ТОВ «ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«МЕТІНВЕСТ ПОЛІТЕХНІКА»

Англійська мова для сфери інформаційних технологій (The CSB English for IT) :

методичні вказівки до виконання самостійної роботи для студентів ІІ курсу спеціальності F3

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Рекомендовано Науково-методичною радою
ТОВ «ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«МЕТІНВЕСТ ПОЛІТЕХНІКА»
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А64 **Англійська** мова для сфери інформаційних технологій (The CSB English for IT) : методичні вказівки до виконання самостійної роботи для студентів ІІ курсу спеціальності F3 / уклад.: Н. В. Варех, Н. В. Рагуліна. Запоріжжя : ТОВ «ТЕХНІЧНИЙ УНІВЕРСИТЕТ «МЕТІНВЕСТ ПОЛІТЕХНІКА», 2026. 55 с.

У методичних рекомендаціях наведені завдання до виконання самостійної роботи, які виконуються в процесі вивчення дисципліни.

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ЗМІСТ

Вступ

В університеті МЕТІНВЕСТ ПОЛІТЕХНІКА іноземна мова є одним із компонентів підготовки студентів. Згідно з програмою бакалаври знайомляться з необхідною професіональною лексикою, читають тексти, що містять спеціальну лексику, розвивають навички усного мовлення, сприймають іноземне мовлення на слух, перекладають тексти, коротко викладають у письмовій формі основний зміст тексту, розвивають діалогічне та монологічне мовлення.

Студенти університету беруть участь у Міжнародних наукових конференціях і зустрічах, у програмі обміну досвідом і підготовки спеціалістів. Знання іноземної мови є показником компетентності професіоналів високого рівня в сфері IT технологій.

Цілі навчання

Загальна мета:

1. Показати вміння спілкуватися іноземною мовою в письмовій і усній формі.
2. Розвивати у студентів навички діалогічного та монологічного мовлення. Сформувати мовленнєві навички, які містять у собі розвиток лексичних одиниць.
3. Навчання усного мовлення на основі розвитку необхідних мовленнєвих навичок.
4. Сприяти досягненню необхідних умінь і навичок свідомого вживання граматичних форм шляхом самостійної роботи.

Певні цілі:

1.Засвоїти лексичний матеріал, що пов'язаний з граматикою, яка вивчається.

2.Розвинути навички аналітичного та пошукового читання та перекладу.

3.Використовувати лексико-граматичний матеріал у спілкуванні.

4. Вести бесіду, складати діалоги з теми, що вивчається.

5. Складати стислий переказ загальнонаукових текстів.

Методичні вказівки до виконання самостійної роботи розраховані для студентів комп’ютерних спеціальностей Університету МЕТІНВЕСТ ПОЛІТЕХНІКА на ґрунтовне засвоєння англійської мови професійного спрямування у сфері комп’ютерних технологій. Методичні вказівки складаються з 10 тем, зміст яких відповідає лексичному та граматичному матеріалу, який студенти вивчають на практичних заняттях із англійської мови. Розділи методичних вказівок побудовано таким чином, щоб студент мав змогу зосередитися на таких видах діяльності як читання, виконання лексико-граматичних вправ, які спрямовані на розвиток усного мовлення у професійному контексті.

MODULE 3 INFLUENCE OF COMPUTERS ON THE DIGITAL GENERATION

Theme 11. Communication skills

Navigating Digital Landscapes: Key Communication Skills for IT Professionals

To succeed in the IT field, you certainly need to have your fair share of technical skills and practical expertise. However, having strong communication and interpersonal skills also pays off in this ever-changing field. Long gone is the stigma of the IT professional being a reclusive role; today's tech professionals are required to be collaborative team players with an ongoing desire to grow and learn.

So, what soft skills should the next generation of IT professionals have—and why do these skills matter? Understanding these concepts, you can better prepare yourself for a successful IT career.

Unveiling the Importance of Communication Skills for IT Professionals

Strong communication skills are a must-have in the modern workplace. This remains true for IT professionals at all levels of their careers. Whether working directly with clients or in a more inward-facing role, communicating clearly and effectively will serve you well in this field.

The Role of Effective Communication in Digital Landscapes

As an IT professional, effective communication ensures that your clients and coworkers are on the same page. Information technology is a highly technical field—and there's a good chance that your customers and clients won't understand the terminology and jargon that you use on a daily basis. Explaining common IT jargon in a way that anybody can understand will help you better communicate with your clients and keep them properly informed. By working on these communication skills, you'll be able to serve your clients better down the road.

Exploring Key Communication Skills for IT Professionals

It's no secret that working in IT means developing an expansive set of technical skills. However, in most IT positions, technical skills alone won't be enough to do your job well day in and day out. In addition to that technical proficiency, you'll need to possess some key communication skills.

Technical Proficiency and Its Connection to Communication

Technical proficiency and communication/interpersonal skills aren't as far removed from each other as you might initially think. In fact, the very nature of having a lot of technical skills and expertise *requires* you to be a strong communicator. IT professionals carry out a wide range of highly technical processes each day on the job.

Occasionally, they have to explain these processes to their clients, supervisors, and others. However, they must do so in a way that is easy to

understand—especially for clients or customers who may not understand "the language" that IT professionals speak. In this sense, IT professionals must become translators, explaining the processes and tasks that they perform in a way that is accessible and understandable to any audience. In this sense, the technical skills of an IT professional go hand-in-hand with the ability to communicate.

Nurturing Soft Skills: An Integral Part of IT Careers

If you're considering a career in IT, you may wonder which soft skills you should be working on. Most often, IT professionals need to have strong interpersonal, problem-solving and negotiation skills to do their jobs well.

Interpersonal Skills for Collaborative IT Environments

Interpersonal skills include the ability not just to communicate with others effectively but to interact with them as well. Often referred to as "people skills," interpersonal skills are essential in the world of IT because this type of work requires you to communicate with people on a daily basis. Even if your position doesn't require you to speak to clients directly, you'll still need interpersonal skills to interact with coworkers, supervisors and other people you work with.

Problem-Solving Skills: Bridging the Gap in IT Challenges

Problem-solving skills are another must-have for IT professionals. IT professionals are constantly in problem-solving mode, from figuring out how to best integrate new coding into existing software to dealing with a cybersecurity attack. They are often required to think quickly on their feet and come up with the best solution to address any number of common IT challenges.

Assessing a scenario quickly, weighing potential options and deciding on the best solution will serve you well in this field.

Negotiation Skills for IT Professionals

The ability to negotiate may seem like something that would be more applicable to sales professionals than to IT professionals. However, the reality is that people working in IT are often tasked with advocating for their work and the solutions they present. This may mean anything from convincing a client to go with a particular software solution to negotiating the details of a project with other team members. Being able to negotiate strongly and present arguments will certainly come in handy as an IT professional.

What Makes a Good Team Player in IT?

Working in IT involves a lot more collaboration than many people realize. Whether you're working an entry-level IT job or even an upper-level position, being a team player and having strong leadership skills matters.

The Value of Teamwork in the IT Sector

While it's true that you may find yourself working alone on some projects in the IT world, the reality is that many aspects of your job will involve collaborating with others. This may include working on a group project or even collaborating with other stakeholders within the company for which you

work. No matter how proficient you are with your technical skills, you simply can't go far in the IT world without the right collaborative mindset.

Leadership Skills for IT Professionals: Steering the Digital Ship

Strong leadership and management skills may not be necessary for an entry-level IT professional; you will need to develop some leadership skills if you plan to work your way up the proverbial career ladder. This is especially true if you aspire to work in a supervisory or managerial role overseeing other IT team members or entire departments. Being able to delegate tasks, oversee workers and motivate team members will go a long way towards a more successful career.

Why Should IT Professionals Cultivate Adaptability Skills?

In addition to such soft skills as communication, problem-solving and leadership, successful IT professionals should also work on their adaptability and resourcefulness from an early stage.

Thriving in an Ever-Evolving Tech World

Why does adaptability matter in IT? By its very nature, the IT world is dynamic and constantly changing. Keeping up with the latest developments and innovations will require a fair amount of versatility and resourcefulness, especially when it comes to solving new problems as they emerge.

How Can IT Professionals Improve Their Communication Skills?

There are some specific strategies young IT professionals can keep in mind to help them build upon their communication and other soft skills. It's never too early to start working on these skills, regardless of whether you have recently enrolled in an IT program or are already nearing graduation. The earlier you start working on these skills, the better off you'll be when working in your field.

Strategies for Enhancing Interpersonal Communication

Aspiring IT professionals can start building their interpersonal communication skills by taking public speaking classes and practicing active listening around others. Likewise, being more conscious about eye contact, body language and other communication cues can go a long way.

Embracing Continuous Learning in IT

When you work in IT, you're never *done* learning. There's always something new and exciting on the horizon—and the most successful IT professionals are those who are constantly looking for the next best thing. It’s important for IT students to embrace the concept of continuous learning. This means never being complacent with what you already know. Instead, look for new opportunities to learn, acquire new skills and explore new ideas. Having this mindset from an early stage in your career will serve you well down the road.

The Impact of Good Communication on Career Advancements in IT

If you're still having a hard time seeing how communication can play such a vital role in the IT field, take some time to read up on some case studies and real-world examples.

