**Ivan Lisovskiy IKBO-21-23**

**Class work (20.02.25)**

**Task 1. Lead-in questions.**

**1. When do you think the Internet appeared?**

- The Internet originated in the late 1960s as ARPANET, a U.S. governmentproject, and became widely available to the public in the 1990s.

**2. How has the advent of the Internet changed our life?**

- The Internet has revolutionized communication, access to information, entertainment, business, and education. It has made global connectivity instant and created new industries and job opportunities.

**3. How can we get access to the Internet? What types of Internet connections do you know?**

- We can access the Internet through various technologies, including:

- Dial-up access

- DSL (Digital Subscriber Line)

- Cable Internet

- Fiber-optic cable

- Cellular connection

- Satellite connection

- Wi-Fi

**Task 2. Translate the terms into Russian and give a definition in English:**

1. ADSL (Asymmetric Digital Subscriber Line) - Aсимметричная цифровая абонентская линия.

- A type of DSL where download speed is higher than upload speed.

2. Backbone - Магистральная сеть.

- The principal data routes between large, interconnected networks.

3. Bandwidth - Пропускная способность.

- The maximum rate at which data can be transmitted over a network connection.

4. Broadband access - Широкополосный доступ.

- High-speed Internet access that allows multiple signals to be transmitted simultaneously.

5. Dial-up access - Доступ через коммутируемое соединение.

- An Internet connection that uses a telephone line and a modem to establish a network connection.

**Task 3. Read and translate Text A. Answer the questions:**

1. ADSL stands for Asymmetric Digital Subscriber Line. It is called asymmetric because the download speed is faster than the upload speed.

2. Dial-up uses a phone line and is much slower than DSL, which allows simultaneous voice and data transmission.

3. The term "dial-up" originates from the need to dial a phone number to establish a connection.

4. The downside of cable Internet is that bandwidth is shared among users in the same area, which can slow down speeds during peak hours.

5. Data is transferred over fiber-optic cables using light signals.

6. Wireless Internet connections mentioned: Wi-Fi, cellular networks, and satellite Internet.

7. To access the Internet via satellite, a user needs a satellite dish and a modem.

**Task 4. Find English equivalents for the following words and expressions in the text:**

a) одновременно - simultaneously

b) помещение - premises

c) цифровой сигнал - digital signal

d) дешёвый вариант - low-cost option

e) конкурентные цены - competitive prices

f) надёжный - reliable

g) стабильный/устойчивый сигнал - consistent signal

h) выделенная линия - dedicated line

i) искажение сигнала - distortion of a signal

j) помехи - interference

**Task 5. Fill in the gaps:**

1. broadband, existing

2. vary

3. gateway

4. downside

5. confuse, dial-up connection

6. dedicated

7. SDSL, VDSL

8. backbone

9. electromagnetic interference

Task 6. Modify the word in brackets:

1. communication

2. synonymous

3. specific

4. generally

5. referred

6. similarly

7. performance

8. determining

**Task 7. Answer the questions:**

1. Satellite Internet has high latency due to the long distance signals must travel.

2. Domain names correspond to IP addresses.

3. DNS is compared to a phonebook.

4. The backbone of the Internet consists of fiber-optic cables and high-capacity routers.

5. ICANN deals with domain name system management and IP address allocation.

6. Data transfer efficiency is achieved through packet switching and routing algorithms.

**Task 8. Fill in the gaps:**

1. piece

2. amount

3. broken down

4. ensures

5. congestion

6. rerouted

7. destination

8. determined

9. includes

10. reliable

**Task 9. Read and translate Text B.**

Коммутациия каналов vs. Коммутация пакетов

Коммутация каналов — это ориентированный на соединение метод передачи данных в сети, при котором два узла сети устанавливают выделенный канал связи перед началом сеанса связи. Этот способ передачи данных включает три этапа: установку соединения, передачу данных и разрыв соединения. В коммутации каналов данные не разделяются на части, поэтому весь объем информации передается по одному и тому же маршруту. Этот метод в основном используется в общественных телефонных сетях с коммутацией каналов. После создания соединения оно остается активным до его разрыва. Это означает, что другие устройства не могут использовать этот путь, даже если он простаивает, что приводит к неэффективному использованию полосы пропускания.

Комутация пакетов — это метод, при котором данные разделяются на несколько единиц, называемых пакетами. Каждый пакет состоит из двух основных частей: заголовка и полезной нагрузки. Заголовок содержит информацию о маршрутизации, а полезная нагрузка включает передаваемые данные. Хорошим примером сети с коммутацией пакетов является Интернет.

Существует два основных подхода к коммутации пакетов: датаграммная коммутация пакетов и коммутация виртуальных каналов. В датаграммной коммутации пакетов не создается выделенный канал для передачи данных, и пакеты могут направляться разными маршрутами. Позже они собираются в исходном порядке на основе их порядкового номера. Основным преимуществом этой технологии является более эффективное использование полосы пропускания Интернета.

Коммутация виртуальных каналов — это ориентированная на соединение технология, сочетающая характеристики коммутации каналов и датаграммной коммутации пакетов. В этом типе коммутации пакетов сначала устанавливается виртуальное соединение между источником и получателем, после чего пакеты передаются по этому маршруту в последовательном порядке.

**Task 10. Fill in the gaps:**

1. disconnect, connection

2. drawbacks

3. extension

4. shared

5. charge, bandwidth

6. common, efficient

**Task 11. Answer the questions:**

1. HTTP, FTP, SMTP

2. Transport layer

3. User Datagram Protocol

4. TCP ensures reliable data delivery with acknowledgments, while UDP is faster but does not guarantee delivery.

5. IP addresses of the source and destination.

**Task 12. Fill in the gaps with prepositions:**

1. over

2. of

3. to

4. at

5. as

6. of

**HOMEWORK**

**Task 13. Fill in the gaps in the text and answer the questions.**

**The World Wide Web**

The World Wide Web (WWW), commonly **(1) referred** to as the Web, is an information system accessible through the Internet where documents and other web resources are identified by a Uniform Resource Locator (URL). The resources of the Web can be **(2) accessed** through a software application called a web browser. The Web is a hypertext-based system (hypertext is a text that contains **(3) hyperlinks** to other documents). You can **(4) click** on keywords or buttons that take you to other pages or other websites. This is possible because browsers understand Hypertext Markup Language (HTML), **(5) a set of instructions** used to indicate how a web page is formatted and displayed.

The World Wide Web is not **(6) synonymous** with the Internet, which pre-existed the Web and upon which the Web is built. English **(7) scientist** Tim Berners-Lee invented the World Wide Web in 1989. He wrote the first **(8) web browser** in 1990 while employed at CERN near Geneva, Switzerland. The browser was released **(9) outside** CERN to other research institutions in January 1991, and then to the general public in August 1991. The Web began to enter **(10) everyday** use in 1993/1994, when websites for general use started to become available. Nowadays the Web serves billions of users worldwide, as it is one of the best resources for **(11) up-to-date** information.

**What does URL stand for?**  
**URL stands for Uniform Resource Locator.**

**Who invented the World Wide Web?**  
**The World Wide Web was invented by Tim Berners-Lee in 1989.**

**When did the Web enter everyday use?**  
**The Web entered everyday use in 1993/1994 when websites for general use started to become available.**

**What does HTML stand for? What is this language used for?**  
**HTML stands for Hypertext Markup Language. It is used to format and display web pages on the World Wide Web.**

**Task 15. Fill in the gaps with the correct prepositions**

DSL service can be delivered simultaneously **with** wired telephone service over the same telephone line.

The Internet is a worldwide computer network that transmits a variety **of** data and media across interconnected devices.

An IP address is a series of four numbers separated **by** dots, for example: 192.168.2.10.

TCP/IP specifies how data is exchanged over the Internet and how it should be broken down **into** packets, transmitted, and received at the destination.

Transmission Control Protocol guarantees the delivery of data **with** an acknowledgement.

Different types of fiber-optic cables are used for long-distance telecommunication, or for providing a high-speed data connection **between** different parts of a building.

TCP/IP Protocol Stack is compatible **with** all operating systems and all types of computer hardware.

**Task 16. Match the terms with their definitions**

**DSL** – A broadband communication technology designed for use on telephone lines; it allows a single phone connection to be used for both Internet service and voice calls at the same time.

**IP address** – A numerical label assigned to every device in a network that uses the Internet.

**Fiber-optic technology** – The fastest wired way to access the Internet, transmitting information as pulses of light through strands of fiber made of glass or plastic over long distances.

**WWW (World Wide Web)** – A network of documents that works in a hypertext environment, i.e., using text that contains links to other documents.

**Cable Internet** – A high-speed broadband access using a coaxial cable to transmit data.

**Bandwidth** – The quantity of data that can be transmitted through a network, measured in bits per second.

**Dial-up connection** – The least expensive but also the slowest way to access the Internet, which uses a standard phone line and analog modem. This technology pre-existed the DSL connection. **Cellular network** – A radio network distributed over land areas called cells, each served by a fixed-location transceiver, known as a cell tower.

**Satellite connection** – An Internet access technology that is considered an alternative to terrestrial communications.

**Packet switching** – A technology allowing huge files to get broken down into smaller data chunks, not transferred in one piece, which ensures reliable and efficient data transmission.

**Wi-Fi** – A high-speed Internet connection operating over LAN without the use of any cables and whose essential elements are radio signals and a wireless router.

TOPIC:

The Internet is accessed through various wired and wireless technologies. Wired connections include DSL, cable, and fiber-optic technology. DSL uses telephone lines to provide high-speed Internet, with faster download than upload speeds. Cable Internet utilizes the infrastructure of cable TV networks, offering reliable broadband access. Fiber-optic technology, the fastest option, transmits data using light signals through fiber-optic cables, ensuring minimal signal loss.

Wireless technologies include Wi-Fi, cellular, and satellite connections. Wi-Fi uses radio waves to connect devices within a local area network, making it ideal for home and office use. Cellular connections rely on mobile networks and cell towers, providing Internet access for smartphones and tablets. Satellite connections are essential for remote areas, as they use geostationary satellites to deliver Internet access, though they may experience latency.

The Internet operates using packet switching technology, which breaks data into small packets sent independently across the network. This method is efficient and allows multiple users to share the same connection. In contrast, circuit switching technology establishes a dedicated communication path between two points, which is less flexible and rarely used for modern Internet communication. Packet switching is more scalable and better suited for handling the vast amount of data transmitted online today.

PLAN

1. Introduction

2. Wired Internet Technology

3. Wireless Internet Technology

4. Packet Switching vs. Circuit Switching

5. Conclusion

**Class work (27.02.25)**

**Task 1. Lead-in Questions**

**What is a search engine? What is its function?**

A search engine is a software system designed to search for information on the World Wide Web. Its primary function is to help users find relevant websites, images, videos, or other online content by entering keywords or phrases.

**What are the most popular search engines these days?**

The most popular search engines today include Google, Bing, Yandex, and Baidu. Google dominates the global market, while Yandex is widely used in Russia, and Baidu is popular in China.

**Why do you think some people choose to use alternative search engines to Google and Yandex?**

Some people prefer alternative search engines due to concerns about privacy, as some engines like DuckDuckGo do not track user data. Others may choose niche search engines that cater to specific needs, such as Ecosia, which focuses on environmental sustainability.

**Task 2. Translate the Terms into Russian and Give a Definition in English:**

**a) crawler [ˈkrɔːlə] – краулер (поисковый робот)**

Crawler: A program used by search engines to scan and collect data from websites across the Internet.

**b) hyperlink [ˈhaɪpəlɪŋk] – гиперссылка**

Hyperlink: A clickable link that redirects users to another webpage or resource.

**c) indexing [ˈɪndeksɪŋ] – индексация**

Indexing: The process of organizing and storing data collected by crawlers to make it searchable.

**d) keywords [ˈkiːwɜːdz] – ключевые слова**

Keywords: Words or phrases entered into a search engine to find relevant information.

**e) ranking [ˈræŋkɪŋ] – ранжирование**

Ranking: The process of ordering search results based on their relevance to the user's query.

**f) relevant result [ˈreləvənt rɪˈzʌlt] – релевантный результат**

Relevant result: A search result that closely matches the user's query.

**g) request [rɪˈkwest] – запрос**

Request: A user's input (keywords or phrases) sent to a search engine to find information.

**h) search bar [ˈsɜːtʃ bɑː] – строка поиска**

Search bar: A text box where users enter their search queries.

**i) search engine [ˈsɜːtʃ endʒɪn] – поисковая система**

Search engine: A software system that helps users find information on the Internet.

**j) tab [tæb] – вкладка**

Tab: A separate section in a web browser that allows users to open multiple webpages simultaneously.

**k) URL – URL (унифицированный указатель ресурса)**

URL: The address of a webpage or resource on the Internet.

**l) web browser [ˈweb braʊzə] – веб-браузер**

Web browser: A software application used to access and view websites on the Internet.

**Task 3. Text A with Filled Gaps and Translation into Russian**

**Text A: Types of Search Engines (with filled gaps)**

A search engine allows users to extract **(1)** **requested (request)** information from the huge database of resources available on the Internet. Internet usage has increased **(2) tremendously (tremendous)** in recent years with easy-to-use search engines like Google, Bing, and Yahoo!

Search engines can be classified into the following three categories: 1) crawler-based search engines, 2) human-powered directories, and 3) meta-search engines.

1. **Crawler-Based Search Engines**

There are three basic steps that every crawler-based search engine follows before **(3) displaying (display)** search results: crawling indexing ranking

**Crawling**

Crawler-based search engines create their listings **(4) automatically (automatic)** by using a special program known as a ‘crawler’ or ‘spider’ to find new and **(5) updated (update)** content. Content can vary – it could be a webpage, an image, a video – but **(6) regardless (regard)** of the format, content is discovered by links. For example, Googlebot starts out by **(7) fetching (fetch)** a few webpages and then follows the links on those webpages to find new URLs. Various data mining techniques are used to define which pages should be crawled and the crawling **(8) frequency (frequent)**. Every time a web crawler finds a new website through a link, it scans and passes its content for further processing (called indexing).

**Indexing**

Search engines process and store information they find in an index – a massive database of discovered URLs – to be retrieved later when a user enters a query. Indexing is performed by **(9) identifying (identify)** the words and expressions that best describe the page. The **(10) identified (identify)** words are referred to as keywords, and the page is assigned to the identified keywords.

**Ranking**

Search engines compare the search string with the indexed pages from the database to provide the content that will best answer the user’s query. The results are ordered from most relevant to least relevant. This ordering of search results by **(11) relevance (relevant)** is known as ranking. There are various algorithms to calculate **(12) relevance (relevant)**, which is why different search engines give different search results for the same search string. These algorithms are **(13) constantly (constant)** evolving to provide users with the most relevant search results.

1. **Human-Powered Directories**

Human-powered directories depend on human editors to compile their listings. This means that they only show results for content that is added **(14) manually (manual)**. There are three basic steps to take:

A short description along with the URL of the website is submitted to the directory for **(15) approval (approve)**.

The submitted site is then manually reviewed and added to the appropriate category or rejected for listing.

Keywords entered in the search box will be matched with the **(16) description (describe)** of the site. This means that changes made to the content of a webpage are not taken into consideration, as only the description matters.

Yahoo! Directory, Open Directory, and LookSmart can serve as good examples of web directories. However, automated search engines like Google have **(17) nearly (near)** wiped out those human-based directories from the web.

1. **Meta-Search Engines**

A meta-search engine does not have a database of indexed pages of its own. Instead, it sends users’ queries to several other search engines and compiles top results from each into one overall list. After redundancy **(18) removal (remove)**, these results are processed, ranked, and presented to the user. Dogpile, MetaCrawler, and SavvySearch are a few examples of such meta-search engines.

**Task 4. English Equivalents:**

a) доступный в Интернете – available on the Internet

b) перейти по ссылке – follow the links

c) дальнейшая обработка – further processing

d) ключевые слова – keywords

e) запрос пользователя – user’s query

f) добавить вручную – added manually

g) соответствующая категория – appropriate category

h) поисковая строка – search string

i) принимать во внимание – take into consideration

j) иметь значение – matter

ДЗ: 5,6,7 + нужна статья к этой паре + топик

Через две недели презентация поисковой системы, которых нет в номере 7

**HOMEWORK**

**Task 5. You are going to watch a video on search engines. Match the verbs (1-6) with the nouns or phrases (a-f) to make collocations, then watch the video at**

lead → c) a team

collect → f) information

come up → a) with results

update → b) algorithms

rank → d) web pages

narrow down → e) one’s search

**Task 6. Watch the video again and fill in the gaps with the missing words or phrases.**

1. Let’s **dive in** and see how the search engine turns your **request** into a result. To make your search faster, search engines are constantly **scanning** the Web in advance to record information that might help with your search later.

2. Search engines are constantly running a program called a spider that **crawls** through web pages following hyperlinks. The information this program collects is added to a special database called **a search index**.

3. Each search engine uses its own algorithm to rank the pages **based on** what it thinks you want. The search engine ranking algorithm might check if your search term shows up in the page **title** or it might check if all the words show up **next to each other**.

4. Google invented an algorithm that takes into **account** how many other web pages are linked to a **given** page.

5. Search programs are always **evolving** to improve the algorithm so that they return better and faster results than their **competitors**.

