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NATIONAL TECHNICAL UNIVERSITY OF UKRAINE

«IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE»

ENGLISH PRACTICAL COURSE
FOR FIRST-YEAR STUDENTS:
Information Technology
PART 2

Kyiv

Igor Sikorsky Kyiv Polytechnic Institute

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The Study Electronic Book
English practical course for first-year students:
Information Technology
for first-year students
part 2

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ABSTRACT. This e-book is recommended to work with first-year students of the Institute for Applied System Analysis, Igor Sikorsky Kyiv Polytechnic Institute. The main goal of the publication is to develop English communicative skills in speaking, listening, reading, writing, as well as developing and improving translation skills. The book consists of six units and five appendixes which comprise real professional themes for teaching future specialists in the field of information technology. This book meets the requirements of the syllabus within the discipline «Foreign language».

CONTENTS

PREFACE

The e-book «English practical course for first-year students: Information technology. Part 2» is recommended for bachelor's degree first-year English language classroom work as well as for students' self-study activities at the Institute for Applied System Analysis, specialty 124 «System analysis», Igor Sikorsky Kyiv Polytechnic Institute.

The e-book consists of six units, three self-assessment modules, grammar reference, list of useful vocabulary and five appendices. Each unit includes: lead-in, listening, reading, language in use, grammar, vocabulary, translation, speaking, and writing tasks and up-to-date authentic texts to develop all language skills. Information-rich cognitive material and a variety of lexical tasks will help to increase students' motivation to learn English during both practical classes and homework.

The authentic materials for units have been taken from different printed and electronic sources, so the list of references is presented. Unfortunately, we have been unable to trace some articles and would appreciate any information which would enable us to do so. While developing the material we have shared a lot of experience with students, colleagues and friends. We would like to express our thanks to them all for their participation, suggestions and comments, and hope that you will also share that pleasure we had by working on the course.

We hope that this book will be practical and motivating for your students.

For questions: marabota@i.ua

UNIT 1. CHOOSING A PRINTER
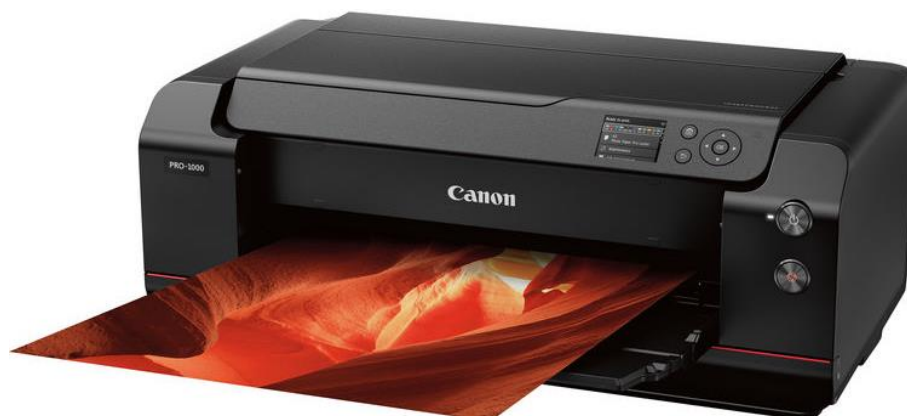
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1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What is a printer?

2. What types of printers do you know?

3. What is a hard copy?

4. What materials are used for 3D printing?

5. What do you know about inkless printers?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	machine		
2	wireless		
3	directly		
4	media		
5	electrostatically		
6	raster		
7	layer		
8	matrix		
9	transparencies		
10	impact		

1.4. Fill in the missing words in the text:

form	employs	laser	adapted	data
letter-quality	impact	ink-jet	written	advanced
	characters	output	dot-matrix	

A printer is a computer 1.__ device that records information on paper. The information can be in the form of 2.__ script, numerical 3.__ or graphics. Printers can produce 4.__ print, like a typewriter. There are two main types of printers: 5.__ printers and 6.__ printers. Dot-matrix printer 7.__ a matrix of small pegs that, hit from behind, 8.__ a series of dots on paper. The dot-matrix printer can 9.__ a wide variety of 10.__ as well as graphics. Ink-jet printers can be 11.__ to complex colour printing. The more 12.__ type of printers is the 13.__ printer which is capable of both black and white and colour printing.

2. LISTENING

2.1. Work in teams (3-4 students). Discuss the advantages and disadvantages of 3D printers using computer terms from task 1.2.

2.2. You will watch the video explaining about the best 3D printers in 2021. Before you watch brainstorm and complete the chart. Predict what the video will be about:

your ideas	
1	
2	
3	
4	
5	

2.3. Watch the video and check your answers in Task 2.2 with your groupmates.

link	QR code
https://www.youtube.com/watch?v=XcOonw0lvYU	

2.4. Watch the video again and try to answer the questions:

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	FlashForge Adventurer 3 can print objects up to 5.9 inches high	**True**	**False**

2	FlashForge Creator Pro 2 can print more then 1 object at a time	**True**	**False**
3	Dremel Digilab 3D45 is ideal for both ordinary users and professionals	**True**	**False**
4	Anycubic Photon Mono X can print up to 2.36 inches an hpur	**True**	**False**
5	Creality Ender 3 v2 costs 180 US dollars	**True**	**False**
6	A|ll the printers mentioned in the videa are for scientific purpose only	**True**	**False**

3. READING

3.1. Pronounce the following words and phrases, translate them into Ukrainian and memorize:

	word / phrase	translation
1	substantial effect	
2	inappropriate	
3	print engine	
4	scanning	
5	copying	
6	dot-matrix	
7	application	
8	charge	
9	power consumption	
10	3D printing	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words or phrases from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. You are going to read about different types of printers. Before you read the text, think of five questions you expect to be answered when reading. Use the following chart to organize your ideas. Skim the text to find the answers. Share your ideas and results with your groupmates:

question	answer
Who……?	
What…...?	
When…..?	
Why……?	
How……?	

3.4. Look through the passages and choose suitable titles for them out of the given ones. Three of them are extra titles:

1. 3D printer

2. Plotter

3. Laser printer

4. Classification of printer

5. Thermal printer

6. Notebook printer

7. Ink-jet printer

8. dye-sublimation printer

9. Business printer

TYPES OF PRINTERS

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A   Printing information on paper is still the most common form of output. It is frequently required for legal documentation. Thus, computers can produce reports, correspondence, sales invoices, payroll checks, bank statements and others. A printer is a peripheral device with small liquid crystal display which produces a hard copy of documents stored in electronic form. Many printers are primarily used as local peripherals and are attached to a computer by USB cable. Some printers, commonly known as network printers, have built-in network interface (wireless or Ethernet) and can serve as a hardcopy device for any user on the network. Individual printers are often designed to support both local and network connected users simultaneously. Some printers combined with scanners and fax machines in a single unit can function as photocopiers. Printers that include non-printing features are sometimes called Multifunction Printers (MFP), Multifunction Devices (MFD) or All-In-One (AIO) printers. Most MFPs include such features as printing, scanning and copying.

B   Representatives of his type of printers spray very small droplets of ink which have electrical charge onto the paper. The placement of the ink is determined by the charge of a cathode and electrode between which the ink moves. Solid ink is a technology used in computer printers and multifunction devices originally created by Tektronix in 1986. Solid ink-jet printers are the most commonly used as colour office printers. Drawbacks of this technology include high power consumption and long warm-up time. The most famous manufacturers of ink-jet printers are Canon, Hewlett-Packard, Epson and Lexmark.

C   It uses an electrostatic process similar to a photocopying machine to produce many pages per minute of high-quality black-and-white output. Laser printers are very fast and can use different sizes of paper. Since they are non-impact printers they are very quiet and produce good graphics. The laser printer works by beaming a laser onto an electrically charged drum which creates an invisible image on the drum, revealed when a special substance, called toner, is poured over it. When the paper is brought into contact with the drum, the image melts onto the paper as it is heated. Laser printers have many significant advantages over other types of printers. Unlike impact printers, the speed of laser printers can vary and depend on many factors,

including the graphics intensity of the job being processed. The fastest monochrome laser printers can produce over 200 pages per minute (ppm) while the colour ones can print over 100 ppm.

D   It is a vector graphics printing device used to print graphical plots. There are two types of plotters: pen and electrostatic plotters. Pen plotters print by moving a pen across the surface of paper to draw complex line art and text. When computer memory was very expensive and processor power was very low, it was the fastest way of producing colour high-resolution vector-based artwork or very large drawings efficiently.

E   Representatives of his type of printers produce printed images by heating paper selectively when it passes over the thermal print head. The coating becomes black in the areas where it is heated. Two-colour thermal printers are capable of printing both black and an additional colour (often red), by applying heat at two different temperatures.

F   Inkless printers use paper with colourless dye crystals embedded between the two external layers of the paper. When the printer is turned on, the heat of the drum causes the crystals to colorize at different rates and become visible. The inkless printing technology, Zink, originally developed at Polaroid, became available in 2007. Because of the way it prints, the printer can be as small as a business card and the produced images are waterproof. Nowadays, Xerox works on an inkless printer which uses a special reusable paper but this technology is still in development.

G   It employs the process of dye transferring to media, such as a plastic card, paper or canvas. These printers are primarily intended for high-quality colour applications, including colour photos, and they are less suited for text. This type of printers is now increasingly used as a dedicated consumer photo printer.

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3.5. Answer the questions to check your understanding of the text:

1. What types of printers are mentioned in the text?

2. What advantages do the multifunction printers have?

3. What is the distinguishing feature of a thermal printer?

4. What is the productivity of the monochrome laser printers?

5. What is the key difference between ink-jet and laser printers?

6. What are the basic features of plotters?

7. Which printer is the fastest one according to the text?

8. What areas of our lives can be printers used in?

3.6. Complete the following sentences with the ideas from the text:

1. Inkless printers use paper with _____.

2. These printers are primarily intended for high-quality colour applications, including _____.

3. Nowadays, Xerox works on _____.

4. The placement of the ink is determined by the charge of _____.

5. Network printers have built-in _____.

6. Printers that include non-printing features are sometimes called _____.

7. Laser printers are very fast and can use _____.

3.7. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	Individual printers are often designed to support only local users	**True**	**False**
2	Dot-matrix printer is used for non-impact printing	**True**	**False**
3	Solid ink-jet printers are used as colour home printers	**True**	**False**
4	Inkless printers can be as small as a business card	**True**	**False**
5	Laser printers are a common type of computer printers	**True**	**False**
6	Solid ink-jet printer is the fastest one	**True**	**False**
7	Dot-matrix printers are used for printing drawings	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	English equivalent
1	найбільш загальна форма	
2	найшвидший спосіб	
3	називають (відомі як)	
4	термографічний принтер	
5	спеціальна речовина	
6	велике споживання енергії	
7	електричний заряд	
8	різного формату	
9	додатковий колір	
10	технологія друку	
11	інтенсивність роботи	
12	висока роздільна здатність	
13	захищений від вологи	

4.2. Find synonyms from the text to the words in the table and translate them into Ukrainian:

	English phrase or word	synonym from the text	sentence
1	printed copy		
2	need		
3	mix		
4	silent		
5	benefits		
6	difficult		
7	picture		
8	extra		

9	water resistant		
10	non-impact		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 synonyms from the task above. Write them down and ask your group mates to translate them into Ukrainian.

4.4. Imagine that you are preparing for the presentation on the topic «Printing technologies». Explain the following terms to make them clear for your audience:

1. non-impact printers

2. solid ink-jet printers

3. 3D printers

4. multifunction devices

5. types of network printers

6. fax machines

7. pen and electrostatic plotters

8. high-resolution vector-based artwork

4.5. Match the terms with their definitions:

	term		definition
1	printer	a	method of doing something that needs skill
2	memory	b	a symbol available on the keyboard
3	output	c	a machine that can be programmed to process data in a variety of ways
4	technique	d	a printer that prints by hammering pins onto an inked ribbon
5	ink-jet	e	a method of doing something or dealing with the problem

6	laser	f	a common output device used for printing the output of a computer on paper
7	character	g	a printer that prints using toner powder and laser light
8	computer	h	the processed data or signals that come out of a computer system
9	way	i	the electronic part of a computer system used for storing programs and data
10	dot-matrix	j	a printer that generates an image by spraying droplets of ink at the paper

4.6. Cover the left column of the table in task 4.5 and recall the terms.

4.7. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	a machine that creates a plastic or metal part one layer on top of another (the additive fabrication method). Used mostly for quickly creating prototypes and molds. Available for myriad industrial uses as well as for the hobbyist, a variety of different technologies are used to form the layers
2	a device that converts computer output into printed images
3	are the most common type of consumer printers. They work by spraying very fine drops of ink on a sheet of paper. These droplets are «ionized» which allows them to be directed by magnetic plates in the ink's path. As the paper is fed through the printer, the print head moves back and forth, spraying thousands of these small droplets on the page.
4	is a printer that uses a focused beam or light to transfer text and images onto paper. Though contrary to popular belief, the laser does not actually burn the images onto the paper. Instead, as paper passes through the printer, the laser

	beam fires at the surface of a cylindrical drum called a photoreceptor. This drum has an electrical charge (typically positive), that is reversed in areas where the laser beam hits it. By reversing the charge in certain areas of the drum, the laser beam can print patterns (such as text and pictures) onto the photoreceptor
5	is a 2D matrix of dots that can represent images, symbols, or characters. They are used for electronic displays, such as computer monitors and LED screens, as well as printed output
6	is a printed document. It may be a text file, photograph, drawing, or any other type of printable file. For example, instead of e-mailing a business memo, it may be sent out as a hard copy, or an actual physical paper containing the memo
7	is a document saved on a computer. It is the electronic version of a document, which can be opened and edited using a software program
8	is used to measure the resolution of an image both on screen and in print. As the name suggests, the DPI measures how many dots fit into a linear inch
9	is a printer designed for printing vector graphics. Instead of printing individual dots on the paper, they draw continuous lines. This makes them ideal for printing architectural blueprints, engineering designs, and other CAD drawings
10	is a set of characters of the same design. These characters include letters, numbers, punctuation marks, and symbols. Some popular typefaces include Arial, Helvetica, Times, and Verdana

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Present simple tense». Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=X8lu4_5F0hg	

5.3. Find in the text «Types of Printers» all examples of Present Simple Tense (Active and Passive).

Present Simple Active	Present Simple Passive
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

5.4. Change the following sentences from Active into Passive:

1. Our scientists solve many important problems.

2. We can find books on this subject in every library.

3. They are discussing the report now.

4. They take steps to improve the situation.

5. Few people read many books.

6. You must follow his good example.

7. Our team is investigating this problem.

8. They are going to invite a young scientist to the conference.

9. A group of students is conducting a large amount of research in the field of telecommunication systems**.**

10. They carry out experiments in a new laboratory.

11. The scientists are speaking a lot about the new theory.

12. We often refer to this article.

13. The students are going to carry out this experiment.

14. Many researchers approach this problem.

15. You can find the interesting material about their experiment in the journal.

5.5. Choose the correct item:

1. If we ___ (receive / will receive) the necessary data, we'll inform you.

2. As we know an interesting research ___ (is being done / is done) at our Institute this month.

3. Different automatic systems ___ (are providing / provide) a wide variety of control.

4. Our control over nature ___ (increases / is increasing) constantly.

5. Prospects of the usage of solar energy ___ (are understood / are being understood) by everybody.

6. Electronics ___ (is used / is being used) more and more throughout the industry.

7. Each substance ___ (melts / is melting) at a definite temperature.

8. The scientists who are carrying out research in nuclear physics ___ (are dealing / deal) with the most difficult problems.

9. Technical progress ___ (is being / is) now impossible without high quality materials.

10. A new type of computing equipment ___ (is producing / is being produced) at the plant.

11. As long as the current ___ (will flow / flows) the apparatus will keep working.

12. We ___ (look for / are looking for) a more simple method of solution but cannot find it.

13. One of Mendeleyev's important ___ (work / works) is his book «Principles of Chemistry».

14. Our laboratory __ (is housed / houses) in an old building.

15. Now solar energy ___ (is studied / is being studied) by a lot of research groups.

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

3D printing, or **additive manufacturing**, is the construction of a three-dimensional object from a CAD model or a digital 3D model. The term «3D printing» can refer to a variety of processes in which material is **deposited**, joined or **solidified** under computer control to create a three-dimensional object, with material being

added together (such as plastics, liquids or powder grains being fused together), typically layer by layer. In the 1980s, 3D printing techniques were considered suitable only for the production of functional or **aesthetic prototypes**, and a more appropriate term for it at the time was rapid **prototyping**. As of 2021, the precision, repeatability, and material range of 3D printing have increased to the point that some 3D printing processes are considered viable as an industrial-production technology, whereby the term additive **manufacturing** can be used synonymously with 3D printing. One of the key advantages of 3D printing is the ability to produce very complex shapes or geometries that would be otherwise impossible to construct by hand, including hollow parts or parts with internal **truss structures** to reduce weight. Fused deposition modeling (FDM), which uses a continuous filament of a **thermoplastic material**, is the most common 3D printing process in use as of 2020. 3D printable models may be created with a **computer-aided design** (CAD) package, via a 3D scanner, or by a plain digital camera and photogrammetry software. 3D printed models created with CAD result in relatively fewer errors than other methods. Errors in 3D printable models can be identified and corrected before printing. The manual modeling process of preparing **geometric data** for 3D computer graphics is similar to plastic arts such as sculpting. 3D scanning is a process of collecting digital data on the shape and appearance of a real object, creating a digital model based on it. CAD models can be saved in the **stereolithography** file format (STL), a de facto CAD file format for additive manufacturing that stores data based on **triangulations** of the surface of CAD models. STL is not tailored for additive manufacturing because it generates large file sizes of topology optimized parts and **lattice structures** due to the large number of s**urfaces** involved. A newer CAD file format, the **Additive Manufacturing File** format (AMF) was introduced in 2011 to solve this problem. It stores information using curved triangulations.

Retrieved from https://bit.ly/3ihYibt

6.2. Translate the following sentences into English:

1. Струменеві принтери є найбільш поширеними у наші часи.

2. Плотери використовуються для друку креслень.

3. Головною перевагою використання лазерних принтерів є вартість їх обслуговування.

4. Сучасні 3D принтери можуть друкувати навіть людські органи.

5. Багатофункціональні пристрої є незамінним інструментом для кожного офісу.

6. Барабан принтеру є найбільш дорогим елементом усього пристрою.

7. Безчорнильні принтери можуть мати розмір смартфону.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. Advantages of non-impact printers

2. Areas where 3D printers can be used

3. Types of network printers

4. Fonts for printing

5. Pen and electrostatic plotters

6. A typewriter as a predecessor of a modern printer

7.2. Work in pairs. Imagine you are interviewing a famous IT scientist. Interview your classmate using the questions below. List all of his or her ideas in the table. Swap the roles.

student 1		student 2	
1		1	
2		2	
3		3	
4		4	
5		5	

6		6	

1. What are the most commonly used types of printers nowadays?

2. Is there a key difference between ink-jet and laser printers?

3. What type of printers is the fastest one?

4. What is the best solution for printing colour photos?

5. What advantages do the multifunction printers have?

6. What are new developments in printing technologies?

7.3. With the help of this picture, describe the principle of ink-jet printer work. Use Appendix D if necessary.

Retrieved from https://bit.ly/3rujrDE
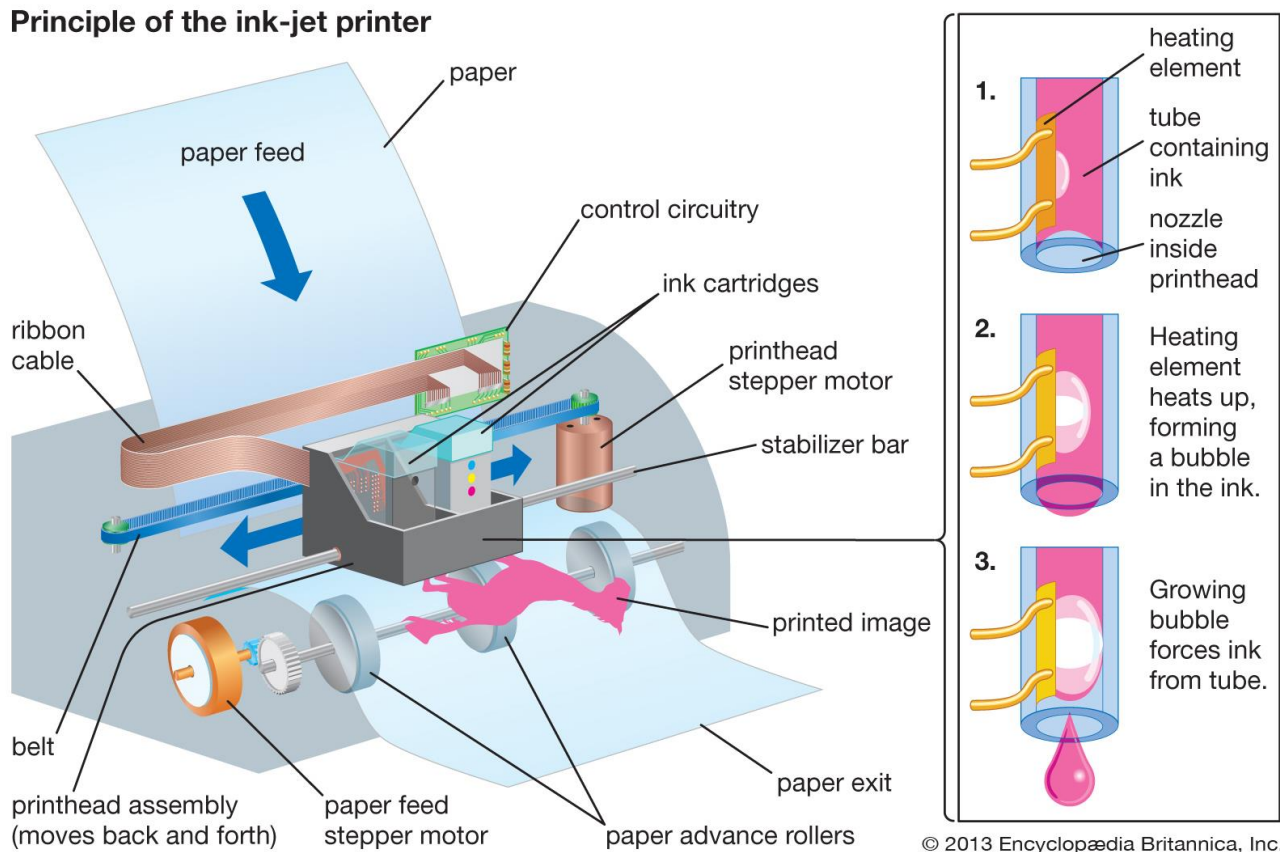
8. WRITING

8.1. Write a summary to the text «Types of printers» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about different types of printers (about 100-120 words). Use Appendix C if necessary.

UNIT 2. MAGNETIC STORAGE

Retrieved from https://bit.ly/3rujrDE

1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What magnetic storage devices do you know?

2. Are floppy disks in use now?

3. What is a hard disk drive?

4. What is a capacity of your HDD?

5. Can hard disk drives be used as an external storage media?

6. Are magnetic storage devices affected by magnetic fields?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	magnetisation		
2	patterns		
3	magnetic tape		
4	recorder		
5	drum		
6	actuator		
7	density		
8	resistance		
9	device		
10	software		

2. LISTENING

2.1. Work in teams (3-4 students). Discuss the advantages and disadvantages of different magnetic storage devices using computer terms from task 1.2.

2.2. You will watch the video about top 5 external hard drives in 2021. Before you watch brainstorm and complete the chart. Predict what the video will be about:

your ideas	
1	
2	
3	
4	
5	

2.3. Watch the video and compare your answers in Task 2.2 with your groupmates.

link	QR code
https://www.youtube.com/watch?v=gHVcEOvQamQ	

2.4. Watch the video again and try to answer the questions:

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	The sequential red / write speed of the SanDisk Extreme is up to 550 MB/s	**True**	**False**
2	LaCie Raid Shuttle is water resistant	**True**	**False**
3	Samsung T5 uses transfer protocol USB 3.2	**True**	**False**
4	G-drive has IP67 water and dust resistance and can hold up to 2 TB of data	**True**	**False**
5	Western Digital My Passport has a capacity up to 10TB	**True**	**False**
6	Western Digital My Passport is the most reliable storage device according to the presenter	**True**	**False**
7	LaCie Raid Shuttle is shock resistant	**True**	**False**

3. READING

3.1. Pronounce the following words and phrases, translate them into Ukrainian and memorize:

	word / phrase	translation
1	non-volatility	
2	thermal-assisted switching	
3	spin-transfer torque	
4	storage density	
5	endurance	
6	memory cells	
7	shock robustness	
8	magnetoresistance	
9	high capacity	
10	ferrite-core memory	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words or phrases from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. Look through the passages and choose suitable titles for them out of the given ones. Three of them are extra titles:

1. Compact disks

2. The origin of Magnetic storage

3. Read-only memory

4. Definition of Magnetic storage

5. Principal of Magnetic storage work

6. Innovations in magnetic storage

7. Memristors

MAGNETIC STORAGE

Retrieved from https://bit.ly/3rujrDE

A   Magnetic   storage or magnetic   recording is   the   storage   of data on a magnetized medium. Magnetic storage uses different patterns of magnetisation in a magnetizable material to store data and is a form of non-volatile memory. The information is accessed using one or more read/write heads. Magnetic storage media, primarily hard   disks,   are   widely   used   to   store computer   data as   well as audio and video signals. In the field of computing, the term magnetic storage is preferred and in the field of audio and video production, the term magnetic recording is more commonly used. The distinction is less technical and more a matter of preference. Other examples of magnetic storage media include floppy disks, magnetic tape, and magnetic stripes on credit cards.

B   Magnetic storage in the form of wire recording — audio recording on a wire — was publicized by Oberlin Smith in the Sept 8, 1888 issue of Electrical World. Smith had previously filed a patent in September, 1878 but found no opportunity to pursue the idea as his business was machine tools. The first publicly demonstrated (Paris Exposition of 1900) magnetic recorder was invented by Valdemar Poulsen in 1898. Poulsen's device recorded a signal on a wire wrapped around a drum. In 1928, Fritz Pfleumer developed the first magnetic tape recorder. Early magnetic storage devices were designed to record analog audio signals. Computers and now most audio and video magnetic storage devices record digital data. In old computers, magnetic

storage was also used for primary storage in a form of magnetic drum, or core memory, core rope memory, thin film memory, twistor memory or bubble memory. Unlike modern computers, magnetic tape was also often used for secondary storage.

C A write head magnetises a region by generating a strong local magnetic field, and a read head detects the magnetisation of the regions. Early HDDs used an electromagnet both to magnetise the region and to then read its magnetic field by using electromagnetic induction. Later versions of inductive heads included Metal In Gap (MIG) heads and thin film heads. As data density increased, read heads using magnetoresistance (MR) came into use; the electrical resistance of the head changed according to the strength of the magnetism from the platter. Later development made use of spintronics; in read heads, the magnetoresistive effect was much greater than in earlier types, and was dubbed «giant» magnetoresistance (GMR). In today's heads, the read and write elements are separate, but in close proximity, on the head portion of an actuator arm. The read element is typically magneto-resistive while the write element is typically thin-film inductive. Magnetic storage media can be classified as either sequential access memory or random access memory, although in some cases the distinction is not perfectly clear. The access time can be defined as the average time needed to gain access to stored records. In the case of magnetic wire, the read/write head only covers a very small part of the recording surface at any given time. Accessing different parts of the wire involves winding the wire forward or backward until the point of interest is found. The time to access this point depends on how far away it is from the starting point. The case of ferrite-core memory is the opposite. Every core location is immediately accessible at any given time.

