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«Дагестанский Государственный Университет»

Кафедра Иностранных Языков для ЕНФ

**PROFESSIONAL ENGLISH**

**for**

***Information Technology Students***

Учебное пособие по английскому языку для магистрантов, обучающихся по специальности 02.04.02 «Фундаментальная информатика и информационные технологии», профиль подготовки

«Информационные технологии»

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Печатается по решению редакционно-издательского совета Дагестанского государственного университета

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Данное учебно-методическое пособие предназначено для студентов 1 и 2 курсов магистратуры и предусматривает сформированность соответствующих иноязычных коммуникативных умений профессионального общения как в устной, так и в письменной формах.

Пособие состоит из 20 уроков, при изучении которых студенты ознакомятся с различными составляющими английского языка профессионального общения, которые сопровождаются последовательным анализом и описанием наиболее существенных функционально-обусловленных способов выражения мысли в устной и письменной речи в профессиональных целях. Для более глубокого освоения изучаемых тем разработан цикл упражнений, включающий разделы Listening и Speaking. Большое внимание уделяется упражнениям, направленных на совершенствование коммуникативных умений и языковых навыков и развитие профессиональной, прагматической и общей компетенций. Реализация коммуникативных способностей будет осуществляться в процессе выполнения исследовательских заданий, изучения международного опыта на основе соответствующих аутентичных текстов, участия в ролевых играх и в разработке проектов в соответствии с ориентацией курса на предметную профессиональную подготовку. На освоение материала, представленного в пособии, отводится 52 аудиторных часа (24 часа в 1 семестре и по 14 часов во 2 и 3) и 92 часа самостоятельной работы (12 + 22+ 58).

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**Unit 1**

***Careers in Computing***

**Starter**

- What are you going to be after you graduate your Master’s degree course?

- Where do you plan to work?

- What career would you like to deal with in future and why?

- What is your particular area of interest in computer science?

- Make a list of jobs which use IT.

**I. Vocabulary**

*Complete these definitions with jobs from the box:*

|  |
| --- |
| software engineer, computer security specialist, blog administrator, help desk technician, webmaster, DTP operator, hardware engineer, network administrator |

1. A \_\_\_\_\_\_\_\_\_\_ designs and develops IT devices. 2. A \_\_\_\_\_\_\_\_\_ writes computer programs. 3. A \_\_\_\_\_\_\_ edits and deletes posts made by contributors to a blog. 4. A \_\_\_\_\_ uses page layout software to prepare electronic files for publication. 5. A \_\_\_\_\_\_ manages the hardware and software that comprise a network. 6. A \_\_\_\_\_ designs and maintains websites. 7. A \_\_\_\_\_\_ works with companies to build secure computer systems. 8. A \_\_\_\_\_\_\_ helps end-users with their computer problems in person, by email or over the phone.

**II. Scanning reading**

*Scan the quotes and write the names of the students by the jobs they want:*

1. Web designer \_\_\_\_\_\_\_\_\_\_

2.Computer programmer \_\_\_\_\_\_\_\_\_

3. Database administrator \_\_\_\_\_\_\_

4. E-commerce manager \_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| *Eliza* | I’m interested in writing software. My friends say I’m a techno-nerd because I prefer working with computers to people. Money is important but I’d rather do a job I enjoy. I want to take a distance-learning course so I can study at home. |
| *Katie* | I like shopping and I think the future of business is on the Internet. I’m good with computers but I also like working with people, I’d like to manage my own online company. This will give me a lot of responsibility. E-commerce comes with risks but the rewards are high when you succeed. |
| *Martin* | Many people like Web design, but I think data management gives more job security. There is so much information on the Internet, and companies need people who know how to store, manage and retrieve data. I want to get my degree and work for a good company. |
| *Peter* | I’m using JavaScript to make my website more interactive. After college I’d like to try telecommuting. This is working at home, using e-mail to communicate with clients. I want freedom, flexibility and long holidays, which you don’t get by working in office. |

**III. Discussion**

1.*Choose one of the careers given below. What do the following people do in computing?* *Compare answers with your partner*.

1. Webmaster

2. Help-desk troubleshooter

3. Applications programmer

4. Security specialist

5. Systems programmer

2. *Work in pairs. Your partner must find out what your job is by asking only Yes/No-questions. Your partner cannot ask “Are you a webmaster?”*

**Model**: Do you write programs which enable a computer to carry out particular tasks?

**IV. Comprehension**

*Match the job in computing to the requirements advertised on the Internet:*

|  |  |
| --- | --- |
| 1.Visual Basic Developer | a) - at least 5 years in Unix, SYBASE or ORACLE, NT or Windows 2000, Terminal Server, TCP/IP, Internet.  - strong project management (2 years)  - willingness to travel abroad |
| 2.IT Engineer (Network & Database) | b) - able to manage, lead and develop a team;  - knowledge of C, C++. Delphi;  - experience of object-oriented design within a commercial environment;  - ability to deliver software projects against agreed schedules and within agreed estimates |
| 3. Web Developer | c) – proven track record in the delivery of e-solutions in banking environment;  - knowledge of Unix, NT and Oracle;  - willingness to travel internationally |
| 4. Network Support | d) – minimum 4 years’ lifecycle development experience;  - demonstrable skills using VB, SQL, RDBMS;  -able to develop core s/w;  - excellent communication skills |
| 5. E-commerce Consultant | e) – minimum of 18 months’ commercial experience of Web development;  - knowledge of HTML, Java, ASP;  - full portfolio of URLs as examples |
| 6. Team Leader | f) – experience of NT, Exchange, SQL Server, Monitoring Software, Verta, TCP/IP;  - solid grasp of networking;  - 2 to 5 years’ experience in a network environment |

