consequently, their security often falls short.

Vulnerabilities in IoT devices may allow cyber criminals **4) _____** (**take over)** them and launch attacks against critical systems. Cyber criminals often target and exploit recognised weak points in IoT devices, **5) _____ (convert**) them into compromised networks known as IoT botnets. In 2016, an attack from the Mirai botnet disrupted major websites and services after **6) _____ (take control**) of thousands of vulnerable household IoT devices. These vulnerabilities in IoT devices also lead to numerous privacy breaches, **7) _____ (result)** in significant legal fines for breaking regulations.

8) _____ (combat) the growing range of threats and reduce the risk of federal agencies and services due to IoT device vulnerabilities, the U.S. government enacted the IoT Cybersecurity Improvement Act of 2020. This law establishes cybersecurity guidelines for connected devices **9) _____ (deploy)** by federal entities. These guidelines also include "minimum security requirements for managing cybersecurity risks" inherent in these devices. The aim of these rules is **10) _____ (create)** a unified cybersecurity framework between the government and IoT device makers for devices purchased and used by federal agencies.

Task 12. *Match the abbreviations with their meanings.*

LAN, API, IoE, APN, SIM, Big data, GSMA, IIoT, IP, MNO, M2M, WAN

A) Internet Protocol
B) Application Programming Interface, a software intermediary that makes it possible for two different applications to communicate
C) Industrial Internet of Things, a subset of IoT specific to industrial applications, such as manufacturing and robotics
D) Access Point Name, something that needs to be set when a device uses data.
E) Mobile Network Operator uses the APN to assign the device an IP address so that it can connect to the internet
F) The Global System for Mobile Communications Association, a global body representing mobile network operators' interests
G) Subscriber Identification Module, used to store the International Mobile Subscriber Identity.
H) Internet of Everything
I) Machine-to-machine, a processor or computer working with another processor or computer without the intervention of a human
J) Trillions of IoT devices connected to the Internet

K) Local area network

L) Wide area network

Presentation

Task 13. *You are a group of designers. Your task is to design a perfect smart house for: 1) a family with 3 children,* ***or***

2) a young couple with 2 dogs; ***or***

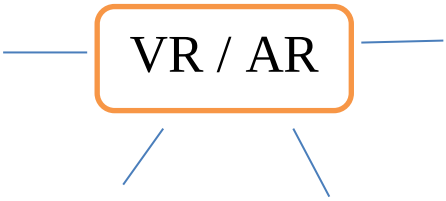
3) a young businessman who has just started his business.

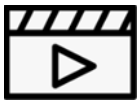
The task of the customer group is to choose the best option from the presented variants and be able to explain their choice.

Unit 6 Immersive technologies

Lead-in

Task 1. *Brainstorm in what areas virtual or augmented realities can be currently used.*



 **Video**

Task 2 *Watch a video explaining the difference between VR, AR and MR.*

https://www.youtube.com/watch?v=XLP4YTpUpBI&t=251s

Complete the following sentences using the information from the video:

1. Immersive technologies comprise _____
2. VR uses _____ to create _____ and helps an individual to immerse in _____.
3. The first VR device called _____ was invented by _____ in _____.
4. VR is revolutionizing many industries like _____.
5. Steven Spielberg calls VR “a wonderful _____”.
6. AR is a technology that _____ helping people to perform tasks _____.
7. The examples of AR include _____.
8. The first AR gadget called _____ was invented by _____ in ___.
9. The popular AR apps are _____.
10. MR or mixed reality is _____ where users can interact with _____ and _____.

Vocabulary in context.

Task 3. *Read the article explaining the basics of VR work. Fill in the article with the words missed. Write down the key concepts connected with the VR environment. Explain their functions.*

angles	disoriented	environment	hardware	quality	tricks
complex	efficiently	experience	immersed	senses	virtual

Virtual reality allows the user to be **1)_____** into a virtual world, unlike regular screens in front of the user, which do not allow for such an experience. VR can include 4 of the 5 **2)_____,** including vision, hearing, touch and possibly even smell. With this power, VR can take people for a **3)_____** world fairly easily. The only current problems are the availability of the necessary **4)_____**and the price at which it can be purchased. But as it currently stands, high **5)_____** VR is not possible without spending quite a bit of cash to get a powerful computer and a headset to go with it.

Virtual reality **6)____**your brain into believing you are in a 3D world. The first way VR does this is with the stereoscopic display. This works by displaying two slightly different **7)_____**of the scene to each eye, simulating depth. This, along with other ways to simulate depth like parallax (farther objects to you seem to move slower), shading and techniques, creates an almost life-like experience.

Your brain builds on your past **8)_____**to develop "rules" by which to interpret the world. For example, the sky tells you which way is up. Shadows tell you where light is coming from. The relative size of things tells you which one is farther away. These rules help your brain operate more **9)_____.**

VR developers take these rules and try to provide the same information to your brain in the virtual world. In an effective virtual **10)_____,** moving objects should follow your expectations of the laws of physics. Shading and texture should allow you to determine depth and distance. Sometimes, when the virtual cues don't quite match your brain's expectations, you can feel **11)_____.** Because the human brain is much more **12)_____**than even the most sophisticated computer, scientists are still trying to understand which cues are most important to prioritise in VR.

Task 4. *Match the descriptions with the correct VR element:*

G) Sensory engagement
H) 3D-simulated environment
I) Immersion
J) Realistic interactivity

The four elements of virtual reality

There are four different elements of VR:

1. _____An artificial environment is rendered through a medium like a VR display or a headset. The user's visual perspective changes based on movements occurring in the real world.
2. _____The environment is realistic enough that you can effectively recreate a realistic, non-physical universe so that a strong suspension of disbelief is created.
3. _____VR can include visual, audio, and haptic cues that help make the immersion more complete and realistic. This is where accessories or input devices, such as special gloves, headsets, or hand controls, provide the VR system with additional input of movement and data.
4. _____The virtual simulation responds to the user's actions, and these responses occur in a logical, real-life manner.