Case Studies of Successful IT Professionals

A quick look at eWeek's list of the "100 Most Influential People in IT" will reveal the importance of technical *and* interpersonal skills in this field. Look at Ray Ozzie, Chief Software Architect of Microsoft. He has been credited with using his interpersonal communication strengths and adaptable thinking to bring the company into the forward-thinking strategy it maintains today.

Are Communication Skills a Game-Changer in IT?

These days, you'd be hard-pressed to find an industry that doesn't require strong communication, interpersonal and problem-solving skills. IT is no exception. By focusing on growing your technical skills *and* working on your IT communication and other soft skills, you can work towards becoming a well-rounded professional. From there, you may also find that you're more marketable and able to find greater success in this challenging yet rewarding field.

Looking for a program that will prepare you for the realities of working in IT? The University of Memphis Global has you covered with our undergraduate degree program in Information Technology. Here, you'll learn about technological development, communication and the significant social and cultural issues raised in those contexts. Meanwhile, you'll sharpen your technical skills in information systems, statistical methods, formal communication and more. Reach out to request more information about this program or start your application today!

Завдання

1. Прочитати та перекласти текст на українську мову.
2. Надати відповіді на запитання.
3. Виконати тестові завдання

Questions

1. Why are communication skills essential for IT professionals?
2. What role does effective communication play in digital workplaces?
3. How can IT specialists explain technical jargon to non-technical clients?
4. Which soft skills are most important for success in the IT field?
5. How are technical proficiency and communication skills connected?
6. Why should IT professionals act as “translators” of technical processes?
7. What are interpersonal skills and why are they crucial in IT teams?
8. How do problem-solving skills contribute to effective communication?
9. Why is negotiation an important skill for IT professionals?
10. What qualities make an IT professional a good team player?
11. Why is adaptability considered a key skill in the IT industry?
12. What strategies can help improve interpersonal communication skills?

13. How does continuous learning influence communication development?
14. In what ways can strong communication skills impact career advancement?
15. Why is collaboration important in IT projects?

Multiple Choice Questions

1. **What is the main role of effective communication in IT?**
   a) To confuse clients with jargon
   b) To ensure mutual understanding
   c) To avoid collaboration
   d) To speed up coding

2. **How can IT specialists make technical jargon understandable?**
   a) By using more acronyms
   b) By explaining in simple language
   c) By ignoring client questions
   d) By sending long manuals

3. **Which soft skill is most important for IT success?**
   a) Interpersonal skills
   b) Memorization
   c) Isolation
   d) Avoiding teamwork

4. **How are technical proficiency and communication skills connected?**
   a) They are unrelated
   b) Only managers need both
   c) Communication replaces technical knowledge
   d) Technical skills require clear explanation

5. **Why should IT professionals act as “translators”?**
   a) To convert code into another language
   b) To explain processes in simple terms
   c) To avoid speaking to clients
   d) To write dictionaries

6. **What are interpersonal skills?**
   a) Skills for coding faster
   b) Skills for writing reports only

c) Skills for interacting effectively with people
d) Skills for avoiding teamwork

7. **How do problem-solving skills help communication?**
   a) They make conversations unnecessary
   b) They allow quick solutions and clear explanations
   c) They replace listening skills
   d) They reduce teamwork

8. **Why is negotiation important for IT professionals?**
   a) To argue with clients
   b) To advocate for solutions and project details
   c) To avoid collaboration
   d) To reduce communication

9. **What makes a good team player in IT?**
   a) Strong technical skills only
   b) Working alone
   c) Avoiding meetings
   d) Collaboration and leadership

10. **Why is adaptability key in IT?**
    a) Technology changes constantly
    b) To avoid learning new skills
    c) To stay in one role forever
    d) To ignore innovation

11. **Which strategy improves interpersonal communication?**
    a) Active listening and public speaking practice
    b) Avoiding eye contact
    c) Using more jargon
    d) Speaking less

12. **How does continuous learning affect communication?**
    a) It makes communication harder
    b) It helps adapt to new tools and contexts
    c) It replaces teamwork
    d) It stops skill development

13. **How can strong communication skills impact career growth?**
    a) They have no effect
    b) They increase marketability and leadership opportunities
    c) They reduce technical knowledge

d) They limit promotions

14. **Why is collaboration important in IT projects?**
    a) Projects often require teamwork and shared expertise
    b) It slows down progress
    c) It reduces innovation
    d) It avoids responsibility

Theme 12. Internet theft. Antivirus software. Preventative measures

Antivirus software

What does anti-virus software do?
Although details may vary between packages, anti-virus software scans files or your computer's memory for certain patterns that may indicate the presence of malicious software (i.e., malware). Anti-virus software (sometimes more broadly referred to as anti-malware software) looks for patterns based on the signatures or definitions of known malware. Anti-virus vendors find new and updated malware daily, so it is important that you have the latest updates installed on your computer.
Once you have installed an anti-virus package, you should scan your entire computer periodically.

- **Automatic scans** – Most anti-virus software can be configured to automatically scan specific files or directories in real time and prompt you at set intervals to perform complete scans.
- **Manual scans** – If your anti-virus software does not automatically scan new files, you should manually scan files and media you receive from an outside source before opening them. This process includes:
    - Saving and scanning email attachments or web downloads rather than opening them directly from the source.
    - Scanning media, including CDs and DVDs, for malware before opening files.

How will the software respond when it finds malware?
Sometimes the software will produce a dialog box alerting you that it has found malware and ask whether you want it to "clean" the file (to remove the malware). In other cases, the software may attempt to remove the malware without asking you first. When you select an anti-virus package, familiarize yourself with its features so you know what to expect.
Which software should you use?
There are many vendors who produce anti-virus software, and deciding which one to choose can be confusing. Anti-virus software typically performs the same types of functions, so your decision may be driven by recommendations, particular features, availability, or price. Regardless of

which package you choose, installing any anti-virus software will increase your level of protection.

How do you get the current malware information?

This process may differ depending on what product you choose, so find out what your anti-virus software requires. Many anti-virus packages include an option to automatically receive updated malware definitions. Because new information is added frequently, it is a good idea to take advantage of this option. Resist believing alarmist emails claiming that the “worst virus in history” or the “most dangerous malware ever” has been detected and will destroy your computer’s hard drive. These emails are usually hoaxes. You can confirm malware information through your anti-virus vendor or through resources offered by other anti-virus vendors.

While installing anti-virus software is one of the easiest and most effective ways to protect your computer, it has its limitations. Because it relies on signatures, anti-virus software can only detect malware that has known characteristics. It is important to keep these signatures up-to-date. You will still be susceptible to malware that circulates before the anti-virus vendors add their signatures, so continue to take other safety precautions as well.

Завдання

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Поставити терміни та їх визначення у відповідність.

Questions

1. What is the main purpose of antivirus software?
2. How does antivirus software detect malware?
3. Why is it important to keep antivirus definitions up to date?
4. What is the difference between automatic and manual scans?
5. How often should you scan your computer with antivirus software?
6. What should you do before opening email attachments or downloads?
7. How does antivirus software respond when it finds malware?
8. Why should you familiarize yourself with the features of your antivirus package?
9. What factors can influence your choice of antivirus software?
10. Why is installing any antivirus software better than having none?
11. How do antivirus programs receive updated malware information?
12. Why should you ignore alarmist emails about “the worst virus ever”?
13. What are the limitations of antivirus software based on signatures?
14. Why is it necessary to take additional safety precautions besides using antivirus software?

15. How does antivirus software help protect against known malware threats?

Matching Exercise: Antivirus Software

	Column A: Terms	**Column B: Definitions**
1	Antivirus software	
2	Malware	
3	Signature	
4	Automatic scan	
5	Manual scan	
6	Email attachment	
7	Malware definition update	
8	Hoax virus warning	
9	Real-time protection	
10	Vendor	
11	Cleaning a file	
12	Limitation of antivirus software	
12	Additional safety precautions	
14	Dialog box alert	
15	CD/DVD scan	

A. A false message claiming the existence of a dangerous virus.
B. A harmful program designed to damage or steal data.
C. A unique pattern used to identify known malware.
D. A process where antivirus checks files without user intervention.
E. A process where the user initiates a file check before opening.
F. A file sent via email that may contain malware.
G. Updating the database of known malware patterns.
H. A false message claiming the existence of a dangerous virus.
I. A feature that monitors files as they are accessed.
J. A company that develops and sells antivirus programs.
K. Removing malicious code from an infected file.
L. The inability to detect unknown malware without signatures.
M. Actions like avoiding suspicious links and downloads.
N. A pop-up message informing about detected malware.
O. Scanning removable media before opening files.

Theme 13. Multimedia

Applications of Multimedia

1. **Multimedia in Business.** Multimedia can be used in many applications in a business.
The multimedia technology along with communication technology has opened the door for information of global wok groups. Today the team members may be working anywhere and can work for various companies. Thus the work place will become global.
The multimedia network should support the following facilities:

- Voice Mail
- Electronic Mail
- Multimedia based FAX
- Office Needs
- Employee Training
- Sales and Other types of Group Presentation
- Records Management

2. **Multimedia in Marketing and Advertising.** By using multimedia marketing of new products can be greatly enhanced. Multimedia boost communication on an affordable cost opened the way for the marketing and advertising personnel. Presentation that have flying banners, video transitions, animations, and sound effects are some of the elements used in composing a multimedia-based advertisement to appeal to the consumer in a way never used before and promote the sale of the products.
3. **Multimedia in Entertainment.** By using multimedia marketing of new products can be greatly enhanced. Multimedia boost communication on an affordable cost opened the way for the marketing and advertising personnel. Presentation that have flying banners, video transitions, animations, and sound effects are some of the elements used in composing a multimedia-based advertisement to appeal to the consumer in a way never used before and promote the sale of the products.
4. Multimedia in Education. Many computer games with focus on education are now available. Consider an example of an educational game which plays various rhymes for kids. The child can paint the pictures, increase reduce size of various objects etc apart from just playing the rhymes. Several other multimedia packages are available in the market which provide a lot of detailed information and playing capabilities to kids.