D A new type of magnetic storage, called magnetoresistive random-access memory or MRAM, is being produced that stores data in magnetic bits based on the tunnel magnetoresistance (TMR) effect. Its advantage is non-volatility, low power usage, and good shock robustness. The 1st generation that was developed was produced by Everspin Technologies, and utilized field induced writing. The 2nd

generation is being developed through two approaches: thermal-assisted switching (TAS) which is currently being developed by Crocus Technology, and spin-transfer torque (STT) on which Crocus, Hynix, IBM, and several other companies are working. However, with storage density and capacity orders of magnitude smaller than an HDD, MRAM is useful in applications where moderate amounts of storage with a need for very frequent updates are required, which flash memory cannot support due to its limited write endurance. Six state MRAM is also being developed, echoing four-bit multilevel flash memory cells, that have six different bits, as opposed to two.

Retrieved from https://bit.ly/3xOyAlh

3.4. Answer the questions to check your understanding of the text:

1. What is the purpose to use magnetic storage media?

2. What are the examples of magnetic storage media?

3. When was magnetic recorder demonstrated for the first time?

4. What is the role of read/write heads in magnetic storage devices?

5. What is the name of a new type of magnetic storage device?

6. What is the advantage of magnetoresistive random-access memory?

7. Can hard disk drive be considered to be a magnetic storage device?

3.5. Complete the following sentences with the ideas from the text:

1. Early HDDs used an electromagnet both to _____.

2. Magnetic storage media can be classified as _____.

3. Magnetic storage uses different patterns of _____.

4. In old computers, magnetic storage was also used for _____.

5. The 2nd generation is being developed through _____.

6. Smith had previously filed a _____.

7. Its advantage is non-volatility, low power usage, and _____.

3.6. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	The write element is typically magneto-resistive	**True**	**False**
2	The access time can be defined as the average time needed to gain access to stored records	**True**	**False**
3	Accessing different parts of the wire involves winding the wire forward or backward until the point of interest is found	**True**	**False**
4	The read element is typically thin-film inductive	**True**	**False**
5	In old computers, magnetic storage was also used for primary storage in a form of magnetic drum	**True**	**False**
6	Magnetic storage uses different patterns	**True**	**False**
7	MRAM stores data in magnetic bits based on the tunnel magnetoresistance effect	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	**English equivalent**
1	записуюча голівка	
2	намагнічена поверхня	
3	пристрій збереження даних	
4	привід гнучких дисків	
5	машинні інструменти	
6	магнітна стрічка	
7	первинний пристрій збереження	
8	електростатичний	
9	енергозалежний	
10	стрімке зростання	

4.2. Find synonyms from the text to the words in the table and translate them into Ukrainian:

	English phrase or word	synonym from the text	sentence
1	information		
2	save		
3	instrument		
4	created		
5	first represented		
6	identify		
7	referring to		
8	tiny		
9	required		
10	switched on		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 synonyms from the task above. Write them down and ask your groupmates to translate them into Ukrainian.

4.4. Imagine that you are preparing for the presentation on the topic «Magnetic storage». Explain the following terms to make them clear for your audience:

1. read / write head

2. magnetic storage media

3. magnetoresistive random-access memory

4. magnetoresistance

5. magnetic storage

6. magnetic recorder

4.5. Match the terms with their definitions:

	term		definition
1	storage device	a	computer memory that stores program and data values during operation and in which each word of memory may be directly (randomly) accessed.
2	magnetic recorder	b	a type of acrylic tape with a fine coating of magnetically sensitive material on one side, used for recording audio and other data
3	medium	c	a type of disk storage composed of a thin and flexible disk of a magnetic storage medium
4	hard disk	d	an electro-mechanical data storage device that stores and retrieves digital data using magnetic storage
5	floppy disk	e	A device that uses electronics or electromechanical means for the audience to access the content
6	magnetic tape	f	a device that records and playbacks data using magnetic surface
7	random access memory	g	a device for storing data

4.6. Cover the left column of the table in task 4.5 and recall the terms.

4.7. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	measures the number of pixels in a digital image or display. It is defined as width by height, or W x H, where W is the number of horizontal pixels and H

	is the number of vertical pixels. For example, the resolution of an HDTV is 1920 x 1080
2	pictures found on the Web and photos you import from your digital camera are this type of graphics. They are made up of grid of pixels, commonly referred to as a bitmap. The larger the image, the more disk space the image file will take up. For example, a 640 x 480 image requires information to be stored for 307,200 pixels, while a 3072 x 2048 image (from a 6.3 Megapixel digital camera) needs to store information for a whopping 6,291,456 pixels
3	is an image file format commonly used for images on the web and sprites in software programs. Unlike the JPEG image format, it uses lossless compression that does not degrade the quality of the image. However, they store image data using indexed color, meaning a standard GIF image can include a maximum of 256 colors
4	is often used interchangeably with the terms hard drive and hard disk. However, this term is technically the most accurate, since hard drive is short for hard disk drive and the hard disk is actually contained within the hard disk drive
5	is a type of electrically erasable programmable read-only memory (EEPROM). The name comes from how the memory is designed – a section of memory cells can be erased in a single action or in a flash
6	is an I/O interface developed by Apple Computer. It is also known as IEEE 1394, which is the technical name standardized by the IEEE. Other names for IEEE 1394 include Sony i.Link and Yamaha mLAN, but Apple's FireWire name the most commonly used
7	is a storage device from which a computer can boot or start up. This disk contains files required by the boot sequence as well as the operating system, which is loaded at the end of the startup process
8	is a type of mass storage device similar to a hard disk drive (HDD). It supports reading and writing data and maintains stored data in a permanent state even

	without power
9	it is an interface used to connect ATA hard drives to a computer's motherboard. Their transfer rates start at 150MBps, which is significantly faster than even the fastest 100MBps ATA/100 drives
10	it was the most widely-used type of hard drive from the mid 1990s to the late 2000s. The integrated aspect of the name describes how the controller is integrated into the drive itself

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Past simple tense». Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=0Ri3QTT41f8	

5.3. Find in the text «Magnetic Storage» 8-10 examples of the Passive Voice (Past Tenses) and write down them:

examples of the passive voice (past tenses)	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

5.4. Rewrite the following sentences in the Passive Voice. Omit the agent where possible:

1. The professor spoke of one the greatest inventions.

2. We had presented the new company structure before they arrived.

3. He had been carrying out his experiment for two hours.

4. Yesterday students wrote essays related to chemistry.

5. Students greeted the professor with loud applause.

6. In 1960 James Clerk Maxwell developed a model for light.

7. We were describing the apparatus used in our research at that moment.

8. He had published his article by the end of March.

9. We discussed the problems of his scientific work last week.

10. Chemists use the symbol system for representing the elements.

11. We had been developing this device for three years before we demonstrated it.

12. We were discussing some properties of new engine at our seminar.

13. The audience was listening to the presentation attentively.

14. Scientists use carbon to determine the approximate age of objects.

15. The chairman presented the new results at the conference.

5.5. Find and correct the mistakes in the sentences below:

1. Recent discoveries had greatly assisted by the development of the research technique.

2. We were informed that a new idea has been advanced at the closing session.

3. They have scanned in about a third of these photos two days ago.

4. There was only one signal to being detected.

5. What method that used by Dr. Strong?

6. If the acid are purified, the reaction would take place.

7. The schematic diagram of this process were presented in Fig. 12.

8. Thermal and other forms of diffusion was discard.

9. As a rule the methods suggested by Corner could used.

10. If I have time, I'd complete the experiment.

11. This research project was approve by Review Board of the institution.

12. The pressure changed, so does the temperature.

13. An interesting phenomenon registered by Dr.N.

14. The only conclusion for him to make were the following.

15. New equipment were installed in our laboratory.

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

A hard disk drive (HDD), hard disk, hard drive, or fixed disk is an **electro-mechanical** data storage device that stores and retrieves digital data using magnetic storage and one or more rigid rapidly rotating platters **coated** with magnetic material. The platters are paired with magnetic heads, usually arranged on a moving **actuator arm**, which read and write data to the **platter surfaces**. Data is accessed in a random-access manner, meaning that individual blocks of data can be stored and retrieved in any order. HDDs are a type of **non-volatile** storage, retaining **stored data** even when powered off. Modern HDDs are typically in the form of a small rectangular box. The primary characteristics of an HDD are its **capacity** and **performance**. Capacity is specified in unit prefixes corresponding to powers of 1000: a 1-terabyte (TB) drive has a capacity of 1,000 gigabytes (GB; where 1 gigabyte = 1 billion (10^9) bytes). Typically, some of an HDD's capacity is unavailable to the user because it is used by the file system and the computer operating system, and possibly inbuilt **redundancy** for error correction and recovery. Also, there is confusion regarding storage capacity, since capacities are stated in **decimal** gigabytes (powers of 1000) by HDD manufacturers, whereas the most commonly used operating systems report capacities in powers of 1024, which results in a smaller number than advertised. Performance is specified by the time required to move the heads to a track or **cylinder** (average access time) adding the time it takes for the desired sector to move under the head (average **latency**, which is a function of the physical rotational speed in revolutions per minute), and finally the speed at which the data is transmitted (**data rate**). The two most common form factors for modern HDDs are 3.5-inch, for desktop computers, and 2.5-inch, primarily for laptops. HDDs are connected to systems by standard interface cables.

Retrieved from https://bit.ly/3wMzjSS

6.2. Translate the following sentences into English:

1. Магнітні пристрої збереження даних є вразливим до магнітних полів.

2. Привід жорсткого диску є одним із представників магнітних пристроїв збереження даних.

3. Не рекомендується відключати магнітний пристрій збереження даних від електромережі під час запису чи зчитування даних.

4. Максимальна ємність сучасних жорстких дисків сягає 10 терабайт.

5. Портативні жорсткі диски значно дешевші ніж твердотілі накопичувачі.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. Different types of spindles

2. Magnetoresistive random-access memory

3. Magnetoresistance

4. New types of magnetic storage devices

5. HD versus SSD

**7.2. Work in pairs. Interview your groupmate using the questions below. List all of his or her ideas in the table. Swap the roles.**

student 1		student 2	
1		1	
2		2	
3		3	
4		4	
5		5	

1. What is the difference between read and write elements of magnetic storage device?

2. What is domain propagation memory?

3. What interfaces are used to connect magnetic storage devices to a computer?

4. What is read / write speed of modern storage devices?

5. What do you know about magnetoresistive random-access memory?

7.3. With the help of this picture, describe the components of a typical hard disk drive. Use Appendix D if necessary.

Retrieved from https://bit.ly/3rujrDE
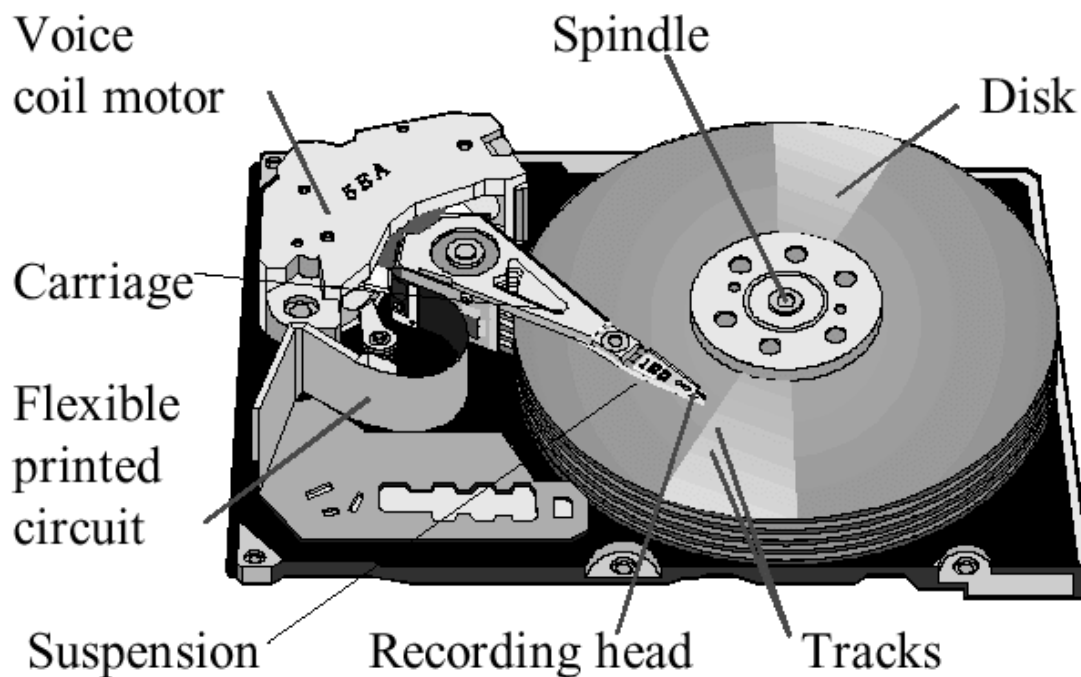
8. WRITING

8.1. Write a summary to the text «Magnetic storage» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about modern trends in magnetic storage devices (about 100-120 words). Use Appendix C if necessary.

SELF-ASSESSMENT (UNITS 1-2)

1. Complete these sentences. Use one or two words in each gap:

1. A(n) _____ stores large amounts of data.

2. Please disconnect the _____ hard drive from the computer.

3. I really like the people I work with: my _____ are all great people!

4. The _____ is the internal part of the computer that everything else connects to.

5. Use the _____ at the side of the window to move down so that you can see the whole page.

6. A big advantage of open _____ software is that it's usually free.

7. You may have to _____ your disks while installing the operating system if you want to divide your big drive into some smaller ones.

8. Don't forget to _____ your data so that you always have a copy!

2. Put these words in the correct order to make sentences and questions:

1. check / every / emails / I / day / my

2. company / software / does / develop / your / ?

3. a / computer / latest / need / new / OS / run / the / to / we

4. personal / use / must / purposes / staff / not / for / computers

5. problem / afraid / a / the / there's / I'm / with / software

6. projector / you / off / could / turn / that / just / ?

7. unplug / first / headphones / you / video camera / could / from / the / the / ?

8. operators / off / to / computer / their / day / need / computer / all / switch / every

3. Read the job advertisement. Are these sentences TRUE (T) or FALSE (F)?

1. Ordinary people can buy the company's products in shops. (T / F)

2. ADS now has offices in nine countries. (T / F)

3. The company is having problems now. (T / F)

4. Clients like ADS because of its low prices. (T / F)

5. If you haven't worked in IT before, you could apply for this job if you have a Diploma in Software Development. (T / F)

6. You need to understand more than one OS to do this job well. (T / F)

7. Working for several years in a small company isn't useful for this job. (T / F)

8. This job is suitable for people who don't need to live close to their family. (T / F)

Atlantic Digital Services

Atlantic Digital Services (ADS) is a software development company providing services to other companies. With over 2000 employees in seven different countries, we are able to help a wide range of clients in many different parts of the world. We are growing very quickly and plan to open offices in two more countries later this year. Our customers keep coming back to us because we can develop high quality software to their specifications very quickly and because of our great customer service.

Software developer positions available

We have positions available in our new international offices for people with the following:

• a Diploma in Software Development with good grades

• experience developing software for the Windows and Linux operating systems

• two years' experience in a company similar to ours

Applicants must be happy to travel to our international offices for some projects, which may last from a few weeks to a year.

---

4. Use the prompts to complete this email to Fred, who has never used a computer before. Explain how to connect an external drive to a computer and save files to it. Include a greeting and a signing off and remember to introduce the topic:

(1) _____ _____,

Here's how to connect your (2) _____ .

First,

(3) _____ (connect / USB cable / hard drive / computer). Then (4) _____ (click / 'Start' menu / open / Windows Explorer). Next, (5)

_____

(right-click / 'Computer') and (6) _____

(should /

see / hard drive). Now (7) _____ (drag and drop files / folders / hard drive).

(8) _____,

_____

5. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

clues
1	stands for «Peer to Peer». In a Peer to Peer network, the «peers» are computer systems which are connected to each other via the Internet. Files can be shared directly between systems on the network without the need of a central server. In other words, each computer on a P2P network becomes a file server as well as a client.
2	is a computer that provides data to other computers. It may serve data to systems

	on a local area network (LAN) or a wide area network (WAN) over the Internet. Many types of them exist, including web servers, mail servers, and file servers. Each type runs software specific to the purpose of the server. For example, a Web server may run Apache HTTP Server or Microsoft IIS, which both provide access to websites over the Internet.
3	is a computer system that hosts websites. It runs Web server software, such as Apache or Microsoft IIS, which provides access to hosted webpages over the Internet. Most of them are connected to the Internet via a high-speed connection, offering OC-3 or faster data transmission rates. A fast Internet connection allows Web servers to support multiple connections at one time without slowing down.
4	is a server that provides access to files. It acts as a central file storage location that can be accessed by multiple systems. File servers are commonly found in enterprise settings, such as company networks, but they are also used in schools, small organizations, and even home networks. It may be a dedicated system, such as network attached storage (NAS) device, or it may simply be a computer that hosts shared files. They are typically used for enterprise applications, since they provide faster data access and offer more storage capacity than non-dedicated systems.
5	is a global wide area network that connects computer systems across the world. It includes several high-bandwidth data lines that comprise the Internet «backbone». These lines are connected to major Internet hubs that distribute data to other locations, such as web servers and ISPs.
6	carries data to smaller lines of transmission and refers to the main network lines that connect several local area networks (LANs) together. The result is a wide area network (WAN) linked by a backbone connection. The Internet, which is