Reading

Task 5. *Read the article about the influence of VR on the working environment. Find which paragraph (A-H) tells that*

1. Audience entertaining experience will diversify _____
2. Working remotely can grow in popularity _____
3. Some people may stop working _____
4. Product cost will decline ___
5. Designing will get faster thanks to virtual prototyping ____
6. Marketing will have new advertising options ____
7. There will be more opportunities for practice _____
8. Visiting other places will be easier for busy people ____

VR Will Change the Workplace

The investment bank Piper Jaffray estimates that by 2025, 500 million virtual reality headsets will be sold. Before diving into the potential impact of this new technology, let's clarify the difference between virtual and augmented reality. Augmented reality overlays information on the real world (the hologram of Princess Leia is an example). Virtual reality creates a 100% digital world in which the viewer is fully immersed. The power of virtual reality lies in the fact that it tricks the subconscious and renders it unable to distinguish between real and stimulating environments.

A) The use of virtual reality in gaming has changed the way people play games. Gaming has become more intense, immersive and even impressive. A recent study cited in the *Economist* found that a significant portion of young men who play video games had chosen to work less and play video games more. As a result, this

cohort tended to live at home longer and marry later in life. Now imagine the impact VR games could have on this segment. It is possible that VR games could cause even more young people to drop out of the workforce or to work less than they do today.

B) The use of virtual reality technology will change the way education systems work. With virtual reality, a child would be able to explore the new dimensions. The child would be able to train himself to do the experiment in a simulator. He would be able to go on a virtual reality field trip to the Moon and other space objects. Medical science is also benefiting from virtual reality. The trainee surgeons can perfect their techniques in a realistic environment and test their theory before applying it in real life.

C) VR is changing the way companies interact with their employees and target customers. In order to get close to the customer, businesses currently have employees conduct live interviews, listen to recorded phone calls or take over customer support channels. In the future, organisations will ask employees to watch the recorded VR experiences that simulate the daily life of prospective buyers on a regular basis.

Companies also create computer-induced reality for their customers. The examples include 3D tours around hotels or VR adventure rides to make the clients feel the thrill. Virtual reality may accelerate the remote-working trend by making it easier for employees to connect with one another digitally. For example, Facebook is already working on virtual reality chatrooms.

D) Even though 3D movies have already enhanced the cinematic experience, mixing it with a virtual reality experience boosts the level. Often, the film watchers want to play the role of some character or enter the era of the movie. With virtual reality, the users would be able to do just that. They would be able to see the movie in action, feel it, enter it and see it from different angles.

E) Everybody wants to escape reality once in a while. They want to travel to new places, but social responsibilities tie them down. However, with virtual reality, users will be able to tour the places without leaving their homes. They can simply relax in their selected place without moving an inch from their sofa. This will further improve the quality of life by exploring the world and experiencing it firsthand.

F) Cost to serve (CTS) is one of the most important metrics for any business. Virtual reality could help to lower costs to serve by helping customers to troubleshoot issues themselves. For example, rather than needing to read the directions on a piece of paper, the customer can watch a short virtual reality clip that shows how the furniture should be assembled. Alternatively, virtual reality could help to train employees, which would in turn help employees to serve customers faster and more efficiently.
G) Companies like Boeing and Raytheon are already using virtual reality to develop new products faster. As reported by CNN, military-hardware producer Raytheon uses a virtual reality product-simulation chamber called a CAVE to help engineers and designers interact with a digital prototype.

The same technology could be used by a number of other industries to make the prototyping process faster and more accurate. For example, most cars are designed via a digital drawing, which is then developed into a full-scale clay model. Virtual reality could eliminate the need to work with clay models. Instead, designers could instantly view a life-size version of any design thanks to a VR headset.

H) Soon, two-dimensional digital ads will give way to virtual reality adverts. Companies like Spectiv are developing technologies that will allow marketers to develop VR content that target audiences actually want to consume.
Content platforms like YouTube will also provide advertisers with new virtual reality ad options. Soon, advertisers will begin to develop VR videos to create novel experiences for prospective customers.

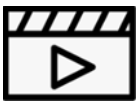
Task 6. *Answer the questions:*

1) What is the main difference between virtual and augmented realities?
2) How will the way to get closer to the customer in the future differ from the strategy that is used nowadays?
3) What impact can virtual reality video games have on the youth?
4) How can virtual reality decrease customer service costs in the future?
5) Why can a car-producing industry become faster and more accurate?
6) What will change in marketing and advertising thanks to VR?

Vocabulary

Task 7. *Match the word or phrase with its definition:*

augmented reality	доповнена реальність	an enhanced version of reality created by the use of technology to overlay digital information on an image of something being viewed through a device (such as a smartphone camera).
immersive	той, що захоплює	(about a computer display or system) generating a three-dimensional image that appears to surround the user.
margin	поле	a space separating text or other elements from the edge of the paper, commonly adjusted through the page setup.
metrics	метрика, показники, параметри	standards of measurement by which efficiency, performance, progress, or quality of a plan, process, or product can be assessed.
product-simulation chamber	камера моделювання роботи продукту	a test chamber for some product.
two-dimensional	двовимірний	flat, having width and length but not depth
virtual reality headset	гарнітура віртуальної реальності	a head-mounted device that provides virtual reality for the wearer



Video

Task 8. *Watch a TED Talk about the perspectives of technological development in the near future https://www.youtube.com/watch?v=2FA-IuDTMjE. Find the answers to the following questions:*

1. Who is the speaker?
2. What is the main idea of her talk?
3. What is the target audience and the purpose of this presentation?

4. Do you find this talk captivating? Why? Why not?
5. What info / data presented impressed you most of all? Why?
6. What are the advantages of the fast technological development?
7. What challenges did she mention?

USE OF ENGLISH

Task 9. *Read the article and choose the correct option.*

Fear of New Technology

Technologies develop **1)_____** than we can grasp them and understand how they will affect our lives. And the unknown often causes fear and **2) _____** It's a tendency that humans have had for centuries. But fear of new technologies goes beyond the tech itself, **3) _____** our sense of stability and cultural norms.