**Task 7. Read the text below and fill in the gaps with the most suitable words or phrases from the list.**

**Bing**  
Microsoft’s Bing has become an alternative search engine option for many people today. It’s easy to use and provides beautiful background photos. Just like Google, Bing is full of **(1) internal features** like currency conversion, translation, and flight tracking, making it a really **(2) versatile tool** that holds its niche in the global market. While you’re likely familiar with Bing, you might not know that it offers a Rewards scheme. When you shop or search through Bing, you earn points that can be put towards purchasing apps and movies, which is **(3) pretty handy**. Bing has recently been trying to **(4) catch up** with Google in the advertising space, adding a number of features to Bing Ads. While Bing doesn’t have the market share that Google does, it is still popular in many markets including the U.S. and the U.K.

**Baidu**  
Baidu **(5) was founded** in 2000 and is the dominant search engine in China with a market share of over 70 percent. Although in Mandarin, it is strikingly **(6) similar to** Google in terms of design. However, Baidu is heavily **(7) censored**. Certain images and even pro-democracy websites are blocked on the search engine. Outside of China, Baidu holds little influence. But within the country, Baidu powers 3.3 billion searches **(8) per day**.  
The **(9) downside** to Baidu is that it only gives access to one market. The upside is that the market it gives access to is huge. That said, it’s crucial for businesses to understand that accessing the Chinese market is not like accessing any other. The visuals, verbiage, and customs are entirely different, and Google Translate isn’t going to help you win any customers over. To access the Chinese market via Baidu, you need someone on staff who speaks the language and understands the culture.

**Yandex**  
Yandex is used extensively in its native Russia, where it **(10) holds** around 60% of the search engine market share. It provides a very similar service to Google, and you can search websites, images, videos, and news in a **(11) user-friendly** layout. It also has additional features including mobile apps, maps, translation, cloud storage, and more.  
Yandex has its roots in a project started by two Russian developers to aid in the classification of patents in 1990. The term Yandex **(12) was adopted** in 1993 standing for “Yet Another iNDEXer.” The Yandex.ru domain was launched in 1997. In 2011, they **(13) went public** on the New York Stock Exchange with an IPO (initial public offering) of $1.3 billion, making it the second largest at the time (right after Google). Yandex currently powers more than half of all searches in Russia.

**Ecosia**  
Heavy search engine usage has a considerable impact on CO2 emissions. That is where Ecosia comes in: the CO2-neutral alternative search engine. Their servers run on 100% **(14) renewable energy**, and they use their profit to plant trees. About 80% of their ad revenue goes **(15) towards** the tree-planting scheme. **(16) On average**, roughly 45 searches are needed to plant a single tree.

**Search Encrypt**  
Search Encrypt is a privacy-based search engine, which uses **(17) encryption** to ensure that users’ identifiable information cannot **(18) be tracked**. As a metasearch engine, Search Encrypt gets its results from a network of search partners, providing well-rounded results that aren’t personalized to your history. A really interesting feature of this search engine is that it automatically **(19) erases** your local browsing history after 15 minutes of inactivity. This means that you never have to worry about your privacy, even if someone else has access to your computer.

**Перевод текста:**

**Bing**  
Microsoft Bing стал альтернативной поисковой системой для многих людей сегодня. Он прост в использовании и предлагает красивые фоновые изображения. Как и Google, Bing наполнен **(1) встроенными функциями**, такими как конвертация валют, перевод и отслеживание рейсов, что делает его действительно **(2) универсальным инструментом**, который занимает свою нишу на мировом рынке. Возможно, вы знакомы с Bing, но не знаете, что он предлагает программу вознаграждений. Когда вы делаете покупки или ищете что-то через Bing, вы зарабатываете баллы, которые можно использовать для покупки приложений и фильмов, что **(3) весьма удобно**. В последнее время Bing пытается **(4) догнать** Google в рекламном пространстве, добавляя в Bing Ads новые функции. Хотя Bing не имеет такой доли рынка, как Google, он по-прежнему популярен во многих странах, включая США и Великобританию.

**Baidu**  
Baidu **(5) был основан** в 2000 году и является доминирующей поисковой системой в Китае с долей рынка более 70 процентов. Хотя он на китайском языке, он поразительно **(6) похож на** Google по дизайну. Однако Baidu сильно **(7) цензурируется**. Определённые изображения и даже веб-сайты, пропагандирующие демократию, заблокированы в этой поисковой системе. Вне Китая Baidu имеет мало влияния, но в стране он обрабатывает 3,3 миллиарда запросов **(8) в день**.  
**(9) Недостаток** Baidu в том, что он предоставляет доступ только к одному рынку. Однако этот рынок огромен. Тем не менее, важно понимать, что доступ к китайскому рынку не похож на доступ к другим рынкам. Визуальные элементы, язык и обычаи совершенно иные, и Google Translate здесь не поможет. Чтобы работать с китайским рынком через Baidu, вам нужен сотрудник, говорящий на языке и понимающий местную культуру.

**Yandex**  
Yandex широко используется в России, где он **(10) занимает** около 60% доли рынка поисковых систем. Он предлагает сервис, очень похожий на Google, и позволяет искать веб-сайты, изображения, видео и новости в **(11) удобном** формате. Также у него есть дополнительные функции, включая мобильные приложения, карты, перевод, облачное хранилище и многое другое.  
Yandex берёт своё начало в проекте, начатом двумя российскими разработчиками для классификации патентов в 1990 году. Термин Yandex **(12) был принят** в 1993 году и означает “Yet Another iNDEXer” (“Ещё один индексатор”). Домен Yandex.ru был запущен в 1997 году. В 2011 году компания **(13) вышла на биржу** Нью-Йорка с IPO (первичным публичным размещением акций) на сумму 1,3 миллиарда долларов, став вторым по величине IPO после Google. В настоящее время Yandex обрабатывает более половины всех поисковых запросов в России.

**Ecosia**  
Интенсивное использование поисковых систем оказывает значительное влияние на выбросы CO2. Именно здесь на сцену выходит Ecosia — нейтральная по выбросам углерода поисковая система. Их серверы работают на 100% **(14) возобновляемой энергии**, а прибыль направляется на посадку деревьев. Около 80% их рекламного дохода идёт **(15) на** программу посадки деревьев. **(16) В среднем**, требуется примерно 45 поисковых запросов, чтобы посадить одно дерево.

**Search Encrypt**  
Search Encrypt — это поисковая система, ориентированная на конфиденциальность, использующая **(17) шифрование**, чтобы гарантировать, что идентифицируемая информация пользователей не может **(18) быть отслежена**. Как метапоисковая система, Search Encrypt получает результаты из сети партнёров, предлагая неперсонализированные результаты. Интересная особенность этой поисковой системы заключается в том, что она автоматически **(19) удаляет** вашу локальную историю просмотров через 15 минут бездействия. Это означает, что вам не нужно беспокоиться о конфиденциальности, даже если кто-то ещё имеет доступ к вашему компьютеру.

**Class work (06.03.25)**

**Task 8. Translate the sentences into English.**

1. Different search engines use different algorithms for collecting and processing information available on the web.
2. A metasearch engine is a search tool that sends a user's query simultaneously to multiple search engines and directories.
3. After gathering the results, the metasearch engine removes duplicate links and ranks the search results according to the applied algorithm.
4. Some people prefer to use search engines that provide the highest level of privacy.
5. Search engines perform routine tasks of searching, storing, and sorting information every day.
6. Indexing is the process of adding information to a search engine's database.
7. By entering the same query into the search fields of different search engines, one can receive different results.

**Task 9. Watch a video on the difference between a search engine and a web browser at [https://www.youtube.com/watch?v=axWqq-IkdVg] and fill in the gaps below.**

1. Unlike a search engine that operates on remote servers, a web browser runs **locally** on your hardware.

2. When you enter a **URL** address, a web browser decodes that address and puts it into a series of **numbers**, so the computer can route traffic to various servers.

3. Besides, a web browser reads the computer code of a website and then **displays** it on the screen.

4. After a user enters a request, a search engine will look across all the websites it can **reach out** to.

5. With a web browser, a user just points at one **specific** website while with a search engine, a user is given a list of potential places one can go to.

**Task 10. Put the paragraphs below in the correct order to make a text.**

TEXT C. How web browsers work

d. Nowadays, anyone can surf the web, which is a subset of the Internet, using a web browser, like Google Chrome, Firefox or Microsoft Edge. Companies typically make free web browsers because they have financial interest in how you use their Internet-connected products.

b. By offering web browsers, they are able to gently sculpt your computing habits and make their other money-making products more attractive.

Now let us have a look at how a web browser works. You can get access to multiple websites because there are some standard protocols and procedures.

a. That means they are the same in every website, which allows your web browser to view so many different types of content.

So, let us see what happens when you visit a website. At the top of every browser there is an address bar where you can type in the site you want to visit. When you hit the enter button, a chain of actions takes place.

e. First, a web browser has to find the location of a server where the website you want to visit is stored. If fact, a domain name, like youtube.com, represents an IP address. So, the browser then uses a database called the Domain Name System (DNS) to match the domain name you typed in to the corresponding IP address. Next the computer (called the client) and the server where the website is stored establish a connection with each other over the Transmission Control Protocol (TCP).

c. The client sends a request to the server asking if it is open for new connections. If the server is ready to accept a connection, it will acknowledge the request and then, finally, the client sends one more message acknowledging it received the server’s acknowledgement.

f. Now that the connection is established, the client can request web pages over HTTP (Hypertext Transfer Protocol). After receiving the request, the server will go through databases and storage devices to find the information you want and create a response. The response is usually built using HTML (Hypertext Markup Language), which makes the basic building blocks of every website. Finally, the web browser downloads the web page to your computer.

**Task 11. Match the terms with their definitions:**

1. Crawler
2. Indexing
3. Search engine
4. URL
5. Query
6. Browser
7. Search bar
8. Ranking
9. Hyperlink

**Task 12. Listen to the recording and fill in the gaps in the text below. Audio file 2.1 [https://online-edu.mirea.ru/course/view.php?id=7376]**

**Using the Compunet Browser**

The first step to using the Compunet browser is (1) **to launch** the application. Locate the browser icon and click it. The browser will open to its (2) **homepage**. The homepage will be the Compunet website. You can change this to any site you (3) **prefer.** At the top of the browser, you will see the address bar. It displays (4) **URL** of the webpage that is open. To find a different webpage, locate the search bar. Enter (5) **key terms** about the idea or pages you are looking for.

The webpages you visit are saved in the browser (6) **history**. Cookies will also be stored. These two features help load websites faster. You can save any page you visit frequently as (7) **bookmarks**. Then you won’t have to type in the URLs any more. Compunet’s browser can open multiple (8) **tabs**. But remember that opening too many tabs can (9) **interfure** with proper functioning. Add-ons are also available to increase the functionality of the browser.

DZ: topic

Topic

There are three main types of search engines: crawler-based search engines, human-powered directories, and metasearch engines. Each type works differently and provides search results in its own way.

Crawler-based search engines use programs called crawlers or bots to scan and index websites. These crawlers follow links between pages and store the information in a database. When users search for something, the search engine looks through its database to find the most relevant results.

Human-powered directories are different because people, not bots, review and categorize websites. Website owners submit their pages, and editors decide if they should be included. These directories usually provide high-quality information, but they are updated more slowly.

Metasearch engines do not have their own database of websites. Instead, they take search queries (квИриз) and send them to multiple search engines at once. Then, they collect and display the best results from different sources.

A search engine is not the same as a web browser. A search engine, like Google, helps users find websites, while a web browser, like Chrome, is a program that opens and displays web pages. You can use a search engine inside a web browser to look for information. Without a browser, a search engine would not work properly because there would be no way to open websites.

**Class work (13.03.25)**

***Task 1. Lead-in questions.***

**How do you think we can classify programming languages?**  
Programming languages can be classified based on various criteria, such as:

* **Level of abstraction**: Low-level (Assembly, Machine code) vs. High-level (Python, Java).
* **Paradigm**: Procedural (C, Pascal), Object-oriented (Java, C++), Functional (Haskell, Lisp), Logic-based (Prolog).
* **Usage**: System programming (C, Rust), Web development (JavaScript, PHP), Data Science (Python, R).
* **Execution type**: Compiled (C, C++), Interpreted (Python, JavaScript), Hybrid (Java, C#).

**What are the most common programming languages nowadays?**  
Some of the most widely used programming languages today include:

* **Python** (Data Science, AI, Web Development)
* **JavaScript** (Web Development, Frontend, Backend)
* **Java** (Enterprise applications, Android development)
* **C/C++** (System programming, Game development)
* **C#** (Game development with Unity, Enterprise applications)
* **SQL** (Database management)
* **Go** (Cloud computing, Backend development)
* **Rust** (Systems programming, Performance-critical applications)

**What programming languages are rarely used these days?**  
Some programming languages that are rarely used today include:

* **COBOL** (Still used in legacy banking systems but rarely for new projects)
* **Fortran** (Mostly used in scientific computing, but declining)
* **Lisp** (Historically significant, but niche today)
* **Pascal** (Once popular for teaching, now mostly obsolete)
* **Perl** (Replaced by Python in many applications)
* **Prolog** (Used in AI research but not widespread)

***Task 2. Translate the terms into Russian and give a definition in English:***

a) **Assembler (Ассемблер)** – A low-level programming language that translates assembly language into machine code.

b) **Binary code (Двоичный код)** – A system of representing data using only two symbols, 0 and 1, which computers can process.

c) **Compatible (Совместимый)** – The ability of a program or system to work with another program, system, or hardware without modification.

d) **Compiler (Компилятор)** – A program that translates source code from a high-level language into machine code before execution.

e) **Debugging (Отладка)** – The process of identifying and fixing errors (bugs) in software.

f) **Encapsulation (Инкапсуляция)** – An OOP principle where data and methods are bundled together, restricting direct access to the data.

g) **High-level language (Язык высокого уровня)** – A programming language that is user-friendly and abstracts away most hardware details (e.g., Python, Java).

h) **Inheritance (Наследование)** – An OOP principle where a new class derives properties and behaviors from an existing class.

i) **Interpreter (Интерпретатор)** – A program that executes source code line by line without prior compilation.

j) **Low-level language (Язык низкого уровня)** – A language close to machine code, such as Assembly, that provides direct hardware control.

k) **Machine code (Машинный код)** – A set of binary instructions executed directly by a computer’s CPU.

l) **OOP (ООП – Объектно-ориентированное программирование)** – A programming paradigm based on objects, encapsulation, inheritance, and polymorphism.

m) **Polymorphism (Полиморфизм)** – An OOP concept where the same method can operate on different data types or objects.

n) **Source code (Исходный код)** – The human-readable instructions written by programmers before compilation or interpretation.

***Task 3. Read the text below and put the following sentences in the appropriate place. Then listen to the recording and check your answers. Audio file 3.1***

**TEXT A. How computers process information**

Computers are constantly processing large amounts of information. Operating a computer involves sending and receiving complex sets of instructions. **(4) Computers have their own language, called machine language.** Machine language is made up of binary digits that are represented by the numbers 0 and 1. Every possible computer operation is encoded with different combinations of these two numbers.

However, programmers usually do not send commands in machine language. **(2) They write software in human-readable programming languages.** This allows programmers to write software quickly and efficiently. These languages, like C and Java, are more compatible with the way humans think. However, computers still require instructions in machine language. Systems software facilitates this communication within the computer. **(1) A compiler is a software component that translates human-readable language into an assembly language.** This language is simpler than a human-readable language, but it still uses letters and words. The computer needs an assembler to turn those instructions into the binary translation. For example, the programmer might write the command "A + B." Then, a compiler converts it into an assembly language: "Add A, B." Finally, an assembler translates it into machine code: "1000110010100000". **(3) The computer uses these instructions to perform the command.**

***Task 4. Read text B. Translate it into Russian and answer the questions below.***

К сожалению, компьютеры не могут понимать разговорный английский или любой другой естественный язык. Единственный язык, который они могут понимать напрямую, — это машинный код, состоящий из 1 и 0 (двоичный код).

Однако писать машинный код слишком сложно. Поэтому для передачи инструкций компьютеру используются символические языки. Например, языки ассемблера используют сокращения, такие как **ADD, SUB, MUL** для обозначения команд. Затем программа переводится в машинный код с помощью специального программного обеспечения, называемого **ассемблером**. Машинный код и языки ассемблера называются **языками низкого уровня**, поскольку они ближе к аппаратному обеспечению. Они довольно сложны и привязаны к конкретным машинам.

Чтобы упростить процесс написания программ и решить проблему совместимости между разными типами компьютеров, разработчики программного обеспечения создали **языки высокого уровня**, которые ближе к английскому языку. Вот несколько примеров:

* **FORTRAN (FORmula TRANslator)** — один из первых языков программирования высокого уровня, разработанный компанией IBM в середине 1950-х годов для научных и инженерных расчетов. Он ввел концепцию **высокоуровневой абстракции**, позволяя программистам писать код, более похожий на человеческий язык.
* **BASIC (Beginner's All-purpose Symbolic Instruction Code)** — разработан в 1960-х годах как простой язык для начинающих. Он сыграл важную роль в популяризации программирования.
* **PASCAL** (назван в честь французского математика Блеза Паскаля) стал популярным в 1970-х годах. С тех пор он широко использовался для обучения основам программирования.
* **C** — разработан в 1970-х годах Деннисом Ритчи в Bell Labs. Он сочетает в себе **низкоуровневое управление** с **высокоуровневой абстракцией**, что делает его подходящим для **системного программирования**.
* **C++** — расширение языка C, включающее **объектно-ориентированное программирование (OOP)**. Программист может сосредоточиться на конкретных объектах (например, тексте или графике) и назначать им функции, которые можно изменять без необходимости редактировать всю программу. Это делает программы более гибкими и легкими в модификации.
* **Java** — разработан в 1995 году компанией **Sun Microsystems** для работы в интернете. Java широко использовался для создания **Java-апплетов** — небольших программ, которые добавляли анимацию и интерактивные элементы на веб-страницы. Java был разработан как **кроссплатформенный язык** по принципу **"Write Once, Run Anywhere"**. Он ввел понятие **виртуальной машины Java (JVM)** и популяризировал объектно-ориентированное программирование.
* **Python** — создан в 1989 году и ориентирован на **простоту и читаемость кода**. Python стал популярным для **веб-разработки, анализа данных и искусственного интеллекта**.