5. **Multimedia in Bank.** Bank is another public place where multimedia is finding more

and more application in recent times. People go to bank to open saving/current accounts, deposit funds, withdraw money, know various financial schemes of the bank, obtain loans etc. Every bank has a lot of information which it wants to impart to in customers. For this purpose, it can use multimedia in many ways. Bank also displays information about its various schemes on a PC monitor placed in the rest area for customers. Today on-line and internet banking have become very popular. These use multimedia extensively. Multimedia is thus helping banks give service to their customers and also in educating them about banks attractive finance schemes.

6. **Multimedia in Hospital.** Multimedia best use in hospitals is for real time monitoring of conditions of patients in critical illness or accident. The conditions are displayed continuously on a computer screen and can alert the doctor/nurse on duty if any changes are observed on the screen. Multimedia makes it possible to consult a surgeon or an expert who can watch an ongoing surgery line on his PC monitor and give online advice at any crucial juncture.

Завдання

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Поставити терміни та їх визначення у відповідність.

Questions

1. What is multimedia and how is it defined in the context of technology?
2. How does multimedia technology support global work groups in business?
3. What facilities should a multimedia network provide for business communication?
4. Why is multimedia important for employee training?
5. How can multimedia enhance sales and group presentations?
6. In what ways is multimedia used in marketing and advertising?
7. What elements are commonly included in multimedia-based advertisements?
8. How does multimedia contribute to entertainment applications?
9. What role does multimedia play in educational computer games?
10. How can multimedia help children learn through interactive activities?
11. Why is multimedia becoming more common in banking services?
12. How does multimedia improve customer experience in banks?
13. What is the role of multimedia in online and internet banking?
14. How is multimedia applied in hospitals for patient monitoring?
15. How can multimedia enable remote consultation during surgeries?

Matching Exercise: Theme 13 - Multimedia

	Column A: Terms	Column B: Definitions
1	Multimedia	
2	Voice Mail	
3	Electronic Mail	
4	Multimedia-based FAX	
5	Employee Training	
6	Sales Presentation	
7	Interactive Educational Game	
8	Online Banking	
9	Real-time Patient Monitoring	
10	Remote Surgery Consultation	

a) A system that allows sending and receiving messages with audio recordings.
b) A technology that combines text, audio, video, and graphics for communication.
c) A method of sending documents with multimedia elements via fax.
d) A process of teaching employees using multimedia tools like videos and simulations.
e) A presentation using animations, sound effects, and video to promote products.
f) A game designed to teach children through interactive multimedia activities.
g) A service that enables customers to manage accounts and transactions via the internet.
h) Continuous observation of a patient's condition displayed on a computer screen.
i) Consulting a surgeon remotely during an operation using live video and multimedia.
j) A system for sending and receiving text messages electronically.

Theme 14. Cell phones.GPS systems

What is GPS and how does it work?

The Global Positioning System (GPS) is a navigation system using satellites, a receiver and algorithms to synchronize location, velocity and time data for air, sea and land travel.

The satellite system consists of a constellation of at least 31 satellites in six Earth-centered orbital planes, each with four satellites, orbiting at 13,000 miles (20,000 km) above Earth and traveling at a speed of 8,700 mph (14,000 km/h).

While we only need three satellites to produce a location on Earth's surface, a fourth satellite is often used to correct the receiver's clock error, which allows for more accurate positioning. The fourth satellite also enables us to calculate the altitude of a device, moving us into the third dimension.

What are the 3 elements of GPS?

GPS is made up of three different components, called **segments**, that work together to provide location information.

The three segments of GPS are:

- **Space (satellites):** The satellites circle the Earth, transmitting signals to users on geographical position and time of day. For fleets, these satellites enable real-time vehicle tracking and accurate route navigation, even in remote areas without cell service.
- **Ground control:** The Control Segment is made up of Earth-based monitor stations, master control stations and ground antenna. Control activities include tracking and operating the satellites in space and monitoring transmissions. There are monitoring stations on almost every continent in the world, including North and South America, Africa, Europe, Asia and Australia.
- **User equipment:** Including GPS receivers and transmitters, including items like watches, smartphones and telematic devices. In fleet operations, devices like telematics units or driver smartphones receive satellite signals and calculate exact positions to support dispatching and fleet safety.

How does GPS technology work?

GPS works through a technique called **trilateration**. Used to calculate location, velocity and elevation, trilateration collects signals from satellites to output location information.

Note: *Trilateration is often mistaken for triangulation, which is used to measure angles, not distances.*

Here's how it works:

1. **Satellites orbiting the Earth** send signals to be read and interpreted by a GPS device, situated on or near the Earth's surface. To calculate

location, a GPS device must be able to read the signal from **at least four satellites**.

2. **Each satellite in the network circles the Earth twice a day**, and sends a unique signal, orbital parameters and time. At any given moment, a GPS device can read the signals from six or more satellites.
3. **A single satellite broadcasts a microwave signal,** which is picked up by a GPS device and used to calculate the distance from the GPS device to the satellite. Since a GPS device only gives information about the distance from a satellite, a single satellite cannot provide much location information. Satellites do not give off information about angles, so the location of a GPS device could be anywhere on a sphere's surface area.
4. **When a satellite sends a signal**, it creates a circle with a radius measured from the GPS device to the satellite.
5. **After adding a second satellite, it creates a second circle**, and the location is narrowed down to one of two points where the circles intersect.
6. **With a third satellite, the device's location can finally be determined**, as the device is at the intersection of all three circles. It is said, we live in a three-dimensional world, which means that each satellite produces a **sphere, not a circle**. The intersection of three spheres produces **two points of intersection**, so the point
7. **As GPS devices move**, the radius (distance to the satellite) changes. When the radius changes, new spheres are produced, giving us a new position. We can use that data, combined with the time from the satellite, to determine velocity, calculate the distance to our destination and the ETA.

What are the uses of GPS?

GPS is a **powerful and dependable tool** for businesses and organizations in many different industries. Surveyors, fleet drivers, scientists, pilots, boat captains, first responders and workers in mining and agriculture are just some of the people who use GPS on a daily basis for work.

They use GPS information for preparing accurate surveys and maps, taking precise time measurements, tracking position or location and for navigation. GPS works at all times and in almost all weather conditions.

There are five main uses of GPS:

1. Location: Determining a position
2. Navigation: Getting from one location to another
3. Tracking: Monitoring objects or personal movement
4. Mapping: Creating maps of the world
5. Timing: Making it possible to take precise time measurements

GPS is especially valuable in fleet management, helping track vehicles in real time, optimize routes and improve driver safety and efficiency.

Keep reading for common use cases of GPS.

Emergency Response
During an emergency or natural disaster, first responders like police use GPS for mapping, following and predicting weather and keeping track of emergency personnel. In the EU and Russia, the eCall regulation relies on GLONASS technology (a GPS alternative) and telematics to send data to emergency services in the case of a vehicle crash, reducing response time. Read more about GPS tracking for first responders.

Entertainment
GPS can be incorporated into games and activities like Pokémon Go and geocaching.

Health and fitness:
Smartwatches and wearable technology can track fitness activity (such as running distance) and benchmark it against a similar demographic.

Construction, mining and off-road trucking
From locating equipment to measuring and improving fleet asset allocation, GPS enables companies in construction and mining to increase the return on their assets.

GPS technology enhances construction vehicle tracking by delivering real-time visibility into equipment usage and location, reducing downtime and improving asset allocation. It also supports off-road equipment tracking, enabling better fuel management, theft prevention, and operational efficiency in rugged environments.

Transportation
Many logistics companies implement telematics systems to improve driver productivity and safety. GPS trackers can be used to support fleet route optimization, fuel efficiency and fleet compliance.

Fleet managers also use GPS for advanced safety monitoring, such as curve logging, which captures detailed vehicle movement data to identify unsafe driving behaviors like harsh turns and abrupt stops.

Other industries where GPS is used include: agriculture, autonomous vehicles, sales and services, the military, mobile communications, security, and fishing.

How accurate is GPS?

GPS device accuracy depends on many variables, such as the number of satellites available, the ionosphere, the urban environment and more.

Some factors that can hinder GPS accuracy include:

- **Physical obstructions:** Arrival time measurements can be skewed by large masses like mountains, buildings, trees and more.
- **Atmospheric effects:** Ionospheric delays, heavy storm cover and solar storms can all affect GPS devices.
- **Ephemeris:** The orbital model within a satellite could be incorrect or out-of-date, although this is becoming increasingly rare.
- **Numerical miscalculations:** This might be a factor when the device hardware is not designed to specifications.
- **Artificial interference:** These include GPS jamming devices or spoofs.

Accuracy tends to be higher in open areas with no adjacent tall buildings that can block signals. This effect is known as an urban canyon.