4) _____some of the things we worry about now — robots taking our jobs, EMP attacks bringing society to a halt, 5G networks harming us in some way. What people are scared of today, says Ed Day, a sociologist at Chapman University in Orange, California, isn't often new devices. The perceived negative effects that technology will have on society is more what keeps us **5) ___**up at night.

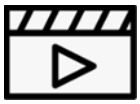
Of course, the types of fears people have do vary based on factors such as age, sex, and education. Separate studies have **6)_____** on the prominence of technophobia in elderly adults, especially women. The level of technophobia can also be **7)_____** to personal **8) _____** : introverts are typically more inclined to embrace a new technology, and people who like to plan their lives well in advance are less **9) ____** to accept new technologies because of the risk of losing control over the situation. Cultural factors are also important. Individualistic societies are less exposed to technophobia: people in such societies are ready to experiment **10) _____**, even if that contradicts common sense.

In the 1960s, there was a hope in society that the development of science would solve social issues. People tended to see the advancement of technology as a reason for social optimism. Now the attitude **11) _____** technology is more complex: techno-optimism is **12) _____** with catastrophic social pessimism, and social science fiction is painted in fatalistic colours because of the fear of losing autonomy and control over actions.

People are interested **13) _____**electric vehicles and home 3D printers, they are ready to wear any smart health sensors, use a personal assistant based on AI and use genetic diagnostics, but they are against implantable sensors and microchips, even if those can expand human **14)_____**. Most negatively, they

perceive various invasive technologies that expand people's mental and physical capabilities, neuro interfaces and unborn children's genome editing. **15) _____**, people are scared of some technologies deciding and doing something for them.

1. fast	faster	the fastest	fastest
2. rejection	intrusion	phobia	danger
3. to challenge	challenging	challenged	challenge
4. think	dream	consider	describe
5. to	in	for	up
6. reported	presented	analysed	told
7. connected	related	combined	depend
8. ideas	feelings	traits	views
9. likely	possibly	probably	definitely
10. less	fewer	more	little
11. with	towards	in	for
12. combined	combines	have combined	is combined
13. in	at	for	to
14. capacities	possibilities	opportunities	probabilities
15. However	Unfortunately	In other words	But

 **Video**

https://www.youtube.com/watch?v=AJJOWemfOYI What type of presentation is it? Has it hooked you? Why? / Why not?

https://www.youtube.com/watch?v=QcANba_1xg8

 **Discussion.**

Task 10. *How do you feel about the increasing use of virtual technologies in different areas of our life (look at the list of examples below)? What benefits do you see? What risks or ethical issues could come up (privacy, addiction, misinformation)?*

Group1: present the arguments for
Group 2: present the arguments against

Education: Virtual field trips, anatomy simulations.
Healthcare: Surgery practice, AR-guided procedures.
Entertainment: Gaming, movies, concerts.
Business/Industry: AR manuals, VR safety training.
Daily Life: AR navigation, virtual shopping.

Unit 7 Cybersecurity

Lead-in (pyramid discussion)

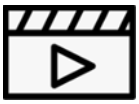
Task 1. *Think about cybersecurity.* ***What deals with cybersecurity? What do you know about cybersecurity?*** *Make a list of your ideas.*

Work in pairs and share with your partner. Work in small groups and compare your lists. Share with the whole class and make a common list of cybersecurity-related things.

Vocabulary

Task 2. *Learn some new vocabulary, explain its meaning, and give examples*

phishing	security breach	better safe than sorry
firewall	to hack into	digital footprint
identity theft	online safety	lock up tight
passwords	cyber attack	privacy concerns
data breach	to protect against	safe and sound



Video

Task 3. *Follow the link https://www.youtube.com/watch?v=ZFVvjgJX1wk Watch a video "What is cybersecurity?" and fill in the gaps.*

Cybersecurity involves using technologies, processes, and controls to prevent **1) _____.** Organisations can face severe penalties for cybersecurity breaches due to data protection laws like **2) _____.** Cyber attacks are becoming more sophisticated, with attackers utilising various tactics like **3) _____.** New regulations and reporting requirements make overseeing **4) _____.** Boards require assurance that **5) _____.** Common cyber threats include **6) _____.** It is essential for everyone connected to the Internet to prioritise **7) _____.**

Task 4. *Follow the link https://www.youtube.com/watch?v=Yr0xPVFcf-U Watch the video "What is cybersecurity?" and do the activities based on the information in the video.*

Activity 1 *Fill in the gaps.*

Cybersecurity is about reducing the risk and impact of **1) _____.** It involves protecting digital assets like **2) _____.** Information security and cybersecurity are related but focus on different **3) _____.** Cybersecurity is crucial for safeguarding digital assets in **4) _____.** Threats to digital assets can lead to critical services going offline or **5) _____.** Understanding terms like **6) _____** is important. Resources like the **7) _____** can help in learning more about cybersecurity for **8) _____.**

Activity 2 *Are these sentences True or False:*

1. Cybersecurity is only concerned with protecting digital data.
2. Information security includes securing both digital and printed information.
3. Cyber-attacks can lead to the public disclosure of sensitive data.
4. The National Cyber Security Center is the only resource mentioned for cybersecurity support.
5. Cybersecurity is important for the delivery of council services.
6. Cyber resilience, cyber threat, and cyber risk are terms that are not relevant to local government.
7. The video is part of a series aimed at enhancing understanding of digital technology and cybersecurity concepts.

Activity 3 *Choose the right answer.*

1. Which of the following is NOT a key component of cybersecurity?

a) *Protecting devices*
b) Securing information
c) Ensuring data privacy
d) Maintaining physical infrastructure

2. The primary difference between cybersecurity and information security is that:

a) Cybersecurity focuses on digital assets, while information security encompasses both digital and physical assets.
b) Cybersecurity is concerned with protecting systems, while information security is focused on protecting data.

c) Cybersecurity is only applicable to government organisations, while information security applies to all sectors.
d) Cybersecurity is a more advanced and specialised field compared to information security.