**V. Reading**

*Read the text and*

**a)** *find out the following information:*

1. Job title; 2. Nature of work; 3. Formal qualifications; 4. Personal qualities; 5. Technical skills; 6. How to get started; 7. How to make progress.

**b)** *find the answers to these questions:*

1. What are the primary requirements for being a good programmer? 2. What is important for a job interview? 3. What professional skills should an applicant for the position possess? 4. What does the author recommend to do in order to be a successive programming expert?

***How to become a programming expert?***

The primary requirements for being a good programmer are nothing more than a good memory, an attention to detail, a logical mind and the ability to work through a problem in a methodical manner breaking tasks down into a smaller, more manageable pieces.

However, it’s not enough just to turn up for a job interview with logical mind as your sole qualification. An employer will want to see some sort of formal qualification and a proven track record. But if you can show someone an impressive piece of software with your name on it, it will count for a lot more than a string of academic qualifications.

So what specific skills are employers looking for? The Windows market is booming and there is a demand for good C, C++, Delphi, Java and Visual Basic developers. Avoid older languages such as FORTRAN and COBOL unless you want to work as a contract programmer.

For someone starting out, my best advice would be to subscribe to the programming magazines such as Microsoft Systems Journal. Get one or two of the low-cost “student” editions of C++, Visual Basic and Delphi. Get a decent book on Windows programming. If you decide programming is really for you, spend more money on a training course.

**VI. Listening**

*Listen to 4 people on a training course introducing themselves and talking about their jobs. Which job does each person do?*

Speaker 1 \_\_\_\_\_\_\_\_\_\_ Speaker 3 \_\_\_\_\_\_\_\_\_\_\_\_\_

Speaker 2 \_\_\_\_\_\_\_\_\_\_ Speaker 4\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**VII. Speaking**

*Speak about the job you would like to do and why. Choose an area of IT that you are interested in. Find information about courses offered by colleges and universities. Find other areas in which there are jobs in IT. Speak to the class on what you need to start the course or to get a good job.*

**Unit 2**

***What are HNCs and HNDs?***

***Starter***

-What degrees can students do at university?

- What do you call students studying for the first degree?

- How long do undergrads normally study for a Bachelor’s degree?

- Do you remember what a gap year is?

- How does it feel to be a computer student?

- What disciplines does the course of study cover?

- Why is it important to be computer literate?

**I. Reading**

*Read the text and answer the following questions:*

1. What is a gap year for? 2. In what way can young people spend it? 3. What is the alternative? 4. What level is higher a HNC or HND? Why? 5. What is the next level? 6. What is common for both HNC and HND? 7. What are the differences between them? 8. Why are these qualifications highly regarded by companies throughout the world? 9. What do both of them focus on? 10. Why do most young people choose either of them instead of doing undergraduate degree?

Your higher education is one of the most important chapters in your life. Your entire future and career depends on the path you choose after completing school. There’s an abundance of options available to you upon completion of your school years, and two of the most popular routes are either a HNC or HND. They may sound very similar but there are some key differences between them.

A Higher National Certificate (HNC) is a higher education/further education qualification in the United Kingdom. It is an industry-specific pathway that is a very popular choice for school-leavers looking to fast-track their way into a career and save time. Instead of choosing to take a gap year, school-leavers can gain a range of skillsets that will not only prepare them directly for a career, but also give them a strong advantage if they choose an undergraduate degree afterwards. A HNC is highly regarded by companies, large and small, throughout the world. It focuses more on practical aspects rather than theory, preparing candidates for their careers in a fairly short time span. HNCs are very streamlined and tailored towards very specific jobs and duties associated with them.

A Higher National Diploma (HND) is an academic higher education qualification in the United Kingdom and various other countries. A HND is also work - related, and specific to various career-pathways and roles within organizations.

Both of them focus on “learning by doing” and give skills that you can use in a particular job. They are highly valued by employers and can also count towards membership of professional bodies and other employer organizations. Both qualifications are provided by further and higher education colleges. HNCs take about one year to complete full-time and two years part-time. HNDs take two years full –time and can also be taken part-time, which takes longer. Since HNCs and HNDs are designed to give you the skills for a particular field of work, they can lead straight to a career. You can also use the qualifications to progress within your current career to gain professional status. (indirect,gov.uk/articles)

**II. Comprehension**

**a.** *Define similarities and differences between an HNC and HND.*

|  |  |  |
| --- | --- | --- |
| Specifications | HNC | HND |
| Provided by Higher education institutions |  |  |
| Focus on practical skills |  |  |
| Duration |  |  |
| Level of qualification |  |  |
| Widely recognized by employers |  |  |

**b)** *Compare specifications which are similar by using* ***both*** *and* ***like****.*

**c)** *Contrast specifications which are different by using* ***whereas*, *unlike*, *but,* *however*.**

**III. Discussion**

Sam is 24. He has a Higher National Certificate in Computing and a Higher National Diploma in Computing Support which he completed two years ago. He has been working for a company providing support services for the last 18 months.