When a device is surrounded by large buildings, like in downtown Manhattan or Toronto, the satellite signal is first blocked, and then bounced off a building, where it is finally read by the device. This can result in miscalculations of the satellite distance.

In addition to physical and environmental factors, digital security is an important consideration for GPS safety. Protecting GPS tracking devices against cyberthreats like spoofing and jamming helps maintain reliable data. This can be done using encrypted signals, firmware updates, and backup location sources to ensure reliable data.

A brief history of GPS

The history of GPS begins with ancient navigation methods. Humans have been practicing navigation for thousands of years using the sun, moon, stars and later, the sextant. **GPS** was an advancement of the 20th century made possible by space-age technology.

GPS technology has been used globally throughout history. The launch of Russia's Sputnik I satellite in 1957 ushered in the possibility of geolocation capabilities, and soon after, the U.S. Department of Defense began using it for submarine navigation.

In 1983, the U.S. government made GPS publicly available but still kept control of the available data. It wasn't until 2000 that companies and the general public gained full access to the use of GPS, eventually paving the way for greater GPS advancement.

Global Navigation Satellite Systems (GNSS)

A GPS is considered a **Global Navigation Satellite System** — meaning it's a satellite navigation system with global coverage.

As of 2020, there are three fully operational global navigation satellite systems:

- The U.S. navigation signal timing and ranging (NAVSTAR) GPS
- Russia's Global Navigation Satellite System (GLONASS)
- Europe's Galileo system

The **NAVSTAR GPS** consists of **32 satellites** owned by the U.S. and is the best-known and most widely utilized satellite system. Russia's **GLONASS** consists of **24 operational satellites** with three remaining as spares or in testing.

Завдання

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Поставити терміни та їх визначення у відповідність.

Questions

1. What does GPS stand for and what is its main purpose?
2. How does GPS technology work in general terms?
3. What are the three main segments of the GPS system?
4. What role do satellites play in GPS functionality?
5. Why is a fourth satellite often used in GPS calculations?
6. What is trilateration and how does it differ from triangulation?
7. How does a GPS device calculate its position using satellites?
8. What types of user equipment can receive GPS signals?
9. What are the five main uses of GPS technology?
10. How is GPS applied in emergency response situations?
11. In what ways is GPS used in transportation and logistics?
12. How does GPS improve fleet management and driver safety?
13. What factors can affect the accuracy of GPS signals?
14. Why is GPS security important and how can it be protected?
15. What are some examples of Global Navigation Satellite Systems (GNSS) besides GPS?

Matching Exercise: Theme 14: Cell phones & GPS systems

	Column A: Terms	Column B: Definitions
1	Control Segment	
2	GNSS	
3	GPS	
4	Mapping	
5	Navigation	
6	Satellite	
7	Timing	
8	Tracking	
9	Trilateration	
10	User Equipment	

a) A global system that determines position using satellites, receivers, and algorithms.
b) A space-based object that transmits signals for location and time data.
c) A method of calculating position using distances from multiple satellites.
d) Earth-based stations that monitor and manage satellites.
e) Devices like smartphones or telematics units that receive GPS signals.
f) Getting from one location to another using GPS data.
g) Monitoring the movement of objects or people in real time.
h) Creating accurate maps using location data.
i) Measuring precise time for synchronization and operations.
j) A category of systems that includes GPS, GLONASS, and Galileo for global coverage.

Theme 15. Artificial intelligence.

How generative AI works?

In general, generative AI operates in three phases:

1. **Training,** to create a foundation model.
2. **Tuning,** to adapt the model to a specific application.
3. **Generation, evaluation and more tuning,** to improve accuracy.

Training

Generative AI begins with a "foundation model"; a deep learning model that serves as the basis for multiple different types of generative AI applications.

The most common foundation models today are large language models (LLMs), created for text generation applications. But there are also foundation models for image, video, sound or music generation, and multimodal foundation models that support several kinds of content.

To create a foundation model, practitioners train a deep learning algorithm on huge volumes of relevant raw, unstructured, unlabeled data, such as terabytes or petabytes of data text or images or video from the internet. The training yields a neural network of billions of *parameters* encoded representations of the entities, patterns and relationships in the data that can generate content autonomously in response to prompts. This is the foundation model.

This training process is compute-intensive, time-consuming and expensive. It requires thousands of clustered graphics processing units (GPUs) and weeks of processing, all of which typically costs millions of dollars. Open source foundation model projects, such as Meta's Llama-2, enable gen AI developers to avoid this step and its costs.

Tuning

Next, the model must be tuned to a specific content generation task. This can be done in various ways, including:

- Fine-tuning, which involves feeding the model application-specific labeled data, questions or prompts the application is likely to receive, and corresponding correct answers in the wanted format.

- Reinforcement learning with human feedback (RLHF), in which human users evaluate the accuracy or relevance of model outputs so that the

model can improve itself. This can be as simple as having people type or talk back corrections to a chatbot or virtual assistant.

Generation, evaluation and more tuning

Developers and users regularly assess the outputs of their generative AI apps, and further tune the model even as often as once a week for greater accuracy or relevance. In contrast, the foundation model itself is updated much less frequently, perhaps every year or 18 months.

Another option for improving a gen AI app's performance is retrieval augmented generation (RAG), a technique for extending the foundation model to use relevant sources outside of the training data to refine the parameters for greater accuracy or relevance.

AI agents and agentic AI

An AI agent is an autonomous AI program, it can perform tasks and accomplish goals on behalf of a user or another system without human intervention, by designing its own workflow and using available tools (other applications or services).

Agentic AI is a system of multiple AI agents, the efforts of which are coordinated, or orchestrated, to accomplish a more complex task or a greater goal than any single agent in the system could accomplish.

Unlike chatbots and other AI models which operate within predefined constraints and require human intervention, AI agents and agentic AI exhibit autonomy, goal-driven behavior and adaptability to changing circumstances. The terms “agent” and “agentic” refer to these models’ *agency*, or their capacity to act independently and purposefully.

One way to think of agents is as a natural next step after generative AI. Gen AI models focus on creating content based on learned patterns; agents use that content to interact with each other and other tools to make decisions, solve problems and complete tasks. For example, a gen AI app might be able to tell you the best time to climb Mt. Everest given your work schedule, but an agent can tell you this, and then use an online travel service to book you the best flight and reserve a room in the most convenient hotel in Nepal.

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Поставити у відповідність.

Questions

1. What are the three main phases of generative AI operation?
2. What is a foundation model in the context of generative AI?
3. Which types of content can foundation models generate?
4. Why is the training process for foundation models considered expensive and time-consuming?
5. How do open-source foundation models like Llama-2 benefit developers?
6. What is fine-tuning and why is it important for generative AI?
7. How does Reinforcement Learning with Human Feedback (RLHF) work?
8. Why is continuous evaluation and tuning necessary for generative AI applications?
9. What is Retrieval Augmented Generation (RAG) and what role does it play?
10. How do AI agents differ from traditional chatbots?
11. What does the term “agentic AI” mean?
12. What are the key characteristics of AI agents, such as autonomy and adaptability?
13. How do multiple AI agents collaborate in an agentic AI system?
14. Can you provide an example of a real-world application of AI agents?
15. Why are AI agents considered the next step after generative AI?

Matching Exercise

	Column A: Terms	**Column B: Definitions**
1		A process that creates new content based on learned patterns and data.
2		A large-scale deep learning model trained on massive datasets to generate content.
3		Adjusting the model with application-specific data for better performance.
4		Reinforcement Learning with Human Feedback to refine outputs.
5		A technique that uses external data sources to improve model accuracy.
6		An autonomous program that performs tasks without human intervention.

7		A system of multiple AI agents working together to achieve complex goals.
8		The ability of an AI system to act independently and make decisions.
9		The capacity to adjust to changing conditions and requirements.
10		An open-source foundation model that reduces training costs.
11		The initial stage of generative AI where the model learns patterns from data.
12		The stage where the model is adapted for specific tasks.
13		The phase where the model produces content and is evaluated.
14		A network of billions of parameters representing patterns and relationships.
15		A model that supports multiple content types like text, image, and audio.

A. Tuning Phase
B. Training Phase
C. RLHF
D. Retrieval Augmented Generation (RAG)
E. Neural Network
F. Multimodal Model
G. Llama-2
H. Generative AI
I. Generation Phase
J. Foundation Model
K. Fine-tuning
L. Autonomy
M. AI Agent
N. Agentic AI
O. Adaptability

MODULE 4. Social media and communications

Theme 16 Education and research. Electronic publishing

Electronic Publishing: What Do We Mean

Electronic publishing has been broadly defined as non-print material that is produced digitally. Electronic publishing is an encompassing term for a variety of digitally produced materials (Jones & Cook, 2000) such as bulletin boards, newsgroups, mailing lists, CD-ROM based media, and websites. Material produced electronically can be classified into two major categories that are not mutually exclusive: communication and information management. CD-ROMs and websites are often categorized as information management, while others like newsgroups/forums and mailing lists can be grouped as a means of communication. The differentiation often lies in whether the central purpose is sending messages (communication) or store-housing knowledge or resources (information management).