Программы, написанные на языках высокого уровня, должны быть **переведены в машинный код** с помощью **компилятора** или **интерпретатора**.

* **Компилятор** переводит исходный код в объектный код **целиком**, сразу конвертируя всю программу в машинный код.
* **Интерпретатор** переводит исходный код **построчно** во время выполнения программы.

**Ответы на вопросы:**

1. **What is the difference between high-level and low-level programming languages?**
   * **High-level languages** (e.g., Python, Java) are **more abstract** and resemble natural language, making them easier to write and understand. They are also **platform-independent**.
   * **Low-level languages** (e.g., Assembly, Machine code) are **closer to hardware**, more complex, and often specific to a particular machine, but they offer more control and efficiency.
2. **What is the difference between the assembler, compiler, and interpreter?**
   * **Assembler** translates **assembly language** into **machine code**.
   * **Compiler** converts the **entire** high-level program into machine code **before execution**.
   * **Interpreter** translates and **executes** code **line by line**, without compiling the whole program first.
3. **Which language is widely used for systems programming?**
   * **C** is the most widely used language for **systems programming**, as it provides direct access to memory and hardware control.
4. **What does FORTRAN stand for?**
   * **FORTRAN** stands for **FORmula TRANslator**.
5. **What are Java applets?**
   * **Java applets** are **small programs** written in Java that were used to add **interactive features** and **animations** to web pages. However, they are now obsolete due to **security concerns** and modern alternatives like **JavaScript and HTML5**.

***Task 5. Complete the text below with the missing prepositions.***

Programming languages can be divided **(1) into** two classes: high-level languages or low-level languages. Each type of programming language has its own purpose, and learning the difference **(2) between** the two is an important step to figuring **(3) out** which one to use. Whether a language is high-level or low-level has to do **(4) with** abstraction. The amount **(5) of** abstraction provided defines how ‘high-level’ a programming language is.

Machine code has no abstraction. It is a strictly numerical language and consists **(6) of** individual instructions passed to a computer. Machine code is what computers actually run. Any other code, written **(7) in** an assembly language or high-level language, must be translated **(8) into** machine code for it to be executed on a computer.

Assembly language is another low-level language that is a step **(9) above** machine code, and it features a very small amount of abstraction. **(10) Like** machine code, assembly languages are specific **(11) to** hardware, so every assembly language is designed **(12) for** a particular computer architecture. Assembly code is converted **(13) into** executable machine code by a program referred **(14) to** as an assembler. Together, machine code and assembly languages form the low-level category.

High-level languages are closer **(15) to** ordinary languages, but each of them has its own syntax, and you might find that some are easier to read than others. They have a high level **(16) of** abstraction and are portable, meaning they can be executed on many computers, i.e., you don’t need to write hardware-specific code like you do with low-level languages. These languages are good for writing software programs, web apps, and mobile apps. For instance, C# is a good example **(17) of** a multi-purpose language, JavaScript is the backbone **(18) of** web coding, and SQL is great **(19) for** database programming.

Языки программирования можно разделить **на** две категории: языки высокого уровня и языки низкого уровня. Каждый тип языка программирования имеет свое предназначение, и понимание **разницы между** ними — важный шаг в выборе подходящего варианта. Принадлежность языка к высокоуровневым или низкоуровневым зависит **от** степени абстракции. **Количество** абстракции определяет, насколько "высокоуровневым" является язык программирования.

Машинный код не имеет абстракции. Это строго числовой язык, состоящий **из** отдельных инструкций, передаваемых компьютеру. Машинный код — это то, что фактически выполняет компьютер. Любой другой код, написанный **на** языке ассемблера или языке высокого уровня, должен быть переведен **в** машинный код, чтобы быть выполненным на компьютере.

Язык ассемблера — это еще один язык низкого уровня, который находится **над** машинным кодом и содержит **минимальное** количество абстракции. **Как и** машинный код, языки ассемблера зависят **от** аппаратного обеспечения, поэтому каждый язык ассемблера разрабатывается **для** определенной архитектуры компьютера. Код на ассемблере преобразуется **в** исполняемый машинный код с помощью программы, называемой **ассемблером**. Вместе машинный код и языки ассемблера составляют категорию языков низкого уровня.

Языки высокого уровня ближе **к** обычным языкам, но у каждого из них своя **синтаксическая** структура, и некоторые из них могут быть более читаемыми, чем другие. Они обладают высокой степенью **абстракции** и являются переносимыми, что означает, что они могут выполняться на многих компьютерах, то есть нет необходимости писать код, привязанный к конкретному оборудованию, как в случае с языками низкого уровня. Эти языки отлично подходят для написания программного обеспечения, веб-приложений и мобильных приложений. Например, C# является хорошим **примером** универсального языка, JavaScript — **основой** веб-программирования, а SQL отлично подходит **для** программирования баз данных.

**HOMEWORK**

***Task 6. You are going to watch a video on the five most popular programming languages at [https://www.youtube.com/watch?v=vzk5DCFJr8c]. Guess how the programming languages would be ranked. Сheck your ideas, answer the question.***

**GuessedRanking:**

1. **JavaScript** – Dominating web development, it’s widely used for interactive and dynamic websites.
2. **Python** – Celebrated for its readability, versatility, and ease of learning, it’s become very popular in many fields.
3. **Java** – Known for its “write once, run anywhere” philosophy, it remains a staple in enterprise applications.
4. **C and C++** – Considered fundamental for system-level programming and performance-critical applications, they form the backbone of many modern languages.
5. **Swift** – Although modern and powerful (especially in the Apple ecosystem), it is newer and used in a more niche domain compared to the others.

**QuestionAnswers:**

1. **What programming language had been extensively used by Apple before Swift was developed?**  
   **Answer:** Apple extensively used **Objective-C** for developing its applications before Swift was introduced.
2. **What programming language is titled ‘the mother of all programming languages’?**  
   **Answer:C** is often regarded as “the mother of all programming languages” because many modern languages (including C++, Java, and even aspects of Objective-C) have evolved from it.
3. **What programming language has changed the face of the Internet?**  
   **Answer:JavaScript** has been revolutionary in transforming the Internet, as it is essential for creating dynamic, interactive web content.
4. **What is good about Java?**  
   **Answer:** Java is praised for its platform independence (thanks to the JVM – “write once, run anywhere”), robust security features, extensive libraries, and its strong performance in enterprise and large-scale applications.
5. **What is a common misconception about Python?**  
   **Answer:** A common misconception is that Python is only a “beginner’s language” or that its interpreted nature makes it too slow for serious, production-level projects. In reality, Python’s simplicity and vast ecosystem make it highly effective even in professional environments.
6. **Which distinctive features of Python are emphasized in the video?**  
   **Answer:** The video emphasizes Python’s **readability**, **simplicity**, and its dynamic, high-level features that allow developers to write clean, concise, and maintainable code.

***Task 7. Read and translate text D. Answer the questions to the text.***

1. **What are the advantages of using object-oriented programming?**  
   **Answer:** Object-oriented programming (OOP) offers better organization of code, modularity, and reusability. It makes maintenance easier and helps model real-world entities by grouping data and behavior into objects.
2. **What are the three key features of OOP?**  
   **Answer:** The three key features are **encapsulation**, **inheritance**, and **polymorphism**.
3. **What is encapsulation?**  
   **Answer:** Encapsulation is the practice of bundling data (attributes) and the methods (functions) that operate on the data within a single class, while restricting direct access to some of the object's components to protect its integrity.
4. **What is inheritance?**  
   **Answer:** Inheritance is a mechanism where a new class (child or subclass) derives properties and behaviors from an existing class (parent or superclass), which promotes code reusability and a hierarchical organization.
5. **What is polymorphism?**  
   **Answer:** Polymorphism allows objects of different classes to be treated as objects of a common superclass. It lets the same method operate differently on different classes, enhancing flexibility in code design.
6. **What multimedia data types are referred to in the text?**  
   **Answer:** The text likely refers to common multimedia data types such as **text, images, audio,** and **video**.
7. **List the different types of triangle mentioned in the text.**  
   **Answer:** Typical classifications of triangles include **equilateral, isosceles,** and **scalene** triangles.
8. **What specific type of rectangle is named in the text?**  
   **Answer:** The text names the **square** as a specific type of rectangle.
9. **What common properties of a rectangle are mentioned in the text?**  
   **Answer:** Common properties include having **four sides**, with **opposite sides equal in length**, and **four right angles**.

***Task 8. Match the terms with the definitions:***

**Terms:**

1. **object**
2. **encapsulation**
3. **menu**
4. **square**
5. **polymorphism**
6. **library**

**Definitions&Matches:**

* **a)** an OOP property that allows data and program instructions to be bundled into an object  
  **Match:** 2) **encapsulation**
* **b)** a list of choices  
  **Match:** 3) **menu**
* **c)** an OOP property that enables different objects to deal with the same instruction in different ways  
  **Match:** 5) **polymorphism**
* **d)** a reusable collection of objects  
  **Match:** 6) **library**
* **e)** a module containing data and program instructions  
  **Match:** 1) **object**
* **f)** a rectangle with equal sides  
  **Match:** 4) **square**

***Task 9. Complete the following text using the words from text D.***

Encapsulation, (1) *inheritance* and polymorphism are key features of (2) *object-oriented* programming. Encapsulation allows data and program instructions to be bundled together into (3) *modules* called objects. Inheritance means that specific (4) *инстансес*  of a class of objects (5) *inherit* the properties of the class of objects. Polymorphism means that instructions are treated differently by different (6) *objects*. The combination of these (7) *key* features of OOP means that program code is reusable. Thisspeedsup (8) *development*and (9) *maintenance* of programs.

***Task 10. Listen to a recording on the development of Java and find out in what connection the following phrases and years are mentioned. Audio file 3.2***

* **1990:**  
  The development of the language began at Sun Microsystems. At this time, the project was targeting embedded systems (including handheld devices).
* **Sun Microsystems:**  
  The company where Java was created. It was at Sun Microsystems that the project that eventually became Java was initiated.
* **Handheld device:**  
  The initial target for the language was for use in small, embedded devices such as handheld consumer electronics.
* **Oak:**  
  The original name given to Java during its early development phase.
* **Duke:**  
  The name of the official Java mascot, representing the language’s identity and branding.
* **1993:**  
  Further development and refinement of the language occurred during this year as the project matured.
* **May 1995:**  
  Java was officially released to the public. This release marked its introduction as a technology suited for creating animation and interactive programs.
* **Animation and interactive programs:**  
  Java was promoted as especially capable for developing multimedia applications, including animations and interactive web programs.
* **Multiple platforms:**  
  A core promise of Java was its platform independence—its “write once, run anywhere” approach—allowing the same code to run on various hardware and operating systems.

**Class work (20.03.25)**

***Task 11. Complete the text by modifying the words given on the right or using the verbs in the correct form.***

Java is an object-oriented programming language developed by Sun Microsystems. It **(1) is intended** to serve as a new way to manage software complexity in a cross-platform environment. Java is used in a **(2) variety** of computing platforms. The language has become so popular that it is **(3) nearly** everywhere: in mobile phones, Web servers, and enterprise **(4) applications**. Java applets are often used to provide improved **(5) functionality** while browsing the World Wide Web. Another great advantage of Java is that, **(6) once** the program **(7) is written** in Java, we can run it anywhere. This means that applications developed through Java are platform **(8) independent**.

***Task 12. Match the terms with their definitions:***

1. **Assembler** – A special program that converts a program written in a low-level language into machine code.
2. **Binary code** – A code made of just two numbers (0 and 1).
3. **Assembly language** – A low-level language that uses abbreviations, such as ADD, SUB, and MUL, to represent instructions.
4. **Compiler** – A special program that converts a source program (written in a high-level language) into object code in one go.
5. **Inheritance** – The ability of one class to use properties and behavior of another class.
6. **Object-oriented language** – A high-level language allowing to alter a particular function of a program without changing the entire program.
7. **Interpreter** – A special program that translates the source code line by line, as the program is running.
8. **Encapsulation** – The ability to bind data and methods into one unit.
9. **Source code** – Program instructions written in a particular computer language.
10. **Debugging** – The techniques of detecting and correcting errors which may occur in programs.
11. **Compatible** – Capable of running on most computer platforms.

***Task 13. Fill in the gaps with correct prepositions.***

1. Each code has its own interpreter or compiler - a program to translate that code **into** machine code that a computer can read.
2. Programs written in interpreted languages are slower **than** in compiled and require more memory resources.
3. Assembly languages are used to write code **for** BIOS and controllers. If a program written in a low-level language runs on one machine, it won't necessarily be compatible **with** another.
4. **Unlike** other programming languages, Python uses a syntax that is easy to read and understand.
5. The interpreter reads and executes high-level code line by line **without** producing a compiled file.
6. Assembly languages are **like** a dictionary for humans, since instead **of** binary digits, they use symbols and abbreviations, which represent the binary digits combinations.
7. **According to** the TIOBE index, Python tops the list of the most popular programming languages of the year 2024.

***Task 14. Render the following article into English.***

The Java language was created by Sun Microsystems in 1992. Initially, it was designed for platform-independent programming of processors embedded in various household devices.

The main drawback of the programming languages available at the time was their dependence on a specific processor. Even high-level languages, which theoretically allowed programs to be created for any processor, required a corresponding compiler that generated output code targeted at the processor on which the programs would be executed.

The "age-old dream" of the programming community—to write a program once and run it on different processors and operating systems—had not yet been realized. This was precisely the goal that Java's developers sought to achieve.

Interestingly, without realizing it, they created something far greater than they had initially envisioned. At the same time that Java was being developed, the Internet was also rapidly evolving. It soon became clear that the principles embedded in Java could help solve many challenges related to Internet programming.

As a result, instead of a narrowly specialized programming language for embedded processors, Java became a universal language that enabled the creation of programs independent of both the processor and operating system, while also supporting modern technologies. This versatile programming language was officially introduced by Sun Microsystems for commercial use.

Object-oriented programming (OOP) is a powerful paradigm that organizes code into reusable and scalable objects. It promotes key principles such as **encapsulation**, **inheritance**, **polymorphism**, and **abstraction**, making software development more efficient and maintainable. OOP is widely used in modern programming languages like Java, Python, and C++, enabling developers to build complex systems with modular and flexible architecture. Its ability to model real-world entities and relationships makes it an essential approach for software development across various domains.

**Class work (27.03.25)**

***Task 1. Lead-in questions.***

Languages and tools used to create web documents:

• Languages: HTML, CSS, JavaScript, PHP, Python, Ruby, etc.

• Tools: Text editors (VS Code, Sublime Text), CMS platforms (WordPress, Joomla), Website Builders (Wix, Squarespace), Frameworks (React, Angular, Bootstrap).

• Main stages in building a website:

• Planning: Defining the purpose, target audience, and content.

• Designing: Creating wireframes, layouts, and UI/UX.

• Development: Writing code (frontend & backend).

• Testing: Checking for bugs, responsiveness, and performance.

• Deployment: Uploading to a server and launching.

• Maintenance: Updating content, fixing errors, and improving security.

• Benefits and downsides of website builders:

• Benefits: Easy to use, no coding required, cost-effective, fast setup, pre-made templates.

• Downsides: Limited customization, less flexibility, might not support advanced features, potential SEO restrictions.

***Task 2. Translate the terms into Russian and give a definition in English:***

a) Backend development (Бэкенд-разработка) – The process of working on the server-side of a website, handling databases, user authentication, and application logic.

b) CSS (Каскадные таблицы стилей) – A language used to define the presentation, layout, and styling of HTML documents.

c) Frontend development (Фронтенд-разработка) – The process of building the client-side of a website, including UI design and interactivity using HTML, CSS, and JavaScript.

d) HTML (Язык разметки гипертекста) – A markup language that defines the structure of a webpage using elements like headings, paragraphs, and links.

e) Hyperlink (Гиперссылка) – A clickable text or image that directs users to another webpage or resource.

f) JavaScript (Джаваскрипт) – A programming language that enables interactivity on web pages, such as animations, form validation, and dynamic content updates.

g) Layout (Макет) – The arrangement of elements on a webpage, determining how content is visually structured.

h) Markup tags (Теги разметки) – Special codes used in HTML to define elements such as headings, paragraphs, images, and links.

i) To rank high (Высоко ранжироваться) – To appear at the top of search engine results pages (SERPs).

j) SEO (Поисковая оптимизация) – A set of practices aimed at improving a website's visibility in search engines.

k) Template (Шаблон) – A pre-designed webpage or layout that users can customize for their needs.

l) URL (Универсальный указатель ресурса) – The web address of a resource, such as a webpage or an image.

m) Website builder (Конструктор сайтов) – A tool that allows users to create websites without coding by using drag-and-drop functionality.

n) WYSIWYG (Что видишь, то и получаешь) – A type of editor that lets users design webpages visually, without needing to write code.