**a.** *Study the list of subjects included in his Diploma course. Match subject areas and topics of study:*

|  |  |
| --- | --- |
| 1.Computer Architecture | a. LAN Topologies |
| 2.HW Installation and Maintenance | b. PC Bus Architectures |
| 3.Info Tech Applications (1) | c. Modems |
| 4. Info Tech Applications (2) | d. How to connect printers |
| 5.Multi-user Operating System | e. Unix Operating System |
| 6.Network Technology | f. Pascal |
| 7.Software Development Life Cycle | g. Writing a Program |
| 8.Standalone Computer System Support | h. Creating a database |
| 9.Software Development Procedural Lang | i. Maintenance of desktops |
| 10.Data Communications | j. Word processing and other office applications |
| 11.Information Systems and Services | k. Binary system |
| 12.Systems Development | l. Making presentations |
| 13.Communication |  |
| 14.Project Management |  |
| 15.Mathematics for computing |  |

**b.** *Give the list of subjects to be taught during the first term of your postgraduate course. Ask your partner some questions about topics of each subject.*

**IV. Speaking**

**a.** *Study the description of Pamela’s first term. Ask questions to the words in italics.*

|  |
| --- |
| In her first term Pamela studied *6 subjects*. She had classes *four days* a week. On Monday morning she had *IT and Information Systems*. *Tuesday* was a free day for home study. On Wednesday she had Systems Analysis in *Room 3-64*. She studied *Computer Architecture* on Thursdays. *Programming* happened on Friday mornings. Communication took place *once* a week on Friday afternoons. She liked *Mr. Flint’s lectures* most of all. She had a 15-minute coffee break every day and a lunch break *from 12:00 to 1pm.* |

**b.** *Give your time-table for a week.*

**V. Listening**

*Listen to Part I of the recording and answer the following questions:*

1. Which of the subject areas listed in exercise III **(a)** are mentioned by Sam? 2. Which additional subjects does he mention? 3. Why did he choose to do his Diploma in Computing Support? 4. What practical work was included in the course? 5. Which subject did he particularly enjoy?

*Listen to Part II of the recording and answer the following questions:*

1.What suggestions does Sam have for improving the course? Note a) his suggestions for improvement; b) the reasons he gives.

2. Which of the subjects he studied has he found useful in his work? Note a) the subjects; b) examples in the work situation.

*Listen to Part III of the recording and answer the following questions:*

1. In which situations does Sam have to learn fast? 2. What sources does he use for help? 3.What advice did the college provide on sources of information? 4. What was the problem with the set book? 5. How does he feel about going back to college?

**Unit 3**

***Master in University of Great Britain***

***Starter***

- What faculty did you graduate from?

- How many years did you study for a Bachelor’s degree?

- Why did you decide to continue for a Master’s degree?

- What course did you choose and why?

- Would you like to do your degree abroad? What country would you like to study in and why?

**I. Scanning reading**

*Scan the text and*

**a)** *Answer the following questions:*

1.What is the main condition for doing Master’s degree in the UK? 2. How many levels does a Master’s course provide? 3. What are the requirements for enrolling in Master's programs in most British universities? 4. How long must postgraduates study to get a master's diploma of the first degree? 5. What types of courses may there be if you want to get [a master's degree](https://smapse.com/catalog/united-kingdom/master's-degree-english/)? 6. Do teaching programs in different universities vary? 7. What is a general format for classes? 8. In what way are graduates usually tested? 9. In what case can a diploma be not issued? 10. Which of the students is worth receiving insignia? 11. Why do you think estimates are not put? 12. What is the most popular and ranking qualification in the world? 13. In what way do research programs of the Master's course differ from teaching ones? 14. When can students claim a doctoral degree?

**b)** *Compare your Master’s course at Dagestan State University with those in the UK. Speak about similarities and differences. You may put all the known facts into a single table.*

Master's degree in the UK is only possible for those who already have a bachelor's degree or [a British higher education diploma](https://smapse.com/catalog/united-kingdom/higher-education/), as well as an equivalent obtained in the same branch of science in another country.

***The master has three levels:***

- a certificate or a master's degree

- a master's degree

- a doctoral degree

***Requirements for enrolling in Master's programs in most British universities:***

* 1-2-year experience after receiving [Bachelor's Degree](https://smapse.com/catalog/united-kingdom/bachelor-english/);
* a high level of English proficiency - not less than 6.5 on the scale [IELTS](https://smapse.com/catalog/ielts-courses/);
* student visa Tier 4 (General);
* the school must have a Highly Trusted license issued by the UKBorderAgency organization.
* Student visa is given for 5 years. When obtaining a doctorate and training in some specialties, a visa is issued for a longer period.