	the ultimate wide area network, relies on it to carry data over long distances.
7	describes the maximum data transfer rate of a network or Internet connection. It measures how much data can be sent over a specific connection in a given amount of time. For example, a gigabit Ethernet connection has a bandwidth of 1,000 Mbps (125 megabytes per second). An Internet connection via cable modem may provide 25 Mbps of bandwidth. While it is used to describe network speeds, it does not measure how fast bits of data move from one location to another. Since data packets travel over electronic or fiber optic cables, the speed of each bit transferred is negligible.
8	measures the number of times something occurs in a specific amount of time. In technical applications it is typically used to measure wave rates or processing speed.
9	is the rate at which a processor can complete a processing cycle. It is typically measured in megahertz or gigahertz. One megahertz is equal to one million cycles per second, while one gigahertz equals one billion cycles per second. This means a 1.8 GHz processor has twice the clock speed of a 900 MHz processor.
10	it consists of set of wires that allow data to be passed back and forth. Most computers have several buses that transmit data to different parts of the machine. Each bus has a certain size, measured in bits (such as 32-bit or 64-bit), that determines how much data can travel across the bus at one time. Buses also have a certain speed, measured in megahertz, which determines how fast the data can travel.

```
T S N Y O H E L K G S S J T R
D E M C F C C C C M Y A I C E
E R Y N I U O N H H Z N X S V
Z V B E J L F D X S T Q O D R
L E S U C G S P E D E U H E
W R M Q O Q K Y R Z A I D X S
H O J E G F Y N G J R X V P M
L T T R U G E S N D H F D G R
Q S D F F T E N O B K C A B N
N K X I H Z G X J F D B O C R
S Y I Q W C T G U O I Y U W M
H B L L D H C K U S L O S Y
I W F Q M X N H S E R V E R P
P Q J Q G P V A J I N O J A X
T V I F V K H L B E J M M O U
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UNIT 3. FLASH MEMORY

Retrieved from https://bit.ly/3rujrDE

1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What do you use flash memory cards for?

2. What is the capacity of your flash memory card?

3. What is the difference between flash memory cards and hard disk drives?

4. What are the advantages of flash memory?

5. Is flash memory a volatile type of memory?

6. What are the future prospects of flash memory technology?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	random		
2	storage		
3	firmware		
4	endurance		
5	sequential		
6	volatile		
7	secure		
8	wire		
9	gigabit		
10	assumption		
11	digital		
12	solid-state		
13	resistance		

2. LISTENING

2.1. Work in teams (3-4 students). Discuss the advantages and disadvantages of flash memory using computer terms from task 1.2.

2.2. You will watch the video explaining the difference between SSDs and HDDs. Before you watch brainstorm and complete the chart. Predict what the video will be about:

	your ideas
1	
2	
3	
4	

5	

2.3. Watch the video and check your answers in Task 2.2 with your groupmates.

link	QR code
https://www.youtube.com/watch?v=SStYw356J1k	

2.4. Watch the video again and try to answer the questions:

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	The boot up speed of the SSD is 36 seconds	**True**	**False**
2	HDD can open a 25MB PDF file faster	**True**	**False**
3	Spinning disks inside HDD are vulnerable to extreme vibration and shock	**True**	**False**
4	The battery life test shows that a user can work longer on a device equipped with HDD	**True**	**False**
5	Hard disk drives use flash memory technology	**True**	**False**
6	Hard disk drives are affected by magnetic fields	**True**	**False**

3. READING

3.1. Pronounce the following words and phrases, translate them into Ukrainian and memorize:

	word / phrase	translation
1	non-volatile	

2	memory cards	
3	USB flash drives	
4	dominant technology	
5	solid-state storage	
6	battery-powered	
7	access time	
8	portable devices	
9	immersion	
10	interconnected	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words or phrases from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. Look through the passages and choose suitable titles for them out of the given ones. Three of them are extra titles:

1. Hard disk drives

2. Flash memory durability

3. Intel Optima SSDs

4. Definition and examples of applications

5. Erase / write time and density

6. Invention of flash memory

7. Flash memory for laptops

8. NAND flash memory

9. Data transfer rate

FLASH MEMORY

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A   Flash memory is non-volatile computer memory that can be erased and reprogrammed. This technology is primarily used in memory cards and USB flash drives for general storage and data transfer between computers and other digital devices. It is a specific type of EEPROM (Electrically Erasable Programmable Read-Only Memory) that is erased and programmed in large blocks. Flash memory has become the dominant technology wherever a significant amount of solid-state storage is needed. These applications include PDAs, laptop computers, digital audio players, digital cameras and mobile phones. Flash memory has also gained popularity on the game console market, where it is often used instead of EEPROMs or battery-powered SRAM for saving data in games.

B   Flash memory is non-volatile, i.e., no power is required to maintain the information stored in the chip. In addition, flash memory offers fast access time and better kinetic shock resistance than hard disks. These characteristics explain the popularity of flash memory in portable devices. When flash memory is packaged in a «memory card», it is enormously durable, being able to withstand intense pressure, extremes of temperature and even immersion in water. The term «EEPROM» is generally used to refer to non-flash EEPROM which is erasable in small blocks, typically bytes. The large blocks are used in the process of flash memory erasing and give a significant speed advantage over old-style EEPROM because erase cycles are slow.

C Flash memory was invented by Dr. Fujio Masuoka while working for Toshiba in 1984. According to Toshiba, the name «flash» was suggested by Dr. Masuoka's colleague, Mr. Shoji Ariizumi, because the erasing process of the memory contents reminded him a flash of a camera. Dr. Masuoka presented the invention at the 1984 International Electron Devices Meeting (IEDM) held in California. In 1988 Intel saw the massive potential of the invention and introduced the first commercial NOR type flash chip. NOR-based flash has long erase and write time, but provides address and data buses, allowing random access to any memory location. This makes it a suitable replacement for older ROM chips, which are used to store program code that rarely needs to be updated, such as a computer's BIOS or the firmware. Its endurance is 10,000 to 1,000,000 erase cycles. NOR-based flash was the basis of early flash-based removable media; CompactFlash was originally based on it, though later cards moved to less expensive NAND flash. Toshiba announced NAND flash at ISSCC in 1989.

Type	NOR	NAND
arrangement	connected in parallel, allowing extremely fast random access	Connected in serial and required fewer data lines
chip capacity	called «Code Flash», with lower chip capacity than NAND, main market capacity is about 512MB	called «Data Flash», with larger chip capacity and density, main capacity is 2GB
addressing type	linear-addressed device	non-linear addressed device
read/write speed	higher reading speed than NAND	higher writing and erasing speed than NOR flash
manufacturers	Intel, AMD, Fujitsu, and Sharp (set-top boxes, game machines)	Toshiba, Samsung, and SanDisk (digital cameras, mp3 players)

D This technology has faster erase/write time and allows greater storage density and lower cost per bit than NOR flash. Also, it has up to ten times the endurance of

NOR flash while the I/O interface of NAND flash does not provide a random-access external address bus.

E   This makes NAND flash an unsuitable replacement for programmable ROM. NAND flash is similar to such secondary storage devices as hard disks and optical media and, thus, it is very suitable to use in mass-storage devices, e.g., memory cards. The first NAND-based removable media format was SmartMedia, and after it a lot of others have followed, including MultiMediaCard, Secure Digital, Memory Stick and xD-Picture Card. The common feature of the new generation of memory card formats (RS-MMC, miniSD and microSD and Intelligent Stick) is extremely small form factor. For example, the microSD card has an area of just over 1.5 cm², with a thickness of less than 1 mm; microSD capacities range from 64MB to 32GB.

F   Flash memory cards are available at different speeds. Some are specified the approximate transfer rate of the card such as 2 MB per second, 12 MB per second, etc. However, other cards are simply rated 100x, 300x, 200, etc. For these cards the base assumption is the 1x is equal to 150 kilobytes per second. This was the speed at which the first CD drives could transfer information, which adopted as the reference speed for flash memory cards. The most common cause of data corruption is removal of the flash memory device while data is being written to it.

3.4. Answer the questions to check your understanding of the text:

1. What type of memory is called flash?

2. What is the origin of the term «flash memory»?

3. Who invented flash memory?

4. When was the first commercial NOR type flash chip introduced?

5. What is the main difference between NOR and NAND types of flash memory?

6. Why is flash memory so popular?

7. In what devices can flash memory be used?

3.5. Complete the following sentences with the ideas from the text:

1. These applications include PDAs, laptop computers, _____.

2. The term «EEPROM» is generally used to _____.

3. Flash memory was invented by _____.

4. NOR-based flash has long _____.

5. Also, it has up to ten times the endurance of _____.

6. The most common cause of data corruption is _____.

7. Flash memory has also gained popularity on the _____.

3.6. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	Flash memory was invented in 1984	**True**	**False**
2	The endurance of flash memory is 100,000 to 1,000,000 erase cycles	**True**	**False**
3	Intel introduced the first commercial NOR type flash chip in 1989	**True**	**False**
4	Flash memory does not need power to maintain the information stored in the chip	**True**	**False**
5	Flash memory cards are available in different speeds	**True**	**False**
6	There are many standards of flash memory cards	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	English equivalent
1	енергозалежна пам'ять	
2	карта пам'яті	
3	твердотілий накопичувач	
4	дисковий привід	

5	великі блоки	
6	живиться від батареї	
7	зберігання даних	
8	занурення у воду	
9	цикл зчитування даних	
10	зчитуюча голівка	

4.2. Find synonyms from the text to the words in the table and translate them into Ukrainian:

	English phrase or word	synonym from the text	sentence
1	needed		
2	get		
3	offer		
4	fast		
5	speed		
6	duplicate		
7	sreate		
8	memory unit		
9	a lot of		
10	manage		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 synonyms from the task above. Write them down and ask your group mates to translate them into Ukrainian.

4.4. What do the following abbreviations stand for? Use the Appendix E if necessary.

USB	
EEPROM	

SRAM	
IEDM	
ROM	
BIOS	
MMC	
NOR	
NAND	
ISSCC	

4.5. Match the terms with their definitions:

	term		definition
1	chip	a	a set of instructions for solving a specific problem by computer
2	interface	b	this refers to the integration of audio, video and animation with computing
3	access time	c	a change that provides the latest version
4	file	d	permanent software instructions contained in the ROM
5	disk	e	an electronic integrated circuit in a small package
6	code	f	the average time required for the read/write head to access data
7	firmware	g	a computer program or data stored on a storage device
8	update	h	the hardware/software that connects two systems and allows them to communicate with each other
9	multimedia	i	a storage device made of circular plates with magnetizable surfaces

10	program	j	a piece of program text written in a programming language

4.6. Cover the left column of the table in task 4.5 and recall the terms.

4.7. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
	clues
1	is a general term that describes computer programs
2	a program written with the purpose of causing damage or causing a computer to behave in an unusual way
3	is a type of electrically erasable programmable read-only memory (EEPROM)
4	is the integration of multiple forms of media. This includes text, graphics, audio, video, etc.
5	it is important to know that this is not a synonym for the Internet. The Internet is the actual network of networks where all the information resides. Things like Telnet, FTP, Internet gaming, Internet Relay Chat (IRC), and e-mail are all part of the Internet, but are not part of the World Wide Web
6	consists of multiple devices that communicate with one another. It can be as small as two computers or as large as billions of devices
7	is a standard way to measure data transfer rates, such as network connection and Internet download speeds
8	measures the number of pixels in a digital image or display. It is defined as width by height, or W x H, where W is the number of horizontal pixels and H is the number of vertical pixels. For example, the resolution of an HDTV is 1920 x 1080
9	the signal path for receiving communications from a client computer to a server in a network
10	the person using a computer

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Future Simle Tense». Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=CI0Kr4e4vzI	

5.3. Change the following sentences from Active into Passive:

1. I'll solve the equation if you help me.

2. They will use this substance in the experiment provided it has the necessary properties.

3. The group of young scientists will have been carrying out the experiment for two months.

4. We'll inform the council about the new discovery.

5. New data will support the results of our research.

6. The engineer will check the apparatus in the lab.

7. She will be writing her paper for the next two weeks.

8. By the time you come he will have been writing his thesis for three hours.

9. They will have published their article by the end of August.

10. The technician will have recorded the data before you come.

11. By the end of the year our company will have developed a new system.

12. Our group will insist on this experiment.

13. Our engineers will install new computers at the lab next Monday.

14. I will be translating the article from 10 till 12.

15. The developers will have designed a new control system by the end of week.

5.5. Choose the correct item:

1. We can talk about it after he _____.

a) will leave

b) is leaving

c) leaves

2. They _____ the results obtained by their group next week.

a) will discuss

b) will have discussed

c) discuss

3. «I suppose your report isn't ready yet». «Don't worry. I _____ it by tomorrow».

a) am finishing

b) will be finishing

c) will have finished

4. You'll be leaving for the scientific conference devoted to the development of new software soon, _____?

a) shall you

b) aren't you

c) won't you

5. By the end of July he _____ on this problem for two months.

a) will be

b) will have been working

c) will has been

6. «So, when is your maths exam?» «Well, this time tomorrow I _____ for it».

a) will be sitting

b) will sit

c) sit

7. If you _____ role in leadership, you are going to develop special skills.

a) took on

b) take on

c) will take on

8. She _____ to the University when she finishes her paper.

a) will go

b) goes

c) will be going

9. I _____ till you come.

a) will work

b) will be working

c) will have been working

10. By the 1st of July I _____ all my exams.

a) will pass

b) will be passing

c) will have passed

11. This group of students _____ the important experiment next week.

a) will begin

b) begin

c) will be beginning

12. A course of lectures on the theory of probability _____ by our dean.

a) will deliver

b) will be delivered

c) will been delivered

13. If he _____ his attention on his studies, he will pass his exams successfully.

a) will concentrate

b) concentrate

c) concentrates

14. They _____ the experiment at the laboratory from 9 till 12.

a) will be carrying out

b) are carrying out

c) will carry

15. New equipment _____ to continue our researches next Monday.

a) will install

b) will be installed

c) will have installed

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

A solid-state drive (SSD) is a solid-state storage device that uses **integrated circuit** assemblies to store data persistently, typically using flash memory, and functioning as secondary storage in the hierarchy of computer storage. Compared with **electromechanical** drives, SSDs are typically more resistant to **physical shock**, run silently, and have quicker access time and lower latency. SSDs store data in **semiconductor cells**. As of 2019, cells can contain between 1 and 4 bits of data. SSD storage devices vary in their properties according to the number of bits stored in each cell, with single-bit cells («Single Level Cells» or «SLC») being generally the most reliable, durable, fast, and expensive type, compared with 2- and 3-bit cells («Multi-Level Cells/MLC» and «Triple-Level Cells/TLC»), and finally **quad-bit** cells («QLC») being used for consumer devices that do not require such extreme properties and are the cheapest per Gigabyte of the four. In addition, 3D XPoint memory (sold by Intel under the Optane brand), stores data by changing the **electrical resistance** of cells instead of storing electrical **charges** in cells, and SSDs made from RAM can be used for high speed, when data persistence after power loss

is not required, or may use battery power to **retain data** when its usual power source is unavailable. **Hybrid drives** or solid-state hybrid drives (SSHDs), such as Apple's Fusion Drive, combine features of SSDs and HDDs in the same unit using both flash memory and a HDD in order to improve the performance of frequently-accessed data.

<div align="center">Retrieved from https://bit.ly/3xMH0d9</div>

6.2. Translate the following sentences into English:

1. Карта флеш пам'яті є незамінним засобом збереження та перенесення даних.

2. Сучасні комп'ютери оснащуються не тільки приводами жорсткого диску, а й твердотілими накопичувачами.

3. Швидкість передачі даних у твердотілих накопичувачах набагато вища, ніж у жорстких дисків.

4. Одним із недоліків флеш пам'яті є обмежений життєвий цикл пристрою накопичення.

5. Не дивлячись на усі переваги, флеш пам'ять має багато істотних недоліків.

6. Існує багато стандартів шлеш накопичувачів.

7. Зазвичай користувачі встановлюють операційну систему на твердотілий накопичувач, а мультимедійні файли зберігають на жорсткому диску.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. Innovations in solid-state drives

2. The best solution for home data storage

3. Internal and external SSDs

4. The invention of solid-state drives

5. Reliability of SSDs

7.2. Work in pairs. Interview your groupmate using the questions below. List all of his or her ideas in the table. Swap the roles.

student 1		student 2	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	

1. What is the difference between HDD and SSD?

2. What device to use to back-up sensitive data?

3. What is the life cycle of a typical flash memory card?

4. Is there a difference between ordinary flash memory card and high-capacity flash memory card?

5. What flash memory card to use to record videos on GoPro camera?

6. How to keep your flash memory card secure?

7.3. With the help of this picture, describe the difference between hard disk drive and solid-state drive. Use Appendix D if necessary.

SSD   HDD

0.1 ms	**Access times** SSDs exhibit virtually no access time	**5.5 ~ 8.0 ms**
SSDs deliver at least **6000 io/s**	**Random I/O Performance** SSDs are at least 15 times faster than HDDs	HDDs reach up to **400 io/s**
SSDs have a failure rate of less than **0.5 %**	**Reliability** This makes SSDs 4 - 10 times more reliable	HDD"s failure rate fluctuates between **2 ~ 5 %**
SSDs consume between **2 & 5 watts**	**Energy savings** This means that on a large server like ours, approximately 100 watts are saved	HDDs consume between **6 & 15 watts**
SSDs have an average I/O wait of **1 %**	**CPU Power** You will have an extra 6% of CPU power for other operations	HDDs' average I/O wait is about **7 %**
the average service time for an I/O request while running a backup remains below **20 ms**	**Input/Output request times** SSDs allow for much faster data access	the I/O request time with HDDs during backup rises up to **400~500 ms**
SSD backups take about **6 hours**	**Backup Rates** SSDs allows for 3 - 5 times faster backups for your data	HDD backups take up to **20~24 hours**

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8. WRITING

8.1. Write a summary to the text «Flash memory» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about external solid-state drives (about 100-120 words). Use Appendix C if necessary.

UNIT 4. THE OPERATING SYSTEM

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1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What is an operating system?

2. What is the main function of an operating system?

3. What operating systems do you know?

4. What does the abbreviation GUI stand for?

5. What are the differences between Microsoft Windows and Apple Macintosh operating systems?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	capability		
2	batch		
3	overlap		
4	sophisticated		
5	command		
6	remote		
7	installation		
8	access		
9	proprietary		
10	transfer		

2. LISTENING

2.1. Work in teams (3-4 students). Discuss the most important features of different operating systems using computer terms from task 1.2.

2.2. You will watch the video about new features of Macintosh OS 12 Monterey. Before you watch brainstorm and complete the chart. Predict what the video will be about.

	your ideas
1	
2	
3	
4	
5	

2.3. Watch the video and check your answers in Task 2.2 with your groupmates.

link	QR code
https://www.youtube.com/watch?v=AmYDXFaA3Yk	

2.4. Watch the video again and try to answer the questions:

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	Function «Focus» can disable notifications for pre-set applications	**True**	**False**
2	iCloud+ cannot make the user sure that the content on the iCloud account is encrypted	**True**	**False**
3	MacOS Monterey Maps application provides 3D view of any building all over the world	**True**	**False**
4	By means of Tag Browser in MacOS Monterey you can organize your notes by assigning them hash tags.	**True**	**False**
5	MacOS Monterey Safary browser starts with stream line tab	**True**	**False**
6	According to the presenter, MacOS Monterey users are not satisfied with a new Safary browsers start tab	**True**	**False**

3. READING

3.1. Pronounce the following words and phrases, translate them into Ukrainian and memorize:

	word / phrase	translation
1	high level languages	
2	requirements	
3	set of programs	
4	processing	
5	certain objectives	
6	workgroup management	
7	simplified access	
8	database servers	
9	engineering environments	
10	required software	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words or phrases from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. Look through the passages and choose suitable titles for them out of the given ones. Two of them are extra titles:

1. Different types of operating systems

2. General information

3. Linux kernel

4. Batch processing

5. Microsoft Windows family

6. Multiprogramming

7. Linux OS

8. Macintosh operating system

9. Android OS

10. Unix-like family

THE ORIGIN OF OPERATING SYSTEMS

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A   Computers vary considerably in size, capability and type of application. There is a wide variety of ways in which they can be operated. Each type of computer operation requires a different type of operating system. Most microcomputers and some minicomputers can only process one program at a time. This is a single program operation and it requires only a simple operating system. The operating system supervises the loading and running of each program and the input and output of data. Any errors occurring are reported.

B   Next in complexity is batch processing. A number of programs are batched together and then run as a group. Although, the programs are actually run one at a time, input and output from various programs can overlap to some extent. Programs are normally queued up for batch processing and the operating system starts the next program in the queue as soon as sufficient computing resources are available for it.

C   Similar to batch processing, but much more sophisticated, is multiprogramming. At any time, a number of programs are on the computer at various stages of completion. Resources are allocated to programs according to the requirements of the programs and in order to maximize the usage of the different resources of the computer. A particular type of multiprogramming is transaction processing designed for systems which must run large number of small programs very frequently.

D   Like the question «What is a computer?» the question «What is an operating system?» can be answered at several levels. Firstly, an operating system is a program, or set of programs. Operating systems vary in size from very small to very large, but all are pieces of software. In the past, almost all operating systems were written in a low level language. Currently, many operating systems are partly or completely written in high level languages. Secondly, an operating system is, by virtue of its name, a system. It is a collection of parts, working together towards some common goals. Thirdly, a computer may be regarded as a set of devices or resources, which provide a number of services, such as input, processing, storage and output. The operating system of the computer may be regarded as the manager of these resources. It controls the way in which these resources are put to work. Finally, an operating system is the lowest layer of software on a computer. It acts directly on the «raw» hardware of the computer. It supports other layers of software such as compilers and applications programs. The part of the task of an operating system is to avoid users from the complexities of direct use of the computer hardware. In summary, an OS is a program or set of programs, driving the raw hardware of a computer, which manages the resources of the computer in accordance with the certain objectives.

E   Mac OS X is a line of proprietary, graphical operating systems developed, marketed and sold by Apple Inc., the latest of which is pre-loaded on all currently shipping Macintosh computers. Mac OS X is a UNIX operating system built on the technology that was developed at NeXT during the second half of the 1980s and up until Apple purchased the company in 1997. The operating system was first released in 1999 as Mac OS X Server 1.0. Since then, four more distinct end-user and server editions of Mac OS X have been released. On 26 October, 2007, Apple released Mac OS X 10.5, nicknamed «Leopard». The server edition, Mac OS X Server, is architecturally identical to its desktop counterpart but usually runs on Macintosh server hardware. Mac OS X Server includes workgroup management and administration software tools that provide simplified access to key network services, including a mail transfer agent and domain name server.

F   Microsoft Windows family of operating systems originated as a graphical layer on the top of the older MS-DOS environment for the IBM PC. Modern versions are based on the newer Windows NT core that was originally intended for OS/2 and borrowed from VMS. Windows runs on 32-bit and 64-bit Intel and AMD processors but earlier versions also ran on the DEC Alpha, MIPS and PowerPC architectures. Windows is also used on servers supporting applications, such as web and database servers. The most widely used version of the Microsoft Windows family is Windows XP, released on 25 October, 2001. In November 2006, after more than five years of developing, Microsoft released Windows Vista. It was new version of Microsoft Windows which contained a large number of architectural changes and new features (user interface and visual style Windows Aero, security features and multimedia applications, such as Windows DVD Maker). The newest operating system from Windows family is Windows 7.

G   Unix-like family is a diverse group of operating systems with several major sub-categories including System V, BSD and Linux. The name «Unix» is a trademark of The Open Group. «Unix-like» is commonly used to refer to the large set of operating systems which resemble the original Unix. Unix systems run on a wide variety of machine architectures. They are used as server systems in business, as well as workstations in academic and engineering environments. Free software Unix variants, Linux and BSD, are popular in these areas. The market share for Linux is divided among many different distributions. Historically, users installed a distribution by themselves, but in 2007 Dell began to offer the Ubuntu Linux distribution on home PCs. Some Unix variants like HP's HP-UX and IBM's AIX are designed to run only on the vendor's hardware. Others, such as Solaris, can run on multiple types of hardware, including servers and PCs.

H   Linux is a generic term that commonly refers to Unix-like computer operating systems that use Linux kernel. This is one of the most prominent examples of free software and open source development. The name «Linux» comes from the Linux kernel, originally written in 1991 by Linus Torvalds. The system's utilities and libraries usually come with the GNU operating system, announced in 1983 by

Richard Stallman. Linux can be controlled by one or more text-based command line interfaces (CLIs), graphical user interface (GUI), or through controls on the device itself. On desktop machines, KDE, GNOME and Xfce are the most popular user interfaces, though a variety of other user interfaces exist. The primary difference between Linux and other popular operating systems is that the Linux kernel is free and open source. Historically, Linux has mainly been used as a server operating system and has risen to prominence in that area. In September 2006, Netcraft reported that eight of the ten most reliable Internet hosting companies ran Linux on their web servers. Linux is the cornerstone of the LAMP server-software combination (Linux, Apache, MySQL, Perl/PHP/Python) which has achieved popularity among developers and is one of the most common platforms for website hosting. Linux is commonly used as an operating system for supercomputers. In August 2008, out of the top 500 systems, 423 ran Linux. A Linux distribution, commonly called a «distro», is a project that manages a remote collection of Linux-based software and facilitates installation of the Linux operating system. Distributions are maintained by individuals, volunteer organizations and commercial entities. They include system software and applications software in the form of packages and distribution-specific software for initial system installation and configuration as well as later package upgrades and installs. A distribution is responsible for the default configuration of the installed Linux system, system security and integration of the different software packages into a coherent whole.

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3.4. Answer the questions to check your understanding of the text:

1. What are reasons for the different OSs required by the various computer operations?

2. What is the difference between «single program operation» and «batch processing»?

3. What are the essential functions of an OS at the simple level?

4. Who developed Mac OS?

5. What are the most widely used versions of Microsoft Windows family?

6. What is Unix?

7. How can a user control the Linux operating system?

8. What is the main difference between the Linux and other operating systems?

3.5. Complete the following sentences with the ideas from the text:

1. A distribution is responsible for _____.

2. Linux is a generic term that commonly refers to _____.

3. Unix-like family is a diverse group of _____.

4. Windows runs on 32-bit and 64-bit Intel and AMD processors but _____.

5. Mac OS X is a UNIX operating system built on _____.

6. In the past, almost all operating systems were written in _____.

7. A particular type of multiprogramming is transaction processing designed for _____.

3.6. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	A single program operation requires some OS	**True**	**False**
2	Multiprogramming is similar to a single program operation	**True**	**False**
3	In the past, almost all OSs were written in high level languages	**True**	**False**
4	An OS is the lowest layer of software on a computer	**True**	**False**
5	Linux can be used without graphical interface	**True**	**False**
6	All operation systems are not free of charge	**True**	**False**
7	Linux OS has a command-line interface	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	English equivalent
1	пакетна обробка	
2	спроектований для системи	
3	операційна система	
4	кількість послуг	
5	обробка даних	
6	керувати ресурсами	
7	програмне забезпечення	
8	апаратне забезпечення	
9	прикладні програми	
10	графічний інтерфейс користувача	

4.2. Suggest everyday English words to the following rather more formal, academic words and translate them into Ukrainian:

	academic word	everyday English word	sentence
1	errors		
2	considerably		
3	require		
4	allocate		
5	cushion		
6	sufficient		
7	similarly		
8	complexity		
9	frequently		
10	unique		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 everyday English words from the task above. Write them down and ask your groupmates to translate them into Ukrainian.

4.4. Fill in the gaps with the appropriate words from the list. Some words can be used more than once:

a) Unix-like	b) server
c) packages	d) distributions
e) very	f) diverse

1. Linux is a generic term that commonly refers to _____ computer operating systems.

2. Operating systems vary in size from _____ small to very large.

3. Historically, Linux has mainly been used as a _____ operating system.

4. Enterprise and non-enterprise Linux _____ may be found running on servers.

5. Enterprise class _____ by Red Hat or SuSe are used by corporations.

6. The Unix-like family is a _____ group of OSs.

7. Windows is also used on _____, supporting applications.

4.5. Define the following terms and write down your definitions in the table:

	term	definition
1	operating system	
2	desktop PC	
3	architecture	
4	data	
5	server	
6	handheld computer	

7	hardware	
8	host	
9	interface	
10	application	

4.6. Cover the left column of the table in task 4.5 and recall the terms.

4.7. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	to bring up to date, i.e., to change into the latest version
2	a Microsoft Windows desktop component that indicates what programs are currently being used and allows the user to switch between them
3	a narrow band displayed across the bottom of a window in a Microsoft Windows application to display useful information for the user, e.g., number of pages in a document
4	the programs and data used in a computer
5	a computer program that is used to change the interface of another program, e.g., to change the screen display on an MP3 player program
6	a programmed virtual environment that imitates real or planned system
7	software that is distributed freely and only paid for if the user decides to keep it
8	the part of a graphical user interface window that allows the user to move through a document by clicking or dragging with the mouse
9	a section of a database made up of related database fields
10	a list of choices that appear below a menu title on a display screen when the user clicks on the menu title using a mouse

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Revision of all simple tenses».

Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=PQG_gYFePD4	

5.3. Find and correct the mistakes (if any) in the sentences given below:

1. She will go to the University when she will finish her paper.

2. Only a hundred years ago the steam engine was being considered an efficient engine.

3. All pure substances are characterizing by constancy of composition.

4. Education is very important for ambitious young people.

5. By the beginning of the lecture the laboratory assistant had been brought all the necessary diagrams.

6. If you will take on role in leadership, you are going to develop special skills.

7. Atomic theory is studied by all students of chemistry.

8. Telescopes are used since their invention.

9. Genetics seem to be the science of the 21st century.

10. We have been conducting this experiment for an hour before they came.

11. Why you don't return books to the library?

12. Electronics has made a rapid progress.

13. I am understanding the importance of this invention.

14. Our drawings will be finished by the end of the semester.

15. He takes English classes this year.

5.4. Read the text below and decide which option best fits each space. Pay attention on irregular verbs:

Elsewhere, German start-up UVIS 1. _____ a virus-killing UV light box that disinfects escalator handrails, leaving them 99.99% germ-free. Called ESCALITE, the product has already been snapped up by some of the world's leading escalator companies and, like the aforementioned coatings, could play a major role in 2. _____ the spread of COVID-19 and other infectious agents.

Another UV light-based bacteria buster is this LED Desktop Disinfection Light, which 3. _____ between a computer screen and keyboard and automatically blasts the keys with UV light every hour to rid it of mould, bacteria, fungus and viruses. Each cleanse 4. _____ five minutes and motion sensors ensure the light only comes on when users 5. _____ the keyboard to prevent potentially harmful UV exposure. 6. _____ by accessory manufacturer Targus, the company plans to start selling the devices for $299 (£220) from April. It is also working on an antimicrobial mouse and keyboards.

No longer the stuff of science fiction, Minority Report-style touchless gesture recognition is being fine-tuned by a host of major organisations, from tech titans such as Apple and Microsoft to research universities, with COVID-19 7. _____ its widespread adoption. By way of example, Abu Dhabi Airport installed the technology in 53 lifts in June 2020 to help minimise the spread of the virus, and the trend soon caught on. In July, Norwegian airport operator Avinor partnered with tech company Amadeus to launch touchless travel across four airports, covering everything from check-in and baggage drop to security and boarding.

The coronavirus pandemic means most of 8. _____ wearing masks in shops and enclosed public spaces. But air wearables company AirPop has gone above and beyond the humble face mask and produced what is essentially a fitness tracker for lungs. The Active+ Halo Smart Mask tracks breathing, air quality and the mask filter's effectiveness via an app, while promising protection from pathogens such as coronavirus, airborne risks 9. _____ dust storms, and man-made pollution such as factory pollution. While demand for face masks has soared because of the COVID-

19 outbreak, AirPop actually came about six years ago when founder Chris Hosmer 10. _____ to design a mask for his young daughter, who was suffering from acute respiratory reactions.

<center>Retrieved from https://bit.ly/2U4ITDl</center>

	A	B	C	D
1	has invented	was inventing	have invented	invents
2	have prevented	has prevented	has being preventing	preventing
3	sat	sits	sited	sated
4	have taken	has took	takes	taked
5	was not using	are not using	were not using	are not used
6	produced	is producing	were producing	was produced
7	have accelerated	accelerates	accelerating	has accelerated
8	has been used	were used	used	are used to
9	included	has included	including	include
10	wanted	wants	was wanting	were wanting

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

Microsoft has announced plans to soon release Windows 11. It turns out Windows 10 wasn't the last version of Windows after all, but that's okay, because Windows 11 will be free for all Windows 10 users, and includes a whole **bunch** of new features and **improvements** over the current version of Windows. This is everything you need to know. Windows 11 includes a whole bunch of new features and changes that differentiates it over Windows 10. To begin, Windows 11 features a brand new user interface (UI) design, built from the ground up with **simplicity** and ease of use in mind. Microsoft has tried to simplify the UI in as many areas as possible, creating a clean, **fluid space** for work and play. Microsoft says the new UI will help you stay productive or in your creative flow, as the OS does its best to

remain out of the way. The company is adding new productivity **features** that help keep you in your flow, such as new functionality like the new «Snap Navigator» menu that **drops down** from an app window's maximize button. This lets you snap an app to a predetermined set of grid **layouts** without needing to drag your window to the edge of your display. There's also a new Chat app built right into the Taskbar, which lets you share files, text, and video with friends, family, or colleagues via Microsoft Teams for consumers. Microsoft is integrating Teams into Windows 11 in other ways, such as with the ability to **share an app window** into a Teams call directly from the Taskbar, as well as mute your mic from the System Tray area. Microsoft has built a new Start menu and Taskbar experience, now centered by **default**. Gone are live tiles, and in their place is a grid of app icons that can be rearranged. Pinned and running apps in the Taskbar are now also centered, and there are many new subtle animations when **clicking** and moving things around. The System Tray and Action Center has been tweaked to match this, with Notifications and Quick Actions now **split** into two separate menus. Quick Actions are now known as Quick Settings and appear when you click on the System icons on the far right of the Taskbar. From here, you can connect to Wi-Fi or a Bluetooth device, enable **night light**, configure focus mode, and much more. Clicking on the date and time will open your calendar view and notifications.

Retrieved from https://bit.ly/3rev3KE

6.2. Translate the following sentences into English:

1. Існує велика кількість вірусів для різних операційних систем.

2. Кінцевому користувачу іноді складно одразу зрозуміти як налаштувати операційну систему Linux до своїх потреб.

3. Вже проходять тестування останньої версії операційної системи Windows 11.

4. Для користування операційною системою, її спочатку потрібно придбати.

5. Під час оновлення до останньої версії, користувачі операційної системи Macintosh відчули проблеми із інтерфейсом користувача, але з часом призвичаїлись до нього.

6. Користувачі не дуже задоволені останнім оновленням операційної системи Макінтош.

7. Усі користувачі, які мають ліцензійну версію операційної системи Windows 10, зможуть у майбутньому безкоштовно оновитись до версії Windows 11.

8. Говорячи про взаємодію користувача з персональним компютером, слід зазначити, що графічний інтерфейс значно полегшує та прискорює роботу з текстовими документами.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. Advantages and disadvantages of Microsoft OS family

2. The latest versions of Linux distributions

3. The nature of OS

4. GUI as a connection path between a user and an operating system

7.2. Work in pairs. Interview your groupmate using the questions below. List all of his or her ideas in the table. Swap the roles.

student 1		student 2	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	

1. What are the advantages and disadvantages of Microsoft OS family?

2. What is batch processing?

3. Who developed Mac OS X?

4. What Linux distributives do you know?

5. What is the latest version of Macintosh operating system?

6. Who developed Linux OS?

7. What is the latest version of Windows operating system?

7.3. With the help of this picture, describe operating system components. Use Apendix D if necessary.

Retrieved from https://bit.ly/3rujrDE

8. WRITING

8.1. Write a summary to the text «The origin of operating systems» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about new features of Windows 11 (about 100-120 words). Use Appendix C if necessary.

SELF-ASSESSMENT (UNITS 3-4)

1. Complete these sentences. Use one or two words in each gap:

1. We use a(n) _____ to access the internet.

2. Please speak into the _____ so that we can record your voice. Thanks!

3. We have some standard plans or, if you give us your specifications, we can _____ our service just for you!

4. Company employees must use the standard company _____ at the end of all emails.

5. Use the 'Sum' function to _____ a set of numbers in a row or a column, to find the total.

6. The primary key in a table must be _____ – no other record in the same table should have the same value.

7. You can store all our data on the office NAS (Network _____ _____).

8. Could you _____ the logs? I think there might be a problem.

2. Put these words in the correct order to make sentences and questions:

1. after / because / holiday / I'm / is / looking / manager / my / office / on / the

2. is / Mary / manages / network / our / person / the / who

3. a / can / database, / find / if / information / quickly / use / you / you

4. check / find / you / if / log, / problem / the / the / you'll

5. in / morning / room /server / the / this / were / you / ?

6. a / access / network / by / can / internet / private / secure / the / using / virtual / we

7. after / call / can / computer / me / off / switching / the / you / ?

8. I / called / when / installing / network / the / was / you

3. Read the advertisement and answer these questions:

1. Is the company selling to consumers or companies?

2. Are the devices standard?

3. How can the devices help new drivers or drivers who get lost? (2 answers)

4. If a customer has a problem, how can the company's devices help?

5. When a driver delivers something, what does the customer do with the device?

6. How will a company that uses these devices save money? (2 answers)

Make your delivery drivers more efficient!

Our mobile devices are changing the way many companies work – and yours could be the next! We can customise devices to your needs and help your workers operate much better. Here are some of the advantages:

With built-in GPS, you will always know where your delivery drivers are. Our software helps you to check that they are doing their job.

Maps that can be shown on the screen, together with GPS, mean that your drivers will never get lost again! Our clients tell us that there are no more late deliveries!

Our devices allow two-way communication. So, if a situation changes while your drivers are on the road, they can report any problems to you straight away and you can send them information if, for example, a package needs to go to a different address.

When customers receive a parcel, they can sign for their deliveries electronically by using the devices. This means much more efficient administration and keeping costs down.

Our devices make it much easier to keep records electronically – this saves a lot of money!

---

4. **You are an assistant to your company's system administrator. She was on holiday last week and you looked after everything. Use these notes to write an email to report what you did while she was away:**

CEO's laptop: hard drive crashed; replaced website crashed; restarted servers
Accounts Department database: new report replaced old server

Hi Wen Min,

I hope you had a good holiday. Here's a list of what happened while you were away:

1

2

3

4

So, quite a peaceful few days!

See you tomorrow,

---

5. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	stands for «Peripheral Component Interconnect». It is a hardware bus used for adding internal components to a desktop computer. For example, a PCI card can be inserted into a PCI slot on a motherboard, providing additional I/O ports on the back of a computer.
2	It is also known as a «tower» or «chassis», contains the main components of a desktop computer. It includes the motherboard, CPU, RAM, and other components. The case that houses these components is also part of the system unit.
3	is a computer that is designed to stay in a single location. It may be a tower (also known as a system unit) or an all-in-one machine, such as an iMac. Unlike laptops and other portable devices, desktop computers cannot be powered from an internal battery and therefore must remain connected to a wall outlet.
4	are portable computers that you can take with you and use in different environments. They include a screen, keyboard, and a trackpad or trackball, which serves as the mouse. Because they are meant to be used on the go, they have a battery which allows them to operate without being plugged into a power outlet. Laptops also include a power adapter that allows them to use power from an outlet and recharges the battery.

5	is an ultra high-performance computer made for high-volume, processor-intensive computing. They are typically used by large businesses and for scientific purposes. In the hierarchy of computers, they are right below supercomputers, the most powerful computers in the world.
6	is a high performance computing machine designed to have extremely fast processing speeds. They have various applications, such as performing complex scientific calculations, modeling simulations, and rendering large amounts of 3D graphics. They may also be built to simply showcase the leading edge of computing technology.
7	stands for «Media Access Control Address», and no, it is not related Apple Macintosh computers. It is a hardware identification number that uniquely identifies each device on a network. It is manufactured into every network card, such as an Ethernet card or Wi-Fi card, and therefore cannot be changed.
8	is a wireless networking technology that allows computers and other devices to communicate over a wireless signal. It describes network components that are based on one of the 802.11 standards developed by the IEEE and adopted by the Wi-Fi Alliance.
9	is a device, such as a wireless router, that allows wireless devices to connect to a network. Most of them have built-in routers, while others must be connected to a router in order to provide network access. In either case, they are typically hardwired to other devices, such as network switches or broadband modems.
10	this wireless technology enables communication between Bluetooth-compatible devices. It is used for short-range connections between desktop and laptop computers, PDAs (like the Palm Pilot or Handspring Visor), digital cameras, scanners, cellular phones, and printers.