3. Why is cybersecurity particularly important for local governments?

a) *It helps prevent data breaches and protect sensitive resident information.*
b) It ensures the continuous delivery of essential public services.
c) It safeguards the council's reputation and financial stability.
d) All of the above.

4. Which of the following resources would be the best starting point for local governments to learn more about cybersecurity?

a) *The National Cyber Security Centre (NCSC) website*
b) The Centre for National Protective Security Authority
c) The National Cyber Crime Unit
d) Consulting with a cybersecurity expert

5. The term "cyber resilience" refers to:

a) *The ability to withstand and recover from cyber-attacks.*
b) The use of advanced encryption techniques to protect digital assets.
c) The implementation of strict cybersecurity policies and procedures.
d) The continuous monitoring and detection of cyber threats.

6. Which of the following is NOT considered a key term associated with cybersecurity?

a) Cyber risk
b) Cyber incident
c) Cyber vulnerability
d) Cyber compliance

7. The primary focus of cybersecurity is to:

a) Protect physical infrastructure
b) Ensure compliance with government regulations
c) Secure digital data and systems
d) Maintain the confidentiality of electronic records

Reading

Task 5 *Read the text and complete the tasks below.*

What is cybersecurity?

Cybersecurity is the art of protecting networks, devices, and data from unauthorised access or criminal use and the practice of ensuring the confidentiality, integrity, and availability of information. It seems that everything relies on computers and the internet now — communication (e.g., email, smartphones, tablets), entertainment (e.g., interactive video games, social media, apps), transportation (e.g., navigation systems), shopping (e.g., online shopping, credit cards), medicine (e.g., medical equipment, medical records), and the list goes on. How much of your daily life relies on technology? How much of your personal information is stored either on your own computer, smartphone, tablet or on someone else's system?

What are the risks of having poor cybersecurity?

There are many risks, some more serious than others. Among these dangers are malware erasing your entire system, an attacker breaking into your system and altering files, an attacker using your computer to attack others, or an attacker stealing your credit card information and making unauthorised purchases. There is no guarantee that even with the best precautions, some of these things won't happen to you, but there are steps you can take to minimise the chances.

What can you do to improve your cybersecurity?

The first step in protecting yourself is to recognise the risks. Familiarise yourself with the following terms to better understand the risks:

- **Hacker, attacker, or intruder.** These terms are applied to the people who seek to exploit weaknesses in software and computer systems for their own gain. Although their intentions are sometimes benign and motivated by curiosity, their actions are typically in violation of the intended use of the systems they are exploiting. The results can range from mere mischief (creating a virus with no intentionally negative impact) to malicious activity (stealing or altering information).
- **Malicious code.** Malicious code (also called malware) is unwanted files or programs that can cause harm to a computer or compromise data stored on a computer. Various classifications of malicious code include viruses, worms, and Trojan horses. Malicious code may have the following characteristics:

    - It might require you to actually do something before it infects your computer. This action could be opening an email attachment or going to a particular webpage.
    - Some forms of malware propagate without user intervention and typically start by exploiting a software vulnerability. Once the victim computer has been infected, the malware will attempt to find and infect other computers. This malware can also propagate via email, websites, or network-based software.
    - Some malware claims to be one thing, while in fact doing something different behind the scenes. For example, a program that claims it will speed up your computer may actually be sending confidential information to a remote intruder.
- **Vulnerabilities.** Vulnerabilities are flaws in software, firmware, or hardware that can be exploited by an attacker to perform unauthorised actions in a system. They can be caused by software programming errors. Attackers take advantage of these errors to infect computers with malware or perform other malicious activity.

To minimise the risks of cyberattacks, follow basic cybersecurity best practices:

- **Keep software up to date.** Install software patches so that attackers cannot take advantage of known problems or vulnerabilities. Many operating systems offer automatic updates. If this option is available, you should enable it.
- **Run up-to-date antivirus software.** A reputable antivirus software application is an important protective measure against known malicious threats. It can automatically detect, quarantine, and remove various types of malware. Be sure to enable automatic virus definition updates to ensure maximum protection against the latest threats. Note: Because detection relies on signatures—known patterns that can identify code as malware—even the best antivirus will not provide adequate protection against new and advanced threats, such as zero-day exploits and polymorphic viruses.
- **Use strong passwords.** Select passwords that will be difficult for attackers to guess, and use different passwords for different programs and devices. It is best to use long, strong passphrases or passwords that consist of at least 16 characters.
- **Change default usernames and passwords.** Default usernames and passwords are readily available to malicious actors. Change default passwords as soon as possible to a sufficiently strong and unique password.

- **Implement multifactor authentication (MFA).** Authentication is a process used to validate a user's identity. Attackers commonly exploit weak authentication processes. MFA uses at least two identity components to authenticate a user's identity, minimising the risk of a cyber attacker gaining access to an account if they know the username and password.
- **Install a firewall.** Firewalls may be able to prevent some types of attack vectors by blocking malicious traffic before it can enter a computer system, and by restricting unnecessary outbound communications. Some device operating systems include a firewall. Enable and properly configure the firewall as specified in the device or system owner's manual.
- **Be suspicious of unexpected emails.** Phishing emails are currently one of the most prevalent risks to the average user. The goal of a phishing email is to gain information about you, steal money from you, or install malware on your device. Be suspicious of all unexpected emails.

(From https://www.cisa.gov/news-events/news/what-cybersecurity)

Activity 1 *Fill in the blanks using the given words.*

availability	***cybersecurity***	***improve***	***risks***
communication	***entertainment***	***integrity***	***shopping***
confidentiality	***guarantee***	***medicine***	***transportation***

What is **1)** _____ ?