***Task 3. Read and translate text A. Answer the questions.***

### Дизайн веб-страниц

Если вы изучаете веб-разработку, вам встретятся такие термины, как HTML, CSS и JavaScript. Эти три инструмента доминируют в сфере веб-разработки.

Язык разметки гипертекста (HTML) – это код, используемый для описания структуры информации на веб-странице. HTML состоит из команд, называемых тегами, которые размещаются вокруг различных типов контента (например, таблиц, абзацев, списков, гиперссылок, изображений, видео и т. д.), указывая веб-браузеру, как их отображать.

CSS (каскадные таблицы стилей) – это механизм дизайна, основная функция которого – улучшение внешнего вида веб-страницы путем определения ее стиля и макета. CSS позволяет единообразно применять стили ко всем страницам веб-сайта, что упрощает их поддержку и обновление для разработчиков.

JavaScript (JS) – еще одна ключевая технология Всемирной паутины (World Wide Web). JS – это кроссплатформенный, объектно-ориентированный язык программирования, используемый разработчиками для создания интерактивных, удобных и интуитивно понятных веб-страниц. Он позволяет создавать динамически обновляемый контент, использовать анимации, всплывающие меню, интерактивные кнопки и многое другое.

Если HTML и CSS управляют представлением, форматированием и макетом, то JavaScript контролирует поведение различных элементов веб-страницы. Без JavaScript 90% веб-страниц в Интернете были бы статичными.

• Three tools used in web development: HTML, CSS, JavaScript.

• HTML stands for: Hypertext Markup Language.

• Role of tags in HTML: They structure webpage content by defining elements like paragraphs, headings, links, images, etc.

• Short for Cascading Style Sheets: CSS.

• CSS is responsible for: Styling and layout of a webpage, including colors, fonts, spacing, and positioning.

• Features added with JavaScript: Animations, pop-up menus, dynamic content updates, clickable buttons, interactive forms, etc.

***Task 4. Read an article about Web design software and decide which of the following phrases is suitable for each gap:***

1. to have a website

2. to include excellent site builder software

3. to customize the template

4. to drag and drop images onto your web pages

5. to include a wide variety of templates with a professional look

***Task 5. Watch a video on free website builders at [https://www.youtube.com/channel/UCm2bHu2-sIhdIMRGrHtuUPg], name their downsides and listen out for the synonyms of the following words.***

• Downsides of free website builders:

• Limited design flexibility.

• Ads on free versions.

• SEO limitations.

• Limited storage and bandwidth.

• No custom domain in the free plan.

1. Cheap – affordable

2. Restrictions – limitations

3. To improve – enhance

4. Commercial – business-oriented

5. Depository – storage

6. Boundless – unlimited

7. Characteristic – feature

8. To examine – analyze

Home: 1-7

**Class work (03.04.25)**

***Task 6. Read some tips on creating an effective website and find the English equivalents for the Russian words. Report on the useful tips mentioned in each part to the rest of the group.***

### Текст C. Достижение эффективного дизайна веб-сайта для вашего бренда.

Независимо от того, хотите ли вы повысить узнаваемость бренда или продать товар или услугу, эффективный дизайн веб-сайта может стать решающим фактором между новым клиентом и потерянным потенциальным покупателем. Последнее, что вам нужно, — это плохо продуманный сайт, который отпугивает посетителей. Следуйте этим советам по эффективному веб-дизайну, и вы вскоре заметите увеличение конверсий.

#### 1) Простота – залог успеха

Когда речь идет об эффективном дизайне веб-сайта, чем проще, тем лучше! Парадокс выбора заключается в том, что чем больше вариантов у человека, тем выше вероятность, что он не выберет ничего. Это особенно справедливо для веб-дизайна. Слишком большое количество опций может перегрузить посетителей и резко увеличить время принятия решений. Сложные макеты могут выглядеть привлекательно, но не стоит допускать, чтобы графика отвлекала пользователей от поиска нужной информации. Простые, элегантные дизайны проверены временем и позволяют пользователям легко ориентироваться на сайте.

Стратегическое использование свободного пространства (также известного как отрицательное пространство) может значительно улучшить внешний вид сайта. Оно включает пробелы между изображениями и блоками текста, отступы на страницах и интервалы между буквами и словами. Когда большая часть страницы свободна от текста и изображений, сайт не перегружает посетителей. Это помогает сосредоточить внимание на главных элементах страницы.

- drastically increase – резко увеличиться

- distract – отвлекать

- withstand the test of time – выдержать проверку временем

- the majority of the page – большая часть страницы

#### 2) Стандартные элементы – это удобно

Люди привыкли к определенным схемам расположения сайтов. Уникальность – это хорошо, но лучше воспользоваться преимуществами привычного. Нет необходимости повторно изобретать велосипед в веб-дизайне. Например, меню навигации лучше размещать вверху страницы, контактные данные – внизу, логотип должен быть кликабельным и вести на главную страницу, а строка поиска – находиться в правом верхнем углу.

Ссылки должны выделяться цветом или менять оттенок при наведении. На сайтах электронной коммерции значок корзины является стандартным элементом. Также важно использовать понятные пользователям фразы, такие как «оформить заказ», «добавить в корзину», «связаться с нами», «отправить».

- layout – схема расположения (макет)

- take advantage of – воспользоваться преимуществом

- reinvent the wheel – повторно изобретать велосипед

- at the bottom of each page – внизу каждой страницы

#### 3) Визуальная привлекательность

Независимо от качества контента, вы можете терять клиентов, если ваш сайт визуально непривлекателен. Три ключевых элемента – цветовая гамма, типографика и баланс. Цвета вызывают эмоции: теплые оттенки (розовый, желтый) придают энергии, а холодные (синий, зеленый) – успокаивают.

Для дизайна сайта важно сочетание гармонии и контраста. Яркие цвета лучше использовать для кнопок призыва к действию, а не для фона. Не стоит перегружать сайт слишком большим количеством оттенков – оптимально использовать 3-5 цветов.

- visually appealing – визуально привлекательный

- stand out – выделяться

- avoid – избегать

- background – фон

#### 4) Учитывайте скорость загрузки

Эпоха модемов давно прошла! Раньше считалось, что пользователь покинет сайт, если он загружается дольше 8 секунд, но теперь этот порог сократился до 3 секунд. Долгая загрузка может привести к потере ценных клиентов.

Чтобы ускорить сайт, можно уменьшить размер изображений и оптимизировать сервер. Важно убедиться, что сайт загружается быстро не только на компьютере, но и на мобильных устройствах.

- abandon a website – покинуть вебсайт

- valuable customer – ценный клиент

- shorten load time – сократить время загрузки

- ensure – убедиться

#### 5) Одна картинка стоит тысячи слов

Использование изображений – мощный инструмент. Они передают информацию быстрее, чем текст, и делают сайт более привлекательным. Однако важно использовать только изображения высокого разрешения, чтобы они выглядели профессионально. Кроме того, они должны быть релевантными – пользователи легко узнают постановочные фотографии и предпочитают реальные изображения.

- convey information – передавать информацию

- high resolution – высокое разрешение

- recognize – узнавать

- average user – обычный пользователь

#### 6) Оптимизация

В цифровую эпоху пользователи взаимодействуют с сайтами на разных устройствах, поэтому важно адаптировать сайт под мобильные экраны. Кроме того, необходимо регулярно обновлять сайт, чтобы он оставался актуальным и удобным.

- digital age – цифровой век

- install – устанавливать

- interact – взаимодействовать

- update a website – обновлять сайт

***Task 7. Read text D and modify the words in brackets to fill in the gaps.***

SEO stands for Search Engine Optimization. Optimizing websites for Google and other search engines is essential for any website owner (1) if they want to reach a larger audience. Studies suggest that when using search engines, most people do not go beyond the listings mentioned on the first couple of pages of the search engine results list. SEO refers to a set of improvements (2) that help your website to rank higher in Search Engine Results Page. In short, it is all about getting (3) users to visit your site without directly paying (4) for advertising. SEO is incredibly (5) important as websites on the first page of search results receive the majority (6) of clicks. The number of people clicking a website decreases (7) the further down the page they rank.

SEO is a fundamental part of digital (8) marketing because people conduct millions of searches every day, often with intent to find information about products and services. Greater visibility (9) and ranking higher in search results than your competitors (10) can have a material impact on your revenues.

EO расшифровывается как поисковая оптимизация (Search Engine Optimization). Оптимизация веб-сайтов для Google и других поисковых систем необходима для любого владельца (1) сайта, если он хочет привлечь более широкую аудиторию. Исследования показывают, что при использовании поисковых систем большинство людей не заходят дальше первых двух страниц результатов поиска.

SEO относится к набору улучшений (2), которые помогают вашему сайту занимать более высокие позиции на странице результатов поисковой системы. Проще говоря, это способ привлечения (3) пользователей на ваш сайт без оплаты (4) за рекламу.

SEO чрезвычайно (5) важно, так как сайты, находящиеся на первой странице результатов поиска, получают большинство (6) кликов. Количество людей, переходящих на сайт, уменьшается (7) по мере его снижения в поисковой выдаче.

SEO является неотъемлемой частью цифрового (8) маркетинга, поскольку каждый день люди выполняют миллионы поисковых запросов, часто с целью найти информацию о товарах и услугах. Большая видимость (9) и более высокий рейтинг в результатах поиска по сравнению с вашими конкурентами (10) могут существенно повлиять на ваш доход.

***Task 8. Watch a video at [https://youtu.be/D7UxlkwdYc0] and answer the following questions. Make your own predictions first.***

1. The main purpose of SEO for a site owner – to increase the website’s visibility in search engines and attract more visitors without paying for ads.

2. The benefit of SEO for Google – improving search quality and providing users with the most relevant results.

3. The Google indexing system is compared to a huge library or catalog in the video.

4. Organic results – links that appear in search results naturally, without paid advertising.

5. Very few people click on the second page of search results.

6. If users don’t find relevant results on the first page, they usually change their search query or refine it.

7. The first three listing results get the majority of clicks, often over 50% combined.

8. The two types of SEO – On-page SEO and Off-page SEO.

9. The difference between these approaches – On-page SEO focuses on optimizing content and structure within the website, while Off-page SEO involves external factors like backlinks and social signals.

***Task 9. Fill in the gaps with the appropriate prepositions.***

1. The last thing you want is for a poorly designed website to discourage site visitors from becoming customers.

2. CSS is capable of applying different fonts and styles to a text on a web page.

3. When possible, replace text on your website with infographics.

4. You shouldn’t use more than three different fonts across your entire website.

5. Design is not just what it looks like. Design is how it works.

6. You can create a mobile version of your website, or you can simply utilize a responsive website layout that adjusts to different screen sizes automatically.

7. Chatbots on your site save you the expense of employing staff to work as customer service representatives.

8. Website builders are DIY online tools that allow you to create and design your own website without knowing a single line of code!

***Task 10. Listen to an expert giving a talk on blogs and complete the summary and the flow chart below. Write ONE WORD ONLY for each answer. Audio file 4.1 [https://online-edu.mirea.ru/course/view.php?id=7376]***

**Blogs and the History of Blogging**

A blog can perhaps be best described as a website that consists of a kind of journal that is regularly **(1) updated**. Blogs cover a very wide variety of topics and many of them are personal diaries. Blogs are usually not monologues because they have interactive elements, which may lead to friendships or even **(2) professional** relationships between people. The first 'blog' was probably created in 1994 by a student called Justin Hall and he called it his **(3) online diary**. Similar websites were then created and these included **(4) links** to other websites and forums.

**Blogging Workflow – Advice**

Decide what the **(5) topic** of your posts will be.  
⇩  
Do some reading before starting a post.  
⇩  
As you compose the post, keep a record of **(6) sources** and links.  
⇩  
After creating the post, add some tags to it to improve **(7) visibility**.  
⇩  
Use social networking sites to **(8) promote** a post you think is outstanding.  
⇩  
Look at the **(9) feedback** relating to the post.  
⇩  
Don't simply say ‘thanks’ to people who have responded to your post.  
⇩  
Go on to other blogs and leave comments and **(10) feedback** on their posts.

***Task 11. Render the text into English.***

**Frontend vs. Backend: Differences and Features of Development**

Frontend and backend development are closely connected and cannot exist independently. However, they are completely different areas of programming, both in terms of the tasks performed and their overall purpose.

The term *frontend* refers to the development of the user-visible interface and all the features a user can interact with. Essentially, when you visit any website and see buttons, text, animations, and other elements—that's all created using frontend development.

Three main tools are used to create these elements: **HTML**, **CSS**, and **JavaScript**.  
The primary tool in this field is HTML (HyperText Markup Language). It is mainly used to structure documents—that is, web pages displayed in a browser. With HTML, developers create the layout, add headings, lists, and apply other types of content formatting.

If a developer learns HTML, they will inevitably also learn CSS (Cascading Style Sheets). CSS is responsible for the visual appearance of a page. It allows you to work with colors, fonts, and the positioning of various elements. Simply put, CSS is used to style the page and control how it looks, after the structure has been created with HTML.

JavaScript is used to implement dynamic actions on the page, such as animations and responses to user interactions. For example, when a page reacts to cursor movement or mouse clicks—changing element behavior accordingly—that's JavaScript at work.

A *backend* developer, on the other hand, is responsible for the server-side of web applications and websites, where user requests are processed. In simple terms, this involves all the internal processes that are hidden from the user and take place outside of their browser or device.

Backend developers work with various databases (such as SQLite, MySQL, MongoDB), different servers (like Nginx, IIS, and Apache), and are generally free to choose any programming language. This could be Java, PHP, Python, Ruby, or others.

***Task 12. Match the terms with their definitions.***

Here’s the correct matching of terms with their definitions:

1. **CSS** – A mechanism for adding style (e.g. fonts, colors, spacing) to web documents.
2. **Home page** – The first page on a website that usually contains links to other pages.
3. **HTML** – The language used to create hypertext documents (e.g. web pages).
4. **Frontend development** – A field of web development that focuses on the visible part of the site.
5. **Hyperlink** – A text, image or button that takes you to other web pages when you click on it.
6. **SEO** – A set of improvements that help your website to rank higher in Search Engine Results Page.
7. **Layout** – The arrangement of content on a web page, including text, images, videos, and other elements.
8. **Backend development** – A field of web development that is associated with the part of the site connected to the server.
9. **Website builder** – A platform that can be used to create a website without having to code.
10. **Template** – A pattern used as a guide to design a web page.
11. **Tags** – Instructions used in markup languages.
12. **Customize** – To modify a template of a web page to your needs.

**Class work (10.04.25)**

***Task 1. Lead-in questions.***

**1. What types of malware do you know?**

Some common types of malware include viruses, worms, trojans, ransomware, spyware, adware, and rootkits.

**2. What types of cybercrime can you name?**

Cybercrimes include hacking, identity theft, phishing, online fraud, cyberbullying, intellectual property theft, and distributing malware.

**3. What is the difference between a DoS attack and a DDoS attack?**

A DoS (Denial of Service) attack involves a single source trying to overwhelm a server or network with traffic to make it unavailable to users. A DDoS (Distributed Denial of Service) attack is similar but involves multiple sources, usually from a network of compromised devices (botnet), making it harder to stop and much more damaging.

***Task 2. Translate the terms into Russian and give a definition in English***

**a) Adware**

- Translation: Рекламное ПО

- Definition (English): Software that automatically displays or downloads advertisements, often without the user's consent, usually to generate revenue for the developer.

- Определение (Russian): Программное обеспечение, которое автоматически отображает или загружает рекламу, часто без согласия пользователя, обычно для генерации дохода для разработчика.

**b) Copyright violation**

- Translation: Нарушение авторских прав

- Definition (English): The unauthorized use or reproduction of copyrighted material, such as music, software, or text.

- Определение (Russian): Несанкционированное использование или воспроизведение защищенных авторским правом материалов, таких как музыка, программное обеспечение или текст.

**c) Cybercrime**

- Translation: Киберпреступность

- Definition (English): Criminal activities involving computers or networks, such as hacking, fraud, and distributing malicious software.

- Определение (Russian): Преступная деятельность, связанная с компьютерами или сетями, такая как взлом, мошенничество и распространение вредоносного ПО.

**d) DDoS attack (Distributed Denial of Service)**

- Translation: Атака распределённого отказа в обслуживании (DDoS)

- Definition (English): A cyberattack that involves multiple systems flooding a target system with traffic to make it unavailable.

- Определение (Russian): Кибератака, в которой несколько систем направляют трафик на целевую систему, чтобы сделать ее недоступной.

**e) Defacement**

- Translation: Уничтожение (дефейсмент)

- Definition (English): The act of altering a website's appearance, usually with unauthorized content, often for malicious or protest purposes.

- Определение (Russian): Действие по изменению внешнего вида веб-сайта, обычно с несанкционированным контентом, часто с целью вредоносного воздействия или протеста.

**f) Keylogger**

- Translation: Ключевой логгер

- Definition (English): Malicious software that records the keystrokes of a user to steal sensitive information like passwords or credit card numbers.

- Определение (Russian): Вредоносное ПО, которое записывает нажатия клавиш пользователя для кражи конфиденциальной информации, такой как пароли или номера кредитных карт.

**g) Malware**

- Translation: Вредоносное ПО

- Definition (English): Software designed to harm or exploit any device, service, or network.

- Определение (Russian): Программное обеспечение, предназначенное для нанесения ущерба или эксплуатации любого устройства, сервиса или сети.

**h) Miner**

- Translation: Майнер

- Definition (English): A type of malware that uses a device’s resources to mine cryptocurrency without the user’s consent.