```
W Q F K S A B D H A W S Y Q B F G K E J
L T G W P U E F T G H C V W R P H U K X
X Z Z N M S A V O T V Y L C A J Z P K O
Y X W Q K V K X O C I C F B Z W Z B K P
S H P T G F L B T J V V S P J F M P W I
Z N O S I E X F E W I S S M R Z S Q W Y
A P F K P P D V U T H J Y E Z Y I H S H
V V P W T O V T L L I C T G R E W I H A
M A N Z D U T L B P Y U K O R F P C I S
V H A S U A K P R U P H E M V P U Z N R
R E T U P M O C A M M V A I W E N Y F L
Z U A A I A W T O L J Y W D F M I H D N
H A G L U U I C U J W E M D D A T V T A
O H K O M J R T M A C B I W Z R R G H Y
A M N N V E A R N J S P A X V F E V Z C
V R A P P A J L D I P Y X N B N D S T V
J A M U S S E C C A O W S K V I R V S C
V R S O T E U Y G S W P J T X A G S Y M
S O Q J W P G O O V C L E Q E M W B L B
G Q N H G T C G O E F M Q R Y M L V L A
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UNIT 5. WORD PROCESSING

Retrieved from https://bit.ly/3rujrDE

1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What types of word processors do you know?

2. What is the main purpose of using word processors?

3. What is a «thesaurus»?

4. What is the latest version of Microsoft Office?

5. What tools do you need to edit texts?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	word processor		
2	edit		
3	paper-based		
4	conventional		
5	highlighted		
6	equipped		
7	processor		
8	medium-sized		
9	typewriter		
10	display		

2. LISTENING

2.1. Work in teams (3-4 students). Discuss with groupmates your experience of fast typing using computer terms from task 1.2.

2.2. You will watch the video about top 10 Microsoft Word new features for 2021. Before you watch brainstorm and complete the chart. Predict what the video will be about:

	your ideas
1	
2	
3	
4	
5	

2.3. Watch the video and check your answers in Task 2.2.

link	QR code
https://www.youtube.com/watch?v=ql5nxK1rBYg	

2.4. Watch the video again and try to answer the questions

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	It is impossible to set up black mode in Microsoft Word 365	**True**	**False**
2	The commenting feature in Microsoft Word 365 allows to collaborate with other users even offline	**True**	**False**
3	Read aloud feature in Microsoft Word 365 supports many languages	**True**	**False**
4	With Microsoft Word 365 a user can dictate information that appears on the screen	**True**	**False**
5	Microsoft Word 365 does not allow to integrate videos from YouTube	**True**	**False**
6	Microsoft Word 365 is integrated in Google environment	**True**	**False**

3. READING

3.1. Pronounce the following words and phrases, translate them into Ukrainian and try to memorize:

	word	translation
1	electromechanical	
2	auxiliary	
3	precursor	
4	similarities	
5	database	
6	feature	
7	equipment	
8	correct	
9	removable	
10	cache memory	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. Look through the passages and choose suitable titles for them out of the given ones. Three of them are extra titles:

1. Current developments of word processors

2. The introduction of WYSIWYG

3. Microsoft Office versus Google Docs

4. Invention of the first word processor

5. Word processing functions

6. Microsoft 365

7. CRT-based word processor

8. OpenOffice.org

9. Word processors applications

WORD PROCESSORS

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A   A word processor (document preparation system (DPS)) is a computer application used for creating (editing, formatting and printing) materials. The term «word processing» was invented by IBM in the late 1960s. IBM's Mag Tape Selectric Typewriter (MTST) and later Mag-Card Selectric (MCST) were the first devices, which allowed to work with documents. In the early 1970's, computer scientist Harold Koplow was hired by Wang Laboratories to program calculators. One of his programs allowed a Wang calculator to interact with an IBM Selectric typewriter. In 1974, Koplow's interface program was used in the Wang 1200 Word Processor, an IBM Selectric-based text-storage device. The machine operator typed the text on a conventional IBM Selectric and, when the Return key was pressed, the line of the text was stored on the cassette tape. One cassette stored approximately 20 pages of the text and could be «played back» by printing the contents onto the paper and the stored text could be edited, too. Basic editing functions were Insert, Delete and Skip.

B   Wang 1200 machine was the precursor of the Wang Office Information System (OIS) introduced in 1976. Its CRT-based system was a breakthrough in word processing technology. It displayed the text on a CRT screen and incorporated virtually every fundamental characteristic of word processors. It was a true office machine, affordable by medium-sized law firms and small organizations. The Wang was not the first CRT-based machine because in the early 1970s, Linolex, Lexitron and Vydec introduced pioneering word-processing systems with CRT display editing.

C   Automatic Electronic Systems, a Canadian company, introduced a product similar to Wang's one in 1973. It was the first office product, AES-90, that combined a CRT-screen, a floppy-disk and a microprocessor, i.e., the combination that would be used by IBM for its PC seven years later. The AES-90 software was able to

support French and English languages. The first eight devices were delivered to the office of the then Prime Minister, Pierre-Elliot Trudeau, in February 1974. Some of the earliest CRT-based machines used cassette tapes for removable-memory storage until floppy diskettes became available for this purpose. With the rise of personal computers, software-based word processors gradually displaced dedicated word processors and the term referred to software rather than hardware. MacWrite, Microsoft Word and other word processing programs were introduced in 1984. They were probably the first true WYSIWYG word processors known to many people before the introduction of Microsoft Windows.

D   Word processing functions include a «spell checker», «grammar checker» and «thesaurus». Word processors can be distinguished from several other forms of software, such as text editors (e.g., Notepad, Emacs), which were the precursors of word processors. Text editors are now used mainly by programmers, website designers and computer systems administrators. Almost all word processors enable users to employ styles, which are used to automate consistent formatting text body, titles, subtitles and highlighted text. Most current word processors can calculate various statistics: characters, words, sentences and lines.

E   Word processors have variety of applications within the business world, home and education. Businesses tend to have their own format and style. Thus, versatile word processors are widely used in most businesses. Many schools have begun to teach their students typing and word processing. Undergraduate students spend a lot of hours writing essays, as well as creating research works. They often contain 200 pages and are typically the defining point of a student's career.

F   Now word processors have become sophisticated systems which include more than three programs to edit texts, tables, databases and presentations. People use word processors very often to make reports, write letters and print documents. There are many commercial and open-source word processing applications, such as OpenOffice.org Writer and KWord. On-line word processors (e.g., Google Docs) are a relatively new category. But Microsoft Word is the most widely used computer

word processing system. For a long time it was considered to be the main program in Microsoft Office. DOC format is considered to be the de facto standard, although it's the most recent version, Word 2019, can also use a new XML-based, Microsoft Office-optimized format called .DOCX. This format has been standardized by ECMA as Office Open XML and it is available for the Windows and Mac platforms.

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3.4. Answer the questions to check your understanding of the text:

1. Who invented the term «word processing»?

2. What is Harold Koplow famous for?

3. How many pages of the text can be stored on IBM Selectric?

4. When was Wang Office Information System introduced?

5. What is AES-90 famous for?

6. What is a «spell checker»?

7. What commercial and open-source word processing applications do you know?

8. Is Microsoft Word available for Mac platform?

3.5. Complete the following sentences with the ideas from the text:

1. The AES-90 software was able to support _____.

2. Word processors have a variety of _____.

3. Undergraduate students typically spend _____.

4. A word processor is _____.

5. Some of the earliest CRT-based machines used _____.

3.6. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	The term «word processing» was invented by Microsoft Corporation in 1960	**True**	**False**
2	One cassette of IBM Selectric could store approximately 200 pages of the text	**True**	**False**

3	Wang Office Information System was introduced in 1976	**True**	**False**
4	WYSIWYG stands for What You See Is Where You Go	**True**	**False**
5	Word processors cannot be distinguished from several other forms of software, such as text editors	**True**	**False**
6	Now word processors have become sophisticated systems	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	**English equivalent**
1	редагування тексту	
2	форматування	
3	системи обробки тексту	
4	юридичні фірми	
5	приблизно 20 сторінок	
6	видавати	
7	фактично	
8	використовується головним чином	
9	дослідницькі роботи	
10	оновлене програмне забезпечення	

4.2. Find synonyms from the text to the words in the table and translate them into Ukrainian:

	English phrase or word	**synonym from the text**	**sentence**
1	machine		
2	predecessor		
3	basic		
4	properties		
5	mixture		

6	maintain		
7	aim		
8	count		
9	identify		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 synonyms from the task above. Write them down and ask your groupmates to translate them into Ukrainian.

4.4. What do the following abbreviations stand for? Use Appendix E if necessary.

DPS	
IBM	
MTST	
MCST	
CRT	
OIS	
AES	
WYSIWYG	
XML	

4.5. Define the following terms and write them down in the table:

	term	definition
1	platform	
2	word processor	
3	text editor	
4	spell checker	
5	grammar checker	
6	thesaurus	

7	machine	
8	cassette tape	
9	typewriter	
10	font	

4.6. Cover the left column of the table in task 4.5 and recall the terms.

4.7. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	a piece of program text written in a programming language
2	to reduce to a much smaller size
3	a term used in data mining meaning a group of data that has similar features or is based on a limited data range
4	a type of applications program used for storing information so that it can be easily searched and sorted
5	to change coded information into normal text
6	a storage area used for grouping files so that they can be easily located. A directory is sometimes called a folder
7	able to transfer data in both directions, i.e., can send and receive data
8	a computer program for making changes to test in computer programs or data
9	to perform a computer operation by processing a program instruction
10	a section of a database where an item of data is stored

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Sequence of tenses». Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=ZGdt9apUpqg	

5.3. Turn the following sentences from direct into indirect (reported) speech. Mind the rule of sequence of tenses:

1. Yesterday morning my teacher said, «The results of your test will be here two days from today».

2. The librarian asked, «Have the books come?».

3. The student said, «I'll work at my diploma next year».

4. The professor said to the students, «The next lecture will be on linear motion».

5. She asked the student, «Can you translate the article?».

6. The teacher said to us, «Don't look up the words in a dictionary when you translate such an easy text».

7. He says, «Charles Babbage produced the first general purpose digital computer».

8. He was asked, «What printers are called ink-jet ones?».

9. The engineer asked, «Have you ever seen a jet engine in action?».

10. My scientific adviser said to me, «You'll go to London to take part in the conference».

11. He said, «The engineer of our laboratory was offered new research work».

12. He said, «These three components interact with each other to perform a given task».

13. He said, «A new device for measuring pressure is being designed now».

14. He says, «Transistors require much more electrical power to operate».

15. In 1905 Albert Einstein declared, «Matter can be converted into energy».

5.4. Find and correct the mistakes (if any) in the sentences given below:

1. They know that the students had organized a meeting.

2. They were told where they will have their industrial training.

3. I was asked whether I could take part in the research work.

4. The professor was glad that the students are listening to him so attentively.

5. He tells me that we should go to the plant on the following week.

6. The teacher wanted to know how many students have already written their tests.

7. The designer asked us what we think of his project.

8. The students said they had finished all their drawings.

9. The student said that this material is not directly related to the information he was looking for.

10. She said that she has comprehended the main idea of the article.

11. The scientist said that he would complete his experiment by the end of the month.

12. The newspaper wrote that in the modern world people cannot imagine their life without computers.

13. Thus it was stated that Lomonosov had discovered a number of scientific laws of world importance as early as in the 18th century.

14. The teacher said that we might complete our drawings next week.

15. Mendeleyv predicted that the vacant places in his table would be filled by yet unknown elements.

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

Microsoft first announced Office 365 in October 2010, beginning with a **private beta** with various organizations, leading into a public beta in April 2011, and reaching general availability on 28 June 2011 with a **launch aimed** originally at **corporate users**, framing Office 365 as a successor to Microsoft Business Productivity Online Suite (BPOS). Facing **growing competition** from Google's similar service Google Apps, Microsoft designed the Office 365 platform to «bring

together» its existing **online services** (such as the Business Productivity Online Suite) into «an always-up-to-date cloud service» incorporating Exchange Server (for e-mail), SharePoint (for internal social networking, collaboration, and a public web site), and Lync (now Skype for Business) (for communication, VoIP, and conferencing). Plans were initially launched for small business and enterprises; the small business plan offered Exchange e-mail, SharePoint Online, Lync Online, web hosting **via** SharePoint, and the Office Web Apps, with the **enterprise plan** also adding **per-user licenses** for the Office 2010 Professional Plus software and 24/7 phone support. Following the official launch of the service, Business Productivity Online Suite customers were given 12 months to migrate from BPOS to the Office 365 platform. With the release of Office 2013, an updated version of the Office 365 **platform** was launched on 27 February 2013, expanding Office 365 to include new plans aimed at different types of businesses, along with new plans aimed **at general consumers,** including benefits tailored towards Microsoft consumer services such as OneDrive (whose integration with Office was a major feature of the 2013 suite). The server components were updated to their respective 2013 versions, and Microsoft **expanded** the Office 365 service with new plans, such as Small Business Premium, Midsize Premium, and Pro Plus. A new Office 365 Home Premium plan aimed at home users offers **access** to the Office 2013 suite for up to five computers, along with expanded OneDrive storage and 60 minutes of Skype calls monthly. The plan is aimed at **mainstream consumers**, especially those who want to install Office on multiple computers. A University plan was introduced, **targeted** at post-secondary students. With these new offerings, Microsoft began to offer prepaid Office 365 subscriptions through retail outlets alongside the normal, non-subscription-based editions of Office 2013, which, in comparison, are only licensed for use on one computer.

Retrieved from https://bit.ly/3wFdZPf

6.2. Translate the following sentences into English:

1. Текстові редактори дозволяють не лише редагували, але й створювати тексти.

2. Сучасні текстові процесори мають багато налаштувань.

3. Графічний інтерфейс користувача Microsoft 365 є інтуїтивно зрозумілим.

4. Наразі користувачі можуть встановити спеціальні допоміжні програми для перевірки граматичних помилок.

5. Користуватись пакетом програм для редагування тексту можливо й онлайн.

6. Google Docs надає користувачам можливість створювати та редагувати текст в режимі реального часу.

7. Усі програми в середовищі Google є взаємоінтегрованими і отримати до них доступ можуть лише зареєстровані користувачі.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. The advantages of Google Docs

2. Google Docs versus Office 365

3. Key differences between Microsoft Office 2019 and Office 365

4. The disadvantages of Google Docs

5. Libra Office

6. Open Office Org as an alternative to paid analogues

7.2. Imagine you are interviewing a famous IT scientist. Try to interview your classmate using the questions below. List all of his or her ideas in the table. Swap the roles.

student 1		student 2	
1		1	
2		2	

3		3	
4		4	
5		5	
6		6	

1. Can you share your experience of using Google Docs?

2. Have you updated your Microsoft Office Pakage to the latest version?

3. What applications are included into Libra Office Pakage?

4. Have you ever used Open Office Org?

5. What is your opinion about Office 365?

6. Is it possible to share documents on the internet?

7.3. With the help of this picture, describe all the elements of Microsoft Office window. Use Appendix D if necessary.

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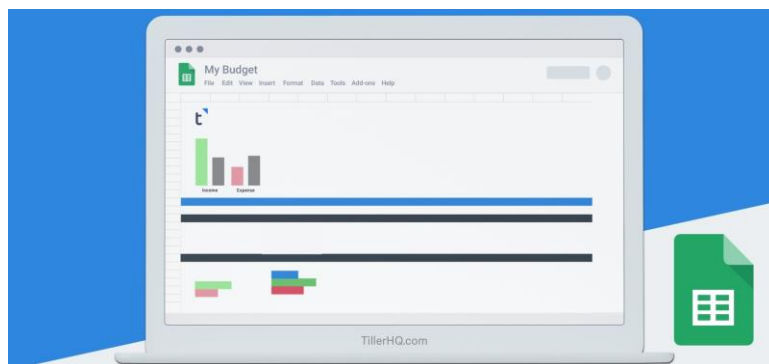
8. WRITING

8.1. Write a summary to the text «Word processors» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about online word processing (about 100-120 words). Use Appendix C if necessary.

UNIT 6. SPREADSHEETS AND DATABASES

Retrieved from https://bit.ly/3rujrDE

1. LEAD-IN

1.1. Discuss the following questions in pairs and share the information:

1. What do you know about spreadsheets?

2. What is a cell?

3. What is the purpose of using Microsoft Excel?

4. What is a database?

5. What is the main purpose of using databases?

6. What are the areas where databases can be applied?

1.2. Think of the words related to the topic for each letter. Share your ideas with your groupmates and complete the missed letter-lines. Do not forget to add new words and phrases while working on the unit:

A _____   J _____   S _____

B _____   K _____   T _____

C _____   L _____   U _____

D _____   M _____   V _____

E _____   N _____   W _____

F _____   O _____   X _____

G _____   P _____   Y _____

H _____   Q _____   Z _____

I _____   R _____

1.3. Practice the pronunciation of English terms, translate them into Ukrainian and explain their meaning in English:

	term	translation	meaning
1	hierarchical		
2	concurrency		
3	schema		
4	properties		
5	query		
6	retrieve		
7	convenient		
8	essential		
9	polymorphism		
10	arrangement		

1.4. Fill in the gaps with the words from the following list. Some words can be used more than once:

on	with	various	between	of
include	namely	for	from	requires
much	an	a	the	overall
includes	out	consists of	and	by
all	be	or	in	to
in common with				

1.___ most aspects of computing 2. ___ database is part of a system 3. ___ a database system. 4. ___ database system 5. ___ the stored data, the 6. ___ data models, a piece 7. ___ software called a database management system, and 8. ___ person called a database administrator. The diagram illustrates the 9. ___ structure of a database system. 10. ___ database management system (DBMS) is 11. ___ large 12. ___ complex piece 13. ___ software, responsible 14. ___ all aspects of the creation,

accessing 15. ___ updating of the database. Tasks it performs 16. ___ transforming 17. ___ mapping the data 18. ___ one model 19. ___ another, or 20. ___ the central model and 21. ___ stored database. 22. ___ interactions between users and 23. ___ database are deal with 24. ___ the DBMS. This 25. ___carrying 26. ___ various security checks. A database management system is a real-time system, and has 27. ___ in common with 28. ___ operating system. The database administrator (DBM) is 29. ___ person 30. ___ charge 31. ___ the overall running 32. ___ the database system. Duties of 33. ___ database administrator 34. ___ deciding 35. ___ the information content of the database and the structure 36. ___ the various data models, deciding how the data is to 37. ___ stored, liasing 38. ___ users, and defining a strategy 39. ___ back-up storage and recovery from breakdown. This job 40. ___ a combination of software and managerial skills.

2. LISTENING

2.1. Work in teams (3-4 students). Discuss your experience of using Microsoft Excel and Google Sheets using computer terms from task 1.2.

2.2. You will watch the video explaining the advantages and disadvantages of Microsoft Excel and Google Sheets. Before you watch brainstorm and complete the chart. Predict what the video will be about.

your ideas		video	
1		1	
2		2	
3		3	
4		4	
5		5	

2.3. Watch the video and compare your answers in Task 2.2 with your groupmates.

link	QR code
https://www.youtube.com/watch?v=GAdivCizVN4	

2.4. Watch the video again and try to answer the questions:

1. Who is the presenter?

2. What was the presenter talking about?

3. What technical information would you add to the presenter's speech?

2.5. After watching the video mark the following sentences as TRUE or FALSE:

1	Google Sheets is integrated into other applications by Google	**True**	**False**
2	Microsoft Excel is available both online and offline	**True**	**False**
3	Using the Microsoft Excel if the internet connection goes down your information in the spreadsheet is lost	**True**	**False**
4	Google Sheets application has more simplified toolbar in comparison with Microsoft Excel	**True**	**False**
5	Nowadays Microsoft Excel contains less then 120 formulas	**True**	**False**
6	Microsoft Excel is a free of charge software	**True**	**False**

3. READING

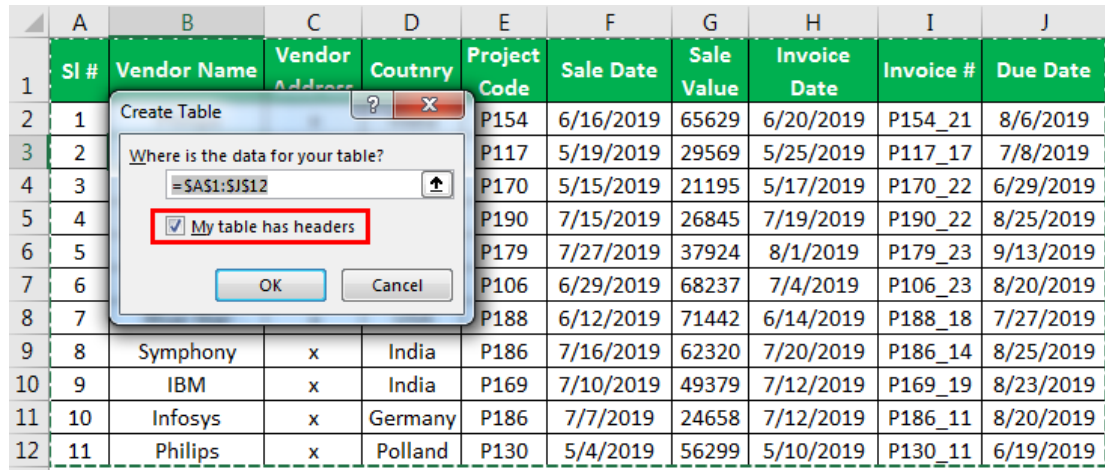**3.1. Pronounce the following words, translate them into Ukrainian and try to memorize:**

	word	translation
1	simulate	
2	alphanumeric	
3	formula	
4	column	
5	percentage	
6	sign	
7	worksheet	
8	chart	
9	row	
10	automatically	

3.2. Work in pairs. Make up your own sentences in English with any 3-4 words from the task above. Write them down and ask your groupmate to translate them into Ukrainian.

3.3. Look through the passages and choose suitable titles for them out of the given ones. Three of them are extra titles:

1. Free analogues

2. Google Tables

3. Definition of a spreadsheet

4. Open Offis Org

5. Early spreadsheets

6. Spreadsheet applications

7. Features

8. Office 365 features

9. Definition of a cell

SPREADSHEETS

SI #	Vendor Name	Vendor Address	Coutnry	Project Code	Sale Date	Sale Value	Invoice Date	Invoice #	Due Date
1				P154	6/16/2019	65629	6/20/2019	P154_21	8/6/2019
2				P117	5/19/2019	29569	5/25/2019	P117_17	7/8/2019
3				P170	5/15/2019	21195	5/17/2019	P170_22	6/29/2019
4				P190	7/15/2019	26845	7/19/2019	P190_22	8/25/2019
5				P179	7/27/2019	37924	8/1/2019	P179_23	9/13/2019
6				P106	6/29/2019	68237	7/4/2019	P106_23	8/20/2019
7				P188	6/12/2019	71442	6/14/2019	P188_18	7/27/2019
8	Symphony	x	India	P186	7/16/2019	62320	7/20/2019	P186_14	8/25/2019
9	IBM	x	India	P169	7/10/2019	49379	7/12/2019	P169_19	8/23/2019
10	Infosys	x	Germany	P186	7/7/2019	24658	7/12/2019	P186_11	8/20/2019
11	Philips	x	Polland	P130	5/4/2019	56299	5/10/2019	P130_11	6/19/2019

(Create Table dialog box: "Where is the data for your table?" =$A$1:$J$12 ☑ My table has headers OK Cancel)

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A   A spreadsheet is a computer application that simulates a paper worksheet. It displays multiple cells that together make up a grid consisting of rows and columns. Each cell contains either alphanumeric text or numeric values. Alternatively, a spreadsheet cell may contain a formula that defines how the content of that cell is to be calculated. Spreadsheets are frequently used for financial information because of their ability to recalculate the entire sheet automatically after a change to a single cell is made.

B   VisiCalc is usually considered to be the first electronic spreadsheet. Lotus 1-2-3 was the leading spreadsheet of DOS era. Now Excel is generally considered to have the largest market share. The compound word «spread-sheet» means the format used to present book-keeping ledgers, invoices and the amount of payment in the cell. The concept of a spreadsheet was outlined in the paper «Budgeting Models and System Simulation» by Richard Mattessich in 1961. The subsequent work by Mattessich applied computerized spreadsheets to accounting and budgeting systems. As a rule, spreadsheets dealt primarily with the addition or subtraction of entire columns or rows rather than individual cells. Microsoft had been developing Excel on the Macintosh platform for several years. The result of including Excel to Windows 2.0 was a fully-functional Windows spreadsheet. The more robust Windows 3.x platforms of the early 1990s made it possible for Excel to take market share from Lotus and now Microsoft Excel dominates on the commercial spreadsheets market.

C   OpenOffice.org Calc is a freely available, open-source program modeled after Microsoft Excel. Calc can both open and save data in the Excel (XLS) file format. Calc can be acquired not only as an installation file but also as a portable program, capable of being run from a device, such as USB memory drive. It can be downloaded from the OpenOffice.org website.

D   A cell can be thought of as a box for holding data. A single cell is defined by its column and row. Its physical size can be tailored for its content by dragging its height or width at box intersections.

My Spreadsheet			
	A	B	C	D
01	value 1	value 2	value 3	value 4
02	10	20	30	200

An array of cells is called a «sheet» or «worksheet». It is analogous to an array of variables in a conventional computer program. In most implementations, many worksheets may be located within a single spreadsheet. Functionally, the spreadsheet operates as a whole and all cells operate within the spreadsheet. A cell may contain a value or formula, or it may be left empty. By convention, formulas usually begin with = sign. A value can be entered from the computer keyboard by typing into the cell. Also, a value can be based on a formula to perform calculations, display the current date and time.

E   Real time update feature refers to updating a cell's content periodically when its value is derived from an external source, such as a cell, in another «remote» spreadsheet. A formula assigns values to a cell or range of cells, and typically has the format:

=expression

where the expression consists of:

• values, such as 2, 9, 14 or 6.67E-11;

- references to other cells, e.g., A1 for a single cell or B1 : B3 for a range;

- arithmetic operators, e.g., +, -, *, /, and others;

- relational operators, e.g., >, =, <, and others;

- functions, e.g., SUM (), TAN (), and many others.