Cybersecurity is the art of protecting networks, devices, and data from unauthorized access or criminal use and the practice of ensuring **2)** _____**,** **3)** _____**,** and **4)** _____ of information. It seems that everything relies on computers and the internet now **5)** _____ (e.g., email, smartphones, tablets), **6)** _____ (e.g., interactive video games, social media, apps), **7)** _____ (e.g., navigation systems), **8)** _____ (e.g., online shopping, credit cards), **9)** _____ (e.g., medical equipment, medical records), and the list goes on. How much of your daily life relies on technology? How much of your personal information is stored either on your own computer, smartphone, tablet or on someone else's system?

What are the risks of having poor cybersecurity?

There are many **10)** _____**,** some more serious than others. Among these dangers are malware erasing your entire system, an attacker breaking into your system and altering files, an attacker using your computer to attack others, or an attacker stealing your credit card information and making unauthorised purchases. There is no **11)** _____ that even with the best precautions some of these things won't happen to you, but there are steps you can take to minimize the chances.

What can you do to **12)** _____ your cybersecurity?

The first step in protecting yourself is to recognize the **13)** _____**.**

Activity 2 *Are these sentences True or False:*

1. The definition of cybersecurity involves safeguarding networks, devices, and data from unauthorised access.
2. In the future, all aspects of life will rely on computers and the internet.
3. There are only a few risks, all of them equally serious.
4. The risks include malware erasing data, unauthorised access, and theft of personal information.
5. There is a guarantee that with the best precautions, nothing will happen to you.
6. Familiarising yourself with terms does not help in understanding the risks.
7. Hackers, attackers, or intruders exploit software weaknesses for personal gain.
8. Malicious code is beneficial for computer systems.
9. Vulnerabilities are software, firmware, or hardware flaws that attackers can exploit.
10. Following basic cybersecurity practices will eliminate all risks.

Activity 3 *Choose the right answer.*

1. What is the primary focus of cybersecurity?

a *Protecting personal data on social media*
b Ensuring confidentiality, integrity, and availability of information
c Preventing unauthorized access to online games
d Eliminating the need for passwords

2. What are some risks associated with poor cybersecurity?

a Losing access to social media accounts
b Having credit card information stolen
c Getting locked out of email accounts
d Forgetting passwords to online shopping sites

3. What is the role of hackers, attackers, or intruders in cybersecurity?

a To assist in software development
b To exploit weaknesses for personal gain
c To provide customer service for computer systems
d To educate users on cybersecurity best practices

4. . What are some characteristics of malicious code?

a It always requires user intervention to infect a computer
b It can propagate without user intervention
c It never claims to be something different than it is
d It only infects computers through email attachments

5. Why is keeping software up to date important for cybersecurity?

a To slow down computer performance
b To prevent attackers from exploiting known vulnerabilities
c To increase the chances of malware infecting the system
d To make the computer more susceptible to cyberattacks

6. What is the purpose of implementing multifactor authentication (MFA)?

a To make it easier for attackers to access accounts
b To provide multiple ways to forget passwords
c To validate a user's identity with multiple components
d To eliminate the need for passwords altogether

7. How can users protect themselves from phishing emails?

a By clicking on all links in unexpected emails
b By sharing personal information with unknown senders
c By being suspicious of all unexpected emails
d By automatically downloading all email attachments

Task 4 *Answer the following questions.*

1. What is cybersecurity and why is it important in today's world?
2. What are some of the risks associated with poor cybersecurity practices?
3. Who are hackers, attackers, or intruders, and what are their intentions when exploiting weaknesses in computer systems?
4. How can malicious code, such as malware, harm a computer system or compromise data?
5. What are vulnerabilities in software, firmware, or hardware, and how do attackers exploit them?
6. What are some basic cybersecurity best practices that individuals can follow to minimise cyberattack risks?
7. Why is it important to keep software up to date and install patches regularly for cybersecurity purposes?
8. How has the increase in remote work impacted cybersecurity concerns?
9. In what ways can cybersecurity threats affect businesses and governments?
10. What role do you think government regulations should play in ensuring cybersecurity?
11. How do you stay informed about the latest cybersecurity threats and trends?
12. How do you think advancements in technology will impact the future of cybersecurity?

Discussion

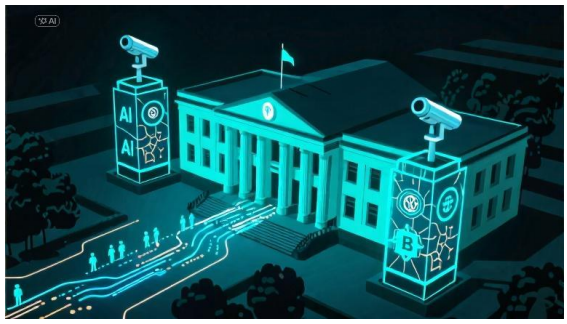
Task 5 Reflection *Share your experience.*

1. Have you ever experienced a cyber attack or data breach personally?
2. What measures do you take to protect your personal information online?
3. Do you believe that individuals should be responsible for their own cybersecurity, or should it be the responsibility of companies and organisations?

Task 6. Group work. *In small groups, discuss:*

a) Privacy and security.

Should governments be allowed to monitor online activities to prevent cyberattacks?



Group1: present the arguments **for**
Group 2: present the arguments **against**

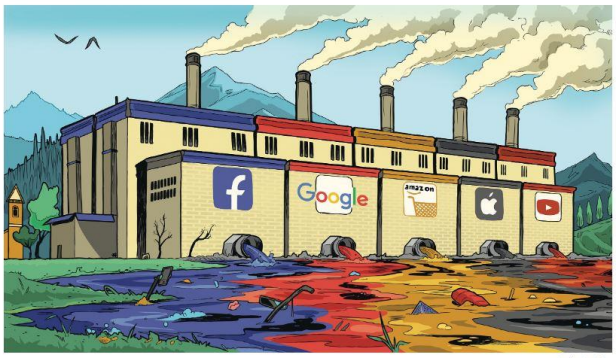
b) Artificial Intelligence in Cybersecurity

Form two teams. One team defends the idea that **AI will make the internet safer**, the other argues that **AI will create more risks**. Debate.