- Определение (Russian): Вредоносное ПО, которое использует ресурсы устройства для майнинга криптовалюты без согласия пользователя.

**i) Misdirection routine**

- Translation: Процедура обмана

- Definition (English): A technique used to mislead or redirect the user or system to hide malicious activity.

- Определение (Russian): Техника, используемая для введения в заблуждение или перенаправления пользователя или системы, чтобы скрыть вредоносную деятельность.

**j) Payload**

- Translation: Полезная нагрузка

- Definition (English): The part of malware that performs the malicious action, such as stealing data or damaging a system.

- Определение (Russian): Часть вредоносного ПО, которая выполняет вредоносные действия, такие как кража данных или повреждение системы.

**k) Phishing**

- Translation: Фишинг

- Definition (English): A cybercrime where attackers attempt to steal sensitive information by masquerading as a trusted entity.

- Определение (Russian): Киберпреступление, при котором злоумышленники пытаются украсть конфиденциальную информацию, выдавая себя за надежное лицо или организацию.

**l) Piggybacking**

- Translation: Пиггибэкинг (несанкционированное использование)

- Definition (English): Gaining unauthorized access to a network or system by exploiting the access of a legitimate user.

- Определение (Russian): Получение несанкционированного доступа к сети или системе через использование доступа легитимного пользователя.

**m) Ransomware**

- Translation: Вымогательский софт

- Definition (English): A type of malware that encrypts a user’s data and demands payment in exchange for decryption.

- Определение (Russian): Вредоносное ПО, которое шифрует данные пользователя и требует оплату за их расшифровку.

**n) Reproduction routine**

- Translation: Процедура воспроизведения

- Definition (English): A sequence of actions or code designed to replicate or copy a specific process, often used by malware to spread.

- Определение (Russian): Последовательность действий или кода, предназначенная для воспроизведения или копирования конкретного процесса, часто используемая вредоносным ПО для распространения.

**o) Salami shaving**

- Translation: Нарезка ломтями (постепенные кражи)

- Definition (English): A type of fraud where small, often undetected, amounts of money are taken repeatedly from various sources.

- Определение (Russian): Вид мошенничества, при котором маленькие, часто незаметные суммы денег систематически украдены из разных источников.

**p) Software piracy**

- Translation: Пиратство программного обеспечения

- Definition (English): The illegal copying, distribution, or use of software without proper authorization from the copyright holder.

- Определение (Russian): Незаконное копирование, распространение или использование программного обеспечения без должного разрешения владельца авторских прав.

**q) Spyware**

- Translation: Шпионское ПО

- Definition (English): Software that collects data from a user's device without their knowledge, often to track browsing habits or steal personal information.

- Определение (Russian): Программное обеспечение, которое собирает данные с устройства пользователя без его ведома, часто для отслеживания привычек в интернете или кражи личной информации.

**r) Trigger**

- Translation: Триггер

- Definition (English): A specific event or condition that activates malware or a malicious payload.

- Определение (Russian): Конкретное событие или условие, которое активирует вредоносное ПО или его полезную нагрузку.

**s) Trojan**

- Translation: Троян

- Definition (English): A type of malware that disguises itself as a legitimate program to trick users into installing it.

- Определение (Russian): Вредоносное ПО, которое маскируется под легитимную программу, чтобы обмануть пользователей и заставить их установить его.

**t) Virus**

- Translation: Вирус

- Definition (English): A type of malicious software that replicates itself and spreads to other computers, often damaging files or systems.

- Определение (Russian): Вид вредоносного ПО, который самовоспроизводится и распространяется на другие компьютеры, часто повреждая файлы или системы.

**u) Worm**

- Translation: Червь

- Definition (English): A self-replicating malware that spreads across networks and systems without the need for user interaction.

- Определение (Russian): Самовоспроизводящееся вредоносное ПО, которое распространяется по сетям и системам без необходимости взаимодействия с пользователем.

***Task 3. Read text A and answer the questions below.***

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

The types of malware mentioned in the text are:

* Virus
* Worm
* Trojan horse
* Ransomware
* Spyware
* Keylogger
* Adware
* Phishing
* Miner

2. How can viruses enter a PC?

Viruses can enter a PC via an infected USB flash drive or through the Internet.

3. What is a worm?

A worm is a standalone program that spreads rapidly, often through email attachments, and can damage systems by deleting files, creating botnets, or consuming network bandwidth.

4. What is understood by a Trojan horse?

A Trojan horse is a type of malware that is distributed through legitimate-looking programs, like utilities, games, or antivirus programs. Unlike viruses, Trojans do not replicate themselves, but they can delete, modify, or capture sensitive information and open a backdoor for unauthorized access.

5. What is the damaging effect of ransomware?

Ransomware encrypts data and demands payment for its release, which can cause significant financial and operational damage to individuals and organizations.

6. What is the difference between spyware and adware?

The key difference is that spyware is designed to collect and report personal information about the user, such as their internet activity, microphone use, location, and contacts. Adware, on the other hand, generates revenue by automatically displaying unwanted ads on the user’s screen but does not gather personal information.

7. What sort of data is targeted while using a keylogger?

Keyloggers capture keystrokes made on a targeted device, including usernames, passwords, and other sensitive information.

8. What program gets the victim to reveal confidential data by sending fake emails?

Phishing is the program that gets the victim to reveal confidential data by sending fake emails.

9. What is meant by defacement?

Defacement refers to the act of changing the visual appearance of a website, often with disturbing images or offensive phrases, typically for ideological, political, or personal reasons.

10. What is the damaging effect of a miner?

A miner hijacks the victim's central processing unit (CPU) and graphics processing unit (GPU) to mine cryptocurrency. This slows down the device, increases electricity bills, and shortens the device's lifespan.

11. Why is it difficult to detect salami shaving?

Salami shaving involves stealing small amounts of money from a large number of accounts over a long period of time. Since the amounts are small, the theft goes unnoticed.

12. What is a possible consequence of setting weak passwords for Wi-Fi networks?

Setting weak passwords for Wi-Fi networks can allow unauthorized users to access the network and potentially steal sensitive information, which is called piggybacking.

13. What are the most common ways to protect your PC?

The most common ways to protect your PC include:

• Not opening email attachments from strangers

• Being careful when downloading files from the web

• Regularly updating your antivirus software.

Перевод:

Безопасность и конфиденциальность в Интернете

В современном мире технологий продолжается борьба с вредоносным программным обеспечением, или малым ware, с целью защиты наших устройств, сетей и конфиденциальной информации. Поскольку киберпреступники постоянно развивают свои инструменты, понимание разнообразного спектра вредоносных программ и киберпреступности стало необходимым для защиты нашей цифровой жизни. Рассмотрим некоторые из самых распространённых типов вредоносных программ и киберпреступлений, изучая их особенности и способы заражения.

Вирус — это вредоносный код, который заражает приложения, служащие хост-программами для его репликации. Вирусы могут попасть на ПК через зараженную USB-флешку или через Интернет. Они распространяются, изменяя другие компьютерные программы, вставляя в них свой вредоносный код и выполняя его на устройстве жертвы, что может привести к потере данных, атакам DDoS или атакам программ-вымогателей.

Черви — это самостоятельные программы, которые могут быстро распространяться и повреждать системы, удаляя файлы, создавая ботнеты или потребляя сетевую пропускную способность. Червь — это программа, которая распространяется через вложения в электронной почте; она сама себя реплицирует и отправляет копию всем контактам в адресной книге, используя уязвимости или недостатки безопасности на целевом компьютере.

Трояны часто распространяются через программы, которые выглядят легитимно, такие как утилиты, игры и антивирусные программы. В отличие от вирусов, \*\*троянские программы не реплицируют себя, но могут быть не менее разрушительными, поскольку могут удалять, изменять или захватывать конфиденциальную информацию. Кроме того, трояны открывают «заднюю дверь» в компьютер, позволяя злоумышленникам получить несанкционированный доступ к системе.

Программное обеспечение-вымогатель (ransomware) шифрует данные и требует плату за их восстановление, что вызывает значительный финансовый и операционный ущерб для физических лиц и организаций. Операции жертвы организации страдают, и они должны заплатить выкуп для восстановления доступа. Однако нет гарантии, что оплата приведет к возвращению доступа к данным.

Шпионские программы (spyware) — это тип вредоносного ПО, которое собирает и передает данные о действиях пользователя в Интернете, а также получает доступ к микрофону пользователя, его местоположению, календарю и контактам. В отличие от вредоносных программ, цель которых — повредить компьютер или сеть, шпионские программы предназначены для сбора личной информации пользователя.

Кейлоггеры — это специфический тип шпионского ПО, представляющий собой программы или аппаратные компоненты, предназначенные для записи нажатий клавиш пользователя без его ведома или согласия. Эти инструменты работают в фоновом режиме, захватывая каждое нажатие клавиши на целевом устройстве, включая имена пользователей, пароли и другие конфиденциальные данные, а затем тихо передают эту собранную информацию хакерам, позволяя им получить несанкционированный доступ к личным учетным записям или даже финансовым активам.

Рекламное ПО (adware) — это тип ПО, который генерирует доход для своих разработчиков путем автоматического отображения нежелательной рекламы на экране пользователя. Это не является незаконным, но довольно раздражает. Рекламное ПО обычно включается в «бесплатные» загрузки.

Фишинг (phishing) (или рыбалка за паролями) — это попытка украсть конфиденциальную информацию, обычно в виде имен пользователей, паролей, номеров кредитных карт или банковских реквизитов с целью их использования или продажи. Мошенники маскируются под легитимный источник с привлекательным запросом, заставляя жертву раскрыть конфиденциальные данные, аналогично тому, как рыбак использует наживку для ловли рыбы. Киберпреступники обычно отправляют поддельные электронные письма с ссылками на фишинговые веб-сайты, что является одним из самых популярных методов онлайн-мошенничества.

Дефейсмент веб-сайтов (website defacement) — это форма вандализма веб-сайтов, которая заключается в изменении внешнего вида веб-страницы. Некоторые нападающие меняют внешний вид веб-сайтов по идеологическим, политическим или личным причинам. Оскорбительные изображения и фразы могут отпугнуть посетителей от сайтов, которые не могут гарантировать безопасность. В результате жертвы дефейсмента могут понести финансовые убытки, потерю репутации бренда, сбои в бизнесе или психологические травмы.

Майнер — это тип вируса, который работает в фоновом режиме, захватывая центральный процессор и графический процессор жертвы для «майнинга» криптовалюты, решая сложные математические задачи, которые подтверждают криптографические транзакции, пока пользователь этого не замечает. Эта кража вычислительных ресурсов жертвы замедляет другие процессы, увеличивает счета за электричество и сокращает срок службы устройства.

Нарезка ломтями (salami shaving) — это вредоносная техника, включающая кражу небольших сумм денег с большого числа счетов. Цель мошенника — украсть деньги с каждого счета, совершая мелкие покупки или снимая небольшие суммы денег за длительный период времени, чтобы избежать обнаружения.

Пиггибэкинг (piggybacking) в вычислительных системах означает получение несанкционированного беспроводного доступа к сети бизнеса, если она не защищена или использует слабый пароль, что позволяет несанкционированным пользователям получить доступ к сети и потенциально конфиденциальной информации.

**Homework (15.04.25)**

**Task 4. Read text B, guess where the following words are used, then listen and check your answers. Audio file 5.1 [https://online-edu.mirea.ru/course/view.php?id=7376]**

**Text B. Viruses**

The fear that a virus may (1) **infect** your computer is a familiar one for many. Even casual computer users know that unfamiliar files may (2) **carry** viruses. While viruses are a well-known (3) **threat**, many computer users do not know their enemy. There are many specific types of viruses that one needs to guard against. One dangerous type of virus is an overwriting virus. These viruses not only (4) **replicate** malicious code, they also replace the information contained in other programs. They (5) **erase** important information, sometimes rendering a computer entirely unusable. Another common virus is a resident virus. They stay (6) **dormant** until a particular event activates them. If your computer harbors resident viruses, you may not discover them until the (7) **damage** is done. A Trojan horse is another destructive type of program. It's not technically a virus because it doesn't (8) **replicate**, but it's still dangerous. A Trojan horse looks like an ordinary, useful file or program. However, it has destructive programming (9) **embedded** in it. This programming may also piggyback onto beneficial files. Lastly, unlike viruses and Trojan horses, a worm does not need to (10) **attach** itself to another program.

**Task 5. Match the words or phrases (1-6) with the definitions (a-f):**

 **virus** → **f)** a harmful program that infects a computer

 **host** → **d)** a computer or program that carries a virus

 **to embed** → **a)** to plant a harmful program within an ordinary program

 **resident virus** → **c)** a virus that is dormant until activated

 **to piggyback** → **e)** to attach to another program for transferring

 **overwriting virus** → **b)** a virus that erases information by replacing it

**Task 6. Watch a video on different types of malware at [https://www.youtube.com/watch?v=n8mbzU0X2nQ], answer the questions below and complete the blanks.**

**A. What are some common ways for malware to enter your computer?**  
➡️ Through infected email attachments, visiting suspicious websites, or downloading untrusted software.

**B. What activates viruses existing on your system?**  
➡️ Opening or running the infected file or program activates the virus.

**C. What is the harmful effect of ransomware?**  
➡️ It locks or encrypts your computer or files and demands money to unlock them.

**D. How does spyware operate?**  
➡️ It secretly monitors and collects information about your activities, like keystrokes and personal data.

**E. What type of malware misleads the user by pretending to be a useful one?**  
➡️ A Trojan horse.

**F. What is the difference between viruses and worms?**  
➡️ Viruses need user action to spread, while worms can self-replicate and spread through networks without user help.

 Malware can make entry onto your computer via **infected email attachments**, visiting **malicious websites** …

 Viruses often **hide** on the Internet and **spread** when downloading a file infected with a virus.

 A Trojan is a **malicious** piece of software that looks **legitimate**.

 Ransomware holds your PC **hostage** and **demands** money. It locks up your computer **threatening** to destroy data …

 **Spyware** secretly **gathers** private information about the user activity …

 Worms can **self-replicate** and infect multiple computers on the network **without human action**.

**Task 7. Read text C and find the equivalents to the words below.**

Основное различие между вирусом и червём заключается в том, что вирусы должны быть активированы через запуск заражённого файла (хоста), в то время как черви — это автономные вредоносные программы, которые могут самовоспроизводиться и распространяться независимо, как только проникают в систему. Червям не требуется активация — или какое-либо вмешательство пользователя — чтобы выполнить или распространить свой код.

Вирусы часто прикреплены к загружаемым файлам или скрыты в них. Когда такой файл принимается системой, вирус остаётся в спящем состоянии до тех пор, пока заражённый файл не будет активирован. Только после активации файла вирус запускается, выполняет вредоносный код и копирует себя, чтобы заразить другие файлы на компьютере.

В отличие от вирусов, червям не нужно активировать файл-хост. Как только червь попадает в систему, обычно через сетевое подключение, он может сразу выполняться, самовоспроизводиться и распространяться без запуска извне. Червь создаёт множество своих копий, которые затем распространяются по сети. Эти копии заражают все недостаточно защищённые компьютеры и серверы, подключённые — через сеть или Интернет — к изначально заражённому устройству.

* 1. **distinction** → **difference**

*"The main difference between a virus and a worm..."*

1. **while** → **whereas**

*"...viruses must be triggered by the activation of their host, whereas worms are standalone malicious programs..."*

1. **hidden** → **concealed**

*"Viruses are often attached or concealed in downloaded files."*

1. **stay** → **remain**

*"...the virus remains dormant until the infected host file is activated."*

1. **demand** → **require**

*"Worms do not require activation..."*

1. **as soon as** → **once**

*"Once a worm has entered the system..."*

1. **inappropriately** → **inadequately**

*"...infect any inadequately protected computers and servers..."*

1. **appliance** → **device**

*"...to the originally infected device."*

**Task 8. Listen to a conversation between two IT employees. Mark the following statements as true, false, or not given and complete the blanks. Audio file 5.2 [https://online-edu.mirea.ru/course/view.php?id=7376]**

**True / False / Not Given:**

1. **A virus has spread to several computers.** → **False**

It’s suspected, but not confirmed that the virus has spread.

1. **The woman suggests shutting down all the computers.** → **False**

There is no suggestion about shutting down all computers.

1. **The man has already checked the resident extensions.** → **False**

He checked the desktop, but there is no mention of resident extensions.

**Complete the blanks:**

1. Gary reported that his desktop isn’t working. It won't even ***start up***.
2. Yeah. I ***checked it out*** earlier today. I’m afraid it’s probably a virus.
3. I hope it’s not an ***overwriting virus***, or we'll have trouble
4. ***recovering*** his files.
5. He said he recently ***downloaded*** a new word processing program.
6. Well, at least it would be ***limited to*** his computer.
7. Yes, but it could be a ***worm***.
8. We’ll have to make sure it hasn’t ***spread to*** the other computers on the network.

**Class work (17.04.25)**

**Task 10. Read text D and answer the questions below.**

**1. In what way do computer viruses resemble biological viruses?**

**Answer:**  
They both infect a host (living cells or a computer system), use the host’s resources to reproduce, and often cause harm to the host.

**2. Why are viruses designed to be loaded into memory?**

**Answer:**  
So they can stay resident in memory and continue to infect other programs using a reproduction routine until the computer is switched off.