***Certificate or Master's Degree***

To obtain these documents, you need to complete an annual full-time study. [Universities](https://smapse.com/catalog/united-kingdom/university/)offer a wide range of subjects: management, information technology, education and many others. Different educational institutions establish different orders. In some you can get a master's diploma of the first degree and continue your studies. In other diplomas it is issued after one-year training, if it is not planned to write a dissertation, and this ends the training.

***Master's Degree***

In Britain, you can get [a master's degree](https://smapse.com/catalog/united-kingdom/master's-degree-english/), studying at courses of two types: teaching and research.

Teaching programs are very different from each other in different universities. Some have a fixed structure, others include a base unit and courses for the student's choice. The format of classes is seminars and trainings, and testing can be different: exams, term papers, interviews, group projects, essays or dissertations. Estimates, as a rule, are not put. The diploma simply cannot be issued if the study was unsuccessful, successful students receive the degree of MA - Master of Arts, MSc - Master of Science and MEng - Master of Engineering. Especially successful students also receive insignia.

Very high demand is used for MBA business courses - masters of business administration. This is the most popular and ranking qualification. In the field of postgraduate education in business and management, there is a number of degrees equivalent to MBA.

Research programs of the Master's program do not require attending lectures. Students are engaged in research in the chosen field. Some such programs contain training modules, but the results are evaluated according to the quality of the submitted thesis. After receiving a master's degree, students can claim a doctoral degree.

**II. Reading**

*Read the article from Postgraduate Prospectus for entry in 2021 and tell the class where you knew information about postgraduate course in Computing from.*

Welcome to

**University of Roehampton**

**London**

**Computing**

**Postgraduate**

**Apply for this course**

*Gain an MSc in Computing with no previous experience in the field*

* IT work culture is embedded in the program, replicating industry experience
* Train to become a socially responsible IT practitioner, contributing to the evolving technology sector
* A collaborative program with flexible delivery where you work with other students
* Work on projects from anywhere using a cloud platform
* Study in labs in the brand-new state-of-the-art media center on campus

**Summary**

Rapid developments in technology have resulted in a wealth of opportunity across all sectors and industries for people who are qualified in multiple areas of computing.

**Our MSc Computing Degree is a conversion program that requires no previous academic experience in the field of computing**, making it the ideal course if you want to change career or develop a new set of skills to complement your existing experience and move a wider range of exciting roles in computing and IT.

The course focuses on core computing skills such as software development, databases and cyber security, helping you to become a competent and fluent computing professional. You will learn key programming skills across languages and platforms, as well as how to provide data solutions and secure systems.

You will learn about developing software and working with data and build your fluency in Python.

You will complete your degree with a project that will explore a topic of your choice, producing a product and a supporting report. The project will fit one of the following four types; student defined, research based, industry defined or social enterprise. You will be able to work with academic staff across the University, not just within Computing.

There are no timetabled lectures in this degree program, but instead short videos of content. Your teaching time will take the form of labs, workshops and tutorials, providing you with a more tailored experience with plenty of face-to-face contact time. Industry standard IT resources are hosted in the cloud to allow you to work on projects and assignments from anywhere.

***Life at Roehampton***

At Roehampton, we can offer all new students the opportunity to live in accommodation on our beautiful parkland campus, including affordable and high-end options.

We offer scholarships, provide hardship funding and help you find advice on managing your finances while you study.

We provide plenty of opportunities for you to get involved, through volunteering, playing sport or music, or joining one of our many active student societies.

**III. Watching**

*Watch the video* ***Here to support you/University of Roehampton*** *(2:30) on YouTube and say What is Roehampton for every student of the University and why?*

**IV. Writing**

*Study the description of a computer course. Then write a description of your computer course, or one of its components as shown below:*

**MSc in Advanced Computer Science at Oxford**

*The course aims:*

* to provide a foundation for research into the theory and practice of programming and the design of computer based systems;
* to present knowledge, experience, reasoning methods and design and implementation techniques that are robust and forward-looking;
* to provide the foundation for a professional career in the computing-based industries, including telecommunications, process control, business-, mission-, and safety-critical fields; and
* to enhance the skills of a professional who is already working in one of these industries.

***Description***

The MSc in Advanced Computer Science at Oxford has been designed to teach a range of advanced topics to graduates of computer science and other mathematical disciplines.

Recognizing this, this full-time, twelve-month MSc has been designed to teach the mathematical principles of specification, design and efficient implementation of both software and hardware.

The MSc is designed to combine theory and practice. It teaches the advanced techniques and ideas that are being developed in application domains (such as machine learning, verification and computer security) and the rich and diverse theories that underpin them. These include models of computation and data, and mathematical analysis of programs and algorithms.

The Department of Computer Science is committed to the development and application of effective theory based on realistic practice, and some of the modules were developed through consultation and collaboration with industry. The department believes that only by the interplay of theory and practice can you be trained properly in such a rapidly advancing subject. Practice alerts us to real contemporary problems - theory is a shield against professional obsolescence.