Unit 8 Digital Pollution

Lead-in

Task 1 *Look at the pictures. What are these pictures about? What is similar between them?*



Nick Sirotich

Task 2 *Look at the article heading. What do you think this article is about? What other types of pollution do you know*?

Reading

Task 3 *Look through the article and decide which problem it focuses on*:

a) *information overload*
b) *greenhouse gas emissions*
c) *huge energy consumption*

How can we deal with digital pollution?

By Keri Allan

Data may seem ethereal, but everything from the biggest cloud to a single unopened email has an environmental cost

Global data overload

The changes the coronavirus pandemic has forced upon us are leading many to take a long look at the way we live and the effect it has on the environment. We've

seen dramatic improvements to air quality thanks to so many people staying home, and there's a lot of talk about how we might do things differently as lockdown restrictions ease and we create a "new normal".

When it's safe to go back to the office, we may find more people choose to continue working remotely, for example, as many have discovered that they're able to work productively from home.

Removing the daily commute is obviously good for the environment, but there is another issue that we need to consider: going digital does not equate to going carbon neutral. In fact, the Paris-based Shift Project says that "digital technology is currently doing more to fuel global warming than prevent it".

What is digital pollution?

Dubbed 'digital pollution', the greenhouse gases that come from building, delivering and using digital technology currently make up 4% of global greenhouse emissions – double that of the global aviation industry.

Millions of physical servers in data centres around the world are running 24/7 in order to transmit all our data, and every year, energy consumption from digital technology increases by 9%.

While consumer use is a big contributor – streaming services represent 20% of greenhouse gas emissions from digital devices – business also has a role to play in reducing our digital carbon footprint and need to look towards more efficient ways of working and storing/sharing data.

Every time we use the Internet, a small amount of carbon is emitted. Searching for something on Google has a price, as each internet request represents 7g of carbon dioxide equivalent (CO2e). Sending or receiving an email emits 4g of CO_2 and even unopened spam emails pollute, as they still use 0.3g of carbon dioxide.

"Whilst that may not sound like much, the average office worker sends 120 emails a day, meaning that a business housing 50 employees generates 6,264kg (6.2 tonnes) of carbon emissions a year," says James Harper, marketing manager at manufacturing firm Viessmann. "This is almost the equivalent of taking two return plane journeys a year from London to Hong Kong, which emits 6,800kg (6.8 tonnes) of CO2e between the four trips."

Task 4 a) *Read the article and find what the following figures stand for:*

4; 7; 0.3; 20; 120; 50; 6.2; 24/7

b) Write the sentences describing these figures using the words ***amount, percentage, a period of time, a number of, volume, quantity, level.***

Example: *"4" is the percentage of greenhouse emissions that come from digital technology.*

Task 5: *Offer possible solutions to the problem of digital pollution. Be ready to present your ideas to the class. Use the following phrases:*

We can…./ The government could / The business should/….

It will be good to…

I would recommend…….

It's a good idea to…

I think…..

I would….

Task 6 *Read the second part of the article. Decide if the following statements are True or False.*

1. Clients and employees can influence the business's behaviour regarding environmental problems.
2. There's only one way to solve the problem of digital pollution.
3. "Carbon footprint" means that your feet may leave an accidental print on some carbon-containing material.
4. Every e-mail, even spam that you do not usually read, pollutes the environment.
5. The use of the Internet does not influence carbon emissions, unlike plants, factories, cars, etc.
6. Cloud technologies don't have any carbon footprint.
7. Data centres are not always "green".
8. It is important for businesses to raise their employees' awareness of digital pollution.

Why should businesses care?

Customers and employees alike are now very aware of the climate crisis and environmental responsibilities of the firms they work with, buy from and the organisations they are employed by. As such, they're selecting organisations that fit with their own purpose-led principles. This ranges from seeking to use greener data centres and communicating to the customer base through their CSR communications, to individuals who are increasingly buying on a matter of principle.

Steps you can take

Businesses of all sizes are able to see what's causing the most digital pollution and act accordingly. And there are many tools available to provide support in this area. For example, Microsoft recently launched a sustainability calculator to help businesses analyse the carbon emissions (carbon footprint) of their IT infrastructure, and applications such as Cleanfox remove unwanted and unnecessary emails from your inbox.

Some businesses are going as far as to make management of digital pollution part of a role. They have a head of operations who's responsible for managing how efficient the company is, and as part of that role, is looking at the digital carbon footprint. Others have special departments aimed at reducing their digital pollution through greater use of automation to reduce manual, inefficient ways of working. If you can automate a workflow, you can reduce the number of emails you send, which not only saves time and money but also reduces your digital carbon footprint. Ensure systems and processes are as efficient as possible.

All steps make a difference, and there are a few simple changes businesses can make to start reducing their digital carbon footprint. These include advising staff to unsubscribe from spam/junk emails even if they don't open them, use Wi-Fi over 4G and – where suitable – use USB sticks or external HD to store files rather than in the cloud. You can also encourage workers to talk to each other rather than sending mass emails, and use USBs to transfer some files rather than storing them digitally – this limits the use of the cloud. It is also possible to remove unused apps and software you don't need, and try to download rather than stream.

The role of data centres

Power-hungry data centres are unlikely to become obsolete, but they do have a real opportunity to raise the bar – highlighting Microsoft's move to offset all its past and current emissions. The end users should ensure they only use 'green' data centres. Businesses should ask for efficiency certificates and green credentials, and find out whether they offset residual emissions.

Companies have a responsibility to educate their staff on digital pollution and instigate culture changes that will help manage and reduce digital pollution. Many

might not be aware of the cost of sending that unnecessary 'thank you' email, but small changes across the board will help us move towards the net-zero goal by 2050.