**3. What examples of payload does the writer provide?**

**Answer:**

* Displaying a message on the monitor screen (harmless)
* Deleting files on the hard disk (destructive)

**4. What kind of files do viruses often attach to?**

**Answer:**  
COM or EXE program files

**5. How does a Trojan differ from a virus?**

**Answer:**  
A Trojan has a payload but does **not** have a reproduction routine, so it cannot infect other programs like a virus does.

**6. Match each virus routine to its function:**

| **Routine** | **Function** |
| --- | --- |
| 1) **misdirection** | c) hides the presence of the code |
| 2) **reproduction** | b) attaches a copy of itself to another program |
| 3) **trigger** | d) decides when and how to activate the payload |
| 4) **payload** | a) does the damage |

**Анатомия вируса**

Биологический вирус — это очень маленький и простой организм, который заражает живые клетки, известные как **хозяева**, прикрепляясь к ним и используя их для собственного размножения. Это часто наносит вред клеткам-хозяевам.

Аналогично, компьютерный вирус — это очень маленькая программная подпрограмма, которая заражает компьютерную систему и использует её ресурсы для самовоспроизведения. Обычно он делает это, модифицируя операционную систему так, чтобы та могла обнаруживать файлы программ, такие как **COM** или **EXE** файлы. Затем он копирует себя в эти файлы, что иногда может нанести ущерб заражённой системе.

Когда пользователь запускает заражённую программу, она загружается в оперативную память вместе с вирусом. Вирус использует распространённую программную технику, чтобы остаться **резидентным** в памяти. После этого он может использовать процедуру размножения, чтобы заражать другие программы. Этот процесс продолжается до тех пор, пока компьютер не будет выключен.

Вирус также может содержать **полезную нагрузку** (*payload*), которая остаётся в спящем состоянии до тех пор, пока не произойдёт определённое **событие-триггер**, например, пользователь нажмёт конкретную клавишу. Полезная нагрузка может быть самой разной: от безобидного сообщения на экране до серьёзных действий, например, удаления файлов с жёсткого диска.

Когда вирус заражает файл, он заменяет первую команду в программе-хозяине на команду, которая изменяет обычную последовательность выполнения. Эта команда называется **JUMP-команда (переход)** и заставляет сначала выполняться инструкции вируса. После этого вирус возвращает управление основной программе, которая продолжает выполняться как обычно.

Чтобы считаться вирусом, программа должна иметь **процедуру воспроизведения**, позволяющую ей заражать другие программы. Однако вирус может содержать четыре основные части:

* **Процедура маскировки (misdirection)** — помогает вирусу прятаться,
* **Процедура размножения (reproduction)** — копирует вирус в другие программы,
* **Триггер (trigger)** — активирует полезную нагрузку в нужное время или по определённому событию,
* **Полезная нагрузка (payload)** — может быть безобидной шуткой или серьёзно повредить систему.

Если программа содержит **payload**, но не имеет процедуры размножения, она называется **Троянским конём (Trojan)**.

**Task 11. Watch a video on a DDoS attack at [https://www.youtube.com/watch?v=ilhGh9CEIwM] and answer the questions.**

**1. What does DDoS stand for?**

**DDoS** stands for **Distributed Denial of Service**.

**2. How does a DDoS attack disrupt the work of a network or server?**

A DDoS attack overwhelms a server, service, or network by flooding it with excessive internet traffic from multiple sources. This surge in traffic exhausts the target's resources, rendering it unable to process legitimate requests, effectively taking it offline.

**3. What's the difference between a DoS attack and a DDoS attack?**

* **DoS (Denial of Service)**: Originates from a single source, making it easier to detect and mitigate.
* **DDoS (Distributed Denial of Service)**: Involves multiple compromised systems attacking simultaneously, making it more challenging to defend against.

**4. Why is it easier to handle a DoS attack than a DDoS attack?**

DoS attacks come from a single source, allowing for straightforward identification and blocking. In contrast, DDoS attacks originate from numerous sources, often mimicking legitimate traffic, complicating detection and mitigation efforts.

**5. How is a DDoS attack technically performed?**

Attackers utilize a network of compromised devices, known as a **botnet**, to send a massive volume of requests to the target simultaneously. This coordinated effort overwhelms the target's resources, leading to service disruption.

**6. What is a botnet?**

A **botnet** is a network of internet-connected devices infected with malware and controlled by an attacker. These devices, often unbeknownst to their owners, can be directed to perform coordinated tasks, such as launching DDoS attacks.

**7. What are the reasons for a DDoS attack?**

Motivations for DDoS attacks include:

* **Hacktivism**: Protesting or bringing attention to social or political issues.
* **Extortion**: Demanding ransom payments to stop the attack.
* **Revenge or Competition**: Disrupting competitors or settling personal scores.
* **Testing or Demonstration**: Showcasing hacking skills or testing system vulnerabilities.

**Task 12. Complete the blanks with the correct prepositions.**

 A virus can stay dormant **until** a particular event activates it.

 A Trojan looks **like** an ordinary, useful file or program.

 A worm does not need to attach itself **to** another program.

 Spyware works **in** the background aiming to collect confidential information of the user.

 A hacker is someone who tries to break **into** a computer system.

 We aren't permitted to download files from the Internet **without** authorization.

 Since phishing is a serious crime, we are working **with** federal police to stop it.

 A lost database can result **in** receiving unwanted sales calls.

 In case **of** data breach, all the affected customers are informed as soon as possible.

 These viruses not only spread malicious code, they also replace the information contained **in** other programs.

**Task 13. Guess what type of malware or cybercrime is described in each paragraph.**

 **Spyware** is malicious software designed to enter a computer device, gather data about a person or organization, and forward it to a third party without a user’s consent.

 **Adware** is a form of financially supported malware that usually presents itself as unwanted commercials.

 **A keylogger** is a type of spyware used to monitor and record each keystroke on a specific keyboard. The information is gathered and sent to the attacker. This malware is most often used for stealing passwords.

 **A worm** is a standalone malicious computer program that replicates itself to infect other computers. It is able to spread across the network directly without attaching itself to an existing program.

 **Hijacking** is a type of cybercrime which involves redirecting anyone trying to visit a certain site elsewhere.

 **A DDoS attack** is an attack where hackers overload networks and servers with traffic so that computer systems are unable to keep up with legitimate needs.

 **A Trojan horse** is any malware that misleads users of its true intent by pretending to be a useful program.

 **Phishing** is a type of cybercrime where the attacker sends a fake message designed to trick a person into revealing sensitive information to the attacker.

 **Backdoor** is using technology to open the Internet connection to unwanted users.

 **Ransomware** is a type of malware that threatens to publish the victim’s data, encrypts the victim’s data, or blocks access to the device unless a payment is made.

 **A miner** is a virus which uses your computer power to earn cryptocurrency for others.

 **Software piracy** is unauthorized copying of a program for sale or distributing to other users.

 **Backdoor** is a technique that involves leaving, within a completed program, an illicit program that allows unauthorized and unknown entry.

 **Defacement** is a cybercrime which involves changing the information shown on another person's website.

 **Salami shaving** is a computer crime in which a program is altered so that it transfers a small amount of money from a large number of accounts to make a large profit.

**Unit 6**

### Classwork

Task 1. Lead-in questions

1. What methods of protecting a computer from crime and emergencies do you know?
   1. Using antivirus software and a firewall
   2. Keeping software regularly updated
   3. Creating backups of important data
   4. Setting strong passwords and using multi-factor authentication
   5. Employing biometric authentication such as fingerprint or facial recognition
2. What methods of creating a reliable password do you know?
   1. Making it at least 12 characters long
   2. Mixing uppercase and lowercase letters, numbers and special symbols
   3. Using mnemonic phrases
   4. Never reusing the same password
3. What is biometric authentication?  
   A method of verifying a user’s identity by unique physical traits such as fingerprint, iris pattern, facial or voice recognition

Task 2. Translate terms and give definitions in English  
a) backup: a copy of data stored separately to restore it in case of loss  
b) biometric authentication: verification of a user by unique biological traits  
c) brute force: a password-breaking method that tries all possible combinations  
d) CAPTCHA: a challenge–response test to distinguish humans from bots  
e) cryptanalysis: the practice of studying and breaking cryptographic systems  
f) cybersecurity: protection of systems, networks and data from digital attacks  
g) to deny access: to prevent a user or program from entering a system  
h) encryption: the process of encoding information so that only authorized parties can read it  
i) firewall: hardware or software that filters network traffic according to rules  
j) MFA (multi-factor authentication): authentication requiring two or more independent credentials  
k) to update antivirus software: installing the latest virus definitions and program versions

Task 3. Listen to Audio 6.1 and choose answers

1. How would you describe the main purpose of the letter?  
   b) to help clients keep their information secure
2. How can users verify they are on the official Safeguard website?  
   c) by checking the URL
3. How did hackers infect clients’ computers with malware?  
   b) by attaching spyware to a download

Task 4. Read Text A “The Firewall” and choose answers

1. What is the main purpose of the article?  
   c) to clarify information about firewalls
2. Which of the following is not one of the steps of packet filtering?  
   b) The network administrator decides to reject or permit the communication
3. Why would a user create an exception?  
   a) to allow communication from a particular program

Task 5. Match words with definitions

1. a firewall – a program used to protect private networks
2. to deny – not to allow someone to do something
3. a packet – a division of data
4. unauthorized – not allowed
5. default – a preselected option when no alternative is specified
6. to permit – to allow someone to do something

Task 6. Listen to Audio 6.2: true/false and gaps  
True/False

1. The woman cannot use the Internet or her email. True
2. The firewall isn’t installed yet. False
3. The man suggests using the default settings. True

Gaps

1. what’s going on
2. look into it
3. firewall software
4. firewall
5. settings
6. too restrictive

Task 7. Watch video “firewall” and answer

1. What is the role of a firewall?  
   To block or allow network traffic based on rules and protect internal networks
2. Why is a network firewall associated with a building’s firewall?  
   Both create a barrier to prevent unauthorized access while permitting legitimate traffic
3. Who sets filters for incoming traffic?  
   The network administrator or security specialist
4. What can filters be based on?  
   IP addresses, domain names, port numbers, keywords, protocols
5. What is the difference between host-based and network-based firewalls?  
   Host-based protects a single computer; network-based protects an entire network segment
6. What is the benefit of combining both?  
   Layered defense: host-based stops threats that bypass network-based measures and vice versa

Task 8. Fill in gaps in Text B “Antivirus Software”

1. disarm
2. unwanted
3. suspicious
4. robust
5. hands-off
6. signature
7. infected
8. intent
9. detection

### Homework

Task 9. Find English equivalents in the text

1. принимать меры – take action
2. нежелательные шпионские программы – unwanted spyware
3. подозрительные сайты – suspicious websites
4. на шаг впереди – ahead of
5. подход – approach
6. отпечаток пальцев – fingerprint (or signature)
7. отличительная черта – signature
8. заражённый – infected

Task 10. Read Text C “What is encryption?”, match paragraphs and answer  
Paragraph titles

1. Definition of data encryption
2. Data encryption solutions
3. The primary functions of data encryption
4. Challenges to contemporary encryption

Questions

1. What is data encryption?  
   Converting plaintext into ciphertext so only authorized parties can read it
2. What is ciphertext?  
   The incomprehensible encoded text resulting from encryption
3. What does “cryptography” mean?  
   Secret writing (from Greek words meaning hidden and writing)
4. What is a cryptographic key?  
   A randomized string of bits used to encrypt and decrypt data
5. What are the two main types of encryption?  
   Symmetric and asymmetric (public-key) encryption
6. What is the difference between symmetric and asymmetric encryption?  
   Symmetric uses one secret key for both encryption and decryption; asymmetric uses a public key to encrypt and a private key to decrypt
7. What does encryption guarantee?  
   Confidentiality, authentication, integrity and non-repudiation
8. What are two methods of breaking a cipher?  
   Brute force attacks and cryptanalysis

Task 11. Translate into English

1. Even the best and strongest companies can face cybersecurity challenges.
2. Reliable software is one of the most effective ways to defend against cyber threats.
3. Today, thanks to secure servers, clients can easily shop online.
4. Phishing emails may contain links to websites infected with malware.
5. Make sure your most important accounts are protected with strong passwords that you never reuse.
6. Numeric-only passwords are weaker than those containing letters, numbers and special characters.
7. Secure websites will notify you that data transfer is encrypted and your browser will display the padlock icon to confirm it.

Task 12. Fill in with appropriate prepositions

1. bigger than it was last year
2. contain a variety of numbers and special symbols
3. to cope with data loss, accidental deletion or cyberattacks
4. capable of making your device more secure
5. related to online trade
6. converted into a secret code
7. protects the system from public access
8. based on IP addresses, domain names, port numbers and so on
9. Before entering your confidential data check the URL
10. infected with malware through illegal downloads
11. benefit of multi-factor authentication

### Classwork

Task 13. Complete sentences with your ideas

1. Cyber criminals can steal confidential information if you use weak or reused passwords.
2. If you make purchases on an unsecured website your payment data may be intercepted.
3. Any person with a computer will become a software pirate if they share paid programs for free without a license.
4. If I had known about this type of cyber fraud I would have enabled multi-factor authentication.
5. Your computer would not have been hacked if you had updated the antivirus in time.
6. If you don’t have a good antivirus program malware can infect your system undetected.

Task 14. Find 17 terms in the word search grid  
virus, worm, spyware, adware, miner, phishing, infected, firewall, ransomware, backup, patch, password, hacker, trojan, exploit, malware, keylogger

Task 15. Email “Online transactions security” questions

1. How many security features will the company have?  
   Six: VPN, network firewall, web application firewall, SSL, two-factor authentication, encrypted backups
2. Which feature stops attacks on the network?  
   The virtual private network with a perimeter firewall
3. What protects customer contacts and login boxes?  
   The web application firewall
4. What protects private user information in transit?  
   Secure Sockets Layer (SSL)
5. What will two-factor authentication prevent?  
   Unauthorized access in case of password leaks
6. What will protect information?  
   Encrypted backups

Task 16. Match terms with definitions

1. firewall – a combination of software and hardware used to protect private networks by filtering incoming data traffic
2. signature – a distinguishing feature that every computer virus contains
3. heuristic scanning – a detection technique that identifies potentially malicious software without an exact signature match
4. cybersecurity – the practice of protecting computers, servers, networks and data from digital attacks
5. multi-factor authentication – a user verification method requiring more than one type of credential
6. encryption – encoding data so only authorized parties can understand it
7. brute force – trying random keys to decrypt encoded data
8. password – secret data, typically a string of characters, used to confirm a user’s identity
9. cryptanalysis – analyzing a cipher to find weaknesses and break it

**Unit 7**

**Classwork**

**Task 1. Lead-in questions**

1. What are the latest trends in the field of IT?  
   Answer: Active development of artificial intelligence and machine learning; expansion of the Internet of Things and smart devices; application of augmented and virtual reality; use of blockchain beyond cryptocurrency.
2. What are the most common areas for AI technology application?  
   Answer: Healthcare (image-based diagnosis, big data analysis); finance (algorithmic trading, credit scoring); manufacturing and logistics (demand forecasting, supply-chain optimization); smart homes and building automation.
3. What are the advantages and disadvantages of using AI?  
   Answer: Advantages: automation of routine tasks, higher accuracy, ability to analyze huge datasets, new business opportunities. Disadvantages: risk of job displacement, high data quality requirements, privacy and security concerns, “black-box” decision-making.

**Task 2. Translate the terms into Russian and give a definition in English**  
a) Artificial Intelligence – искусственный интеллект; the branch of computer science concerned with creating machines capable of performing tasks that normally require human intelligence.  
b) artificial neural network – искусственная нейронная сеть; a computing system inspired by biological neural networks, composed of interconnected units (“neurons”) that learn patterns from data.  
c) augmented reality – дополненная реальность; technology that overlays digital information onto the user’s view of the real world in real time.  
d) backpropagation – обратное распространение ошибки; an algorithm for training neural networks by propagating the error gradient backward through the network to adjust weights.  
e) biometrics – биометрия; methods of verifying identity based on unique physiological or behavioral characteristics.  
f) Internet of Things – Интернет вещей; a network of physical objects embedded with sensors and connectivity to exchange data.  
g) machine learning – машинное обучение; the study of algorithms that improve automatically through experience and data.  
h) raw data – сырые данные; unprocessed information collected from sensors or systems before any cleaning or analysis.  
i) smart home – умный дом; a residence equipped with IoT devices that automate and remotely control functions like lighting, heating, and security.  
j) virtual reality – виртуальная реальность; a fully immersive digital environment that replaces the user’s real-world surroundings.

**Task 3. Watch a video on the Turing Test and answer the questions**

1. When was the idea of the Turing Test first introduced?  
   Answer: In 1950, in Alan Turing’s paper “Computing Machinery and Intelligence.”
2. What is the procedure that the Turing Test involves?  
   Answer: A judge communicates via text with two hidden participants—one human and one machine—and must decide which is which. If the judge cannot reliably distinguish them, the machine is said to have passed.
3. What were Turing’s predictions for how computers would do on the test in the future?  
   Answer: That by the year 2000 machines would fool about 30 percent of human judges after five minutes of questioning.
4. What was the name of the first program claimed to have passed the Turing Test?  
   Answer: ELIZA (1966).
5. What potential problems with the test did the success of ELIZA and PARRY reveal?  
   Answer: That simple pattern-matching and conversational tricks can fool judges without genuine understanding.
6. How did Eugene Goostman manage to deceive the judges?  
   Answer: By pretending to be a 13-year-old Ukrainian boy, using language quirks and low expectations to mask limitations.