Entrants to the course will come from either a computer science or mathematical background. You may be a recent graduate in computer science and will supplement your knowledge with the kind of sound mathematical basis which is not always found in undergraduate courses. If you are a graduate in mathematics you will apply your training in the context of a rigorous application of the fundamental techniques of computer science.

You will develop knowledge and understanding of a formal disciplined approach to computer science, a range of relevant concepts, tools and techniques, the principles underpinning these techniques and the ability to apply them in novel situations. On subsequent employment, you will be able to select techniques most appropriate to your working environment, adapt and improve them as necessary, establish appropriate design standards for both hardware and software, train colleagues and subordinates in the observance of sound practices, and keep abreast of research and development.

***Course outline***

The academic year is split into three terms of eight weeks but work on the MSc course continues throughout the year and is not restricted just to term time. During the three terms of the course, you will choose from modules on various aspects of computer science. Most modules will last for one term and will be between 16 to 24 lectures. In addition, all modules will have problem classes and some may also have practical sessions associated with them. In the third term (Trinity term) you will undertake a dissertation.

A typical week for a student taking three courses in each of the first two terms may be as follows:

* Lectures - eight hours
* Tutorial classes - three hours
* Practicals - four hours
* Self-directed study, including preparatory reading, problem sheets, revision of material - 20 hours

Total - 36 hours

The spilt of work may differ depending on whether a course has practicals associated. This should be taken as a guide only.  
  
Examples of modules offered:

* Advanced Security
* Advanced Topics in Machine Learning
* Quantum Computer Science
* Categories, Proofs and Processes
* Computational Complexity
* Database Systems Implementation
* Computational Learning Theory
* Probabilistic Model Checking

*Assessment*

* For the taught modules, the mode of assessment shall be either written assignment or written examination, dependent on the module you are taking.
* Your dissertation will be up to 30,000 words, completed independently under the guidance of an expert supervisor, on a topic of your choice and approved by the supervisor and MSc Course Director. (0x.ac.uk)

**V.** *Speak on the topic: “I do Master’s Degree at Dagestan State University”*

**Unit 4**

**Programming Languages**

**Starter**

- What programming languages do you know?

- Why are programming languages necessary?

- Who creates programming languages?

- What easy-to-use languages do you know?

- What programming languages are out of use nowadays?

**I. Speaking**

**a.** *Scan the text and ask questions to know the details:*

It is well-known that no computer can understand any spoken natural language. The only language it is able to obey directly is machine code based on binary numeration system. Since machine language is a low-level language, it is too difficult to write, so we use symbolic languages which have been developed by computer scientists. They are high-level languages which use a computer code that is similar to English.

Programs written in high-level languages must be translated into machine code by a compiler or an interpreter. A compiler translates the source code into object code, i.e. it converts the entire program into machine code in one go. On the other hand, an interpreter translates the source code line by line as the program is running.

A computer receives input, handles data and puts out results according to the program code.

It should be pointed out that some users are able to confuse programming languages with markup languages used to create web documents. The latter one uses instructions, known as markup tags, to format and link text files.

**b***. Work with your partner (***Student A** and **Student B)***. Each of you possesses information about some programming languages. Decide what the most appropriate programming language will be used for each of the situations given below:*

1. A school teacher wants his young pupils to learn some basic mathematics by controlling a simple robot.

2. The owner of a small business wants to create a simple database program to keep track of his stock.

3. An engineer wants to develop a program for calculating the stresses in a mechanical device.

4. A student wants to create webpages for a personal website.

5. A system programmer wants to add some new modules to an operating system.

6. A programmer working for the US army wants to create a program for controlling a new type of weapon.

7. A finance company needs to process data from its branch offices on its mainframe computer.

8. A website designer wants to enable the data on his website to be easily processed by a number of different programs.

9. A student studying artificial intelligence wants to write some programs for a course project.

10. A college lecturer wants his students to learn the principles of programming.

11. A professional programmer wants to create and sell a program for use in language learning.

12. A website designer wants to password-protect a section of a website.

|  |  |
| --- | --- |
| **Student A** has information about the following programming and meta languages: | **Student B** has information about the following programming and meta languages: |
| ***Java*** is widely used for developing interactive applications for the Internet. | ***XML*** stands for eXtensible Markup Language; XML is a metalanguage for creating webpages with meaningful data that can be used by a variety of programs. |
| ***Ada*** named after Countess Ada Lovelace, one of the first programmers, is a superset of Pascal. Itis a structured language developed and used by the US Department of Defense. | ***C++*** is an object-oriented superset of ***C*** which combines the best features of a structured high-level language and an assembly language – that is, it’s relatively easy to code and uses computer resources efficiently. ***C*** was originally designed to write systems software but is now considered a general-purpose language. |
| ***Logo*** is an easy-to-use language that is primarily used to teach children how to program. | ***Visual Basic*** (***Basic*** stands for Beginners’ All-purpose Symbolic Instruction Code) is a simple-to-use language having a graphical interface. It makes it practically easy for an inexperienced programmer to create database programs. |
| ***LISP*** stands for LISt Processor. It is designed to process non-numerical data, that is, symbols such as characters or words. It is used to develop applications in the field of artificial intelligence. | ***Pascal*** (named after the mathematician Blaise Pascal) was primarily created to fill the need for a teaching vehicle that would encourage structured programming. It is often used in college computing courses. |
| ***Fortran***stands for FORmula TRANslator. It is oriented toward manipulating formulas for scientific, mathematical and engineering problem-solving applications. | ***Cobol***(stands for Common Business-Oriented Language; it has been around for a long number of years but is still an important transaction-processing language used to process the records of large organizations on mainframe computers. |
| ***HTML*** stands for Hyper Text Markup Language. Itis a page-description language used to prepare a text for display in a browser program. |  |
| ***Perl*** (Its name comes from Practical Report and Extraction Language). It first appeared in 1987 as a Unix-based tool for producing reports but now is widely used for creating interactive webpages. |  |
| ***Prolog*** stands for PROgramming LOGic; It is used to develop applications in the field of artificial intelligence. It is a popular tool for natural-language programming. |  |