The available options for valid formulas depend on the particular spreadsheet implementation. Modern implementations also offer options to access custom-built functions, remote data and applications. Once entered, selected cells can optionally be «locked» to prevent from accidental overwriting. A cell can optionally be defined to specify how the value is displayed. The default display format is usually set by its initial content if not specifically previously set, so that, for example, «31/01/2009» or «31 Jan 2009» would default to the cell format of «date». Similarly, adding a «%» sign after a numeric value would tag the cell as a percentage cell format. The cell content is not changed by this format. In the earliest spreadsheets cells were a simple two-dimensional grid. Over time, the model has been expanded to include a third dimension. The most advanced examples allow inversion and rotation operations which can slice and project the data set in various ways.

F   Many spreadsheet applications permit charts, graphs or histograms to be generated from specified groups of cells which are dynamically rebuilt as cell content is changed. The generated graphic component can be either embedded within the current sheet or added as a separate object.

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3.4. Answer the questions to check your understanding of the text:

1. What is a spreadsheet?
2. What does a spreadsheet look like?
3. Who is the author of the concept of an electronic spreadsheet?
4. What do you know about Open Office.org Calc?
5. What is a worksheet?

6. What does real time update feature refer to?

7. What was the form of the earliest spreadsheets?

8. What do many spreadsheet applications permit?

3.5. Complete the following sentences with the ideas from the text:

1. Alternatively, a spreadsheet cell may contain a _____.

2. The concept of a spreadsheet was outlined in _____.

3. A cell can be thought of as a box for _____.

4. Spreadsheets are frequently used for _____.

5. A formula assigns values to a cell or _____.

6. Over time, the model has been expanded to _____.

7. Real time update feature refers to _____.

3.6. Consider the following statements whether they are TRUE or FALSE. If the statement is FALSE find the part of the text that gives the correct information:

1	A formula assigns values to a cell or range of cells	**True**	**False**
2	A spreadsheet is a computer application simulating a paper worksheet	**True**	**False**
3	The concept of an electronic spreadsheet was outlined in 1961	**True**	**False**
4	In the earliest spreadsheets, cells were a three-dimensional grid	**True**	**False**
5	Modern implementations do not offer options to access custom-built functions	**True**	**False**
6	Spreadsheets are frequently used for calculating items in stores	**True**	**False**

4. LANGUAGE IN USE

4.1. Find English equivalents to the following Ukrainian word expressions from the text:

	expression in Ukrainian	English equivalent
1	може бути названо	
2	кореневий запис	
3	автоматизоване проектування	
4	мова запитів	
5	широко використовувались	
6	операції, що необхідно виконати	
7	основна перевага	
8	упорядковано в групи	
9	мета полягає в тому, щоб	
10	може бути названо	

4.2. Find synonyms from the text to the words in the table and translate them into Ukrainian:

	English phrase or word	synonym from the text	sentence
1	often		
2	data		
3	the whole		
4	determine		
5	the biggest		
6	quantity		
7	idea		
8	some		
9	keep		

4.3. Work in pairs. Make up your own sentences in English with any 3-4 synonyms from the task above. Write them down and ask your groupmates to translate them into Ukrainian.

4.4. Match the two halves of the sentences:

1	By the time Lotus responded with usable Windows products, …	a	containing the value 10.
2	Sequential programming usually needs every program line and character…	b	typing line after line of text.
3	One error usually stops the whole program …	c	to be updated, too.
4	All dependent cells have …	d	to define program relationships.
5	This makes writing and debugging programs …	e	to be correct for a program to run.
6	Numbers completed Apple's productivity suite…	f	Microsoft had started compiling their Office suite.
7	The available options for valid formulas depend on …	g	much easier and faster.
8	They use spatial relationships …	h	the particular spreadsheet implementation.
9	A2 would represent the cell below …	i	and prevents any result.
10	Sequential programming usually requires …	j	making it a competitor to Microsoft Office …

4.5. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	a section of a webpage that acts as an independent browser window. Clicking on a link in one frame can cause a webpage to be displayed in another frame, e.g., a menu in one frame can provide links to webpages that are displayed in another frame
2	a kind of diagram used by programmers to show the logical steps in the design of a system
3	a skilled programmer who attempts unauthorised access to a network system
4	the physical components of a computer system
5	the first section of a message that contains information about the content and transmission of the message including the sending and destination addresses
6	the main start page of a website
7	allows two-way communication so that user can respond or interact with the system
8	a computer network that is internal to an organization that uses the TCP/IP protocol in the same way as the Internet
9	the lowest level layer at the core of an operating system. It deals with allocating hardware resources to the rest of the operating system and the application programs
10	a word used to categorise documents or records in a file. Keywords can be used by a search engine to find relevant links on the Internet

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

5. GRAMMAR

5.1. You are going to watch the video on the topic «Prepositions». Before you watch, recall what rules from this grammar topic you know.

5.2. Watch the video and make notes. Use grammar reference if necessary.

link	QR code
https://www.youtube.com/watch?v=p_lgP_XwDig	

5.3. Fill in the gaps with the appropriate preposition:

1. In addition _____ this, heat is used to facilitate the granulation process.

a) at

b) to

c) with

2. Accelerate your digital lifestyle by choosing a Pentium _____ 4.3 GHz .

a) on

b) with

c) at

3. You will see vivid, detailed images _____ a 17" display.

a) on

b) at

c) in

4. They allow communication _____ the computer and the devices.

a) among

b) with

c) between

5. This book offers vocabulary reference and practice for specialist areas _____ professional English.

a) in

b) of

c) for

6. The CIC is a very large collection of English texts, stored _____ a computerized database.

a) in

b) for

c) with

7. My computer system has been broken _____ and some useful information has been destroyed.

a) in

b) to

c) into

8. Some devices are equipped _____ a wireless modem.

a) by

b) with

c) in

9. You can also type _____ the detached keyboard or use voice recognition.

a) at

b) on

c) with

10. Enter is pressed to select options _____ a menu or to start a new paragraph.

a) in

b) within

c) from

11. Peripherals are devices _____ the computer but linked to it.

a) at

b) outside

c) of

12. It can be expanded _____ adding extra RAM chips.

a) by

b) with

c) from

13. A disk drive spins the disk at high speed and reads its data or writes new data _____ it.

a) in

b) with

c) onto

14. There are a number of health and safety problems that may result _____ continuous use of computers.

a) in

b) from

c) for

15. _____ computing, ergonomics is about designing computer facilities so they are safe and comfortable.

a) to

b) on

c) in

5.4. Read the text below and fill in the gaps with the appropriate prepositions:

Microsoft Excel, which first wowed business users 1.____ its solid graphics, fast processing, and versatility, has held its position as the indispensable software 2._____ finance executives for 36 years. 3._____ those demanding users who want a function not yet available, there is also the option to «customize» Excel. Companies big and small increasingly need to automatically pull their financial data 4._____ multiple cloud-based systems and utilize more advanced data analytics. While Excel is often used as a collection point for data 5._____ other systems, it is still a «manual and largely siloed vehicle», says Omar Choucair, CFO of software company Trintech. Excel's limited ability to handle massive data sets «can lead 6._____ long processing times and more steps than other database tools», says UHY's Poveda. Add to that the errors that manual entry and cut-and-paste can introduce 7._____ an Excel spreadsheet as well as Excel's limited collaboration features, and it's clear that the killer app 8._____business accounting is showing its age. That's especially true as «the global pandemic has highlighted and accelerated the increased demand 9._____ speed and transparency inside finance organizations», Choucair says. «Advanced business intelligence tools that focus 10._____ data mining, predictive analytics, and visualizations are becoming the norm», Poveda says. Case in point: schools and businesses have been training students and employees 11._____ these newer applications. Like many older applications, Excel stems 12._____ its developer roots 13._____ using arcane text strings to run functions or manipulate data. That creates a culture 14._____ having to learn unconventional commands to make Excel shine. But a new generation of CFOs and other finance executives may be tempted 15._____ flashier, more powerful, and better-integrated tools.

6. TRANSLATION

6.1. Translate the following passage into Ukrainian, pay attention to the words and phrases in bold:

The term «database» was first used in June 1963, when the System Development Corporation **sponsored** a symposium Development and Management

of a Computer-centered Data Base. Database, as a single word, became common in Europe in the early 1970s and by the end of the decade it had been used in American newspapers. The first **database management systems** were developed in the 1960s. A pioneer in this field was Charles Bachman. Bachman's early papers showed that his aim was to make more effective use of the new **direct access** storage devices. Two key data models appeared at that time. CODASYL developed the network model based on Bachman's concept. The second key model, hierarchical, was used in a system developed by North American Rockwell. Later, it was **adopted** by IBM as the **cornerstone** of its IMS product. The relational model was proposed by E. F. Codd in 1970. He criticized existing models for confusing the abstract description of information structure and description of physical access **mechanism**. For a long period of time, however, the relational model remained of academic interest only. During the 1980s, research activity focused on distributed database systems and database machines, but these **developments** had a little effect on the market. In the 1990s, the attention was focused on object-oriented databases that had some success in the fields where it was necessary to handle more complex data than **relational systems** could easily cope with. Nowadays, the fashionable area for innovation is the XML databases.

Retrieved from https://bit.ly/3Bfyyp0

6.2. Translate the following sentences into English:

1. Дані – це структурована інформація.

2. Надаючи права доступу до вашого документу онлайн, зважайте на те, хто бачить ваше покликання.

3. Бази даних є невід'ємним елементом сучасного життя.

4. Системи керування базами даних вивчають у будь якому закладі вищої освіти.

5. Для автоматичного обчислення необхідних даних в електронній таблиці потрібно задати формулу.

7. SPEAKING

7.1. You are a participant of the international conference devoted to the innovations in information technologies and engineering. Choose and speak on one of the following topics:

1. How to organize a database

2. Advantages and disadvantages of using databases

3. Areas where databases can be used

4. The origin of DBMS

7.2. Imagine you are interviewing a famous IT scientist. Interview your classmate using the questions below. List all of his or her ideas in the table. Swap the roles.

student 1		student 2	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

1. What is a database?

2. What is the function of DBMS?

3. When did the term «database» first appear?

4. When was a relational database proposed?

5. Why was a relational database introduced?

6. What does a flat database consist of?

7. What similar features do the hierarchical and network databases have?

8. Why are databases widely used?

7.3. With the help of this picture, describe the tools of Microsoft Excel. Use Appendix D if necessary.

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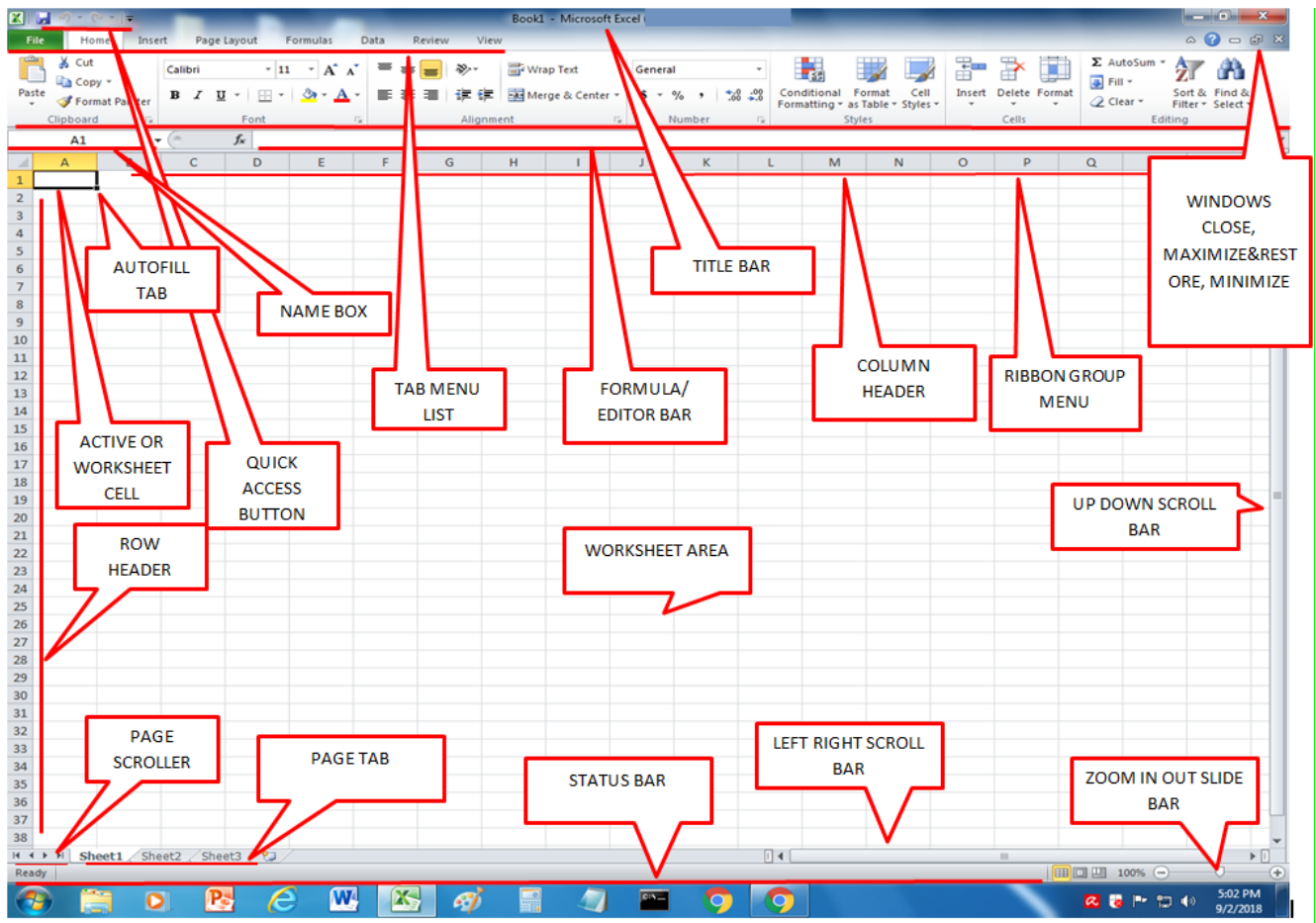
8. WRITING

8.1. Write a summary to the text «Spreadsheets» in 100 words. Use Appendix B if necessary.

8.2. Write a short article for the IT magazine about applications of databases (about 100-120 words). Use Appendix C if necessary.

SELF-ASSESSMENT (UNITS 5-6)

1. Complete these sentences. Use one word in each gap:

1. Can I try _____ the software for a few weeks to check whether it's suitable for us?

2. Do you have the user _____? I've never used this function before.

3. Don't worry, you can buy an extended _____ on this hardware that is good for three years.

4. To see how other users of this software solve problems, visit our user _____.

5. The trial _____ is nearly finished. We'll have to pay for a licence soon.

6. We have a(n) _____ pricing model. There are different prices for different levels; each level has different features.

7. We use _____ hosting rather than dedicated hosting as it's cheaper.

8. We're bringing _____ an upgrade to the software later this year.

2. Choose the correct answer, A, B or C:

1. _____ you please tell me whether it has encryption?

A. Should

B. Must

C. Can

2. How much did it _____ to in total?

A. pay

B. come

C. cost

3. I think it's best _____ an enterprise social networking system.

A. to use

B. using

C. use

4. If we were a bigger company, we _____ use a dedicated server.

A. 'll

B. would

C. did

5. It's as fast _____ the other processor.

A. to

B. than

C. as

6. The monthly fee is _____ for both plans.

A. the same as

B. the same

C. same as

7. We could have a faster website if we _____ more bandwidth.

A. had

B. have

C. 're having

8. Which computer has the _____ memory?

A. least

B. lesser

C. less

3. Read the product profile and answer these questions. Choose Basic (B), Basic Plus (BP) or Premium (P):

What is the lowest level system with these features?

1. chat **(B / BP / P)**

2. ability to add information to messages and documents so they are easier to find (**B / BP / P**)

3. a way of allowing different people to view a file (**B / BP / P**)

4. a way of saving files that you might use later but don't need to access easily (**B / BP / P**)

Which would you recommend for:

5. a company with several premises? (**B / BP / P**)

6. a small company with only one office, which needs to keep costs low and is happy to use paper? (**B / BP / P**)

7. a company which wants to keep its information safe from other companies? (**B / BP / P**)

8. a person who needs to communicate while travelling? (**B / BP / P**)

SuperSocial ESN is an Enterprise Social Networking system produced by SuperSocial Pty Ltd, a company based in Melbourne, Australia. Its main selling points are that it helps clients' employees to communicate more efficiently and gives them better access to digital data. It provides a wide range of functions and because of SuperSocial's tiered pricing, clients can choose not to pay for the features that they don't actually need. Plans start with the Basic system, which is designed for a small business at one location. This has instant messaging as well as file sharing. The next level up, only slightly more expensive, is the Basic Plus system. This has OCR and a document management system with tagging so that the user can scan documents and keep track of the electronic versions. There is also a document archiving feature. The highest level system is the Premium system, which has all the capabilities of the first two levels, plus some additional features. With it, users can give and record webinars, and there is a speech-to-text capability so that users can create documents without typing. Many users like to be able to write and send messages even when driving. Users of the Premium system can access data wherever they are, whether in the office, visiting a client or at home. And it comes with a high level of security, including a VPN and encryption so that access to the server is very secure.

4. Write a report using these instructions and the text in Section 3 above:

- For 1, give the purpose of the report: recommend the SuperSocial ESN Premium system.

- For 2–7, mention the features of the SuperSocial ESN system that match the text.

- For 8, say again which system is best.

Suggestions for solutions to communication problems

Introduction

In response to the request from the CEO, the IT Department has now found a good ESN system.

We (1) _____

Recommendations

There are several reasons for our recommendation, which are as follows:

We need a way for people to communicate more quickly than by email. This ESN system has (2)_____

We also need a way for people to share files easily.

We (3) _____

We have a lot of paper to scan and file. With the (4)_____features, _____

We don't need to worry about security. The SuperSocial system (5) _____

Our people need to access the system from any location. This isn't a problem with the SuperSocial system because (6)_____

We need to give more online presentations. (7) _____ that makes this easy.

In conclusion, we think that (8) _____

---

5. Find all of the words hidden in the letter grid. Words are placed horizontally, vertically and diagonally. Clues below are to help you:

	clues
1	is a unique address that identifies a device on the Internet or a local network. It allows a system to be recognized by other systems connected via the Internet protocol.
2	serve as memorizable names for websites and other services on the Internet. However, computers access Internet devices by their IP addresses. DNS translates domain names into IP addresses, allowing you to access an Internet location by its domain name.
3	is a text field near the top of a Web browser window that displays the URL of the current webpage. The URL, or web address, reflects the address of the current page and automatically changes whenever you visit a new webpage. Therefore, you can always check the location of the webpage you are currently viewing with the browser's address bar.
4	stands for «RDF Site Summary», but is commonly referred to as «Really Simple Syndication». It is a method of providing website content such as news stories or software updates in a standard XML format. Websites such as The Wall Street Journal and CNET's News.com provide news stories to various RSS directories that distribute them over the Internet.
5	is used to define documents with a standard format that can be read by any XML-compatible application. The language can be used with HTML pages, but XML itself is not a markup language. Instead, it is a «metalanguage» that can be used to create markup languages for specific applications. For example, it can describe items that may be accessed when a Web page loads.

6	is another name for a folder. File systems use them to organize files within a storage device, such as an HDD or SSD. For example, system files may be located in one directory, while user files may be stored in another.
7	If a directory is located within another directory, it is called a subfolder of that folder. They may refer to folders located directly within a folder, as well as folders that are stored in other folders within a folder. For example, the main directory of a file system is the root directory. Therefore, all other folders are subdirectories of the root folder.
8	is the top-level directory of a file system. The directory structure can be visually represented as an upside-down tree, so the term «root» represents the top level. All other directories within a volume are «branches» or subdirectories of the root directory.
9	in the computing world, when people talk about it, they are referring to the technical specifications, or the «tech specs» of their computer. These specs typically include processor speed, the amount of RAM, hard drive space, and the type of video card in the machine. While there are many other advanced specifications that you could list, if you know the four mentioned above, most computer geeks will grant you acceptance into their conversation.
10	defines the location of a file or folder in a computer's file system. They are also called «directory paths» because they often include one or more directories that describe the path to the file or folder.

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

UNIT 1. PRESENT SIMPLE TENSE

If you want to talk about an action which is happening in the present moment, you will be using the present simple tense. This is a tense commonly used within the English language and comes with its own set of grammar rules. It is important to understand these rules and know how to use them so that your speech is clear and comprehensive. The simple present tense of English language verbs is more complicated than the name suggests. In English grammar, the **simple present tense** is one of the verb forms associated with the present tense. The simple present tense is typically used for the following four general cases:

To express facts, general statements of truth, and common-sense ideas that everybody knows.

To state habits, customs, and events that happen periodically.

To describe future plans and events.

To tell jokes, stories, and relate sporting events in real-time.

The key thing that simple present tense verbs ARE NOT used for is to talk about an action that subject is performing in the present. That usage is more geared towards present participles.

The first person, second person, and third person plural regular verbs are straightforward and are just like the infinitive form of the verb most of the time.

The third person singular has a couple rules associated with it that may take a bit of memorization at first but will become second nature through repetition.

- To most regular verbs, add an s' at the end.
- To verbs that end in s', ss', sh', ch', th', x', z', or o', add an es'.
- To verbs that end in y', drop the y' and add ies'.

The simple present tense can be combined with several expressions to indicate the time when an action occurs periodically, such as «every Tuesday», «always», «usually», «twice a month», etc…Additionally, this form can be made negative or

can be used in the interrogative form as well. There is a lot of flexibility to this so-called simple tense to express complex ideas.

Examples of the Simple Present Tense

1. In the United States, Daylight Saving Time begins on the second Sunday in March and ends on the first Sunday in November.
2. My wife and I drink a toast to the New Year every January 1st.
3. So, a horse walks into a bar and the bartender says «Why the long face?» ….
4. My company issues promotions and raises next week.
5. The human body maintains a temperature of 98.6 degrees.
6. Do you like my cat?
7. Does my dog wake you up when he barks at night?
8. I always feed my kids before sending them off to school.
9. The best student in the class studies twice as much as anyone.
10. The chef mixes fish shrimp with steak to make the best surf' n turf' in town.

Time Expressions in the Present Simple Tense

- This evening
- At 10 am
- When
- Until
- As soon as
- After
- Before
- Twice a month
- Every Tuesday
- Often
- Sometimes

UNIT 2. PAST SIMPLE TENSE

In English grammar, the **Simple Past** (or **Past Simple)** is the basic form of the past tense. It is used principally to describe events in the past, although it also has some other uses. The simple past tense shows that an action started and completed in the past and has no relevance to the present time at all. It can also be used to describe how someone felt, what their emotional condition was, at a point in the past. There are no forms of the verb to be' or to have' with this tense as there are with others (e.g. walked). The simple past can be used with adverbs to describe a time already in the past (*e.g. I walked to the market last Saturday*) or discussing a specific point in time (*e.g. I studied today*).

Simple Past Tense with "TO BE" (was/were)

Note:

I/She/He/It + was

We/You/They + were

Was not = Wasn't

Were not = Weren't

Positive Sentence:

S + was/were + …

Example:

They were friends.

Negative Sentence:

S + was not/were not + …

Example:

They weren't friends.

Question form:

Was/Were + S + …?

Example:

Were they friends?

Simple Past Tense with Regular Verbs

Regular English verbs form the simple past in –**ed**; however, there are a few hundred irregular verbs with different forms.

Positive Sentence:

S + verb-ed + …

Example:

She worked yesterday.

Negative Sentence:

S + did not/didn't + verb (in base form) + …

Example:

She didn't work yesterday.

Question form:

Did + S + verb (in base form)?

Example:

Did she work yesterday?

Past Simple Tense with Irregular Verbs

There are a few hundred irregular verbs with different forms.

Positive Sentence:

S + irregular verb + …

Example:

They went to Spain for their holidays.

Negative Sentence:

S + did not/didn't + verb (in base form) + …

Example:

They didn't go to Spain for their holidays?

Question Form:

Did + S + (verb in base form)?

Example:

Did they go to Spain for their holidays?

Examples of the Past Simple Tense

1. My teacher taught me about the planets, moon, and stars in the third grade.

2. Our local high school held a car wash to raise money for the band.

3. I felt scared when the power went out during the thunderstorm last night.

4. My boss called me into the office to help with an outage on Sunday night.

5. I really appreciate when you gave me half your lunch yesterday.

6. While I was sleeping, the cat yowled very loudly all night long.

7. My team had a potluck' last week but forgot to send out the invitations!

8. My mom picked me up after school all week long when I had to stay for an extra practice session.

9. Dad took me to the movies and out for pizza for my birthday.

10. I was so proud the day my oldest child graduated from college with honors.

How to Use the Simple Past Tense

The Simple Past Tense Usage

The Simple Past is used:

- To express completed action in the past

Example:

I saw a ghost last Friday.

- To describe a series of completed actions in the past

Example:

I finished work, walked to the beach, and found a nice place to swim.

- To express habits in the past

Example:

When I was young, I watched lots of television every day after school.

- For stative verbs, which are verbs that do not express an action, but a state of mind or being E.g. have (own), be, think (believe), know, dislike, need, owe, understand, wish

Example:

He had a small cottage in the woods.

Time Expressions with Past Simple Tense

- *Yesterday*

- *Ago*

- *Last month*

- *Last week*

- *Last year*

- *In 2003*

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UNIT 3. FUTURE SIMPLE TENSE

If you wish to speak about an event that will happen in the future then you will need to use the simple future tense. This is a great way of adding knowledge of the English language which will enable you to talk in much more detail about things such as your future plans or things that you know are coming up.

The simple future tense indicates that an action is in the future relative to the speaker or writer. There are no inflected forms for the future in English (nothing like those **–ed** or **-s** endings in the other tenses).

The formula for the future simple is **will + V(Base form)**.

Positive Sentence

S + will + V(Base form) + object…

Example:

*I **will go** to Thailand.*

Negative Sentence

S + will not/won't + V(Base form) + object…

Example:

*I **will not go** to Thailand.*

Question form

Will + S + V(Base form) +…?

Example:

***Will** you **go** to Thailand?*

How to Use the Simple Future Tense

Learn how and when to use the future simple tense in English with helpful grammar rules, example sentences, videos and ESL worksheets.

The future simple tense is used:

For Actions Decided at the moment of Speech

Example:

*I have a toothache. I**'ll take** a medicine.*

For Unplanned Future Actions

Example:

*Winter **will come** soon.*

For Offering, Asking for a Request Promising, Ordering, Threatening

Example:

*I'm afraid we **will get** wet.*

For Unpreventable Actions in Future

Example:

*Summer **will come** soon.*

With Conditional, Time and Purpose Clauses

Example:

*When I arrive at home, I **will call** you.*

For Thoughts, Predictions, Assumptions, Sureness, Fears about Future

Example:

*I promise I **won't tell** this anyone.*

UNIT 4. REVISION OF TENSES

Time clauses are used in English to demonstrate a period of time based on an action or event, similar to dependent clauses in conditional sentences. Time clauses are grammatical units that require subjects, verbs and objects, but they do not always use the same verb rules as the main clause. Verb tense tells you when the action happens. There are three main verb tenses: present, past, and future. Each main tense is divided into simple, progressive, perfect, and perfect progressive tenses.

	Present	**Past**	**Future**
Simple	finish	finished	will finish
Progressive	am/is/are finishing	was/were finishing	will be finishing
Perfect	have/has finished	had finished	will have finished
Perfect Progressive	have/has been finishing	had been finishing	will have been finishing

Verb Tense Overview with Examples

Present Simple	**Present Continuous**	**Present Perfect**
I study English every day. She studies English every day. He doesn't study very often. Do you study every day? *Habits, routines, generalities, states; permanent*	I am taking guitar lessons. You aren't studying chemistry today. Is she reading that book at the moment? *Actions happening now or around now; temporary*	I have studied English in several countries. She hasn't lived here for long. Have you studied chemistry before? *Past action with unspecified time; action starting in the past and continuing now*
Past Simple	**Past Continuous**	**Past Perfect**
Two years ago, I studied English in England. He didn't study yesterday. Did you study for the test? *Past, finished, we know when it happened*	I was studying math when you called. What were you studying last night? *Interrupted temporary past action.*	I had studied for 4 hours when they told me the test was cancelled. *Lasting past action interrupted by another action.*
Future Simple	**Future Continuous**	**Future Perfect**
I'll study for the test tonight. Will you study with me tomorrow? *Decision at moment of speaking* I am going to study theatre next year. *Decision before moment of speaking*	I'll be studying when you arrive. Will you be studying Friday morning? *A continuous action, interrupted in the future;* *a complete action that will happen in the normal course of events.*	By 10pm, I'll have studied everything I need to for the test. *An action that will finish before a certain unspecified time in the future.*

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UNIT 5. SEQUENCE OF TENSES

Sequence of tenses (known in Latin as consecutio temporum, and also known as agreement of tenses, succession of tenses and tense harmony) is a set of grammatical rules of a particular language, governing the agreement between the tenses of verbs in related clauses or sentences.