 ***Vocabulary***

Task 7 *Learn the terminology*

https://quizlet.com/_9h79k0?x=1qqt&i=23qrvw - link for terminology training

Task 8 *Complete the text below with the correct word phrases from the box.*

carbon neutral	**indirect energy**	**pollution**
emissions	**greenhouse gas-intensive**	**recyclable packaging**
hybrid cars	**personal carbon footprint**	**renewable**
zero carbon emissions		

How to be **1) _____**

Change the way you use transportation. If you want to dramatically reduce your **2) _____,** consider driving less, or choosing electric vehicles for long trips, and walking and riding a bike when going on shorter journeys.

Reduce or eliminate meat from your diet. In fact, red meat is over 150% more **3)_____** than fish or chicken. However, if you were to replace that red meat with dairy, your emissions would rise. In general, vegetables, fruits, grains and greens require the fewest carbon **4)_____.**

Resell or donate unwanted items, and buy clothing second-hand where possible. It's an excellent way to reuse clothing. Also, landfills are a huge source of methane, with tonnes of clothing creating **5)_____,** so by reselling or donating your unwanted clothes, you're reducing the amount that goes into landfills.

Reduce your intake of single-use plastic. Not only are plastic bags, bottles and containers non-recyclable, they also require a huge amount of **6)_____,** from electricity to run the factory and the air used to transport them.

Keep an eye on your water usage. If you do have a dishwasher, use it, because it actually takes more water to hand-wash dishes. Make sure to fully load your washing machine to avoid wasting water on smaller and more frequent loads, and try to limit the amount of time spent in the shower.

Reduce your household energy consumption. Making the switch to a **7) _____**energy provider is an effective way to reduce your impact. Clean energy is more cost-effective to produce, and it creates **8)_____,** and reduces the pollution that is causing respiratory diseases.

Some of the changes that businesses can make are:

- Join energy efficiency programs
- Use clean energy sources
- Use energy-efficient equipment
- Change interaction style with clients (e.g., online meetings instead of flights)
- Choose electric or **9) _____**for travelling
- Increase recycling
- Aim to produce only **10)_____** for their products
- Allow employees to work from home

Reflection

Task 9 *Share your experience.*

1. What measures can you take to reduce the level of pollution?
2. Do you believe that individuals should be responsible for the level of digital pollution, or should it be the responsibility of businesses or government? Explain your point.

Unit 9 Professional Development

Lead-in: Discussion / Think-Pair-Share
Discuss in pairs, then share ideas with the class.

1. What skills are important for IT professionals today?
2. How do you plan to develop your professional skills in the next 5 years?
3. Have you ever attended workshops, online courses, or training programs? What was useful?

Reading and Vocabulary

Pre-reading

Task 1*. Make a short-term plan of your professional development, describing the skills and knowledge you need to gain to become a qualified professional in the future.*

Task 2. Vocabulary: *Match the words on the left with the words on the right to make collocations.*

E.g. Soft skills

1. soft	**7. identify**	**a) a team**	**g) as a coder**
2. work in	**8. team**	**b) member**	**h) opportunities**
3. present	**9. complex**	**c) effectively**	**i) a problem**
4. run	**10. problem**	**d) a program**	**j) growth**
5. consistent	**11. feel**	**e) skills**	**k) project**
6. career	**12. end up**	**f) solving**	**l) frustration**

Task 3 Reading *Read the article about the necessary skills for programmers and match paragraphs 1-6 with the correct headings A-F*

A) Problem-solving capability
B) Patience
C) Logic
D) Proficiency with programming languages
E) Inquisitiveness
F) Communication skills

Software engineers need to have various skills to perform tasks at the highest level of professionalism. The most effective programmers combine knowledge and technical capability with soft skills such as the ability to work in a team and to communicate well with others. This article covers the most important skills for programmers to have and how to present them effectively when seeking employment.

1)_____Code is written in programming languages such as SQL, Java, C++, Python or others. Programmers aren't expected to know every programming language in existence, but it would be beneficial to be proficient in at least two languages to increase your employment and career opportunities. Most programmers typically decide on an area of specialisation and then learn the programming language that is most appropriate for that field.

2)_____You will need to have the ability to identify problems and come up with the most efficient ways to deal with them via programming.

3)_____ The most effective and successful programmers have a talent for figuring out how something is done and finding ways to do it more efficiently. This skill will help ensure your consistent growth and development as a programmer.

4)_____Programmers generally spend most of their time working solo in front of a computer. However, many situations require you to deal with other programmers and team members, especially when working on large or complex projects. This type of skill will enable you to work effectively with others and to share ideas and solutions.

5)_____Were you a master of Geometry in high school? Love proofs? Live to assess the facts at hand and come to useful conclusions for problem-solving? You may have a skeleton in one of the most important skills for coders. There's a reason so many people who study math and physics end up as coders.

6)_____Coding is extremely difficult. At all stages, but especially when beginning, you should expect to feel extreme frustration. However, your ability to withstand that frustration and move through it, without letting it discourage you, will serve you in all that you do.

Task 4 Group discussion. *Divide the skills described in the article into professional and soft ones.*
What is the difference between these types of skills?
What other skills can you add to this list?

Reading 2. Read the paragraph on

Professional Development in IT Careers

Professional development is essential for IT professionals who want to stay competitive and grow in their careers. The technology landscape changes rapidly, requiring specialists to continuously update their knowledge and skills. One common method is attending workshops or online courses, which offer structured learning opportunities in both technical and soft skills.

Networking with colleagues and joining professional communities is another key strategy, as it allows IT professionals to exchange knowledge and find mentorship opportunities.

Certification programs, such as those offered by leading tech companies, provide formal recognition of **expertise** and can enhance career prospects. **Soft skills** like communication, teamwork, and problem-solving are equally important because IT projects often involve collaboration across teams. By setting clear goals and actively pursuing learning opportunities, IT professionals can ensure their career growth and adapt to emerging trends. In a rapidly evolving industry, continuous learning is not optional but necessary for long-term success.