**c.** *Discuss with your partner:* *Do meta and programming languages mean one and the same thing? If no, what is the similarity/difference between them?*

**II. Vocabulary**

**a.** *Match the terms (1-5) with their definitions (a-e):*

|  |  |
| --- | --- |
| 1. Java | a. an auxiliary program that enables web browsers to support new contact, e.g. animation. |
| 2. applet | b. software that can run on any OS. |
| 3. plug-in | c. an island in Indonesia, coffee (in American slang), and a programming language for the Internet applications. |
| 4. platform- independent | d. a computer programming technique that allows the creation of objects that interact with each other and can be used as the foundation of others; used to create graphical user interfaces. |
| 5. object-oriented programming | e. a small Java application, usually designed to run automatically within a web page. |

**b.** *Match the words in both columns to make phrases:*

1. Java a. applet

2. operating b. page

3. programming c. code

4. web d. system

5. source e. object

6. graphical f. language

**III. Reading**

*Read the text and then translate the Russian part of it. Give the brief summary of the text:*

**What Is Java?**

By

[Paul Leahy](https://www.thoughtco.com/paul-leahy-bio-2033848)

Updated July 03, 2019

Java is built on C++ for a simple-to-use language. Java is a computer [programming language](https://www.thoughtco.com/what-is-a-programming-language-958332). It enables programmers to write computer instructions using English-based commands instead of having to write in numerical codes. It’s known as a high-level language because it can be read and written easily by humans.

[Like English](https://www.thoughtco.com/syntax-grammar-1692182), Java has a set of rules that determine how the instructions are written. These rules are known as its syntax. Once a program has been written, the high-level instructions are translated into numerical codes that computers can understand and execute.

*Who Created Java?*

In the early 90s, Java, which originally went by the name Oak and then Green, was created by a team led by James Gosling for Sun Microsystems, a company now owned by [Oracle](https://www.oracle.com/sun/index.html).

Java was originally designed for use on digital mobile devices, such as cellphones. However, when Java 1.0 was released to the public in 1996, its main focus had shifted to use on the Internet, providing interactivity with users by giving developers a way to produce animated web pages.

However, there have been many updates since version 1.0, like J2SE 1.3 in 2000, J2SE 5.0 in 2004, Java SE 8 in 2014, and Java SE 10 in 2018.

Over the years, Java has evolved as a successful language for use both on and off the Internet.

*Why Choose Java?*

Java was designed with a few key principles in mind:

**Ease of Use:** The fundamentals of Java came from a [programming language called C++.](https://www.thoughtco.com/candand-for-beginners-958278) Although C++ is a powerful language, it is complex in its syntax and inadequate for some of Java's requirements. Java built on and improved the ideas of C++ to provide a programming language that was powerful and simple to use.

**Reliability:** Java needed to reduce the likelihood of fatal errors from programmer mistakes. With this in mind, [object-oriented programming](https://www.thoughtco.com/java-programming-4133478) was introduced. When data and its manipulation were packaged together in one place, Java was robust.

**Security:** Because Java was originally targeting mobile devices that would be exchanging data over networks, it was built to include a high level of security. Java is probably the most secure programming language to date.

**Platform Independence:** Programs need to work regardless of the machines they're being executed on. Java was written to be a portable and cross-platform language that doesn't care about the operating system, hardware, or devices that it's running on.

The team at Sun Microsystems was successful in combining these key principles, and Java's popularity can be traced to it being a robust, secure, easy to use, and portable programming language.

*Where Do I Start?*

To start programming in Java, you first need to download and install the [Java development kit](http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html).

After you have the JDK installed on your computer, there's nothing stopping you from using a basic tutorial to [write your first Java program.](https://www.thoughtco.com/creating-your-first-java-program-2034124)

Итак, после установки JDK создадим первое приложение на языке Java. Что необходимо для создания программы на Java? Прежде всего нам надо написать код программы, и для этого нужен текстовый редактор. Можно использовать любой текстовый редактор, например, Notepad++.