A typical context in which rules of sequence of tenses apply is that of indirect speech. If, at some past time, someone spoke a sentence in a particular tense (say the present tense), and that act of speaking is now being reported, the tense used in the clause that corresponds to the words spoken may or may not be the same as the tense that was used by the original speaker. In some languages the tense tends to be «shifted back», so that what was originally spoken in the present tense is reported using the past tense (since what was in the present at the time of the original sentence is in the past relative to the time of reporting). English is one of the languages in which this often occurs. For example, if someone said "I need a drink", this may be reported in the form "She said she needed a drink", with the tense of the verb need changed from present to past.

The «shifting back» of tense as described in the previous paragraph may be called backshifting or an attracted sequence of tenses. In languages and contexts where such a shift does not occur, there may be said by contrast to be a natural sequence.

In English, an attracted sequence of tenses (backshifting) is often used in indirect speech and similar contexts. The attracted sequence can be summarized as follows: If the main verb of a sentence is in the past tense, then other verbs must also express a past viewpoint, except when a general truth is being expressed.

For example, if Batman spoke the following words:

I need a special key for the Batmobile.

the speech act may be reported using the following words:

Batman said that he needed a special key for the Batmobile.

with the present tense need replaced by the past tense needed, since the main verb of saying (said) is in the past tense.

In some cases, though, a natural sequence of tenses is more appropriate. Here the tense of a verb in a subordinate clause is not determined by the tense of the verb in the superordinate clause, but is determined simply according to the sense of the clause taken apart from the rest of the sentence. The rule for writers following the natural sequence of tenses can be expressed as follows: imagine yourself at the point in time denoted by the main verb, and use the tense for the subordinate verb that you would have used at that time. Thus the tense used in the indirect speech remains the same as it was in the words as originally spoken. This is normal when the main verb is in the present or future tense (as opposed to past tense or conditional mood). For example:

Batman says that he needs a special key for the Batmobile. (main verb in present tense)

Batman has said that he needs a special key for the Batmobile. (main verb in present perfect, not past tense, so no backshifting)

However it is also possible to use the natural sequence even if the main verb is past or conditional:

Batman said that he needs a special key for the Batmobile.

This option is more likely to be used when the circumstance being expressed remains equally true now as it did when the speech act took place, and especially if the person reporting the words agrees that they are true or valid.

Debate amongst grammarians over the appropriateness of the two types of sequence of tenses goes back as far as the 18th century. Use of the attracted sequence sometimes leads to additional problems when the grammatical construction of indirect speech includes an incorporated quotation – that is, when an attempt is made (though using indirect rather than direct speech) to report the words actually spoken. For example, if a minister spoke the words "Such a policy is not without its drawbacks", then a writer may attempt to report this as follows:

The minister admitted that «such a policy is not without its drawbacks».

Using quotation marks to denote that that portion of the sentence represents the minister's actual words. This, however, requires use of the natural sequence of tenses, which might not be felt appropriate in the given situation. There are various possible solutions to this problem:

Rearrange the sentence so that the incorporated quotations become set off, possibly as direct speech:

The minister did not claim perfection: «such a policy is not without its drawbacks», he admitted.

Cut down the incorporated quotation to exclude the verb:

The minister admitted that such a policy was «not without its drawbacks».

Use square brackets to indicate where the words deviate from those actually spoken:

The minister admitted that «such a policy [was] not without its drawbacks».

Similar problems arise from the other changes that typically occur in indirect speech, such as changes of pronoun (depending on speaker), etc.

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UNIT 6. REPOSITIONS

PREPOSITIONS OF PLACE

A preposition of place is a preposition which is used to refer to a place where something or someone is located.

Preposition of place examples:

- ***In*** *America*
- ***In*** *a car*
- ***On*** *a plane*
- ***On*** *the Internet*
- ***At*** *the corner*
- ***At*** *the bus stop*

Prepositions of Place List

Learn useful list of prepositions of place in English with meaning and example sentences.

Above

Meaning:

At or to a higher place or position than something/somebody

Example:

*Our friends in the apartment **above** us are really noisy.*

After

Meaning:

One follows the other

Example:

*He ran **after** her with the book.*

By

Meaning:

Near or at the side of

Example:

*The telephone is **by** the window.*

Beneath

Meaning:

Under someone or something

Example:

*Jaime hid the letter **beneath** a pile of papers.*

Next to/ Beside

Meaning:

At the side of someone or something

(**Beside** and **next to** have the same meaning. The only difference between **beside** and **next to** is their level of formality; **beside** is generally considered to be more formal than **next to**.)

Examples:

*We lay **beside** the pool to dry off in the sun.*

*The hotel is situated **next to** the lively bustling port.*

Near/ Close to

Meaning:

***Near/ Close to** is a short distance from a person or thing*

Examples:

*There is a bush **near** the school playground.*

*The new shopping center is **close to** the railway station.*

Between

Meaning:

Something in or through the space that separates two things, objects, or places

Example:

*There is a gulf **between** the two cities.*

Among

Meaning:

In the middle of or surrounded by other people or things

Example:

*The girl quickly disappeared **among** the crowd.*

In front of

Meaning:

Farther forward than someone or something else

Example:

*They massed **in front of** the city hall.*

Behind

Meaning:

At or towards the back of a thing or person

Example:

*The horse fell **behind** in the race.*

Across from/ Opposite

Meaning:

In a position facing someone or something but on the other side

Example:

*The hospital is **opposite** the post office.*

*The shoe store is **across from** the bank.*

Under

Meaning:

Below or at a lower level than something, or covered by something

Example:

*We slept **under** the open sky.*

Below

Meaning:

In a lower place or position than something else

Example:

*He dived **below** the surface of the water.*

Over

Meaning:

Above or higher than something, without touching it

On something or covering it

Example:

*She held the umbrella **over** both of us.*

Prepositions of Place IN ON AT

In order to describe place, the prepositions at, on, and in go from GENERAL to SPECIFIC.

Prepositions of Place: IN

For describing place, the preposition **IN** is used for the largest or most general places. You can say that "*I lived **in** London as a child.*" And "*He's a very famous person **in** Chinatown.*"

In + Countries

Examples:

In England

In America

In + Cities

Examples:

In London

In New York

In + Neighborhood

Examples:

In Manhattan

In Chinatown

In + Enclosed Space

Examples:

In a traffic jam

In a building

In a car

Prepositions of Place: ON

The preposition **ON** is used for more specific places, like certain streets. You can say that «*He took a northbound trolley **on** State Street*».

On + Means of transport

Examples:

On a bus

On a train

On a plane

On + Communications

Examples:

On the radio

On the television

On the phone

On the Internet

On + Surfaces

Examples:

On a table

On a wall

On the floor

On the roof

Prepositions of Place: AT

At + Exact Addresses or Intersections

Examples:

At 23 Birch Street

At 734 State Street

At + Specific Locations/ Points

Examples:

At The Empire State Building

At the corner

At the bus stop

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PREPOSITIONS OF TIME

What is a Preposition of Time?

A preposition of time is a preposition that allows you to discuss a specific time period.

Preposition of time examples:

- ***On*** *Monday*
- ***On*** *a cold day*
- ***At*** *night*
- ***At*** *the moment*
- ***In*** *January*
- ***In*** *the past*

List of Prepositions of Time with Examples

Learn prepositions of time list with useful grammar rules and example sentences.

During

Used when something happens within the time something else is happening

Example:

*We stayed at a student hostel **during** the conference.*

For

We use **for** with a period of time.

Example:

*I'm just going to bed **for** two hours or so.*

Until/ Till

Until/ till means up to a certain time

Example:

*We'll wait **till/ until** half past six for you.*

Since

Refers back to a point in time when something began.

Example:

*The factory has been here **since** the 1970s.*

From…to

We use **from…to** to show when something starts and finishes.

Example:

*Her visit will extend **from** Monday **to** Thursday.*

Ago

We use **ago** to refer to how far back in time something happened

Example:

*He left the house over an hour **ago**.*

Before

We use **before** to refer to any time previous to a specific point in time

Example:

*She's always up **before** dawn.*

By

We use **by** when we want to say "*not later than*".

Example:

*He had promised to be back **by** five o'clock.*

After

We use **after** when we want to say «*later in time than*».

Example:

*I felt fairly relaxed **after** taking the medicine.*

To

We use **to** in telling the time, when we refer to the number of minutes before the hour.

Example:

*It's a quarter **to** two.*

We can use **to** with the meaning of «until» when we are talking about time.

Example:

*It's just three days **to** Halloween.*

Past

Refers to the amount of time past the hour

Example:

*It's five **past** ten.*

Between…and

We use **between … and** to talk about time that separates two points.

Example:

*The team have a lot of work to do **between** now **and** Sunday.*

Within

Refers to a span of time during which something may occur.

Example:

*You should receive a reply **within** seven days.*

Prepositions of Time IN ON AT

In order to describe time, the prepositions **in**, **on**, and **at** go from **GENERAL** to **SPECIFIC**.

Prepositions of Time: IN

Native speakers use the preposition IN to refer to a general, longer period of time.

In + Parts of the day

Examples:

In the morning

In the afternoon

In the evening

In + Months

Examples:

In January

In February

In December

In + Seasons

Examples:

In (the) spring

In (the) summer

In (the) fall/autumn

In (the) winter

In + Years

Examples:

In 1980

In 1968

In + Decades

Examples:

In the 1960s

In the seventies

In + Centuries

Examples:

In the 15th century

In the 21st century

In + Weeks

Examples:

In a week

In 2 weeks

In + Periods of time

Examples:

In the past

In the next century

In the future

In the 10 years time

In the middle ages

In a few minutes

In a moment

In an hour

In 3 hours

In six months

In a year

In + Holidays

Example:

In the Easter holiday

Prepositions of Time: ON

Moving to more specific periods of time, the preposition ON is used.

On + Days

Examples:

On Monday

On Thursday

On Sunday

On + Dates

Examples:

On April 3rd

On 1st January 2013

On the 10th

On the first day

On the last day

On + Holidays with "day"

Examples:

On New Year's day

On Christmas day

On Easter day

On + Specific days

Examples:

On my birthday

On holiday

On my wedding day

On that day

On + Day + Part of day

Examples:

On Sunday morning(s)

On Friday afternoon(s)

On Monday evening(s)

On + Time

Examples:

On the weekend (U.S.)

On weekdays

On time

On a summer evening

On a cold day

On my lunch break

Prepositions of Time: AT

English speakers use the preposition AT for the most specific times.

At + Hours

Examples:

At 7 am

At 12 o'clock

At 5 pm

At + Parts of the day

Examples:

At night

At noon/ midday

At midnight

At bedtime

At lunch time

At dinner time

At dinner

At lunch

At sunrise/sunset

At dawn

At + Holidays without "day"

Examples:

At Easter

At Christmas

At New Year

At + Time

Examples:

At present

At the weekend (U.K)

At breakfast

At the moment

At this moment

At the same time

At that time

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VOCABULARY

A

account	/ˈəkaʊnt/	N. A registration for a user of a network system. It is used for controlling access to the system	обліковий запис
address bus	/əˈdres bʌs/	N. The set of conductors that carry the memory address signals between different parts of a computer system	адресна шина
algorithm	/ˈælgərɪðm/	N. A set of precise rules or instructions for solving a problem	алгоритм
analogue signal	/ˈænəlɒg ˌsɪgnəl/	N. A type of signal that can take any value between a maximum and a minimum	аналоговий сигнал
anti-virus	/ˌæntɪ ˈvaɪrəs/	N. A computer program or set of programs used to detect, identify and remove viruses from a computer system	антивірус
applet	/ˈæplət/	N. A very small self-contained computer program	мережева прикладна програма
application	/ˌæplɪˈkeɪʃn/	N. See applications program	прикладна програма
architecture	/ˈɑːkɪtektʃə(r)/	N. The general specification of a system	архітектура
artificial intelligence	/ˌɑːtɪfɪʃl ɪnˈtelɪdʒəns/	N. An area of computing concerned with developing computer programs that perform tasks that can normally only be done using human intelligence	штучний інтелект
asynchronous	/ˈeɪˌsɪŋkrənəs/	Adj. Not synchronised, i.e. occurring at irregular intervals	асинхронний, не синхронний
authenticatio n	/ɔːˌθentɪˈkeɪʃn/	N. A process that checks the identity of a user or an object	аутентификация

B

back up	/bæk ˈʌp/	V. To store a copy of data on a storage device to keep it safe	Виконувати резервне копіюванне.Поверт ати базу даних у стан перед збоєм
backbone	/ˈbækbəʊn/	N. The main transmission path handling the major data traffic connecting different LANs together	Магістральний кабель, опорна мережа
bandwidth	/ˈbændwɪdð/	N. The range of frequencies that can be transmitted over a communications channel	Пропускна здатність
barcode	/ˈbaːkəʊd/	N. A sequence of vertical parallel lines used to give items a unique identification number	Штрих-код
batch mode	/ˈbætʃ məʊd/	N. A process in which all the data is collected and processed together in a batch rather than one at a time as they become available	Пакетний режим

binary	/ˈbaɪnərɪ/	N. A number system that only uses two digits, i.e. 1 and 0	двійковий
bit	/bɪt/	N. A small unit of storage capacity. One of the eight binary digits that make up a byte. The term comes from an abbreviation of binary digit	Біт
bookmark	/ˈbʊkmɑːk/	V. To store a link to a webpage to make it easier to find in the future	Закладка
boot	/buːt/	V. To copy a part of the operating system into memory to allow a computer to start up	(початкове) завантаження
bridge	/brɪdʒ/	N. A hardware and software combination used to connect the same type of networks or to partition a large network into two smaller ones	Міст (апаратно-програмний пристрій)
broadband	/ˈbrɔːdbænd/	Adj. Able to carry signals transmitted over a wide range of frequencies	Широкополосна передача
browser	/ˈbraʊzə(r)/	N. A program used for displaying webpages	Веб-браузер (засіб перегляду веб-сторінок в мережі Інтернет)
buffering	/ˈbʌfərɪŋ/	N. A process of temporarily storing data from a fast Source so that it can be fed at a steady rate to a slower system	буферизація
bug	/bʌg/	N. A fault in a system	Помилка (в програмі), збій
bus	/bʌs/	N. A set of conductors that carry signals between different parts of a computer	Шина
byte	/baɪt/	N. A unit of storage capacity. A byte is made up of eight bits and stores one character, i.e. a letter, a number, a space or a punctuation mark	байт

C

cache	/kæʃ/	N. Fast memory used to temporarily store frequently-used data to allow it to be accessed more quickly	Кеш-пам'ять
cathode ray tube	/ˌkæθəʊd rei ˈtjuːb/	N. A display device that uses an electron gun to fire a beam of electrons at a phosphor-coated screen	Електроно-променева трубка (ЕПТ)
central processing unit	/ˌsentrəl ˈprəʊsesiŋ juːnit/	N. The electronic processor at the centre of a computer. The term is sometimes used to refer to the combination of the processor and the main memory	Центральний процесор
channel	/ˈtʃænəl/	N. A path for the transmission of data	Канал, канал зв'язку
chat room	/ˈtʃæt ruːm/	N. A virtual space on a website where online discussions organized around specific interests are held in real-time by users typing text messages	Чат форум
checksum	/ˈtʃeksʌm/	N. A calculated value that is stored with data to detect any errors that may occur when the data is copied or transmitted	Контрольна сума

chip	/tʃip/	N. Common name for a microchip. An electronic integrated circuit in a small package	Мікросхема
client	/ˈklaiənt/	N. A network computer used for accessing a service on a server	клієнт
clock	/klɒk/	N. Electronic circuits used to control the timing of signals and synchronise different parts of a computer system	Генератор синхроімпульсів, тактовий генератор, годинник
cluster	/ˈklʌstə(r)/	N. A term used in data mining meaning a group of data that has similar features or is based on a limited data range	Кластер
coaxial cable	/ˈkəʊæks/	N. A type of shielded cable for carrying signals. It is often used with radio frequency and video signals	Коаксіальний кабель
code	/kəʊd/	N. A piece of program text written in a programming language	Код програми
compatible	/kəmˈpætəbl/	Adj. Able to operate on the same type of system or run the same software	Сумісний
compiler	/kəmˈpailə(r)/	N. A program that converts the whole of a program into machine code before the program is used	Компілятор
compress	/kəmˈpres/	V. To reduce to a much smaller size	Стискати, ущільнювати (дані)
computer	/kəmˈpju:tə(r)/	N. A general purpose machine that can be programmed to process data in a variety of ways	Комп'ютер
computer language	/kəmˈpju:tə ˌlæŋgwidʒ/	N. A language used for writing computer programs	Мова програмування
computer-aided design	/kəmˌpju:tər ˌeidid diˈzain/	N. The process of designing using a computer program computer-aided manufacture	Автоматизоване проектування
computer-aided manufacture	/kəmˌpju:tər ˌeidid mænjəˈfæktʃə(r)	N. The process of manufacturing goods using a computer	Автоматизоване (комп'ютерізоване) виробництво
configure	/kənˈfigə(r)/	V. To adjust the settings	Конфігурувати, задати конфігурацію
control bus	/kənˈtrəʊl bit/	N. The set of conductors that carry the control signals between the Control Unit and other parts of a computer	Шина керування
corrupt	/kəˈrʌpt/	V. To damage in such a way that prevents normal use	Руйнувати, ушкоджати, псувати
crack	/kræk/	V. To break into a computer system in order to steal information or cause damage	Зламувати
crash	/kræʃ/	V. To fail suddenly and completely usually referring to the failure of a hard disk	Фатальний збій
cursor	/ˈkɜ:sə(r)/	N. A symbol on the monitor screen that indicates the point on the screen that is being used	Курсор
cybernetics	/ˌsaibəˈnetiks/	N. The study of control and communication in animals and machines. It is used in the design of robots	Кібернетика

D

data	/ˈdeitə/	N. The information processed by a computer	Дані
database	/ˈdeitəbeis/	N. A type of applications program used for storing information so that it can be easily searched and sorted	База даних (БД)
debug	/ˌdiːˈbʌg/	V. To find and fix faults in a program or system	Налагодження
decipher	/diˈsaifə(r)/	V. To change coded information into normal text	Расшифровувати, дешифрувати
decode	/ˌdiːˈkəʊd/	V. To decide what a program instruction means	Декодувати
decompress	/ˌdiːkəmˈpres/	V. To remove the compression, i.e. to expand to its original size	Распаковувати
decrypt	/ˌdiːˈkript/	N. To recover the original text from an encrypted message	Розшифровувати
default	/diˈfolt, -fɔːlt/	N. An initial setting that can be changed by the user	Значення за умовчанням
denial of service attack	/diˌnaiəl əv ˈsɜːvis əˌtæk/	N. A type of computer crime that involves swamping a server with large numbers of requests	Відмова надійшовшого запиту
desktop	/ˈdesktɒp/	N. The main graphical user interface background screen that displays icons for other programs	"Робочий стіл"
desktop PC	/ˈdesktɒp/	N. A personal computer that is designed to be used on an office desk	Настільний комп'ютер
development life cycle	/diˈveləpmənt ˈlaif ˌsaikl/	N. The phases a software product goes through from when it is first thought of until it becomes obsolete. This typically includes: requirements analysis, design construction, testing (validation), installation, operation, maintenance and retirement	Розробка усіх стадій програмного продукта
digital	/ˈdidʒitəl/	Adj. An electronic system that has only two states, e.g. off or on	Цифровой
directory	/dəˈrektəri, di-, dai-/	N. A storage area used for grouping files so that they can be easily located. A directory is sometimes called a folder	Каталог
disk drive	/ˈdisk draiv/	N. A storage device for reading from and writing to disks	Дисковод
domain name	/dəˈmein neim/	N. An identifier used on the Internet in place of the numerical Internet address. It identifies the host, the type and the country code, e.g. holyrood.ed.ac.uk	Доменне ім'я
dot-matrix printer	/dot ˈmeitrix ˌprintə(r)/	N. A printer that prints by hammering pins onto an inked ribbon	Матричний принтер
download	/daʊnˈləʊd/	V. To copy a file from a server to a client computer in a network	Завантажувати, скачувати
driver	/ˈdraivə(r)/	N. A systems program that controls a peripheral device	Драйвер
duplex	/ˈdjuːpleks/	Adj. Able to transfer data in both directions, i.e. can send and receive data	Подвійний, двосторонній

E

earphone	/ˈiəfəʊn/	N. Sound output device that fits into the ear of the user	Навушник
editor	/ˈeditə(r)/	N. A computer program for making changes to test in computer programs or data	Редактор
electronic publisher	/elekˌtronik ˈpʌbliʃə(r)/	N. An organisation that produces e-books	Електронне видавництво
email address	/ˈiːmeil əˌdres/	N. The unique address code used to contact someone using electronic mail	Адрес електронної пошти
email attachment	/ˈiːmeil əˌtætʃmənt/	N. A file that is attached to an email message	Додаток (до електронного листа)
encapsulation	/enˌkæpsjʊˈleiʃn/	N. A key feature of object-oriented programming that bundles data and program instructions into modules called objects	інкапсуляція
encode	/ˌenˈkəʊd/	V. To write information in a coded form	Кодування
encrypt	/ˌenˈkript/	V. To transform data into coded form to make it secure	Шифрувати
ethernet	/ˈiːθənet/	N. A widely-used local area network standard that broadcasts packets of data that are addressed to particular devices on the network. Each device on the network reads the address and passes it on to the correct device	Мережа Ethernet
execute	/ˈeksikjuːt/	V. To perform a computer operation by processing a program instruction	Виконувати
expansion card	/ikˈspænʃn kɑːd/	N. An electronic circuit board used for adding facilities to a computer	Плата розширення
expert system	/ˈekspɜːt ˌsistəm/	N. An artificial intelligence program that collects and uses human expertise to allow non-experts to solve specialised problems	Експертна система (ЕС)
extensible markup language	/ikˌstensəbl ˈmɑːk ʌp ˌlæŋgwidʒ/	N. A metalanguage that allows developers to create their own set of customised tags that identify the meaning and structure of data. It is used for creating files that are program-independent, platform-independent and able to be used with different languages	Розширювана мова розмітки

F

fault tolerance	/fɔːlt ˌtɒlərəns/	N. A computer's ability to recover from hardware errors	Відмовостійкість
fetch	/fetʃ/	V. To go and get the next instruction or piece of data from memory	Вибирати слідуючу команду чи частину даних із пам'яті
field	/fiːld/	N. A section of a database where an item of data is stored.	Поле.
file	/faɪl/	N. A computer program or data stored on a storage device	Файл.
file transfer	/ˌfaɪl ˌtrænsfə:	N. An Internet service that allows users to transfer files from	Протокол передачі

protocol	/ˈprəʊtəkɒl/	one computer to another.	файлів.
firewall	/ˈfaɪəwɔːl/	N. A combination of hardware and software used to control the data going into and out of a network. It is used to prevent unauthorised access to the network by hackers	Брандмауер
floppy disk drive	/ˈflɒpɪ draɪv/	N. A common magnetic storage device that reads and writes data on a floppy disk. Also known as a diskette drive	Накопичувач на гнучких магнітних дисках
flowchart	/ˈfləʊtʃɑːt/	N. A kind of diagram used by programmers to show the logical steps in the design of a system	Блок-схема
folder	/ˈfəʊldə(r)/	N. See directory	Папка, каталог, директорія
frame	/freɪm/	N. A section of a webpage that acts as an independent browser window. Clicking on a link in one frame can cause a webpage to be displayed in another frame, e.g. A menu in one frame can provide links to webpages that are displayed in another frame.	Фрейм, кадр
freeware	/ˈfriː weə(r)/	N. Computer programs that are made available to anyone who wants to use them at no cost to the user	Вільні програмні засоби
frequency band	/ˈfriːkwənsɪ bænd/	N. A set of frequencies that are used together to provide a path for the transmission of signals	Полоса частот
full-duplex	/ˈful ˌdjuːpleks/	Adj. Able to transfer data in both directions simultaneously, i.e. data can be transmitted and received at the same time	Повнодуплексний

G

games console	/ˈgeɪmz ˌkɒnsəul/	N. An electronic device used for playing computer games	Ігрова консоль (приставка)
gateway	/ˈgeɪtweɪ/	N. An interface that enables dissimilar networks to communicate such as two LANs based on different topologies or network operating systems	Шлюз
general-purpose language	/ˌdʒenrəl ˌpəːpəs ˈlæŋgwɪdʒ/	N. A computer language that can be used to write different types of programs	Універсальна мова
gigabit	/ˈgɪgəbɪt/	N. A unit of storage capacity equal to 1 073 741 824 bits	Гігабіт
gigabyte	/ˈgɪgəbaɪt/	N. A unit of storage capacity equal to 1 073 741 824 bytes	Гігабайт
gigahertz	/ˈgɪgəhəːts/	N. A unit of frequency equal to one thousand million hertz (cycles every second)	Гігагерц
global positioning system	/ˌgləʊbl pəˈzɪʃnɪŋ ˌsɪstɪm/	N. A system that determines the user's location by comparing radio signals from several satellites	Система глобального позиціонування
graphic equaliser	/ˌgræfik ˈiːkwəˌlaɪzə/	N. An electronic device that uses slider controls to adjust the frequency response of an audio system	Еквалайзер
graphical	/ˌgræfikl	N. The part of an operating system that allows the user to	Графічний

user interface	ˈɪntəfeɪs/	interact with a computer using graphic images and cursor	інтерфейс

H

hacker	/ˈhækə/	N. A skilled programmer who attempts unauthorised access to a network system	Хакер
handheld computer	/ˈhændheld/	N. A small portable computer that can be held in one hand	Кишеньковий комп'ютер
hard disk drive	/ha:d dɪsk draɪv/	N. A common magnetic storage device that reads and writes data on metal disks inside a sealed case	Накопичувач на жорсткому диску
hardware	/ˈha:dwɛə(r)/	N. The physical components of a computer system	Апаратне забезпечення
header	/ˈhedə(r)/	N. The first section of a message that contains information about the content and transmission of the message including the sending and destination addresses	Заголовок
headphone	/ˈhedfəun/	N. Sound output device that fits over the ears of the user	Навушники
help-desk	/ˈhelpdesk ˈhelplaɪn/	N. A telephone service for helping users solve problems that occur on computer systems	Інформаційно-довідкова служба
high-end package	/ˌhaɪ ˈend ˌpækɪdʒ/	N. A set of computer programs with a wide variety of complex features	Пакет програм з широкими функціональними можливостями
high-level language	/ˌhaɪ ˌlevl ˈlæŋgwɪdʒ/	N. A programming language closer to human language than low-level computer languages such as machine code or assembly language	Мова високого рівня
homepage	/ˈhəumpeɪdʒ/	N. The main start page of a website	Початкова (головна) сторінка
host	/həust/	N. A computer that provides a service on a network / a program that carries a virus	Хост, головний комп'ютер
hub	/hʌb/	N. An electronic device at the centre of a star network topology	Концентратор
hyperlink	/ˈhaɪpəlɪŋk/	N. A text or image in the webpage that causes a related webpage to be displayed or another program to be started when the user clicks on the hyperlink using the mouse	Гіперссилка
hypertext markup language	/ˌhaɪpətekst ˈma:kʌp ˌlæŋgwɪdʒ/	N. A page description language that has a set of tags that can be inserted into a document to make it act as a webpage. The tags determine how the document is displayed on the screen and marks the position of hyperlinks	Мова розмітки гіпертексту