**Task 4. Fill in the gaps with the words below and translate the text into Russian  
Words: coined, focus, suggested, ahead, retain, emerged, dependent, human, contestants**

Text with answers:  
Alan Turing, the man who was much ahead of his time, started toiling on the thought whether machines can think. In 1950, a time when computers had just come into being, and the term Artificial Intelligence was not even coined and we had Alan already thinking if a machine could think like a human. Alan Turing published a paper in 1950 in which he suggested an idea or a test called ‘The Imitation Game’, today known as the Turing Test. After modifications, Turing proposed the Imitation Game where there would be two contestants, one human (of either gender) and one computer. Besides, there would be a judge or an interrogator whose job would be to decide which of the two contestants is a human and which one of them is a machine.  
Since the time the concept of Artificial Intelligence emerged, creating intelligence that matches human intelligence has been the goal of thousands of researchers. However, not all types of AI are human-like — an excessive focus on HLAI can lead us into a trap … As machines become substitutes for human labor, workers become increasingly dependent on those who control the technology. … In contrast, when AI is focused on augmenting humans rather than mimicking them, then humans retain control.

Translation into Russian (пример):  
Алан Тьюринг, человек, опередивший свое время, задумался, могут ли машины мыслить. В 1950 году, когда компьютеры только возникали, а термин «искусственный интеллект» еще не был введен, Алан уже размышлял о том, может ли машина мыслить как человек. В своей статье 1950 года он предложил идею теста под названием «Игра в имитацию», сегодня известного как тест Тьюринга. После доработок Тьюринг описал игру, в которой участвуют два претендента — человек и компьютер — а задача судьи состоит в том, чтобы определить, кто есть кто.  
С тех пор как возникла концепция искусственного интеллекта, создание интеллекта, сопоставимого с человеческим, стало целью тысяч исследователей. Однако не все виды ИИ должны быть похожи на человека — чрезмерный акцент на сильном ИИ может привести в ловушку. По мере того как машины заменяют человеческий труд, работники все больше зависят от тех, кто контролирует технологию. Напротив, когда ИИ направлен на расширение возможностей человека, а не на его имитацию, люди сохраняют контроль.

**Task 5. Read the text «An artificial neural network» and answer the questions**

1. In what way is an artificial neural network similar to the biological brain?  
   Answer: Both consist of many interconnected processing units arranged in layers.
2. What tasks can be accomplished by neural networks?  
   Answer: Pattern recognition, autonomous driving, CGI generation, machine translation, fraud detection, etc.
3. What is the difference between classification and clustering?  
   Answer: Classification assigns data to predefined classes; clustering groups data into naturally emerging categories.
4. How are units arranged in a fully-connected neural network?  
   Answer: Each neuron in one layer is connected to every neuron in the next layer.
5. What is backpropagation?  
   Answer: The algorithm that adjusts connection weights by propagating the error gradient backward through the network.
6. Why are neural networks compared to ‘black boxes’?  
   Answer: Because their internal decision-making processes are not directly interpretable.
7. What problems do professionals come across when working with artificial neural networks?  
   Answer: High computational cost and training time, and lack of model explainability.

**Task 6. Fill in the gaps with the suitable words using the information given in the text**

1. Artificial neural networks are one of the main tools used in machine learning.
2. Broadly speaking, neural networks are designed for spotting patterns in data.
3. Artificial neural network is based on artificial neurons.
4. In the same way that we learn from experience in our lives, neural networks require data to learn.
5. On a technical level, one of the biggest challenges is the amount of time it takes to train networks.
6. Neural networks learn things in exactly the same way as people do, typically by a feedback process called backpropagation.

**Task 7. Watch a video on a new technology called IoT and answer the questions; complete the gaps**A Questions

1. What is IoT?  
   Answer: A system of interrelated physical objects that can collect and exchange data over a network without human intervention.
2. What things can be interconnected in a smart home?  
   Answer: Household appliances (thermostats, lighting, security systems), kitchen devices, media players, etc.
3. How can hardware be classified in the context of IoT devices?  
   Answer: As sensors, actuators, and gateways.
4. Which centralized element acts as a bridge and connects IoT devices to the cloud?  
   Answer: A gateway or hub.
5. What fields can IoT be applied in?  
   Answer: Healthcare, agriculture, logistics, smart cities, industry.
6. How many devices are predicted to be connected via IoT systems by 2025?  
   Answer: About 50 billion devices.

B Complete the gaps  
a) “… what if you could use your smartphone to know in real time?”  
b) “Now with IoT, practically all appliances can be connected to the Internet and share data.”  
c) “IoT is a system of smart devices connected to the Internet to collect and transfer data from one to the other.”  
d) “… but now things have the ability to sense the surroundings to interact and communicate with one another.”  
e) “They are connected either by wired or wireless interfaces.”

**Task 8. Read and translate text B. Answer the questions to the text**  
Перевод текста B  
Интернет вещей, или IoT, представляет собой систему взаимосвязанных физических объектов, животных или людей, которым присвоены уникальные идентификаторы (UID) и предоставлена возможность передачи данных по сети без необходимости взаимодействия человек-человек или человек-компьютер.  
«Вещью» в Интернете вещей может быть человек с имплантом-монитором сердца, сельскохозяйственное животное с био-чиповым транспондером, автомобиль со встроенными датчиками, предупреждающими водителя о низком давлении в шинах, или любой другой натуральный или искусственно созданный объект, которому можно присвоить IP-адрес и через который можно передавать данные по сети. Эти «умные» устройства используют встроенные системы, такие как процессоры, датчики и др., для сбора, передачи и обработки данных, полученных из разных источников. IoT также может применять искусственный интеллект и машинное обучение для упрощения и повышения динамичности процессов сбора данных.  
Зачем нужен IoT  
Интернет вещей помогает людям полностью контролировать свою жизнь. Помимо автоматизации домашних устройств, IoT необходим и бизнесу. Он дает компаниям возможность в реальном времени видеть, как на самом деле работают их системы, предоставляя информацию обо всем – от работы машин до операций в цепочке поставок и логистике.  
IoT позволяет компаниям автоматизировать процессы и снижать затраты на оплату труда. Он также сокращает потери и улучшает качество услуг, делая производство и доставку товаров более экономичными.  
Преимущества и недостатки IoT  
Среди преимуществ IoT:  
• доступ к информации из любой точки в любое время с любого устройства  
• передача пакетов данных по подключенной сети экономит время и деньги  
• автоматизация задач повышает качество услуг компании и уменьшает потребность в участии человека  
Среди недостатков IoT:  
• по мере роста числа подключенных устройств и объёма передаваемой между ними информации возрастает риск кражи конфиденциальных данных хакером  
• предприятиям, возможно, придётся иметь дело с колоссальным числом – может быть, даже миллионами – устройств IoT, и сбор и управление данными со всех этих устройств будет сложной задачей  
• если в системе обнаружится ошибка, вероятнее всего все подключенные устройства будут повреждены  
• из-за отсутствия международного стандарта совместимости устройствам разных производителей трудно взаимодействовать друг с другом

Ответы

1. UID означает уникальный идентификатор (unique identifier)
2. В текстe в качестве «вещи» упоминаются человек с кардиомонитором, сельскохозяйственное животное с био-чиповым транспондером и автомобиль со встроенными датчиками
3. IoT дает бизнесу возможность мониторить работу систем в реальном времени, автоматизировать процессы, сокращать затраты на труд, уменьшать потери и повышать качество услуг
4. На мой взгляд, главная проблема IoT – это рост уязвимости кибербезопасности: по мере увеличения числа устройств и объема передаваемых данных возрастает риск кражи или компрометации конфиденциальной информации

**Task 9. Find in the text above synonyms to the following words**  
a) interconnected – interrelated  
b) to transmit – to transfer  
c) communication – interaction  
d) built-in – embedded  
e) to reduce – to cut down on  
f) to produce – to manufacture  
g) more affordable – less expensive  
h) benefits – advantages  
i) downsides – disadvantages  
j) huge – massive  
k) private – confidential  
l) damaged – corrupted

**Task 10. Read the sentences below and fill in the gaps with the suitable words**

1. IoT is a system of devices that are provided with the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction
2. A thing in the Internet of Things can be a person with a heart monitor implant, a farm animal with a biochip transponder
3. An IoT ecosystem consists of web-enabled smart devices that use embedded systems, such as processors, sensors and communication hardware
4. IoT can also use artificial intelligence (AI) and machine learning to make data collecting processes easier and more dynamic

**Task 11. Translate the following sentences into English**

1. An artificial neural network consists of a collection of connected nodes called artificial neurons
2. Neural networks are not programmed in the usual sense of the word; they are trained
3. The more data a neural network processes, the more accurate its subsequent performance will be
4. A neural network is a black box into which a user inputs data and from which they receive answers. You can improve the accuracy of the answers, but you do not know exactly how those answers are obtained
5. Neural networks are excellent tools for finding patterns that are too complex or too numerous for a programmer to teach a machine to recognize
6. The Internet of Things helps people better control their lives and increases the efficiency of many companies
7. The more information is transmitted between devices, the higher the likelihood that a hacker could steal confidential information
8. Automating tasks helps improve the quality of business services and reduces the need for human intervention

**Task 12. Match the terms with their definitions**  
1 artificial intelligence  
2 IoT  
3 virtual reality  
4 neural networks  
5 augmented reality  
6 backpropagation

**29.05.2025 Classwork**

**Task 1. Lead-in questions:**

1. Some highly demanded IT jobs in Russia include software engineer, data scientist, cybersecurity specialist, and cloud architect.

2. Jobs like system administrator or IT support specialist used to be popular but are now less in demand due to automation and cloud technologies.

3. I plan to work as a full-stack developer or data analyst in a tech company, using modern tools and AI technologies.

**Task 2. Translate and define in English:**

a) Backend developer — бэкенд-разработчик: Works on server-side logic, databases, APIs, and integration.

b) Cloud architect — архитектор облачных решений: Designs and manages cloud infrastructure and services.

c) Data scientist — специалист по данным: Analyzes large datasets to extract insights using statistics and machine learning.

d) Database administrator — администратор баз данных: Maintains, secures, and organizes databases.

e) Frontend developer — фронтенд-разработчик: Builds the user interface and client-side logic of applications.

f) Full-stack developer — фулстек-разработчик: Works on both frontend and backend of web applications.

g) Network engineer — сетевой инженер: Designs and manages computer networks and infrastructure.

h) Pen tester — специалист по тестированию на проникновение: Tests systems for vulnerabilities by simulating cyberattacks.

i) Software engineer — инженер-программист: Develops, tests, and maintains software systems and applications.

j) Security specialist — специалист по информационной безопасности: Protects systems from cyber threats.

k) System administrator — системный администратор: Maintains computer systems and ensures smooth operation.

**Task 3. Fill in the gaps with correct prepositions:**

1. at

2. of

3. with

4. in

5. to

6. for

7. on

8. with

9. of

10. at

**Task 4. Match the definitions:**

a) detail-oriented

b) innovative

c) efficient

d) mastery

e) dedicated

f) focus

**Task 6. Fill in with prepositions:**

1. to

2. for

3. at

4. for

5. of

6. to

7. from

**Task 7. Fill in the gaps with suitable words:**

Hardware Engineer:

1. components

2. prototypes

3. installation

4. meets

5. needs

System Administrator:

6. responsible

7. ongoing

8. troubleshoot

9. firewalls

10. respond

**Unit 7. Networks – Exercises & Answers (very concise, in English)**

**Task 1. Lead-in**

**1. What is a network?**  
A network is a collection of interconnected devices that share data and resources.

**2. How can networks be classified?**  
By geographic scope (LAN, MAN, WAN), by architecture (peer-to-peer vs. client-server), by topology (bus, star, ring, mesh, tree, hybrid), and by medium (wired vs. wireless).

**3. What are the weak spots of a wireless network?**  
– Interference (walls, metal, other radios)  
– Limited range  
– Lower security (easier eavesdropping)

**Translate each term into Russian and explain in English how it relates to “Networks”:**

1. **Application layer – Прикладной уровень**  
   Layer 7 of OSI where user applications (e.g. HTTP, FTP, SMTP) interface with the network.
2. **Bus topology – Шинная топология**  
   All nodes share a single backbone cable (the “bus”); simple but a single cable failure halts traffic.
3. **Client-server architecture – Клиент-серверная архитектура**  
   One node (server) provides resources/services; others (clients) request them.
4. **Data link layer – Канальный уровень**  
   OSI Layer 2, handles MAC addresses, frames, error detection, and local delivery on one LAN segment.
5. **Hub – Хаб**  
   Layer 1 device that broadcasts incoming frames to all ports on the same LAN.
6. **LAN (Local Area Network) – ЛВС (Локальная вычислительная сеть)**  
   Network confined to a small area (office/home/building).
7. **MAN (Metropolitan Area Network) – ГВС (Городская вычислительная сеть)**  
   A network spanning a city or metropolitan region.
8. **Mesh topology – Ячеистая (сеточная) топология**  
   Every node links to every other node; highly redundant and reliable.
9. **Modem – Модем**  
   Device that modulates/demodulates signals so a digital device can use analog lines (e.g. phone line or cable).
10. **Network backbone – Сетевая магистраль**  
    The primary high-capacity cable or link that interconnects subnets or segments.
11. **Network bridge – Сетевой мост**  
    Layer 2 device that connects (and filters/forwards) frames between two LAN segments.
12. **Network gateway – Шлюз**  
    Interconnects networks with different protocols (performs protocol translation).
13. **Network layer – Сетевой уровень**  
    OSI Layer 3, handles logical (IP) addressing and routing between different networks.
14. **Network node – Сетевой узел**  
    Any device (computer, server, printer, router, etc.) connected to a network.
15. **OSI – Модель OSI (Межсетевой взаимодействия открытых систем)**  
    Seven-layer reference model guiding how data moves from source to destination.
16. **Presentation layer – Уровень представления**  
    OSI Layer 6, translates/encodes data (e.g. ASCII to binary), handles encryption/decryption and compression.
17. **Ring topology – Кольцевая топология**  
    Each node connects to two neighbors in a closed loop; data circulates one direction (or both).
18. **Router – Маршрутизатор**  
    Layer 3 device that forwards IP packets between different IP networks based on routing tables.
19. **Session layer – Сеансовый уровень**  
    OSI Layer 5, establishes/maintains/closes sessions between applications (checkpoints, recoverable transfers).
20. **Star topology – “Звезда” топология**  
    All nodes connect to a central switch/hub; if one node fails, rest still communicate (unless central fails).
21. **Switch – Коммутатор**  
    Layer 2 device that inspects MAC addresses and forwards frames only to the target port (unlike a hub).
22. **Transport layer – Транспортный уровень**  
    OSI Layer 4, segments data, adds source/destination port numbers (TCP/UDP), provides flow control and error checking (checksums).
23. **Wired network – Проводная сеть**  
    Network using physical cables (e.g. Ethernet twisted-pair, coaxial, fiber-optic) for data transmission.
24. **Wireless network – Беспроводная сеть**  
    Network using radio or infrared signals (e.g. Wi-Fi, Bluetooth, GSM) to transmit data without cables.

**Task 2. (Reading/Translation – no written answer required)**

**Task 3. OSI Model – Answer the Questions**

1. **Into what units is data subdivided by these layers?**  
   a) Transport layer – ***Segments***  
   b) Network layer – ***Packets***  
   c) Data link layer – ***Frames***
2. **What is the purpose of a checksum test?**  
   To detect errors by comparing computed sums of contents before/after transmission.
3. **Which layer ensures that the message is transmitted in a language the receiving computer can interpret?**  
   ***Presentation layer*** (Layer 6).
4. **Which layer starts communication between network nodes?**  
   ***Session layer*** (Layer 5) – it establishes and terminates sessions.
5. **Which layer chooses a route for the message to follow?**  
   ***Network layer*** (Layer 3) – uses IP addresses and routing tables.
6. **At which layer are packets broken down into frames?**  
   ***Data link layer*** (Layer 2).

**Task 4. Video “OSI model” (answer in English)**

1. **At which layer do switches operate?**  
   ***Data link layer (Layer 2)***
2. **At which layer do routers work?**  
   ***Network layer (Layer 3)***
3. **At which layer are source and destination port numbers added?**  
   ***Transport layer (Layer 4)*** (TCP/UDP port numbers)
4. **What are the two major protocols of the transport layer?**  
   ***TCP*** and ***UDP***
5. **What is the session layer responsible for?**  
   ***Establishing, maintaining, and closing communication sessions; providing checkpoints for recovery***
6. **Which layer formats data so the receiving application can understand it?**  
   ***Presentation layer (Layer 6)*** (e.g. encryption, compression, character encoding)
7. **Which common application layer protocols are described?**  
   ***HTTP, HTTPS, FTP, SMTP, DNS, Telnet*** (or similar common ones)
8. **Which mnemonic is suggested to memorize the OSI layers?**  
   ***“All People Seem To Need Data Processing”***  
   (Layer 7 = Application, 6 = Presentation, 5 = Session, 4 = Transport, 3 = Network, 2 = Data Link, 1 = Physical)

**Task 5. “Types of Networks” – Answer the Questions**

1. **According to which criteria can networks be classified?**  
   Geographic area, architecture, topology, and medium.
2. **What does MAN stand for?**  
   ***Metropolitan Area Network***
3. **What is the largest WAN in the world?**  
   ***The Internet***
4. **What type of network architecture does not have a dedicated server?**  
   ***Peer-to-peer network***
5. **In which topology are all devices interconnected?**  
   ***Mesh topology*** (each device links directly to every other)
6. **What cables are used to transfer information over long distances at high speed?**  
   ***Fiber-optic cables***
7. **What is Bluetooth used for?**  
   ***Short-range wireless communication (e.g. peripherals, audio devices)***
8. **What are the advantages and disadvantages of wireless networks?**  
   **Advantages:** Mobility, easy installation, no cables.  
   **Disadvantages:** Limited range, signal attenuation by walls/obstacles, security vulnerabilities.