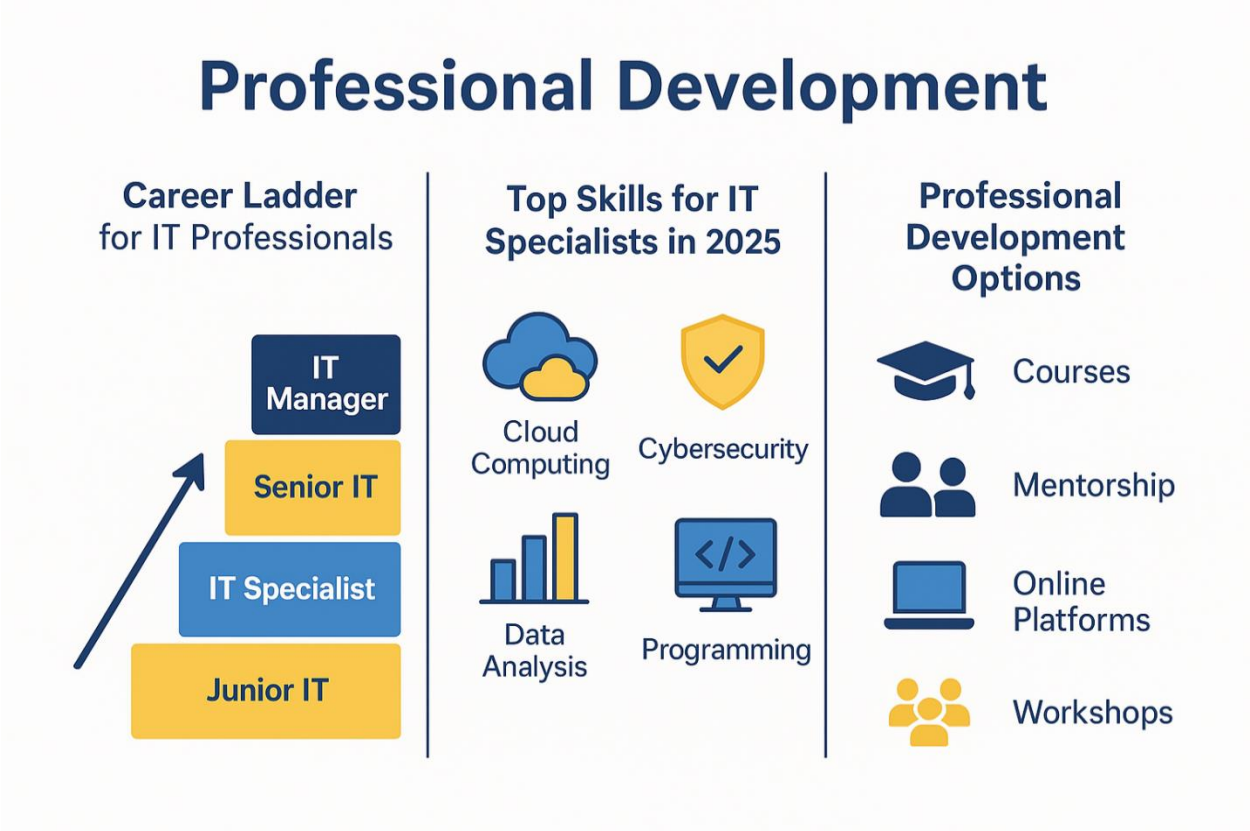
Comprehension Questions:

- What are the main ways IT professionals can develop their careers?
- Why is continuous learning important in IT?
- Name two skills that are becoming essential for IT specialists.

Vocabulary: Match the words in **bold** to definitions:

1. certification	Specialized knowledge or skills in a particular area of work or study.
2. expertise	Personal attributes, communication abilities, and interpersonal skills that help individuals work well with others.
3. networking	A formal recognition or qualification awarded after completing a course or passing an exam in a specific field
4. soft skills	The ability to build and maintain professional relationships that can help in career growth

Analyze the infographic:



Which skills and methods of professional development would you prefer to achieve each of the positions and why?

Complete a short chart:

| Method | Pros | Cons | Would you use it? |

Discuss in pairs to share answers.

Task 6. Grammar & Functional Phrases:

- Modal verbs for advice & obligation
  should, must, have to, can, can't, may
- Functional phrases:
  - *"I recommend that you…"*
  - *"It's essential to…"*
  - *"You might consider…"*

Fill in the blanks with appropriate modals/phrases in IT career scenarios:

1 You _____ update your LinkedIn profile regularly.

2 IT students _____ attend workshops to improve practical skills.

3 You _____ ignore networking opportunities; they are crucial for your career.

4 You _____ participate in coding competitions to showcase your skills.

5 It's essential to _____ learn new programming languages to stay competitive.

6 You _____ rely solely on online tutorials; practical projects are equally important.

7 IT students _____ seek mentorship from experienced professionals in the field.

8 You _____ join professional IT communities or forums to expand your network.

9 You might consider _____ contributing to open-source projects to gain real-world experience.

10 It's recommended that you _____ prepare a portfolio of your projects before job applications.

11 You _____ underestimate the importance of soft skills alongside technical expertise.

12 IT students _____ practice problem-solving and algorithm challenges daily.

13 You _____ be afraid to ask questions during internships or team projects.

Task 7. Speaking: Practice giving advice and sharing opinions on professional development.

- Role-play: One student is a junior IT professional seeking advice, the other is a mentor.
- Use the grammar and functional phrases learned.
- Swap roles and share feedback.

Task 8. Writing/Reflection:

Consolidate vocabulary and functional phrases in writing.

Write a short action plan (150–200 words):

- Describe how you plan to develop your IT skills over the next year.
- Include at least three professional development methods.
- Use modals and functional phrases learned in class.

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Навчальне видання

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АНГЛІЙСЬКА МОВА ДЛЯ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ

Навчальний посібник

Видано в авторській редакції.

Електронний ресурс.
Підписано до видання 30.01.2026. Авт. арк. 5.9.

Підготовлено до видання
в Національному технічному університеті «Дніпровська політехніка».
Свідоцтво про внесення до Державного реєстру ДК № 1842 від 11.06.2004.
49005, м. Дніпро, просп. Дмитра Яворницького, 19.