I

I/O	/aɪ ˈəɔ/	N. Abbreviation for input/output	Ввід/вивід

icon	/ˈaɪkɔn/	N. A small picture used in a WIMP system to represent a program folder or file	Піктограма, іконка
i-frame	/ˈaɪ freɪm/	N. The common name for an intra frame in an MPEG compressed file	Внутрішній кадр
image editor	/ˈɪmɪʤ ˌedɪtə(r)/	N. A computer program that allows the user to make changes to images	Редактор зображень
information technology	/ˌɪnfə ˌmeɪʃn tekˈnɔləʤɪ/	N. The study and practice of techniques or use of equipment for dealing with information	Інформаційна технологія
input device	/ˈɪnput dɪ ˌvaɪs/	N. A piece of equipment used for putting data into a computer	Вхідний пристрій, пристрій вводу
instruction	/ɪnˈstrʌkʃn/	N. One line of a computer program	Інструкція
interactive	/ɪntərˈæktɪv/	Adj. Allows two-way communication so that user can respond or interact with the system	Інтерактивний, діалоговий
interface	/ˈɪntəfeɪs/	N. The hardware or software that connects two systems and allows them to communicate with each other	Інтерфейс
Internet protocol	/ˌɪntənet ˈprəutəkəl/	N. The basic set of standards for enabling computers to communicate over the Internet	Протокол Internet
Internet service provider	/ˌɪntənet ˈsəːvɪs prə ˌvaɪdə/	N. An organization that provides Internet connections for a fee	Поставщик послуг Інтернет
Internet	/ˌɪntənet/	N. The connection of computer networks across the world	Інтернет
intranet	/ˈɪntrənet/	N. A computer network that is internal to an organization that uses the TCP/IP protocol in the same way as the Internet	Внутрішня мережа
iteration	/ɪtəˈreɪʃn/	N. A process that is repeated as a long as certain conditions remain true	Ітерація; цикл

J

JavaScript	/ˈʤaːvəskrɪpt/	N. A scripting language that allows simple programs to be embedded into HTML documents	Мова сценаріїв, створена на основі мови Java
JPEG	/ˈʤeɪ peg/	N. Abbreviation for joint photographic experts group the comittee that devised a common standard for image file format and compression	Об'єднана група експертів в області фотографії
JUMP command/instruction	/ˈʤʌmp kə ˌmaːnd ɪn ˌstrʌkʃn/	N. A programming instruction that causes a program to change its normal sequence	Команда переходу
junk email	/ʤʌŋk ˈiːmeɪl/	N. Unwanted and unsolicited email that is normally advertising or trying to sell something	Спам

K

kernel	/ˈkə:nəl/	N. The lowest level layer at the core of an operating system. It deals with allocating hardware resources to the rest of the operating system and the application programs	Ядро (операційної системи)
keyboard	/ˈkɪ:bɔ:d/	N. The main electronic input device that has keys arranged in a similar layout to a typewriter	Клавіатура
keyword	/ˈkɪ:wə:d/	N. A word used to categorise documents or records in a file. Keywords can be used by a search engine to find relevant links on the Internet	Ключове слово
knowledge base	/ˈnɔlɪdʒ beɪs/	N. A collection of information that can be easily modified, revised and manipulated to enable the user to solve particular problems	База знань

L

language processor	/ˈlæŋgwɪdʒ ˌprəusesə(r)/	N. Software that performs computer language translation	Мовний процесор
laptop computer	/ˈlæptɔp/	N. The largest type of portable computers	Найбільший тип портативних комп'ютерів
laser printer	/ˈleɪzə ˌprɪntə(r)/	N. A printer that prints using tone powder and laser light on a photosensitive drum	Лазерний принтер
line size	/ˈlaɪn saɪz/	N. The amount of data transferred each time there is a transfer between the main memory and cache memory	Довжина строки
link	/lɪŋk/	N. A common term used for a hyperlink, i.e. the connection of a webpage to another webpage or file	Ссилка, лінк
Linux	/ˈlaɪnʌks/	N. A clone of the Unix operating system created by Linux Torwalds for use on personal computers	Операційна система Linux
Linux distribution	/ˈlaɪnʌks dɪstrɪˌbju:ʃn/	N. The Linux-user term for a complete operating system kit complete with the utilites and applications needed to make it do useful things, e.g. command interpreters, programming tools, text editors, typesetting tools and graphical user interfaces	Дистибутив Linux
load	/ləud/	V. To copy a program from a storage device into the computer's memory	Завантажувати, скачувати
local area network	/ˌləukl ˌɛərɪə ˈnetwə:k/	N. Computers connected together over a small area such as company department	Локальна мережа
log on	/lɔg ˈɔn/	V. To connect to a network system account normally using a password	Вхід в мережу
logic circuit	/ˈlɔdʒik ˌsə:kɪt/	N. A digital electronic circuit that compares two or more inputs and gives an output according to a particular rule of logic	Логічна схема
look-up table	/ˈluk ʌp ˌteɪbl/	N. A method by which a program uses two set of related records to find a required value. It is quicker than calculating the value using a formula but takes up more memory space	Таблиця пошуку
low-level	/ˌləu levəl	N. A computer language such as maschine code or assembly	Мова низького

| language | /ˈlæŋgwɪdʒ/ | language that is closer to the form that a computer understands than to that of a human language | рівня |

M

machine code	/məˈʃiːn kəud/	N. A computer language that consists entirely of a combination of 1s and 0s	Машинний код
magnetic tape	/mægˌnetɪk ˈteɪp/	N. A magnetic storage mediun in the form of a thin plastic ribbon wound on a reel or a cassette. It is commonly used for backing up data	Магнітна стрічка
mail client	/ˈmeɪl ˌklaɪənt/	N. An email program that connects to an email server to send and receive email	Поштовий клієнт
mailmerge	/ˈmeɪlməːdʒ/	N. A wordprocessing facility that causes a mailing list to be automatically combined with a standard letter to produce a separate copy of the letter addressed to each person on the mailing list	(Автоматичне) створення стандартих листів
main memory	/ˌmeɪn ˈmeməri/	N. The electronic memory that holds the programs and data being used	Основна пам'ять, основний запам'ятовуючий пристрій
mainframe computer	/ˈmeɪnfreɪm/	N. The largest and most powerful type of computer. It is operated by a team of professionals	Мейнфрейм
markup language	/ˈmaːkʌp ˌlæŋgwɪdʒ/	N. A set of tags that can be inserted into a document to indicate its layout and appearence	Мова гіпертекстової розмітки, мова HTML
megabyte	/ˌmegəbaɪt/	N. A unit of storage capacity equal to 1 048 576 bytes	Мегабайт
megahertz	/ˈmegəhəːts/	N. A unit of frequency equal to 1 million cycles every second.	Мегагерц
memory	/ˈmeməri/	N. The electronic part of a computer system that is used for temporarily storing the programs and data that are being used by the processor	Пам'ять; запам'ятовуючий пристрій
menu	/ˈmenjuː/	N. A list of options displayed on a computer screen	Меню
menu bar	/ˈmenjuː baː(r)/	N. A row of the icons on a display screen that open up menus when selected	Рядок меню
message-integrity scheme	/ˌmesɪdʒ ɪnˈtegrɪti skiːm/	N. A system that allows the receiver of a message to detect whether someone has tampered with the message in transit	Схема перевірки цілісності повідомлення
metadata	/ˈmetədeɪtə/	N. Data about data in the document	Метадані
metalanguage	/ˈmetəlæŋgwɪdʒ/	N. A language from which you can create other languages	Мета-мова
microchip	/ˈmaɪkrəutʃɪp/	N. An electronic integrated circuit in a small package	Чіп, мікрокристал
microcomputer	/ˈmaɪkrəukəmˌpjuːtə/	N. A personal computer. Smaller and less powerful than a mainframe or a minicomputer	МікроЕОМ, мікрокомп'ютер
microprocessor	/ˌmaɪkrəuˈprəusesə(r)/	N. The main electronic chip in a computer. It can be through of as the 'brain' of the computer because it does the main	Мікропроцесор

		processing and controls the other parts of the computer. It is sometimes called CPU.	
microwave	/ˈmaɪkrəuweɪv/	N. A high-frequency electromagnetic wave used in data communication systems	Мікрохвиля
mobile phone	/ˌməubɪl ˈfəun/	N. A wireless telephone that operates over a wide area	Мобільний телефон
mouse	/maʊs/	N. A common cursor control input device used with a graphical user interface. It commonly has two or three button switches on top and a ball underneath that is rolled on a flat surface.	Миша
mouse pointer	/ˈmaʊs ˌpɔɪntə(r)/	N. A cursor image in the shape of an arrow that is controlled by a mouse and is used for pointing and selecting icons on the screen.	Курсор миші
multimedia	/ˌmʌltiˈmiːdiə/	N. The combination of text, graphic, animation, sound and video.	Мультимедіа

N

network computer	/ˈnetwɜːk kəmˌpjuːtə(r)/	N. A computer designed using the industry specification from Oracle and Sun Microsystems (or a low-cost basic personal computer that can have an Intel processor or another type of processor and can use a Java-based operating system.	Мережевий комп'ютер
neural network	/ˈnjʊərəl ˌnet(wɜk)/	N. An artificial intelligence system that is capable of developing rules from given input so that it learns how to deal with more complex input.	Нейронна мережа
node	/nəʊd/	N. A network terminal or point where a computer is connected to a network.	Вузол (мережі)
notebook computer	/nəʊtbʊk/	N. A portable computer that is about the same size as a piece of writing paper.	Ноутбук
numeric keyboard	/njuːˌmerik kiːbɔːd/	N. The section of a computer keyboard [hat includes keys for entering numerical digits 10-9] and mathematical operators	цифрова клавіатура

O

object-oriented programming	/ˈɒbdʒekt ˌɔːrientid ˈprəʊgræmiŋ/	N. A type of programming where programs are made from combinations of predefined modules that can be used over and over again.	об'эктно-орієнтоване програмування (ООП)
office application / suite	/ˈɒfis æpliˌkeiʃn ˌswiːt /	N. A computer program or set of programs that are used in a typical office, e.g. a wordprocessor, spreadsheet and database.	програма office
offline	/ɒfˈlain/	Adj. Disconnected from a computer system or the Internet.	поза мережею, автономний режим
online	/ɒnˈlain/	Adj. Connected to a computer system or the Internet.	у мережі, неавтономний

			режим
open Source	/ˌəʊpən ˈsɔːs/	Adj. Part of a system of software development where anyone is free to take a copy of the source code and extend develop or fix bugs in it.	відкритий вихідний код
operating system	/ˈɒpəreitiŋ ˌsistəm/	N. The set of programs that control the basic functions of a computer and provides communication between the application programs and the hardware.	операційна система
optical character recognition	/ˌɒptikl ˌkæriktə rekəgˈniʃn/	N. A process that enables a computer to scan and recognise printed characters using the reflection of light.	оптичне розпізнавання символів
optical fiber	/ˌɒptikl ˈfaibə(r)/	N. A common name for glass fiber cable used in high speed networks. It enables data signals to be transmitted using laser light	оптоволокно, світлопровід
output	/ˈaʊtpʊt/	N. The processed data or signals that come out of a computer system.	Вивід

P

packet-switching	/ˈpækit ˌswitʃiŋ/	N. A method of transferring data across a network by dividing it into packets and transferring the packets individually from node to node then putting the packets together again when they arrive at the destination.	комутація пакетів
page-description language	/ˌpeidʒ disˈkripʃn læŋgwidʒ/	N. A type of programming language that uses tags to define the layout of a document, e.g. HTML is a page-description language used to design webpages.	мова опису сторінок
pane	/pein/	N. A subsection of a graphical user interface window.	Панель
password	/ˈpɑːswɜːd/	N. A secret code used to control access to a network system.	Пароль
payload	/ˈpeiləʊd/	N. The part of a virus that carries out the threat such as displaying a slogan on the screen	частина вірусу, що завдає шкоду
peripheral	/pəˈrifərəl/	N. A piece of equipment that is connected to the central processing unit of a computer system.	периферійний пристрій
personal computer	/ˌpɜːsənl kəmˈpjuːtə(r)/	N. A computer designed to be used by one person at a time.	персональний комп'ютер
physical layer	/ˈfizikl ˌleiə(r)/	N. The part of a network communications system that encodes the packets into the medium that will carry them and sends the packets along that medium.	фізичний рівень (мережі)
platform	/ˈplætfɔːm/	N. A distinctive type of computer system that needs software to be written specifically for it, e.g. PC, Apple Mac, etc.	Платформа
polymorphism	/ˌpɒliˈmɔːfizm/	N. A key feature of OOP programming by which different objects can receive the same instructions but deal with them in different ways.	Поліморфізм
port	/pɔːt/	V. To convert for use in another operating system or computer platform.	Переносити
portable	/ˈpɔːtəbl/	N. A computer that is small and light enough to he carried from	портативний

computer		place to place. It can usually be powered by batteries.	комп'ютер
presentation layer	/ˌprezənˈteiʃn ˌleiə(r)/	N. The part of a network communications system that ensures the message is transmitted in a language that the receiving computer can interpret.	представницький рівень
printed circuit board	/ˌprintid ˈsɜ:kit bɔ:d/	N. An electronic board that holds and connects the components of an electronic circuit.	друкована плата
printer	/ˈprintə(r)/	N. A common output device used for printing the output of a computer on paper.	Принтер
private key	/ˌpraivət ˈki:/	N. Secret code known only to the owner that is used for encrypting and decrypting messages	закритий ключ
procedural language	/prəˈsid:dʒərəl ˌlæŋgwidʒ/	N. A computer programming language that enables programs to be written using sections of code known as procedures. Each procedure performs a specific task.	процедурна мова
processor	/ˈprəʊsesə(r)/	N. The part of a computer that processes the data	Процессор
program	/ˈprəʊgræm/	N. A set of instructions written in a computer language that control the behaviour of a computer.	Программа
programming language	/ˈprəʊgræmiŋ ˌlæŋgwidʒ/	N. A computer language used for writing computer programs.	мова програмування
protocol	/ˈprəʊtəkɒl/	N. A set of agreed standards.	Протокол
public-key cryptography	/ˌpʌblik ki: kripˈtɒgrəfi/	N. A method of coding messages using public and private keys to prevent others from reading them.	Криптографія з відкритим ключем
pull-down menu	/ˌpʊl daʊn ˈmenju:/	N. A list of choices that appear below a menu title on a display screen when the user clicks on the menu title using a mouse.	меню, що розкривається

R

random access memory	/ˌrændəm ˈækses ˌmeməri/	N. A type of memory that can be accessed in any order. RAM is the main electronic memory of a personal computer and is used for storing the programs and data being used.	Оперативна пам'ять
raw data	/rɔ: ˈdeitə/	N. Data that has not been processed.	Неопрацьовані дані
reboot	/ˌri:ˈbu:t/	V. To restart a computer operating system.	Перезавантажувати
record	/ˈrekɔ:d/	N. A section of a database made up of related database fields.	Запис
reliable stream service	/riˌlaiəbl ˈstri:m ˌsɜ:vis/	N. A data management system provided by the TCP protocol to ensure that data is transferred across a network correctly. It structures and buffers the data flow, looks for responses, and takes action to replace missing data blocks.	Надійна служба передачі даних
resolution	/ˌrezəˈlu:ʃn/	N. A measure of the quality of a display screen in terms of the amount of graphical information that can be shown on the screen. This partly depends on the number of dots that make up the image.	Роздільна здатність

restore	/rɪˈstɔ⊗(r)/	V. To put data back into its original location.	Відновлювати
ripper	/ˈrɪpə(r)/	N. A program that extracts songs from a CD and turns them into WAV files.	Програма конвертування звукових форматів
router	/ˈruːtə(r)/	N. An electronic device that links different networks or parts of a network. It determines the path that a signal should take to reach its destination.	Маршрутизатор
rule	/ruːl/	N. The name given to patterns found in data when using neural networks.	Правило
scanner	/ˈskʌnə(r)/	N. An optical input device that uses the reflection of light to copy text or graphics into a computer.	Сканер
scrollbar	/ˈskrəʊlbɑː(r)/	N. The part of a graphical user interface window that allows the user to move through a document by clicking or dragging with the mouse.	Смуга прокрутки
search engine	/ˈsɜːtʃ ˌendʒin/	N. A program designed to find information on the World Wide Web according to data entered by the user. Search engines are usually accessed from special websites.	Пошуковий механізм
sector	/ˈsektə(r)/	N. A formatted section of a circular magnetic track used for storing data on a disk.	Сектор
seek time	/ˈsiːk taɪm/	N. The amount of time taken by a disk drive to find a particular track on a disk.	Час пошуку
segment	/ˈsegmənt/	N. A subdivision of data created by a network communications transport layer for which a checksum is generated.	Сегмент
serial number	/ˈsɪəriəl ˌnʌmbə(r)/	N. A number that uniquely Identifies a product.	Серійний номер
serial port	/ˈsɪəriəl pɔːt/	N. The small connector at the back of the system unit of a personal computer that is used to connect a serial device such as a serial mouse or a modem. Two serial ports labelled C0M1 and COM2 are usually provided on a PC.	Послідовний порт
server	/ˈsɜːvə(r)/	N. A main computer that provides a service on a network.	Сервер
shareware	/ˈʃeəweə(r)/	N. Software that is distributed freely and only paid for if the user decides to keep it.	Умовно-безкоштовне ПЗ
shell	/ʃel/	N. A graphical user interface for an operating system.	(програмна) Оболонка
simple mail transfer protocol	/ˌsɪmpl meil ˈtrænsfɜː ˌprəʊtəkɒl/	N. A set of standards for sending email from an email client and transferring email between server computers on the Internet.	Простий протокол передачі пошти
simulation	/ˌsɪmjʊˈleɪʃn/	N. A programmed virtual environment that imitates real or planned system.	Симулятор
site map	/ˈsaɪt mæp/	N. A web page that is used to show the overall layout of a website.	Карта сайту
skin	/skɪn/	N. A computer program that is used to change the interface of another program, e.g. to change the screen display on an MP3 player program.	Програма зміни інтерфейсу

smart phone	/ˈsmɑːt fəʊn/	N. A telephone that contains an embedded processor and memory and can process data, e.g. translate English into German, Japanese and French in real time.	Телефон із вбудованим процесором та пам'яттю
software	/ˈsɒftweə(r)/	N. The programs and data used in a computer.	Програмне забезпечення
soundcard	/ˈsaʊndkɑːd/	N. The electronic circuit expansion board in a computer that is used to process audio signals and connect to and control a microphone loudspeaker or headphone.	Звукова плата
source code	/ˈsɔːs kəʊd/	N. Programming code that has to be processed by a compiler or translator to make object code for use in a computer.	Вихідний текст
spam	/spæm/	N. Unsolicited email sent lo large numbers of people indiscriminately usually advertising or trying to sell a product.	Спам, „мережеве сміття"
speaker	/ˈspiːkə(r)/	N. Common term for a loudspeaker. An output device for providing sound output	Динамік ПК
spectrum analyser	/ˈspektrəm ˌænəlaɪzə(r)/	N. An instrument that plots a graph of frequency parameters for a complete frequency band.	Спектральний аналізатор
spoofing	/ˈspuːfɪŋ/	N. A computer crime that involves tricking a user into revealing confidential information such as an access code or a credit card number.	Одержання доступу шляхом обману
spreadsheet program	/ˈspredʃiːt/	N. A type of application program with an array of cells that is used for calculating formulas.	Електронна таблиця
standalone	/ˈstændələʊn/	Adj. Not connected to a network.	Не підключений до мережі, автономний
status bar	/ˈsteɪtəs bɑː(r)/	N. A narrow band displayed across the bottom of a window in a Microsoft Windows application to display useful information for the user, e.g. number of pages in a document.	Рядок стану
storage device	/ˈstɔːrɪdʒ dɪˌvaɪs/	N. A piece of equipment used for reading from and writing to a storage medium.	Пристрій для збереження даних
storage medium	/ˈstɔːrɪdʒ ˌmiːdiəm/	N. A material used for storing programs and data.	Носій даних
streaming	/ˈstriːmɪŋ/	N. A process of downloading and storing the next part of a data signal while the first part is being used. In this way the data signal, e.g. an audio or video is fed to the slower destination device at a steady rate.	Потокова передача даних
supercomputer	/ˈsuːpəkəmˌpjutə(r)/	N. The most powerful type of mainframe computer	Супер-ЕВМ, суперкомп'ютер
supervisor program	/ˈsuːpəvaɪzə(r)/	N. The most important program in the operating system. It is resident and controls the entire operating system. It loads other operating system programs into memory when they are needed.	Диспетчер (програм), управляюча програма
system bus	/ˈsɪstəm bʌs/	N. The sets of connectors that carry signals between system components such as the processor and memory in a computer	Системна шина
systems analysis	/ˈsɪstəmz əˌnæləsɪs/	N. The study of a system to determine how it can be computerised	Системний аналіз

systems program / software	/ˈsɪstəmz ˌprəʊɡræm, ˈsɒftweə(r)/	N. A program or set of programs that is used to control the basic functions of a computer system, e.g. operating system programs	Системна програма, програмне забезпечення

T

tag	/tæɡ/	N. A label used in a markup language such as HTML. It is attached to a piece of text to mark the start or the end of a particular function.	Мітка
tape	/teɪp/	N. A magnetic storage medium commonly used for storing backup files	стрічка; магнітна стрічка
taskbar	/ˈtɑːskbɑː(r)/	N. A Microsoft Windows desktop component that indicates what programs are currently being used and allows the user to switch between them	панель задач
teller machine	/ˈtelə məˌʃiːn/	N. A machine used for taking payments in large shops and supermarkets	банківський автомат
terabit	/ˈterəbɪt/	N. A unit of storage capacity equal to 1 009 511 627 776 bits	терабіт, одиниця інформації, дорівнює 1 009 511 627 776 бітам
terminal	/ˈtɜːmɪnəl/	N. A network device used to input and output data (usually a basic computer)	термінал, мережний пристрій, використовуваний до даних введення й виведення
text editor	/ˈtekst ˌedɪtə(r)/	N. A computer program for editing basic data or program text, i.e. like a basic word processor	текстовий редактор
thin client	/ˈθɪn ˌklaɪənt/	N. A low cost centrally-managed basic computer with a keyboard and display screen processor and memory but no CD-ROM drive, floppy disk drive or expansion slots, e.g. a NetPC or a network computer (NC)	«тонкий» клієнт (мало функціональний, малопотужний мережний клієнт-термінал)
throughput	/ˈθruːpʊt/	N. The amount of data that passes through a system in a given period of time	пропускна здатність
topology	/təˈpɒlədʒɪ/	N. The physical layout of a network	топологія (мережі), загальна схема з'єднань
track	/træk/	N. A formatted circular magnetic storage area on a computer disk	Доріжка
traffic	/ˈtræfɪk/	N. The volume of signals or data that passes through a network system	трафик, робоче навантаження ліній зв'язку
transmission control protocol	/trænˌmɪʃn kənˌtrəʊl ˈprəʊtəkɒl/	N. A set of standards for the delivery of error-free data in communications between computers. It comes into operation once a data packet is delivered to the correct Internet address and application port. It manages the communication exchanges	протокол TCP

		and provides reliable stream service by structuring and buffering the data flow looking for responses and taking action to replace missing data blocks	
Trojan horse	/ˈtrəʊdʒən/	N. A technique used in a computer crime that involves adding concealed instructions to a computer program so that it will still work but will also perform prohibited duties. In other words it appears to do something useful but actually does something destructive in the background	Троянскій кінь
troubleshoot	/ˈtrʌblʃuːt/	V. To find and fix faults in a system	виявлення несправностей
twisted-pair cabling	/ˌtwɪstɪd ˈpeə(r)/	N. A common type of network cable that uses two wires twisted together to reduce interference from external signals	„кручена пара"
typesetting	/ˈtaɪpsetɪŋ/	N. Preparation for printing	набор тексту

U

undo	/ˌʌnˈduː/	V. To restore a file to the condition it was in before the last change was made	Скасовувати
uniform resource locator	/juːnɪfɔːm rɪˈzɔːs ləʊ ˌkeɪtə(r)/	N. The unique address of a webpage	уніфікований покажчик інформаційного ресурсу
uninterruptible power supply	/ˌʌnɪntəˌrʌptəbl ˈpaʊə səˌplaɪ/	N. A battery backup system that automatically provides power to a computer when the normal electricity source fails	джерело безперебійного споживання, ДБС
update	/ˌʌpˈdeɪt/	V. to bring up to date,i.e. to change into the latest version	модернізувати, перетворити, удосконалити
upgrade	/ˌʌpˈgreɪd/	V. To add components to improve the features or performance of a system	модернізувати, удосконалювати
upload	/ˌʌpˈləʊd/	V. To copy a file from a client computer to a server in a network	завантажувати у вилучений комп'ютер
upstream	/ˈʌpstriːm/	N. The signal path for receiving communications from a client computer to a server in a network	зворотний потік
user	/ˈjuːzə(r)/	N. The person using a computer	Користувач
user datagram protocol	/juːzə ˌdeɪtəgræm ˈprəʊtəkɒl/	N. A set of standards for creating a data address in a TCP/IP message. It is used to indicate what application the message is supposed to contact and provides the final routing for the data within the receiving system	протокол UDP передачі дейтаграмм користувача
user-authentication system	/juːzər ɔːˌθentɪˈkeɪʃn ˌsɪstəm/	N. A system that identifies users. This can be done using digital certificates	користувальницька-розпізнавальна система

utility program	/juːˈtɪlətɪ/	N. A program included with an operating system that can perform useful common routine tasks or housekeeping operations, e.g. formatting disks or copying files	програма-утиліта

V

veri fy	/ˈverɪˌfaɪ/	N. To check for accuracy	контролювати; перевіряти; звіряти
video memory	/ˈvɪdɪəʊ ˌmemərɪ/	N. The memory used to store graphics data on a graphics card	відеопам'ять
videoconfere ncing	/ˌvɪdɪəʊ ˈkɒnfərənsɪŋ/	N. A form of communication over a network that uses video cameras so that the people taking part can see and hear each other	видеоконференц-связь
virtual reality	/ˌvɜːtʃʊəl rɪˈælətɪ/	N. A simulated three-dimensional environment that surrounds the user and is generated by a computer	віртуальна реальність
virus	/ˈvaɪrəs/	N. A program written with the purpose of causing damage or causing a computer to behave in an unusual way	Вірус
visualisation technology	/ˌvɪʒʊəlaɪˌzeɪʃn tekˈnɒlədʒɪ/	N. Systems and devices used to create a virtual reality environment	технологія візуалізації
voice synthesis	/ˈvɔɪs ˌsɪnθəsɪs/	N. The generation of a human-sounding voice using electronic circuits	синтез мови

W

wallpaper	/ˈwɔːlpeɪpə(r)/	N. The background graphics on a Microsoft Windows desktop	обої, малюнок на робочому столі Windows
wavetable system	/ˈweɪvteɪbl ˌsɪstəm/	N. A system used in some soundcards for more accurately creating the sound of real musical instruments by reproducing a wide frequency range from a small number of original samples	хвильовий табличний синтезатор
webserver	/ˈweb ˌsɜːvə(r)/	N. A server computer that stores and provides access to websites	веб-сервер, інтернет-сервер
web page	/ˈwebpeɪdʒ/	N. A hyperlinked document in a web network system	веб-страница
website	/ˈwebsaɪt/	N. A set of related pages on the World Wide Web	Сайт
window	/ˈwɪndəʊ/	N. A rectangular screen area containing a program folder or file in a WIMP system	Зовнішній графічний інтерфейс операційної системи
wirelessly	/ˈwaɪələslɪ/	Adj. Using radio signals without the need for connecting wires or cables	Бездротовий
wordprocess or	/ˌwɜːdˈprəʊsesə(r)/	N. A type of computer application program used for typing and editing tent documents	текстовий процессор

workstation	/ˈwɜːksteɪʃn/	N. A powerful desktop computer used by power users for work that requires a lot of processing, e.g. graphic design	робоча станція; дисплейний термінал
World Wide Web	/ˌwɜːld ˌwaɪd ˈweb/	N. An information service on the Internet that allows document pages to be accessed using hyperlinks	"Всесвітня павутина", Мережа
write-back cache	/ˈraɪt bæk ˌkæʃ/	N. A buffer storage system where the processor writes changes only to the cache and not to main memory. Cache entries that have changed are flagged as 'dirty' telling the cache controller to write their contents back to main memory before using the space to cache new data	кэш зі зворотним записом
write-through cache	/ˈraɪt θru: ˌkæʃ/	N. A buffer storage system where the processor writes directly to both the cache and main memory at the same time	кэш із прямим записом