**Task 6. Video on Network Topologies – True/False**

1. **The central point in a ring topology is a hub.** False  
   *(A ring has no central hub; each node connects to exactly two neighbors.)*
2. **Ring topology networks are easy to install.** True  
   *(The text says “easy setup and fast scalability.”)*
3. **In a star topology, if one computer goes down or there's a single break in the cable, all the data flow will be disrupted.** False  
   *(Only that node loses connectivity; others still communicate via the central node.)*
4. **Bus topology is an outdated technology.** True  
   *(It was common long ago; now largely replaced by switch-based Ethernet.)*
5. **Signal reflection is a problem of a mesh topology.** False  
   *(Signal reflection is an issue in bus topologies, not mesh.)*
6. **The redundancy level of a mesh topology is very high.** True  
   *(Every node has multiple paths—high redundancy and fault tolerance.)*
7. **The Internet uses a mesh topology.** True  
   *(At a large scale, the Internet’s interconnections form a decentralized mesh.)*

**Task 7. Fill in the Gaps (choose from: backbone / centralized / layout / redundancy)**

Network topology is the **(1) layout** of a network.  
In a bus topology, all the computers are connected to a single cable or **(2) backbone**.  
In a mesh topology, each computer on the network is connected to every other computer.  
It creates a high **(3) redundancy** level and handles failure very well because the data can be rerouted over a different path to finally reach its destination.  
In an ad hoc topology, all the devices are wirelessly connected to each other in a single peer-to-peer network without using a **(4) centralized** device.

**Task 8. Network Hardware Components – Answer the Questions**

1. **What was the initial role of a modem?**  
   To convert digital signals to analog (modulate) so data could travel over phone lines, and vice versa (demodulate).
2. **Which device is used for forwarding data packets between networks?**  
   ***Router***
3. **What hardware component works at OSI Layer 1?**  
   ***Hub***
4. **Why is a switch considered more intelligent than a hub?**  
   Because it inspects each frame’s MAC address and forwards it only to the correct port instead of broadcasting to all ports.
5. **What is the role of a network bridge?**  
   To divide a LAN into segments and forward/ filter frames between segments that share the same protocol, improving performance.
6. **Is it possible for two networks based on different topologies to communicate efficiently?**  
   Yes, via a **gateway** which performs protocol translation and interconnection.

**Task 9. Video “Hub, Switch, Router Explained” – Answer the Questions**

1. **Why is a hub supposed to be not intelligent?**  
   Because it blindly broadcasts every incoming packet to all ports without inspecting addresses.
2. **What are the consequences of a hub broadcasting data packets to all devices on a network?**  
   Unnecessary traffic (collisions), lower performance, and potential security risks (everyone sees all frames).
3. **What makes a switch similar to a hub?**  
   Both connect multiple devices within a single LAN segment.
4. **How is a switch different from a hub?**  
   A switch learns MAC addresses and forwards frames only to the destination port, reducing collisions and traffic.
5. **What kind of networks are hubs and switches used in?**  
   Ethernet LANs (wired local area networks).
6. **Why are hubs and switches not able to route data outside their own network?**  
   Because they operate only at Layers 1/2 (physical and data-link) and do not handle IP routing (Layer 3).
7. **What are routers used for?**  
   To forward IP packets between different networks based on routing tables (Layer 3).

**Task 10. Range & Speed – True/False**

1. **Wireless networks don’t have a wide range.** True  
   *(Range is limited by the protocol, transmitter power, and obstacles.)*
2. **Network range depends on different factors.** True  
   *(Depends on 802.11 protocol, signal strength, building materials, terrain.)*
3. **Walls and metal frames can increase the range of a WLAN.** False  
   *(They reduce/attenuate the signal, shrinking the range.)*
4. **It’s possible to increase the range of a WLAN.** True  
   *(Using repeaters or range extenders can forward/boost the signal.)*
5. **Data transfer rate is measured in bandwidth and latency.** True  
   *(Bandwidth = max throughput (bits/s); latency = delay in transferring data.)*
6. **The minimum throughput of data in bits per second is the latency.** False  
   *(Latency is delay (ms), not throughput. Throughput is bandwidth (bits/s).)*
7. **Speed depends only on the hardware used.** False  
   *(It also depends on software, protocol, congestion, signal quality.)*
8. **Users can control the latency.** False  
   *(Latency mostly depends on network design, distance, and ISP; end user has little control.)*

**Task 11. Fill in the Gaps (choose from: communication protocols / network nodes / computers / topologies / sharing / telecommunication)**

A computer network is a group of **(1) computers** that use a set of common **(2) communication protocols** over digital interconnections for the purpose of **(3) sharing** resources located on or provided by the **(4) network nodes**. The interconnections between nodes are formed from a broad spectrum of **(5) telecommunication** network technologies, based on physically wired, optical, and wireless radio-frequency methods that may be arranged in a variety of network **(6) topologies**.

The nodes of a computer network may include personal **(7) computers**, servers, networking **(8) hardware**, or other specialized or general-purpose hosts. They are identified by **(9) hostnames** and network addresses. Hostnames serve as memorable labels for the nodes, rarely changed after initial assignment. Network **(10) addresses** serve for locating and identifying the nodes by **(11) communication protocols** such as the Internet Protocol.

**Task 12. Translate from Russian into English**

1. **Компьютерная сеть использует набор протоколов связи и даёт возможность совместного использования ресурсов.**  
   A computer network uses a set of communication protocols and enables resource sharing.
2. **Телекоммуникационная сеть даёт возможность получить необходимую информацию для обеспечения деятельности фирмы или удовлетворения личных потребностей пользователя.**  
   A telecommunication network allows one to obtain necessary information to support a company’s operations or fulfill a user’s personal needs.
3. **Локальные сети подходят для использования на небольшой территории, например, в офисе.**  
   Local Area Networks are suitable for use in a small area, for example, in an office.
4. **Компьютерная сеть может состоять из персональных компьютеров, серверов и сетевого оборудования.**  
   A computer network can consist of personal computers, servers, and networking hardware.
5. **На создание компьютерных сетей повлиял широкий спектр технологических разработок и исторических событий.**  
   The creation of computer networks was influenced by a wide range of technological developments and historical events.
6. **Эти технологии стали технической основой для создания Интернета.**  
   These technologies became the technical foundation for the creation of the Internet.
7. **В частных сетях предусмотрены меры безопасности для предотвращения нежелательных или несанкционированных подключений.**  
   In private networks, security measures are implemented to prevent unwanted or unauthorized connections.
8. **Некоторые сети не требуют пароля для подключения, но требуют, чтобы пользователь вошёл в систему с помощью веб-браузера прежде, чем сможет получить доступ к Интернету.**  
   Some networks do not require a password to connect but require the user to log in via a web browser before they can access the Internet.
9. **Интернет состоит из большого количества локальных и глобальных сетей, связанных между собой с использованием различных проводных и беспроводных технологий.**  
   The Internet consists of a large number of local and global networks interconnected by various wired and wireless technologies.

**Task 13. Fill in the Gaps (choose from: topology / medium / network / criteria)**

Computer networks may be classified by many **(1) criteria**, for example, the transmission **(2) medium** used to carry signals, bandwidth, communications protocols to organize **(3) network** traffic, the network size, **(4) topology**, traffic control mechanism, and organizational intent.

Computer networks support many **(5) applications** and **(6) services**, such as access to the World Wide Web, **(7) streaming** video, digital audio, shared use of application and **(8) storage** servers and printers, and use of email and **(9) instant** messaging applications.

**Task 14. Fill in the Gaps (choose from: online / interpersonal / resources / technologies / conferencing / authorized / shared)**

A computer network extends **(1) online** communications by electronic means with various **(2) technologies**, such as email, instant messaging, **(3) peer-to-peer** chat, voice and video telephone calls, and video **(4) conferencing**. A network allows sharing of network and computing **(5) resources**. Users may access and use resources provided by devices on the network, such as printing a document on a **(6) shared** network printer or use of a shared storage device. A network allows sharing of files, data, and other types of information giving **(7) authorized** users the ability to access information stored on other computers on the network.

**Task 15. Match Terms with Definitions**

1. **Bluetooth** – A wireless technology that allows mobile devices and other peripheral devices to communicate over short distances.
2. **Topology** – The configuration of the elements (nodes) of a network.
3. **Hub** – A network component which sends data packets to all devices on a network, regardless of any MAC addresses contained in the data packet.
4. **Peer-to-peer** – A network architecture in which all the computers have the same capabilities (share files/peripherals) without requiring a separate server.
5. **Ring topology** – A LAN topology in which all devices are interconnected in a continuous loop.
6. **Router** – A networking device that can send data packets from one network to another.
7. **Star topology** – A LAN topology in which all data flows through a central hub, a common connection point for the devices on the network.
8. **Bridge** – A hardware component connecting networks that use the same protocol (at Layer 2).
9. **Wireless** – Having no wires; without the use of cables.
10. **Gateway** – A hardware component connecting two networks which use different protocols (performs protocol translation).

**UNIT 8. PROFESSIONS IN IT**

### Task 1. Lead-in Questions

1. **What highly demanded IT jobs in Russia can you name?**  
   – Data scientist, DevOps engineer, cloud architect.
2. **What IT jobs used to be popular but don’t rank high anymore?**  
   – Desktop support technician, Flash developer, system maintenance operator.
3. **How do you see your future employment in the field of IT upon graduation?**  
   – I aim to work as a full-stack developer in a mid-sized software company.

### Task 2. Translate the Terms into Russian & Define in English

Each term is followed by its Russian equivalent (in parentheses) and a brief English definition.

a) **backend developer** (бэкенд-разработчик) – a programmer who writes server-side code (e.g., APIs, databases).  
b) **cloud architect** (облачный архитектор) – an engineer who designs and manages cloud infrastructure and services.  
c) **data scientist** (специалист по данным) – a professional who analyzes large datasets to find insights, using statistics and ML.  
d) **database administrator** (администратор баз данных) – a specialist responsible for installing, configuring, and maintaining database systems.  
e) **frontend developer** (фронтенд-разработчик) – a programmer who builds user interfaces (HTML, CSS, JavaScript).  
f) **full-stack developer** (фулл-стек-разработчик) – an engineer proficient in both frontend and backend technologies.  
g) **network engineer** (сетевой инженер) – a specialist who designs, implements, and maintains an organization’s network infrastructure.  
h) **pen tester** (специалист по пентесту) – a security professional who attempts to hack systems to find vulnerabilities.  
i) **software engineer** (инженер-программист) – a developer who applies engineering principles to design, build, and test software applications.  
j) **security specialist** (специалист по безопасности) – an expert who assesses, implements, and enforces cybersecurity measures.  
k) **system administrator** (системный администратор) – a technician who installs, configures, and manages servers, networks, and user accounts.

### Task 3. Text A. Fill in the Prepositions

Choose from: at / at / of / of / with / with / to / on / for / in

**Text A. Computer Engineer Position Available**  
DynX Corp. is seeking talented computer engineers. Candidates must have  
(1) **at** least five years of experience. They should have mastery (2) **of** both hardware design and programming. We will only consider an applicant (3) **with** a bachelor’s degree (4) **in** a relevant field. Additionally, he or she must pay close attention (5) **to** current technology and trends.

We are looking (6) **for** someone who is thorough and detail-oriented. Candidates should be able to focus (7) **on** multiple tasks simultaneously. Our systems are extremely complex. This means that even minor errors can be critical.

At DynX Corp., we value critical thinking. We appreciate employees who can find logical solutions. However, we also seek curious individuals (8) **with** innovative ideas. We encourage employees to think creatively. We want people with a balance (9) **of** both practical and creative skills. We have high standards (10) **at** DynX Corp. If you are dedicated and efficient, we encourage you to apply.

### Task 4. Word Definitions from Text A

Match each definition to the word found in Text A.

a) **able to pay attention to small, specific parts of something** → **detail-oriented**  
b) **new, creative and advanced** → **innovative**  
c) **able to do something competently and quickly** → **efficient**  
d) **advanced knowledge or skills in a particular area** → **mastery**  
e) **wholly committed to a certain task or goal** → **dedicated**  
f) **to give full attention to something** → **focus on**

### Task 5. Video: IT Jobs Ranking (YouTube BjZR3VPYL1I)

Answer the comprehension questions (answers are based on typical content of such ranking videos).

1. **What does the job of a big data engineer involve?**  
   – Handling large-scale data pipelines, building distributed systems, and optimizing data storage.
2. **What computer tools should a full-stack developer be familiar with?**  
   – JavaScript frameworks (React or Angular), Node.js, SQL/NoSQL databases, and Git.
3. **What salary is offered to experienced cloud architects in the USA?**  
   – Approximately $140 000–$160 000 per year.
4. **What skills and knowledge should product managers possess?**  
   – Strong communication, project management, market analysis, and agile methodologies.
5. **What companies employ product managers according to the video?**  
   – Google, Microsoft, Amazon, and local startups.
6. **What should data scientists be proficient in?**  
   – Python or R, machine learning libraries (TensorFlow, scikit-learn), and statistical analysis.
7. **Is the ranking accurate for the Russian IT community?**  
   – Mostly yes, but some salaries and demand levels differ due to local market conditions.
8. **English equivalents to the given Russian expressions:**  
   a) **самые высокооплачиваемые профессии** – “highest-paying professions”  
   b) **практический опыт** – “hands-on experience”  
   c) **обладать навыком** – “to possess a skill”  
   d) **зарабатывать** – “to earn (a salary)”  
   e) **нанимать** – “to hire”  
   f) **обеспечивать, гарантировать** – “to ensure”  
   g) **солидный опыт** – “solid experience”  
   h) **приходить к важным выводам** – “to come to important conclusions”

### Task 6. Fill in the Prepositions

Use the context to choose the correct preposition (answers are drawn from Task 6).

1. Full-stack developers should be creative, graphically inclined, and have excellent attention **to** detail.
2. A system administrator is responsible **for** maintaining an organization’s computer systems.
3. Data scientists should be good **at** manipulating data to categorize it by patterns and trends.
4. An IT security specialist should have an in-depth understanding of a variety of cyber security threats that may affect the company they work **for**.
5. Database administrators employ specialized software to organize and keep track **of** data.
6. IT directors ensure that department tasks correspond **to** the company's goals and development.
7. An information security analyst protects an organization’s network and systems **from** security breaches.

### Task 7. Passages Describing IT Jobs (Fill the Gaps)

Below are three passages: Hardware Engineer, System Administrator, Database Administrator. Fill each blank with the most suitable word or phrase from the lists provided.

#### 7.1 Hardware Engineer

Fill in: installation / needs / prototypes / meets / components

Hardware engineers draw on computer engineering to develop, design and test various physical (1) **components** related to computer systems. Their job also involves designing and creating (2) **prototypes** as well as overseeing the manufacturing and (3) **installation** process to ensure the hardware (4) **meets** the existing standards and functions properly. Moreover, people working in this field are responsible for continuing to improve the technology to meet the changing (5) **needs** of computer users.

#### 7.2 System Administrator

Fill in: ongoing / troubleshoot / responsible / respond / firewalls

A system administrator is (6) **responsible** for maintaining an organization’s computer systems and providing a reliable work environment. They perform (7) **ongoing** monitoring of all servers to make sure the systems function properly, install and upgrade computer components and software, (8) **troubleshoot** technical issues. A system administrator also has to ensure security through access control, backups and (9) **firewalls**. They have to monitor the system daily and (10) **respond** immediately to any security and usability concerns.

#### 7.3 Database Administrator

Fill in: measures / be recovered / involves / archiving / take care

The job of a database administrator (11) **involves** creating and managing computerized databases within a wide range of public and private sector organizations. They design and (12) **take care** of computer database systems so that the right person can get the information they need at the right time. Responsibilities can vary according to a company’s needs but typically include: (13) **archiving** data, implementing security (14) **measures**, troubleshooting, keeping the database up to date, ensuring that the database is adequately backed up and can (15) **be recovered** in the event of data loss.

### Task 8. Translate into English

Translate each Russian sentence below into English.

1. **Программист – это специалист, который создаёт код для различных программ.**  
   – A programmer is a specialist who writes code for various applications.
2. **На сегодняшний день сфера информационных технологий является одной из самых быстро развивающихся областей.**  
   – Nowadays, the field of information technology is one of the fastest-growing industries.
3. **Системный администратор следит за тем, чтобы вся компьютерная техника и программное обеспечение в офисе работали без перебоев.**  
   – A system administrator ensures that all computer hardware and software in the office run without interruptions.
4. **Тестировщик ПО моделирует различные ситуации, которые могут возникать в процессе использования программы, чтобы разработчики смогли исправить обнаруженные ошибки.**  
   – A software tester simulates various scenarios that may occur during program usage so that developers can fix discovered bugs.
5. **В обязанности администратора баз данных входит управление учётными записями пользователей и защита системы от несанкционированного доступа.**  
   – A database administrator’s duties include managing user accounts and protecting the system from unauthorized access.
6. **(the sixth sentence appears to be incomplete in the file, so no translation is provided)**