CDs, for example, may store information, such as data from a book or encyclopedia. An increasing number of nursing textbooks include a CD for the buyer and included on the CD are supplemental text material. In a like manner to CDs, information can be stored on web sites. However, instead of the computer reading a CD, the computer reads the information that is kept at the website. The *Online Journal of Issues in Nursing*, for example, is information that is stored at the American Nurses Association's website, Nursingworld (www.nursingworld.org/ojin)

E-mail, bulletin boards, newsgroups, and mailing lists are used to convey messages or to carry out discussions. These type of media require some interactivity with another person either in real time (synchronous) or asynchronously when the other person is not connected to you. In synchronous communication, which is used in chat rooms and in teleconferencing, exchanges are immediate as if talking on the phone. Asynchronous communication is more common than synchronous and implies delayed reading and writing (posting) of messages like an answering machine stores messages.

Electronic publishing, no matter its form is broadcasted, distributed, or disseminated digitally through a computer. However, an important distinction to note is that not all electronic publications are scholarly. Rather some electronic publications include opinions, views, discussions and other types of information that do not meet the criteria of scholarship. Scholarship

in its broadest sense implies that certain criteria have been met: goals are clearly stated, background preparation is sufficient, approach to the issue/topic is appropriate, important conclusions are made; presentation of material is effective, and that the project is thoughtfully evaluated (Glassick,1997, www.unl.edu/peerrev/project_description/glassick.html).

Use and Types of Electronic Publishing

The use of computers has exploded. Currently there are 43 million connected computers across the world. Worldwide there are projected to be over 200 million users online over the age of 16 (NUA survey, 1999,). The use of electronic medium enables a large segment of the peoples of the world to seek out information and exchange ideas for personal, business, and/or educational use. In the United States, for example, fifty percent of all students had access to the use of computers for studying math (ETS's Policy Information Center, 1999. www.ets.org/research /pic/ccsum.html). Using the framework of communication and managing information this section will provide an overview of the ways computers are used a) to send messages and network and b) provide for information management.

Messaging and networking

Messaging and networking are two means of using electronic publication for communication. Messaging through e-mail is one of the most widely established ways to communicate and allows one or more persons to correspond in writing. Networking allows messages to be sent and discussions to occur among a few people or in some cases among thousands of people. As both messaging and networking use an e-mail type application, e-mail will be briefly reviewed first. For the novice user seeking more "how-to" information on e-mail, click on the following links: www.nursingworld.org/, www.webfoot.com/advice/email.context.html , www.pbs.org/uti/guide/email.html, www.pb.org/emoticon.html.

E-mail can be likened to letter or note writing. However, instead of mailing a written copy through a carrier such as a postal service or leaving a message on someone's desk, a note/letter is electronically published through computers. While most e-mail is simply a written message, a file or files can be sent along with the e-mail. These attachments can contain pictures, video, audio, or long text or database files like protocols, articles or research data.

Because e-mail can be distributed widely and it is digital, it is considered an electronic publication. Although, e-mail, like a letter, is obviously not considered scholarly, this type of communication can facilitate scholarship,

as, for example when many clinical and research experts use e-mail among colleagues for the exchange of ideas and information and for reflection.
Networking, in contrast to e-mail, implies a wider list of recipients, a broader array of communication techniques and often an ongoing communication process. Most often networking is based on mutual interests. It involves broadcasting to or interacting with individuals/groups with similar backgrounds like nurses, or teens, or hobbyists. Common methods of networking are mailing lists, usenet news groups, and forums. The frequency of use, whether for announcements or discussion, depends on the purpose of the list, but often range from once a day to once a month. Mailing lists are used for two major purposes: to send one-way announcements to a wide audience or for interactive discussions among a group of "subscribed" members that are interested in a specific topic or field. Both are based on e-mail.
The announcement type mailing list is frequently used by a vast number of organizations throughout the world to send information that needs distributed widely, quickly and efficiently. These messages cannot be sent over the Internet or the Intranet, (a computer system within an organization for networking computers that is set up similarly to the internet, but is for the use of employees only). See definition list for terms at www.matisse.net/files/glossary.html. Some examples of messages that are common, but certainly not exhaustive in mailing lists include: homework assignments, public service announcements, road closings, meeting times and agendas, conference information, news, and jokes.
Discussion-based mailing lists allow subscribers (members who have signed up to participate) to send and receive e-mail messages about the identified purpose of the discussion group. This type of communication is sometimes called a listerv (www.matisse.net/files/glossary.html) reflecting of one of the early software programs used for discussions. These discussion groups (or lists) can be reviewed before being sent (moderated) or just sent immediately to all subscribers without review (unmoderated). One of the largest mailing list services is Listz (www.liszt.com/).

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.

3. Надати відповіді на тестові запитання.

Questions

1. What is the general definition of electronic publishing?
2. Which two major categories can electronic publications be classified into?
3. What is the main difference between communication and information management in electronic publishing?
4. Give two examples of electronic publishing used for information management.
5. Give two examples of electronic publishing used for communication.
6. What is the role of CD-ROMs in electronic publishing?
7. How does a website store and provide information compared to a CD?
8. What is synchronous communication and where is it commonly used?
9. What is asynchronous communication and how does it differ from synchronous?
10. Why are not all electronic publications considered scholarly?
11. List at least three criteria that define scholarly work in electronic publishing.
12. How has the use of computers influenced the growth of electronic publishing worldwide?
13. What is the difference between messaging and networking in electronic publishing?
14. What are mailing lists and what are their two main purposes?
15. What is the difference between moderated and unmoderated discussion groups?

Test Questions

1. **What does electronic publishing primarily involve?**
   a) Printing books on paper
   b) Producing and distributing digital content
   c) Sending handwritten letters
   d) Broadcasting radio programs

2. **Which of the following is an example of asynchronous communication?**
   a) Live video conference
   b) Chat room discussion in real time

c) Email exchange
d) Phone call

3. **What is the main purpose of CD-ROMs in electronic publishing?**
   a) To store and distribute digital information
   b) To enable real-time messaging
   c) To replace websites
   d) To provide synchronous communication

4. **How does a website differ from a CD in storing information?**
   a) A website stores information locally on a disk
   b) A website provides access to information stored online
   c) A website cannot store multimedia content
   d) A website is only for synchronous communication

5. **Which of the following best describes synchronous communication?**
   a) Communication with delayed responses
   b) Real-time interaction similar to a phone call
   c) Posting messages on a forum
   d) Sending emails

6. **Why are some electronic publications not considered scholarly?**
   a) They lack clear goals and evaluation criteria
   b) They are always peer-reviewed
   c) They include only scientific data
   d) They meet all academic standards

7. **Which of the following is a criterion for scholarly electronic publishing?**
   a) Random opinions without evidence
   b) Clearly stated goals and proper evaluation
   c) Informal discussions only
   d) Lack of background preparation

8. **What is the main difference between messaging and networking in electronic publishing?**
   a) Messaging involves one-way announcements only
   b) Networking allows broader interaction among multiple users
   c) Messaging uses websites exclusively
   d) Networking is limited to private emails

9. **What is the purpose of moderated discussion groups?**
   a) To allow messages without any review
   b) To review messages before sending them to subscribers
   c) To block all communication
   d) To send only advertisements

10. **Why has electronic publishing grown rapidly worldwide?**
    a) Increased use of computers and internet connectivity
    b) Decline in digital technology
    c) Lack of interest in online communication
    d) Limited access to global networks

Theme 17. Connecting to clients and employees. Advertising and Marketing

How to build connections?

If you're wondering how to build connections in your personal and professional life, here are 10 steps you can follow:

1. Be active in your industry

You can take part in professional organization events that your industry may host, or you can attend conferences related to your profession. Attending these events may provide you with access to a wide range of professionals in your field. Networking events are usually an excellent way to connect with peers and senior industry professionals. Conferences and professional organizations often offer casual events besides their formal ones, allowing you to establish stronger bonds by making a personal connection.

2. Be outgoing

Whether you're an introvert or an extrovert, you can find hobbies or events that interest you to encourage you to interact with new people. It's possible to meet people that can serve valuable roles in your professional network, even when you meet them at an event that isn't work-related. If being outgoing doesn't come naturally to you, you can practice this skill in your daily activities by motivating yourself to engage in small talk or having conversations with colleagues more often. The more practice you get, the more comfortable you may be when building new connections.

3. Establish multiple levels of contact

It's important to have several ways to communicate with people you meet, such as via email or phone. Having multiple ways of contacting the people you meet can help ensure your ability to communicate with them when necessary. It can also allow you to set preferred communication methods. For example, you can use phone calls or texts for essential situations, and

email for basic relationship maintenance or sending casual messages to one another.

4. Discover commonalities

When meeting someone for the first time, finding shared interests or responsibilities can provide a helpful source of discussion. The common interests may be personal or professional. For example, if you're in an interview and notice that you went to the same college as the hiring manager, you may mention this connection. Commonalities can provide a good foundation for relationships because they can offer both people important insights into one another.

5. Provide value

Whether you're connecting on a personal or professional basis, reciprocity is key to building relationships. In reciprocal relationships, both participants offer benefits to each other, helping to create a balanced partnership. If you're asking for help, it's essential to show that you can offer your help or support in their time of need. Ensuring a balance of giving and taking in the relationship can show genuine respect and concern for one another.

6. Express gratitude

When someone does you a favour, the simplest way to make them feel appreciated is to show how grateful you are. When people feel appreciated, it can encourage them to maintain and strengthen the relationship. You can show your gratitude with a note, an email, or a small gift. Expressing your appreciation shows that you recognize their value and that you're grateful for their generosity.