APPENDIXES

APPENDIX A. LIST OF IRREGULAR VERBS

Infinitive	Past Simple	Participle II	Participle I
Arise	Arose	Arisen	Arising
Be	Was/Were	Been	Being
Become	Became	Become	Becoming
Begin	Began	Begun	Beginning
Bend	Bent	Bent	Bending
Blow	Blew	Blown	Blowing
Break	Broke	Broken	Breaking
Breed	Bred	Bred	Breeding
Bring	Brought	Brought	Bringing
Build	Built	Built	Building
Burn	Burnt/Burned	Burnt/Burned	Burning
Burst	Burst	Burst	Bursting
Buy	Bought	Bought	Buying
Catch	Caught	Caught	Catching
Choose	Chose	Chosen	Coosing
Come	Came	Come	Coming
Cost	Cost	Cost	Costing
Cut	Cut	Cut	Cutting
Deal	Dealt	Dealt	Dealing
Do	Did	Done	Doing
Draw	Drew	Drawn	Drawing
Drive	Drove	Driven	Driving
Fall	Fell	Fallen	Falling
Feed	Fed	Fed	Feeding

Feel	Felt	Felt	Feeling
Fight	Fought	Fought	Fighting
Find	Found	Found	Finding
Forbid	Forbade/Forbad	Forbidden	Forbidding
Foresee	Foresaw	Foreseen	Foreseeing
Forget	Forgot	Forgotten	Foregetting
Forgive	Forgave	Forgiven	Forgiving
Freeze	Froze	Frozen	Freezing
Get	Got	Got/Gotten	Getting
Give	Gave	Given	Giving
Go	Went	Gone/Been	Going
Grow	Grew	Grown	Growing
Hang	Hung/Hanged	Hung/Hanged	Hanging
Have	Had	Had	Having
Hear	Heard	Heard	Hearing
Hide	Hid	Hidden	Hiding
Hit	Hit	Hit	Hitting
Hold	Held	Held	Holding
Hurt	Hurt	Hurt	Hurting
Keep	Kept	Kept	Keeping
Know	Knew	Known	Knowing
Lay	Laid	Laid	Laying
Lead	Led	Led	Leading
Learn	Learnt/Learned	Learnt/Learned	Learning
Leave	Left	Left	Leaving
Let	Let	Let	Letting
Light	Lit	Lit	Lighting
Lose	Lost	Lost	Losing
Make	Made	Made	Making

Mean	Meant	Meant	Meaning
Meet	Met	Met	Meeting
Melt	Melted	Molten/Melted	Melting
Misunderstand	Misunderstood	Misunderstood	Misunderstanding
Offset	Offset	Offset	Offsetting
Output	Output/Outputted	Output/Outputted	Outputting
Overcome	Overcame	Overcome	Overcoming
Overlay	Overlaid	Overlaid	Overlaying
Pay	Paid	Paid	Paying
Put	Put	Put	Putting
Read	Read	Read	Reading
Rebuild	Rebuilt	Rebuilt	Rebuilding
Ride	Rode	Ridden	Riding
Rise	Rose	Risen	Rising
Run	Ran	Run	Running
Say	Said	Said	Saying
See	Saw	Seen	Seeing
Seek	Sought	Sought	Seeking
Sell	Sold	Sold	Selling
Send	Sent	Sent	Sending
Set	Set	Set	Setting
Shake	Shook	Shaken	Shaking
Shoot	Shot	Shot	Shooting
Show	Showed	Shown	Showing
Shut	Shut	Shut	Shutting
Sit	Sat	Sat	Sitting
Speak	Spoke	Spoken	Speaking
Speed	Sped/Speeded	Sped/Speeded	Speeding
Spend	Spent	Spent	Spending

Spin	Span/Spun	Spun	Spinning
Split	Split	Split	Splitting
Spoil	Spoilt/Spoiled	Spoilt/Spoiled	Spoiling
Stand	Stood	Stood	Standing
Stick	Stuck	Stuck	Sticking
Strip	Stript/Stripped	Stript/Stripped	Stripping
Sweep	Swept/Sweeped	Swept/Sweeped	Sweeping
Take	Took	Taken	Taking
Teach	Taught	Taught	Teaching
Tell	Told	Told	Telling
Think	Thought	Thought	Thinking
Throw	Threw	Thrown	Throwing
Understand	Understood	Understood	Understanding
Undertake	Undertook	Undertaken	Undertaking
Wear	Wore	Worn	Wearing
Win	Won	Won	Winning
Wind	Wound	Wound	Winding
Withdraw	Withdrew	Withdrawn	Withdrawing
Work	Worked/Wrought	Worked/Wrought	Working
Write	Wrote	Written	Writing

APPENDIX B. HOW TO WRITE A SUMMARY

Summarizing means giving a concise overview of a text's main points in your own words. A summary is always much shorter than the original text. Writing a summary does not involve critiquing or analyzing the source - you should simply provide a clear, objective, accurate account of the most important information and ideas, without copying any text from the original and without missing any of the key points.

When to summarize

There are many situations in which you might have to summarize an article or other source:

- As a stand-alone assignment to show you've understood the material.

- To keep notes that will help you remember what you've read.

- To give an overview of other researchers' work in a literature review.

When you're writing an academic text like an essay, research paper, or dissertation, you'll engage with other researchers' work in a variety of ways. Sometimes you might use a brief quote to support your point; sometimes you might paraphrase a few sentences or paragraphs. But it's often appropriate to summarize a whole article or chapter if it is especially relevant to your own research, or to provide an overview of a source before you analyze or critique it. In any case, the goal of summarizing is to give your reader a clear understanding of the original source.

Follow the 4 steps outline below to write a good summary

Step 1: Read the text

You should read the article more than once to make sure you've thoroughly understood it. It's often effective to read in three stages:

- Scan the article quickly to get a sense of its topic and overall shape.

- Read the article carefully, highlighting important points and taking notes as you read.

- Skim the article again to confirm you've understood the key points, and re-read any particularly important or difficult passages.

There are some easy tricks you can use to identify the key points as you read:

- Start by reading the abstract - this already contains the author's own summary of their work, and it tells you what to expect from the article.

- Pay attention to headings and subheadings — these should give you a good sense of what each part is about.

- Read the introduction and the conclusion together and compare them: what did the author set out to do, and what was the outcome?

Step 2: Break the text down into sections

To make the text more manageable and understand its sub-points, break it down into smaller parts. If the text is a scientific paper that follows a standard empirical structure, it is probably already organized into clearly marked sections, usually including an introduction, methods, results, and discussion. Other types of articles may not be explicitly divided into sections. But most articles and essays will be structured around a series of sub-points or themes. Try writing a word or phrase in the margin next to each paragraph that describes the paragraph's content. Then you can see at a glance what each part of the article focuses on. If several paragraphs cover similar or related topics, you may group them together in sections.

Step 3: Identify the key points in each section

Now it's time go through each part and pick out its most important points. What does your reader need to know to understand the overall argument or conclusion of the article? Keep in mind that a summary does not involve paraphrasing every single paragraph of the article. Your goal is to extract the essential points, leaving out anything that can be considered background information

or supplementary detail. In a scientific article, there are some easy questions you can ask to identify the key points in each part:

Introduction	What research question or problem was addressed? Are there any hypotheses formulated?
Methods	What type of research was done? How was data collected and analyzed?
Results	What were the most important findings? Were the hypotheses supported?
Discussion/conclusion	What is the overall answer to the research question? How does the author explain these results? What are the implications of the results? Are there any important limitations? Are there any key recommendations?

If the article takes a different form, you might have to think more carefully about what points are most important for the reader to understand its argument. In this case, pay particular attention to the thesis statement - the central claim that the author wants us to accept, which usually appears in the introduction - and the topic sentences that signal the main idea of each paragraph.

Step 4: Write the summary

Now that you know the key points that the article aims to communicate, you need to put them in your own words. To avoid plagiarism and show you've understood the article, it's essential to properly paraphrase the author's ideas. Do not copy and paste parts of the article, not even just a sentence or two. The best way to do this is to put the article aside and write out your own understanding of the author's key points. Let's take a look at an example. Below, we summarize this article, which scientifically investigates the old saying «an apple a day keeps the doctor away». An article summary like the above would be appropriate for a stand-

alone summary assignment. However, oftentimes, you'll want to give an even more concise summary of an article. For example, in a literature review or research paper, you may want to briefly summarize this study as part of a wider discussion of various sources. In this case, we can boil our summary down even further to include only the most relevant information. When summarizing as part of a larger text, it's essential to properly cite the source of the summary. The exact format for citing depends on your citation style, but it usually includes an in-text citation and a full reference at the end of your paper.

Step 5: Check the summary against the article

Finally, read through the article once more to ensure that:

- You've accurately represented the author's work

- You haven't missed any essential information

- The phrasing is not too similar to any sentences in the original.

If you're summarizing lots of articles as part of your own work, it's often a good idea to use a plagiarism checker to double-check that your text is completely original and properly cited. Just be sure to use one that's safe and reliable.

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APPENDIX C. HOW TO WRITE ARTICLES FOR MAGAZINES

Magazine writing is a craft that stands apart from the kind of writing you might encounter in a newspaper, journal, essay, or full-length book. Even within the broader landscape of magazine writing, many subgenres demand different styles and skills - you'll approach a long feature article differently than you would a human interest story; tackling an investigative exposés requires a different skill set than writing reviews and cultural criticism. So while your approach to magazine writing will vary depending on the publication and the nature of the article itself, you'll still need to master the skills that set magazine writing apart from other types of writing. If you aspire to write for magazines, you'll have to adapt to a medium that's been rapidly transformed by digital technology. Many of today's magazines are primarily consumed online, either in web browsers or in apps like Apple News. Some famous weekly magazines now come out monthly or even quarterly. On the other hand, new online publications sprout up constantly and many are seeking new writers who have a great story idea to pitch. Here are some writing tips to help you break into the world of magazine writing.

Target your pitches carefully. Freelance writers typically have to pitch stories via a query letter before being given an assignment. Be judicious when you pitch to editors. Anna Wintour isn't going to publish a dissection of the Cincinnati Bengals' run defense in the pages of Vogue, so don't waste her time with a query letter on the topic. Even if your pitch isn't accepted, by engaging with a magazine you've begun a relationship with its staff, and you always want to impress them at every encounter. Make sure you follow a publication's submission guidelines when you approach them with article ideas.

Become a specialist. Today's media world values specialization. ESPN's Brian Windhorst was well-versed in all professional sports, but he strategically chose to hone in on basketball when he began penning articles for ESPN: The Magazine.

He credits it for his rise within that company (even though the magazine itself no longer exists). If you have specialized know how in a particular discipline (such as medicine, music, or mobile computing), lean into it. The best stories you pitch will likely tap into your personal experience and specific knowledge base. Specialization can help you break through as a new writer.

Do more research than you think you need. It's always better to have more sources, quotes, and statistics than you can use in your story. Often times a magazine writer's document of notes will be longer than the first draft of their story. If you have a great article planned, the urge to start writing immediately can be intense. But before you begin, make sure you are truly overloaded with the substantive facts that will populate your story.

Consider the magazine's target audience. A magazine's most important relationship is with its readers. If you meet those readers on their terms, you could have a long career in magazine journalism. For instance, if you're writing pop astronomy articles for national magazines like Wired or Discover, you cannot weigh down your prose with technical jargon that interferes with your storytelling. On the other hand, if you're writing for trade magazines in the telescope industry, you should absolutely pepper your article with tech specs. It's what your readers want.

Keep track of personnel changes among magazines. Editors frequently leave one magazine and join a new one. Your connection to such people is ultimately more important than the company they work for. Even if you think you have the perfect story for Rolling Stone but you don't know anyone there and you do know the managing editor at Pitchfork, you'll have a much better shot with the latter. Study a magazine's masthead and article bylines to learn who's working there. Online resources like LinkedIn can also provide this information.

Be flexible. Flexibility is one of the greatest writing skills a journalist can be endowed with. Even with the greatest degree of planning, the writing process can lead journalists in strange directions. You may find that your planned 1,000 word article needs 10,000 words to do its subject justice. Conversely, you may find that what you thought would be a voluminous feature should be far more succinct.

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APPENDIX D. HOW TO DESCRIBE A PICTURE

Do:

Look at your picture carefully and take a few moments to think before you start talking.

Talk for all the time you are given. If you have one minute to do the task, use every second.

Practise the useful language below so you can explain which part of the picture you are talking about.

Don't:

Panic if you don't know the words for all the things in the picture. You don't need to know all the words for everything in the picture if you know what to say when you don't know an exact word.

Get distracted and start talking about something else. Focus on the photo or picture.

Panic if your mind goes blank. Take a deep breath, look at the picture and start again.

If you are asked to describe a photo or a picture in the exam, here is some language you can use:

What is in the picture?

In the picture I can see ...

There's / There are ...

There isn't a ... / There aren't any ...

Say what is happening with the present continuous

The man is ...ing

The people are ...ing

It's raining.

Where in the picture?

at the top/bottom of the picture ...

in the middle of the picture ...

on the left/right of the picture ...

next to

in front of

behind

near

on top of

under

If something isn't clear

It looks like a ...

It might be a ...

He could be ...ing

Maybe it's a ...

APPENDIX E. ABBREVIATIONS

A

AIO - All-In-One printers

API - Application Program Interface

ASCII - American Standard Code for Information Interchange

B

BD - Blu-ray Disc

BIOS - Basic Input/Output System

BBS - Bulletin Board System

C

CAD - Computer Aided Design

CCFL - Cold Cathode Fluorescent Lamp

CD - Compact Disk

CD-R - Compact Disc Recordable

CD-ROM - Compact Disk Read Only Memory

COBOL - Common Business-Oriented Language

CPU - Central Processing Unit

CRT - Cathode Ray Tube

D

DBMS - Data Base Management System

DRAM - Dynamic Random Access Memory

DVI - Digital Video Interface

DVD - Digital Versatile Disk

DVD-RAM - Digital Versatile Disk Random Access Memory

DVD-ROM - Digital Versatile Disk Read Only Memory

DOS - Disk Operating System

E

EPROM - Erasable Programmable Read Only Memory

EPFL - École Polytechnique Fédérale de Lausanne

EGA - Enhanced Graphics Adapter

G

GB - gigabyte

H

HDD - Hard Disk Drive

HDMI - High Definition Multimedia Interface

HDTV - High Definition Television

I

IBM - International Business Machines

IC - Integrated Circuit

I/O - Input/Output

ISSCC - International Solid-State Circuit Conference

L

LCD - Liquid-Crystal Display

LAN - Local Area Network

M

MB - Megabyte

MDA - Monochrome Display Adapter

MFD - Multifunction Devices

MMC - Main Memory Controller

MRAM - Magnetic Random Access Memory

O

OLED - Organic Light Emitting Diode

OS - Operating System

P

PC - Personal Computer

PCI - Peripheral Component Interface

PDA - Personal Digital Assistant

PDP - Plasma Display Panel

PPM - Pages Per Minute

PROM - Programmable Read Only Memory

R

RAM - Random Access Memory

RDRAM - Rambus Dynamic Random Access Memory

RGB - Red Green Blue

ROM - Read Only Memory

RPM - Revolutions Per Minute

S

SASD - Structured Analysis, Structured Design

SDRAM - Synchronous Dynamic Random Access Memory

SRAM - Static Random Access Memory

SVCD - Super Video Compact Disks

SVGA - Super Video Graphics Array

T

TDD - Telecommunications Device for the Deaf

TFT - Thin-Film Transistor

TTY - Teletypewriter

TV - Television

U

USB - Universal Serial Bus

V

VCD - Video Compact Disk

VDU - Visual Display Unit

VGA - Video Graphics Adaptor

VRAM - Video Random Access Memory

VR - Virtual Reality

W

WORM - Write Once, Read Many

WYSIWYG - What You See Is What You Get

ACRONIMS

A.D.	Anno Domini	нашої ери
a.m.	ante meridiem	До обіду
a priori		Завчасно, незалежно від досвіду
B.C.	Before Christ	До нашої ери
circa		Приблизно, біля
e.g.	Exempli gratia	наприклад
Etc.	Et cetera	І так далі
i.e.	Id est	тобто
In situ		На місці
N.B.	Nota bene	Примітка, відмітка
p.m.	Post meridiem	Після обіду
Pro et con	Pro et contra	За і проти
Terra incognita		Незнайома область
Vers, vs	versus	проти
Vice versa		В залежності від (чогось)
viz		А саме

APPENDIX F. MATHEMATICAL VALUES AND NOTATION

ac	Alternating current	Змінний струм
Amp-hr	Ampere-hour	Ампер-год
bp	Boiling point	Точка кипіння
cm	centimeter	Сантиметр
cgc	Centimeter-gram-second (system)	Система одиниць сант.-грам.-сек
cu	cubic	Кубічний
cu ft	Cubic foot	Кубічний фут
cfm	Cubic feet per minute	Кубічний фут за хвилину
cfs	Cubic feet per second	Кубічний фут за секунду
Cu in	Cubic inch	Кубічний дюйм
Cu m	Cubic meter	Кубічний метр
Db	decibil	Децибел
Deg	Degree	Градус
C	Degree Centigrade	Градуси Цельсія
F	Degree Fahrenheit	Градуси Фаренгейта
K	Degree Kelvin	Градуси по шкалі Кельвіна
R	Degree Reaumur	Градуси Реомюра
Doz	Dozen	Дюжина
Emf	Electromotive force	Електрорушійна сила
Eq	Equation	Рівняння
Fpm	Feet per minute	Фути за хвилину
Fps	Feet per second	Фути за секунду
Ft-lb	Foot-pound	Футо-фунт
Fps	Foot-pound-second	Система одиниць Фут.-фунт.-сек.
Gal	Gallon	Галон
Gpm	Gallons per minute	Галон за хвилину

G	Gram	Грам
H	Henry	Генрі
Hp	Horsepower	Кінська сила
Hr	Hour	Час
In	Inch	Дюйм
Ips	Inches per second	Дюймів за секунду
J	Joule	Джоуль
Kc	Kilocycle	Кілогерц
Kg	Kilogram	Кілограм
Kg-m	Kilogram-meter	Кілограмометр
Kg/Cu m	Kilograms per cubic meter	Кілограм на кубічний метр
Km	Kilometer	Кілометр
Kv	Kilovolt	Кіловольт
Kw	Kilowatt	Кіловат
Kwhr	Kilowatthour	Кіловат-час
L	Liter	Літр
M	Meter	Метр
Ma	Microampere	Мікроампер
MeV		Мегаелектроновольт
Mf	Microfarad	мікрофарада
Mmf	Micromicrofarad	Мікромікрофарада
M or mu	Micron	Мікрон
Mph	Miles per hour	Миль за годину
Ma	Milliampere	міліампер
Mg	Milligram	Міліграм
Mm	Millimeter	Міліметр
Mv	Millivolt	Мілівольт
Min	Minute	Хвилина
oz	Ounce	Унція

Ppm	Parts per million	Міліонні долі
Lb	Pound	Фунт
Lb-ft	Pond-foot	Фунто-фут
Lb-in.	Pound-inch	Фунто-дюйм
Psf	Pounds per square foot	Фунти на квадратний фут
R.F.	Radio Frequency	Висока частота
Rpm	Revolutions per second	Оброти за секунду
Rms	Root mean square	Середнє квадратичне
Sec	Second	Секунда
Sq ft	Square foot	Квадратний фут
Sq.in.	Square inch	Квадратний дюйм
V	Volt	Вольт
Va	Volt-ampere	Вольт-ампер
W	Watt	Ват
Wt	weight	Вага
Yd	Yard	Ярд
Yr	year	рік

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LISTENING COMPREHENTION

Unit 1

Retrieved from https://www.youtube.com/watch?v=XcOonw0lvYU

Unit 2

Retrieved from https://www.youtube.com/watch?v=gHVcEOvQamQ

Unit 3

Retrieved from https://www.youtube.com/watch?v=SStYw356J1k

Unit 4

Retrieved from https://www.youtube.com/watch?v=AmYDXFaA3Yk

Unit 5

Retrieved from https://www.youtube.com/watch?v=ql5nxK1rBYg

Unit 6

Retrieved from https://www.youtube.com/watch?v=GAdivCizVN4

GRAMMAR

Unit 1

Retrieved from https://www.youtube.com/watch?v=X8lu4_5F0hg

Unit 2

Retrieved from https://www.youtube.com/watch?v=0Ri3QTT41f8

Unit 3

Retrieved from https://www.youtube.com/watch?v=CI0Kr4e4vzI

Unit 4

Retrieved from https://www.youtube.com/watch?v=PQG_gYFePD4

Unit 5

Retrieved from https://www.youtube.com/watch?v=ZGdt9apUpqg

Unit 6

Retrieved from https://www.youtube.com/watch?v=p_lgP_XwDig

IMAGES

Unit 1

Retrieved from https://bit.ly/3rujrDE

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Unit 2

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Unit 3

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Unit 4

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Unit 5

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Unit 6

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TEXTS

Unit 1

Retrieved from https://bit.ly/3Bfyyp0

Retrieved from https://bit.ly/3ihYibt

Unit 2

Retrieved from https://bit.ly/3xOyAlh

Retrieved from https://bit.ly/3wMzjSS

Unit 3

Retrieved from https://bit.ly/3Bfyyp0

Retrieved from https://bit.ly/3xMH0d9

Unit 4

Retrieved from https://bit.ly/3Bfyyp0

Retrieved from https://bit.ly/2U4ITDl

Retrieved from https://bit.ly/3rev3KE

Unit 5

Retrieved from https://bit.ly/3Bfyyp0

Retrieved from https://bit.ly/3wFdZPf

Unit 6

Retrieved from https://bit.ly/3Bfyyp0

KEYS

UNIT 1

1.3.
1. машина
2. бездротовий
3. безпосередньо
4. медіа
5. електростатично
6. растровий
7. шар
8. матриця
9. прозорі плівки

1.4.
1. output
2. written
3. adapted
4. data
5. advanced
6. letter-quality
7. form
8. employs
9. laser
10. ink-jet
11. dot-matrix
12. characters
13. impact

2.5.
1. true
2. true
3. true
4. true
5. false
6. false

3.1.
1. істотний ефект
2. недоречний
3. двигун друку
4. сканування
5. копіювання
6. точкова матриця
7. додаток
8. заряд
9. споживання енергії
10. 3D друк

3.4.	5.5.
1. -	1. receive
2. d	2. is done
3. c	3. provide
4. a	4. is increasing
5. e	5. are understood
6. -	6. is used
7. b	7. is melting
8. g	8. deal
9. –	9. is
	10. is being produced
3.7.	11. flows
1. false	12. look for
2. false	13. works
3. true	14. is housed
4. true	15. is studied
5. false	
6. true	
7. true	
4.2.	
1. hard copy	
2. require	
3. combine	
4. quiet	
5. advantages	
6. complex	
7. image	
8. additional	
9. waterproof	

UNIT 2

1.3.	**3.1.**
1. намагнічування	1. неволатильність
2. візерунки	2. термічне перемикання
3. магнітна стрічка	3. крутний момент обертання
4. рекордер	4. щільність зберігання
5. барабан	5. витривалість
6. приводом	6. клітини пам'яті
7. щільність	7. ударна стійкість
8. опір	8. магнітоопір
9. пристрій	9. висока місткість
10. програмне забезпечення	10. пам'ять з феритовим сердечником
2.4.	**3.4.**
1. true	1. -
2. true	2. b
3. false	3. -
4. true	4. a
5. false	5. c
6. true	6. d
7. true	7. -
	3.7.
	1. false
	2. true
	3. true
	4. false
	5. true
	6. true
	7. false

4.1.

1. recording head

2. magnetized surface

3. data storage device

4. floppy disk drive

5. machine tools

6. magnetic tape

7. primary storage device

8. electrostatic

9. energy dependent

10. rapid growth

4.2.

1. data

2. store

3. tool

4. developed

5. first demonstrated

6. detect

7. according to

8. very small

9. needed

UNIT 3

1.3.	**3.1.**
1. випадковий	1. енергонезалежний
2. зберігання	2. карти пам'яті
3. прошивка	3. USB-флешки
4. витривалість	4. домінуюча технологія
5. послідовний	5. твердотільний накопичувач
6. непостійний	6. на батарейках
7. безпечний	7. час доступу
8. дріт	8. портативні пристрої
9. гігабіт	9. занурення
10. припущення	10. взаємопов'язані
11. цифровий	**3.3.**
12. твердий стан	1. -
13. опір	2. b
	3. -
2.5.	4. a
1. true	5. d
2. false	6. c
3. true	7. -
4. false	8. e
5. false	9. f
6. true	**3.7.**
	1. true
	2. false
	3. true
	4. false
	5. false
	6. true

4.1.

1. volatile memory

2. memory card

3. solid state drive

4. disk drive

5. large blocks

6. battery powered

7. data storage

8. submersion

9. data reading cycle

10. read head

4.2.

1. is required

2. receive

3. suggest

4. quick

5. velocity

6. counterpart

7. produce

8. memory cell

9. many

UNIT 4

1.3.

1. здатність

2. партія

3. перекриття

4. витончений

5. команда

6. дистанційний

7. встановлення

8. доступ

9. власність

10. передача

2.5.

1. true

2. false

3. false

4. true

5. true

6. true

3.1.

1. мови високого рівня

2. вимоги

3. набір програм

4. обробка

5. певні цілі

6. управління робочою групою

7. спрощений доступ

8. сервери баз даних

9. інженерні середовища

10. необхідне програмне забезпечення

3.4.

1. d

2. a

3. -

4. b

5. f

6. c

7. h

8. e

9. -

10. g

3.6.

1. true

2. false

3. false

4. true

5. true

6. true

7. false

4.1.

1. пакетна обробка

2. спроектований для системи

3. операційна система

4. кількість послуг

5. обробка даних

6. керувати ресурсами

7. програмне забезпечення

8. апаратне забезпечення

9. прикладні програми

10. графічний інтерфейс користувача

4.4.

1. a

2. e

3. b

4. d

5. c

6. -

7. f

UNIT 5

1.3.

1. текстовий процесор

2. редагувати

3. на паперовій основі

4. звичайні

5. виділено

6. обладнаний

7. процесор

8. середнього розміру

9. друкарська машинка

10. дисплей

3.1.

1. електромеханічний

2. допоміжний

3. попередник

4. подібності

5. бази даних

6. особливість

7. обладнання

8. правильно

9. знімний

10. кеш-пам'ять

2.4.

1. false

2. true

3. true

4. true

5. false

6. true

7. false

3.4.

1. f

2. c

3. -

4. a

5. d

6. -

7. b

8. -

9. e

3.7.

1. false

2. false

3. true

4. false

5. true

6. true

7. false

4.1.

1. text editing

2. formatting

3. word processing systems

4. law firms

5. about 20 pages

6. issue

7. actually

8. used mainly

9. research work

10. updated software

4.2.

1. device

2. precursor

3. fundamental

4. characteristics

5. combination

6. support

7. purpose

8. calculate

9. define

UNIT 6

1.3.

1. ієрархічні

2. паралельність

3. схема

4. властивості

5. запит

6. отримати

7. зручно

8. істотно

9. поліморфізм

10. розташування

2.5.

1. true

2. true

3. false

4. true

5. false

6. true

7. false

3.1.

1. моделювати

2. буквено-цифровий

3. формула

4. колонка

5. відсоток

6. знак

7. робочий лист

8. діаграми

9. рядок

10. автоматично

3.4.

1. c

2. -

3. a

4. -

5. b

6. f

7. e

8. -

9. d

3.7.

1. true

2. true

3. false

4. true

5. false

6. true

7. false

4.1.

1. can be called

2. root entry

3. automated design

4. query language

5. widely used

6. operations to be performed

7. the main advantage

8. arranged in groups

9. the goal is to

10. can be called