И чтобы превратить код программы в исполняемое приложение необходим компилятор. После установки JDK все файлы по умолчанию помещаются в каталог *C:\Program Files\Java\jdk-[номер\_версии]* (при использовании ОС Windows). В нашем случае это каталог *C:\Program Files\Java\jdk-15*. Если мы откроем в нем подкаталог *bin*, то мы сможем увидеть в нем ряд утилит. Нас прежде всего интересует утилита компилятора **javac**. Чтобы скомпилировать класс программы, нам надо передать ее код этому компилятору.

Также следует отметить другую утилиту из этой папки - java.exe, которая позволяет запускать скомпилированную программу.

Итак, создадим на жестком диске какой-нибудь каталог, в котором будут располагаться файлы с исходным кодом на языке Java. Допустим, это будет каталог C:/Java. Затем создадим в этом каталоге текстовый файл, который переименуем в Program.java. Откроем этот файл в любом текстовом редакторе и наберем в нем следующую программу:

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7 | public class Program{        public static void main (String args[]){            System.out.println("Hello Java!");      }  } |

Java является объектно-ориентированным языком, поэтому вся программа представляется в виде набора взаимодействующих классов. В данном случае определён один класс Program.

**IV. Comprehension**

**a.** *Answer the following questions:*

1. What is Java? 2. What is it built on? 3. What is it for? 4. Is it a low- or high-level language? 5. Why is it called a high-level language? 6. What is Java’s syntax? 7. Who was Java created by and why? 8. What is the last version of Java? 9. What are the key principles of Java? 10. What differs Java from other computer languages? 11. Do you know any alternatives to Java? 12. Is there any substantial difference between C# and Java?

**b.** *Complete the sentences with the words from the box:*

|  |
| --- |
| interpreted animated configured used pronounced object-oriented compiled |

1. Java lets you watch \_\_\_\_\_\_ characters on web pages.

2. Java is an \_\_\_\_\_\_\_ language, similar to C++ but more dynamic.

3. First, the source code of a Java program is \_\_\_\_\_\_\_\_\_ into intermediate format called bytecode. This is then \_\_\_\_\_\_ by any system, possessing a Java interpreter.

4. The Java ME platform is widely \_\_\_\_\_\_ in mobile devices.

5. Nowadays most mobile phones are \_\_\_\_\_ to use Java games.

6. Microsoft’s C# is a simplified version of C and C++ for the Web. It is \_\_\_\_\_\_ “C sharp”.

**c.** *Correct the following statements:*

1. Java was invented by Microsoft.

2. Java has no competitors.

3. Over the years, Java has evolved as a successful language for use only on the Internet.

4. Most programmers dislike Java because it doesn’t allow them to write applets which make web pages more interactive and attractive.

5. Java is not reliable.

6. Java is dependent on the operating system, hardware, or devices that it's running on.

**V. Listening**

*Listen to a part of a lecture on Java and answer the following questions:*

1. When did the idea of Java start?

2. What was this language created for?

3. Why did James Gosling called it Oak?

4. When was the Oak language adapted to the Internet?

5. When was the first version of Java officially introduced?

6. What could web pages display at that time?

7. What were web designers able to include on web pages?

8. What is the name of the first application created with Java?

9. What kind of technology is Java today?

**VI. Writing**

*Write your computer history. Begin with your first computer game.*

**VII. Watching**

*Watch the video* **Top 10 Programming Languages in 2021** *on YouTube (7:52) and say What programming languages are given in the film? What languages have you never heard about? What are the benefits of the most trending and demanding programming languages?*

**Unit 5**

**The Unified Modeling Language**

**Starting**

**-** What subjects are there in your Master’s curriculum?

- Is the Unified Modeling Language among them?

- What do you know about the UML?

**-** Why do you think the UML is necessary for IT specialists?

**I. Vocabulary**

application domain – домен/область применения

implementation platform – платформа внедрения

software development process – процесс реализации программного обеспечения

multiplicity of actors – множественность ´акторов

use case diagram – диаграмма прецедентов/вариантов использования

templated texts – шаблонные тексты

lifeline – линия жизни. Изображается пунктирной вертикальной линией, ассоциированной с единственным объектом на диаграмме последовательности. Линия жизни служит для обозначения периода времени, в течение которого объект существует в системе и, следовательно, может потенциально участвовать во всех её взаимодействиях.

J2EE – abbreviation for Java2Platform Enterprise Edition. J2EE is a platform-independent, Java-centric environment from Sun/Oracle for developing, building and deploying Web-based enterprise applications online.

**II. Reading**

*Read the text to find out answers for the following questions:*

1. What is the UML used for? 2. Who is this language for? 3. Where can it be applied? 4. Is the UML a standard modeling language or a software development process? 5. What are the functions of the UML? 6. Why is the UML intentionally independent process? 7. What is a UML diagram and what role does it play? 8. What elements can a specific diagram contain? 9. What does a kind of diagram depend upon? 10. Is it possible to combine different kinds of diagrams in one? 11. How are the UML diagrams classified? 12. What is the difference between structure and behavior diagrams? 13. What is the last version of the UML?

The Unified Modeling Language is a standard visual modeling language intended to be used for

* modeling business and similar processes,
* analysis, design, and implementation of software-based systems.

The UML is a common language for business analysts, software architects and developers used to describe, specify, design, and document existing or new business processes, structure and behavior of artifacts of software systems.