7. Publish your work

You can take advantage of industry journals or blogging platforms to share your work and get noticed by people in your field. Rather than keeping your work to yourself, publishing it can make it accessible to others to read and share. Sharing your work can be a great way to connect with people in different parts of the world. Some readers may share their thoughts on your work, or it could motivate them to connect with you to work more on the topic. Publishing your content can give you an excellent opportunity to find like-minded people within your industry.

8. Develop an online presence

You can use social media platforms or a personal website to develop an online presence that you can use to connect with professionals in different areas. You can engage in online discussions by following industry blogs or thought leaders on social media platforms and professional groups. Online platforms may enable you to share and find resources to support one another and establish connections. When you meet people, you can exchange social media accounts or professional websites with them. Your new connections can contact you via social media platforms, giving them a chance to learn more about you.

9. Act as a host

A great way to meet people and form bonds is by planning and hosting events. You can create an industry group or facilitate an industry event. As the host of the event, you may become the point of contact for anyone interested in participating. This can help you build connections before or after the event by listening to people's comments or answering their questions. Focusing on industry-related events or groups can give you the chance to find like-minded individuals and may lead to further professional opportunities.

10. Maintain important contacts

Once you make the initial connection, it's vital to continue working toward building the relationship. Periodically messaging or calling them can be an excellent way to maintain important contacts, such as mentors and clients. There are many ways you can stay in contact. You can send a holiday card or email to reconnect and discuss opportunities. Spending effort can show that you value the relationship, and it may help them remember you when they learn about any potential job opportunities.

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Надати відповіді на тестові запитання.

Questions

1. What is the main purpose of building connections in personal and professional life?
2. Why is being active in your industry important for networking?
3. How can attending conferences help you build connections?
4. What does the text suggest for people who are introverted when trying to be outgoing?
5. Why is it useful to establish multiple levels of contact with new people?
6. How can discovering commonalities strengthen relationships?
7. What role does reciprocity play in building connections?
8. Why is expressing gratitude important in maintaining relationships?
9. How can publishing your work help you connect with others?
10. What are some ways to develop an online presence for networking?
11. Why might hosting events be an effective way to build connections?
12. How does maintaining important contacts contribute to long-term professional success?

13. What are the benefits of using social media for professional networking?
14. Why is it important to balance giving and taking in a relationship?
15. How can finding shared interests during an interview improve your chances of success?

Test Questions

1. What is the first step suggested for building connections?
   a) Publish your work
   b) Be active in your industry
   c) Express gratitude
   d) Host events
2. Why is attending conferences useful for networking?
   a) It guarantees job offers
   b) It provides access to professionals in your field
   c) It replaces online presence
   d) It avoids casual interactions
3. What does the text recommend for introverts?
   a) Avoid networking events
   b) Practice small talk and engage in conversations
   c) Focus only on online presence
   d) Host large events immediately
4. Why should you establish multiple levels of contact?
   a) To impress people with technology
   b) To ensure communication through different channels
   c) To avoid meeting people in person
   d) To reduce professional responsibilities
5. What is the benefit of discovering commonalities?
   a) It helps create shared interests and stronger bonds
   b) It guarantees promotions
   c) It eliminates the need for gratitude
   d) It replaces professional skills
6. What does reciprocity mean in building connections?
   a) Giving and taking benefits in a balanced way
   b) Avoiding any help to others
   c) Asking for favors without offering support
   d) Publishing work without feedback
7. Why is expressing gratitude important?
   a) It shows appreciation and strengthens relationships
   b) It replaces the need for networking

c) It guarantees financial rewards
d) It avoids future communication

8. How can publishing your work help?
   a) It makes your work private
   b) It connects you with like-minded professionals
   c) It reduces your online presence
   d) It limits your audience
9. Which of the following is a way to develop an online presence?
   a) Avoid social media
   b) Use professional platforms and share resources
   c) Ignore industry blogs
   d) Focus only on offline events
10. Why might hosting events be effective?
    a) It makes you the central point of contact
    b) It avoids meeting new people
    c) It reduces professional visibility
    d) It limits collaboration
11. What is the main advantage of maintaining important contacts?
    a) It ensures long-term professional success
    b) It replaces skill development
    c) It avoids communication
    d) It guarantees immediate promotions
12. Which tool is mentioned for developing an online presence?
    a) Social media platforms
    b) Printed newsletters
    c) Telephone directories
    d) Fax machines
13. Why is balancing giving and taking important?
    a) It creates mutual respect and trust
    b) It avoids collaboration
    c) It guarantees financial success
    d) It limits communication
14. What does the text suggest about hosting industry events?
    a) It helps you meet like-minded individuals
    b) It reduces networking opportunities
    c) It is only for senior professionals
    d) It avoids professional growth
15. How can finding shared interests during an interview help?
    a) It improves rapport and chances of success
    b) It guarantees a job offer immediately
    c) It replaces technical skills
    d) It avoids further discussion

Theme 18. New technologies. Automation. Software Architecture. Architectural styles . Design Considerations.
Software Architecture.

Let's start our comprehensive discussion of software architecture with an overview of the software design process. We'll uncover key design patterns that define various application architectures and then explore the tools, best practices, and challenges faced in modern software architecture. Along the way, we'll gain insights into the minds of the software architects who design these systems and help bring them to life.

Introduction to software architecture
Software architecture is the fundamental organization of a software system, encompassing the structures, components, and relationships that define how the system operates and evolves. At its core, software architecture provides a blueprint for software development, guiding how different parts of the system interact to fulfill both functional and non-functional requirements. This foundational organization is essential for ensuring that the software system is robust, scalable, and adaptable to change. By establishing clear architectural guidelines from the outset, development teams can create systems that are easier to maintain, extend, and optimize over time. Ultimately, a well-conceived architecture serves as the backbone of any successful software project, shaping the system's behavior and supporting its long-term growth.

Importance of software architecture
The significance of software architecture extends far beyond initial design—it is a decisive factor in the overall success of a software system. A thoughtfully crafted architecture directly influences the system's performance, reliability, and maintainability, making it easier for development teams to manage complexity and deliver high-quality results. Good architecture streamlines software development by providing clear structure and boundaries, which simplifies modifications and the addition of new features. It also enhances scalability and fault tolerance, ensuring the system can handle growth and recover gracefully from failures. Moreover, a strong architectural foundation reduces operational and maintenance costs by minimizing the need for extensive rework and enabling more efficient development processes. In essence, investing in sound software architecture pays dividends throughout the system's lifecycle, supporting both immediate business needs and future innovation.

Software architecture design
Software architecture design determines how to build a software system that satisfies functional and non-functional requirements, balancing factors such as maintainability, effort, engineering velocity, resilience, robustness,

scalability and operational costs. In the design phase, architects specify a multi-faceted blueprint for the software, much like building architects specify plans. This specification includes the software's components and sub-components, interfaces and boundaries, interdependencies, the underlying technology stack, and the frameworks they use. It also outlines key data and control flows and constraints to address non-functional requirements such as response times, redundancy, and security controls.

Typically, the software development life cycle (SDLC) is carried out iteratively and incrementally on top of the same architectural foundation. As the system evolves with new capabilities and requirements, the architecture should remain stable, providing a consistent backbone for the evolving application.

Architectural changes typically incur considerable costs, as they involve system-wide rewrites with high risk of regressions and unexpected production issues. It's essential to address requirements and anticipate the consequences of design decisions. Choosing the best software architecture pattern is crucial to the software's performance, security, maintainability, and cost-effectiveness throughout its development and deployment. The many critical architectural choices made in the design phase justify the investment, as they often determine the final product's success or failure.

Software architectural design patterns

Architects often rely on established software architecture patterns — proven solutions to common design challenges. These patterns offer blueprints for building adaptable systems while avoiding common pitfalls. Let's explore some of the most renowned architectural design patterns.

Layered software architectural design

The layered pattern partitions an application into "horizontal layers," each responsible for a category of functions. For example, the persistence layer manages reading and writing data to persistent storage (e.g., a database), while the presentation layer handles incoming API requests from external clients and routes them to lower layers for processing. Components within a layer may send requests to other components in the same or lower layers, but not to those in higher layers. A common layering for monolithic enterprise applications is the three-layer design, which defines presentation, application (or business) and data (or persistence) as the three standard layers. Some applications use four layers: presentation, business logic, services, and data.

The main advantage of a layered architecture is its separation of concerns via modularity. Developers can focus on building or modifying a component within a layer without considering the implementation details of lower layers or their usage by upper layers. This approach increases engineering velocity, maintainability, reliability and usability.

Let’s look at a typical example of a Java Spring application: “Order Management System” which we use in our vFunction modernization workshops. We call the presentation layer “web” and it contains a set of controller classes that receive REST API requests from clients. The requests are interpreted and processed by calling methods on objects in the service layer which calls APIs of external systems (e.g., to send emails) and uses the object in the persistence layer to read and write data from/to database tables.

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Надати відповіді на тестові запитання.

Questions

Comprehension Questions

1. What is the definition of software architecture?
2. Why is software architecture considered the backbone of a software system?
3. How does software architecture influence system performance and reliability?
4. What role does software architecture play in scalability and fault tolerance?
5. Why is a strong architectural foundation important for reducing operational costs?
6. What does the software architecture design phase involve?
7. How does architecture address both functional and non-functional requirements?
8. Why are architectural changes considered costly and risky?
9. What is the relationship between software architecture and the software development life cycle (SDLC)?
10. Why is choosing the right architecture pattern crucial for software success?
11. What are software architecture design patterns?
12. What is the main advantage of using established architectural patterns?
13. How does the layered architecture pattern organize an application?
14. What is the purpose of the presentation layer in a layered architecture?
15. Why does modularity in layered architecture improve maintainability and engineering velocity?

Test Questions

1. **What is the primary purpose of software architecture?**
   a) To write code faster
   b) To provide a blueprint for software development
   c) To eliminate all bugs
   d) To replace testing
2. **Why is software architecture considered the backbone of a software system?**
   a) It defines the user interface only
   b) It organizes the system's structure and relationships
   c) It focuses only on hardware design
   d) It removes the need for documentation
3. **Which of the following is NOT influenced by software architecture?**
   a) System performance
   b) Reliability
   c) Scalability
   d) Employee salaries
4. **What does the design phase of software architecture involve?**
   a) Coding without planning
   b) Specifying components, interfaces, and constraints
   c) Ignoring non-functional requirements
   d) Skipping technology stack decisions
5. **Why are architectural changes considered costly?**
   a) They require minor edits only
   b) They involve system-wide rewrites and high risk
   c) They never affect production
   d) They reduce maintainability
6. **What is the relationship between architecture and SDLC?**
   a) Architecture changes every iteration
   b) SDLC builds on a stable architectural foundation
   c) Architecture is irrelevant to SDLC
   d) SDLC replaces architecture
7. **Why is choosing the right architecture pattern crucial?**
   a) It determines software success and cost-effectiveness
   b) It eliminates the need for testing
   c) It guarantees zero bugs
   d) It avoids teamwork
8. **What are software architecture design patterns?**
   a) Random coding techniques
   b) Proven solutions to common design challenges
   c) Hardware installation guides
   d) Debugging tools

9. **What is the main advantage of using established architectural patterns?**
   a) They increase complexity
   b) They provide adaptable solutions and avoid pitfalls
   c) They reduce modularity
   d) They eliminate documentation
10. **How does the layered architecture pattern organize an application?**
   a) Into vertical layers for hardware
   b) Into horizontal layers with specific responsibilities
   c) Without any separation of concerns
   d) By mixing presentation and data logic
11. **Which layer handles incoming API requests in a layered architecture?**
   a) Data layer
   b) Presentation layer
   c) Persistence layer
   d) Service layer only
12. **What is the main purpose of the persistence layer?**
   a) To manage user interface design
   b) To read and write data to storage
   c) To handle API routing
   d) To send emails
13. **Why does modularity improve maintainability?**
   a) It allows changes without affecting other layers
   b) It removes the need for testing
   c) It reduces scalability
   d) It limits engineering velocity
14. **Which of the following is a common layering in enterprise applications?**
   a) Presentation, business, data
   b) Hardware, software, network
   c) UI, database, hardware
   d) Testing, debugging, deployment
15. **What is the main benefit of a layered architecture?**
   a) Increased complexity
   b) Separation of concerns and better modularity
   c) Elimination of all bugs
   d) Faster coding without planning

Theme 19. Robotics. Project management.

What is project management?

Project management is the process of planning, organizing, and managing project activities in order to achieve intended outcomes.
Quote: The purpose of project management is to complete a project within budget and time of defined quality on the agreed scope.
The standard definition of project management by *the Project Management Institute (PMI)* says, "*Project management is the application of knowledge, skills, tools, and techniques to project activities to achieve the project objectives. It guides the project work to deliver the intended outcomes and meet or exceed stakeholder needs and expectations from a project."*
The PMI or the Project Management Institute is a not-for-profit organization that provides knowledge resources, community, and certifications to train and educate project managers.
It is the highest authority in the field of project management which has created to provide project managers with the fundamental practices needed to manage projects and achieve results.

What is the importance of project management?

Project management plays a key role in making projects successful. Have a look at the five key points reflecting the importance of project management.

1. Provides a clear roadmap

Project management involves defining the requirements of the project and creating a plan to convert those requirements into measurable tasks before execution. This creates a clear roadmap for the project team to follow. It results in less confusion about how the project will progress and the project team can approach a project more confidently and manage time effectively.

2. Define key roles and responsibilities

Project management includes clearly defining the roles and responsibilities of each individual in the project and assigning the owner of tasks. This provides clarity to the team members on their roles and what is expected of them. Thus, they can be more accountable and better contribute to the project's success.

3. Facilitates teamwork

Project management brings all the project work to a centralized and transparent place. This enhanced visibility and free flow of information brings everyone on the same page, improves team communication, and encourages better collaboration among team members and stakeholders. This results in better teamwork, increased accountability, enhanced trust, and improved productivity.

4. Manage project risks better

Project management involves planning for the project risks before execution and continuous tracking of the project progress for improved visibility. This helps you identify the deviations early on and predict the bottlenecks. Thus, you can take prompt action to resolve issues before they become bigger project risks.

5. Resource optimization and better predictability

Project management involves breaking a project into small tasks and defining the dependencies between tasks. Thus, you can easily calculate the resources required for a project and predict when tasks will be completed. This leads to better resource allocation and accurate estimates.

6. Ensure quality deliverables

Project management follows the strong process of quality management. It includes clearly defining the acceptance criteria of each task and getting approval from the stakeholders before submission. This helps you ensure the project meets the quality requirements and reduces the risks of project failure because the expectations of clients are fulfilled.

7. Reduce the risk of project failure

Project management can help you reduce project risks by clearly outlining the project requirements before the execution of the project or taking feedback throughout the project. This helps ensure project requirements are fulfilled.

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Надати відповіді на тестові запитання.

Questions

1. What is the standard definition of project management according to PMI?
2. What is the main purpose of project management?
3. Which organization is considered the highest authority in project management?
4. What does PMI provide to project managers?
5. Why is project management important for project success?
6. What does project management involve before execution?
7. How does project management create a clear roadmap for the team?
8. Why is defining roles and responsibilities essential in project management?
9. How does project management facilitate teamwork?
10. What role does project management play in managing project risks?

11. How does project management help in resource optimization?
12. What is the importance of quality management in project management?
13. How does project management reduce the risk of project failure?
14. Why is continuous tracking important in project management?
15. How does project management improve predictability in project timelines?

Test Questions

1. **What does PMI stand for in project management?**
   a) Project Management Institute
   b) Professional Management International
   c) Project Monitoring Initiative
   d) Program Management Integration
2. **What is the primary goal of project management?**
   a) To increase company profits
   b) To complete a project within scope, time, and budget
   c) To hire more employees
   d) To eliminate all risks
3. **Which of the following is NOT mentioned as a benefit of project management?**
   a) Clear roadmap
   b) Defining roles and responsibilities
   c) Unlimited budget allocation
   d) Facilitating teamwork
4. **What does project management involve before execution?**
   a) Random task assignment
   b) Defining requirements and creating a plan
   c) Ignoring stakeholder expectations
   d) Skipping risk analysis
5. **Why is defining roles and responsibilities important?**
   a) It reduces accountability
   b) It creates confusion among team members
   c) It provides clarity and accountability
   d) It delays project progress
6. **How does project management help manage risks?**
   a) By avoiding planning
   b) By continuous tracking and early identification of issues
   c) By ignoring deviations
   d) By reducing communication
7. **Which process ensures that deliverables meet client expectations?**
   a) Risk management
   b) Quality management

c) Resource allocation
d) Budget planning

8. **What does resource optimization in project management achieve?**
   a) Better allocation and accurate estimates
   b) Increased project failure
   c) Reduced predictability
   d) Elimination of teamwork
9. **Why is continuous tracking important in project management?**
   a) To identify bottlenecks early and take corrective action
   b) To avoid stakeholder feedback
   c) To reduce visibility
   d) To increase project risks
10. **Which organization provides certifications and knowledge resources for project managers?**
    a) ISO
    b) PMI
    c) IEEE
    d) ITIL

Theme 20. Telecommuting

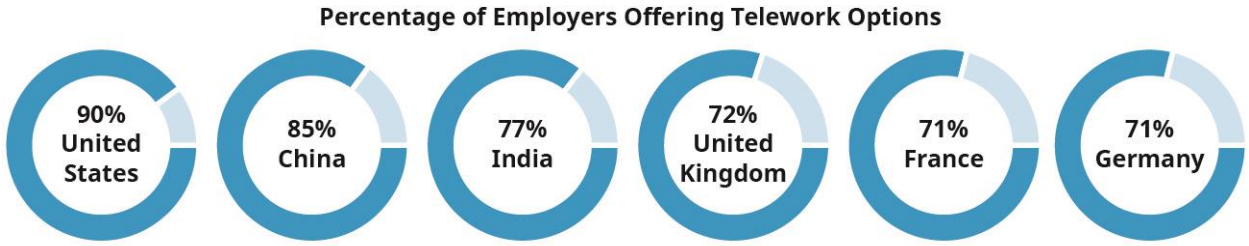
Telecommuting and Its Advantages

The term telecommuting emerged in the 1970s to describe the practice of working at a specific location, whether the employee's home or an alternate office, to reduce commuting time to a centrally located office space or store. "Telework" was greatly facilitated by new telecommunications technology, including the Internet, e-mail, and mobile phones. Today, telecommuting means any mode of working at a remote location (home or other space) by virtue of an electronic connection and/or telephone and encompasses a variety of employment types, from gig assignments to part-time contract work to traditional full-time employment.

The most recent Census data reveal that almost four million U.S. employees skip the commute for at least part of each week, and according to a 2012 poll, worldwide, one in five workers telecommutes frequently, with approximately 10 percent working from home every day.

(Figure) depicts the growth in telecommuting in the United States, China, India, France, Germany, and the United Kingdom. Clearly, employers are embracing telecommuting as a tool for flexibility, on a scale from occasional use to full-time implementation.

As more employers provide the opportunity for telework, fewer people are commuting to a corporate office every day.



Source: Hess, Ken. "Death of the Office and Rise of the Telecommuter." Consumerization: BYOD. ZD Net. June 2, 2014. (Some data from Intuit.)

Employees can connect to networked company computers from home and use work-enhancing tools on their laptops, tablets, and smartphones to make real-time connections by voice, text, or video with inexpensive or free applications (or "apps") like FaceTime and Skype. Other software solutions, like GoToMeeting or WebEx, make setting up and even recording a synchronous meeting with sound and video possible for even the smallest companies at fairly low cost. The communication and productivity tools that facilitate telecommuting can only grow in number and sophistication. Virtual reality tools like Microsoft's Mixed Reality allow a worker in one location to communicate with the holograph of another person in real time. For example, this technology could enable a job interview with a remote candidate. Of course, the use of technology brings with it the need to ensure information security and protection against hacking, including guaranteeing the authenticity of the persons engaging via this technology.

Employers allow employees to telecommute for a variety of reasons. First, it is a powerful recruiting tool for people who want to balance their work and personal lives. It allows employees to work a more flexible schedule to care for children or older relatives while maintaining a career and earning income. Individuals with ability challenges also prefer the flexibility that telecommuting affords them.

Telecommuting also reduces the hours that employees spend traveling to and from the job and can help keep cars off the road. Fewer workers commuting equals less crowding on public transportation.

Fewer cars mean less air pollution as well. The average U.S. employee (who commutes 30 miles and 60 minutes per day) will save more than $1000 on gas per year by telecommuting (along with associated costs of parking and vehicle upkeep and insurance).

Remote workers can continue to do their jobs despite weather conditions that impede travel. They are not exposed to sick coworkers' germs and may take fewer sick days (which sometimes translates to fewer sick days company-wide). Remote employees are also seldom late for work or early to leave when their workday starts at home.

More broadly, there is a good deal of evidence suggesting that telecommuting has beneficial effects on worker productivity. For example, a call-center study reported in the *Harvard Business Review* found that

telecommuting employees made 13.5 percent more calls, resigned their positions at only half the usual rate, and had much higher job satisfaction compared with employees who did not telecommute.

The Colorado Department of Transportation, in a study of telecommuting productivity for a branch that issued permits, found 48 percent faster turnaround times for issuing permits and 5 percent more calls for telecommuters.

Furthermore, studies of JD Edwards teleworkers found them to be 20 to 25 percent more productive than their office colleagues; American Express employees who worked from home were 43 percent more productive than workers in the office.

With none of the distractions of a traditional office setting, like water-cooler gossip and long lunches, and with the happier attitude, workers tend to enjoy when they have control over their work lives. Telecommuting facilitates increased efficiency and productivity and also typically results in higher retention of workers, thereby reducing recruiting and training costs for firms. Studies have shown that a person who commutes for an hour a day experiences added stress, anxiety, social isolation, and possibly depression. Perhaps that is why companies that implement telecommuting experience less absenteeism overall.

It may also be easier to collaborate when not sharing a limited amount of space (such as in a cubicle forest), and people may be more willing to share resources with one another when the total number of workers present at the facility is reduced. Another point is that there may be less chatting and gossip among remote workers who are not in daily contact with each other or their colleagues.

Employers may be attracted to telecommuting for other reasons. Having remote employees can reduce office-space costs.

In fact, a company can consider expanding even when there is no available real estate or capital to enlarge or improve the physical facilities. Companies that hire remote employees can also widen their pool of potential applicants. They can choose recruits with better job skills than the local population could provide and expand their sales and marketing territory by hiring employees based in a new area.

Finally, there are many external environmental benefits of telecommuting. We have seen that a business that reduces total office space also reduces its impact on the environment.

Remote workers would increase their individual consumption of utilities while working at home, but chances are that their home’s energy consumption partially continues during the time spent at a traditional job as well.

Telecommuting is becoming more common around the world. The phenomenon stands to benefit remote workers and also their employers.

Завдання:

1. Прочитати та перекласти текст.
2. Надати відповіді на запитання.
3. Надати відповіді на тестові запитання.

Questions

1. What does the term “telecommuting” mean?
2. When did the concept of telecommuting first emerge?
3. Which technologies have facilitated the growth of telecommuting?
4. How many U.S. employees telecommute for at least part of the week, according to recent data?
5. What percentage of workers worldwide telecommute frequently?
6. How do employees connect to company networks while telecommuting?
7. What are some examples of tools that enable real-time communication for remote workers?
8. Why do employers allow telecommuting for their employees?
9. How does telecommuting help employees balance work and personal life?
10. What environmental benefits are associated with telecommuting?
11. How does telecommuting affect employee productivity, according to studies?
12. What impact does telecommuting have on employee stress and mental health?
13. How can telecommuting reduce office-space costs for companies?
14. In what ways does telecommuting expand the pool of potential job applicants for employers?
15. Why is telecommuting considered beneficial for both employees and employers?

Test Questions

1. **What does telecommuting primarily involve?**
   a) Traveling to the office daily
   b) Working remotely using electronic connections
   c) Avoiding all forms of communication
   d) Working only part-time
2. **Which decade introduced the term “telecommuting”?**
   a) 1960s
   b) 1970s
   c) 1980s
   d) 1990s

3. **Which technology is NOT mentioned as a facilitator of telecommuting?**
   a) Internet
   b) Mobile phones
   c) Virtual reality tools
   d) Steam engines
4. **What is one major reason employers offer telecommuting?**
   a) To increase commuting time
   b) To reduce office-space costs
   c) To avoid using technology
   d) To limit employee flexibility
5. **Which of the following is an environmental benefit of telecommuting?**
   a) Increased fuel consumption
   b) Reduced air pollution
   c) More traffic congestion
   d) Higher parking costs
6. **According to studies, how does telecommuting affect productivity?**
   a) It decreases productivity significantly
   b) It has no measurable effect
   c) It often increases productivity
   d) It eliminates the need for deadlines
7. **Which tool allows remote workers to hold virtual meetings?**
   a) GoToMeeting
   b) Fax machine
   c) Typewriter
   d) Landline phone only
8. **How does telecommuting help companies expand their talent pool?**
   a) By limiting applicants to local areas
   b) By hiring only office-based employees
   c) By enabling recruitment from different regions
   d) By reducing job opportunities
9. **Which of the following is a health benefit of telecommuting?**
   a) Increased exposure to sick coworkers
   b) Reduced stress from commuting
   c) Higher risk of social isolation only
   d) More workplace distractions
10. **Why might telecommuting reduce absenteeism?**
    a) Employees avoid using technology
    b) Remote workers have more control over their schedules
    c) It forces employees to work longer hours
    d) It eliminates all job responsibilities

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Відповіді

Theme 11. Communication skills

1-b
2-b
3-a
4-d
5-b
6-c
7-b
8-b
9-d
10-a
11-a
12-b
13-b
14-a

Theme 12. Internet theft. Antivirus software. Preventative

1-O
2-B
3-F
4-C
5-D
6-K
7-H
8-A
9-G
10-E
11-J
12-M
13-N
14-I
15-L

Theme 13 - Multimedia

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3-J
4-C
5-D
6-E
7-F
8-G
9-H

10-I

Theme 14: Cell phones & GPS systems
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3-A
4-h
5-f
6-b
7-i
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9-c
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2-J
3-K
4-C
5-D
6-M
7- N
8- L
9-O
10- G
11-B
12-A
13- I
14-E
15- F

Theme 16 Education and research. Electronic publishing

1-b
2-c
3-a
4-b
5-b
6-a
7-b
8-b
9-b
10- a

Theme 17. Connecting to clients and employees. Advertising and Marketing

1. **b**
2. **b**
3. **b**
4. **b**
5. **a**
6. **a**
7. **a**
8. **b**
9. **b**
10. **a**
11. **a**
12. **a**
13. **a**
14. **a**
15. **a**

Theme 18. New technologies. Automation. Software Architecture. Architectural styles . Design Considerations.

1. **b)**
2. **b)**
3. **d)**
4. **b)**
5. **b)**
6. **b)**
7. **a)**
8. **b)**
9. **b)**
10. **b)**
11. **b)**
12. **b)**
13. **a)**
14. **a)**
15. **b)**

Theme 19. Robotics. Project management.

1. a)
2. b)
3. c)
4. b)

5. c)
6. b)
7. b)
8. a)
9. a)
10. b)

Theme 20. Telecommuting

1. b
2. b
3. d
4. b
5. b
6. c
7. a
8. c
9. b
10. b

Навчально-методичне видання

Нонна В'ячеславівна Варех
Надія Вікторівна Рагуліна

«АНГЛІЙСЬКА МОВА ДЛЯ СФЕРИ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ (THE CSB ENGLISH FOR IT)»

методичні рекомендації

для виконання самостійної роботи

для студентів ІІ курсу

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