The UML can be applied to diverse **application domains** (e.g., banking, finance, internet, aerospace, healthcare, etc.) It can be used with all major object and component **software development methods** and for various **implementation platforms** (e.g., J2EE, .NET).

The UML is a standard modeling **language**, not a **software development process**, which

* provides guidance as to the order of a team’s activities,
* specifies what artifacts should be developed,
* directs the tasks of individual developers and the team as a whole, and
* offers criteria for monitoring and measuring a project’s products and activities.

The UML is a process–independent notation system - that is, there is no dependency on a particular development process. It is an iterative software development process framework created by **Rational Software Corporation**.

The UML is not complete and it is not completely visual. Given some UML diagram, we can't be sure to understand depicted part or behavior of the system from the diagram alone. Some information could be intentionally omitted from the diagram, some information represented on the diagram could have different interpretations, and some concepts of UML have no graphical notation at all, so there is no way to depict those on diagrams.

For example, semantics of **multiplicity of actors** and **multiplicity of use cases** on [**use case diagrams**](https://www.uml-diagrams.org/use-case-diagrams.html) is not defined precisely in the UML specification and could mean either concurrent or successive usage of use cases.

Name of an [**abstract classifier**](https://www.uml-diagrams.org/classifier.html#abstract-classifier) is shown in italics while [**final classifier**](https://www.uml-diagrams.org/classifier.html#final-classifier) has no specific graphical notation, so there is no way to determine whether classifier is final or not from the diagram.

*UML 2.5 Diagrams Overview*

A **UML diagram** is a partial graphical representation (view) of a model of a system under design, implementation, or already in existence. UML diagram contains **graphical elements** (symbols) - UML nodes connected with edges (also known as paths or flows) - that represent elements in the UML model of the designed system. The UML model of the system might also contain other documentation such as use cases written as templated texts.

The **kind of the diagram** is defined by the primary graphical symbols shown on the diagram. For example, a diagram where the primary symbols in the contents area are classes is [**class diagram**](https://www.uml-diagrams.org/class-diagrams-overview.html). A diagram which shows [**use cases**](https://www.uml-diagrams.org/use-case.html) and [**actors**](https://www.uml-diagrams.org/use-case-actor.html) is [**use case diagram**](https://www.uml-diagrams.org/use-case-diagrams.html). A [**sequence diagram**](https://www.uml-diagrams.org/sequence-diagrams.html) shows sequence of message exchanges between [**lifelines**](https://www.uml-diagrams.org/sequence-diagrams.html#lifeline).

UML specification does not preclude **mixing** of different kinds of diagrams, e.g. to combine structural and behavioral elements to show a state machine nested inside a use case. Consequently, the boundaries between the various kinds of diagrams are not strictly enforced. At the same time, some **UML Tools** do restrict set of available graphical elements which could be used when working on specific type of diagram.

*Classification of UML 2.5 diagrams*

UML specification defines two major kinds of UML diagram: [**structure diagrams**](https://www.uml-diagrams.org/uml-25-diagrams.html#structure-diagram) and [**behavior diagrams**](https://www.uml-diagrams.org/uml-25-diagrams.html#behavior-diagram).

**Structure diagrams** show **static structure** of the system and its parts on different abstraction and implementation levels and how those parts are related to each other. The elements in a structure diagram represent the meaningful concepts of a system, and may include abstract, real world and implementation concepts.

Structure diagrams are not utilizing **time** related concepts, do not show the details of dynamic behavior. However, they may show relationships to the behaviors of the classifiers exhibited in the structure diagrams.

**Behavior diagrams** show the **dynamic behavior** of the objects in a system, which can be described as a series of changes to the system over **time**.

**III. Comprehension**

**a.** *Give English equivalents for the following diagrams:*

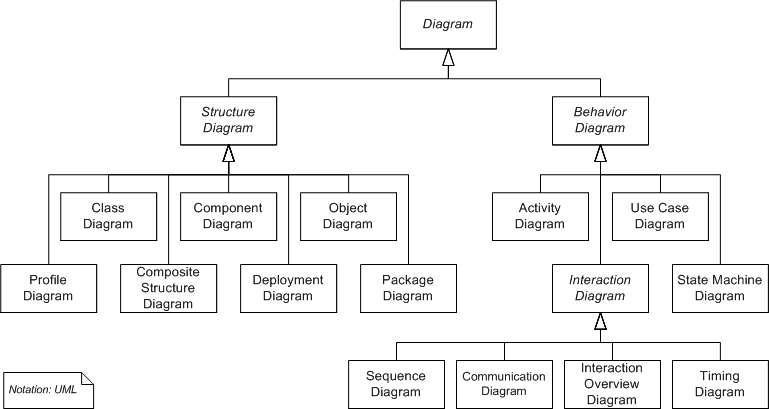
*Структурные диаграммы:*

[Диаграмма композитной/составной структуры](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BA%D0%BE%D0%BC%D0%BF%D0%BE%D0%B7%D0%B8%D1%82%D0%BD%D0%BE%D0%B9_%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%82%D1%83%D1%80%D1%8B); [Диаграмма профилей](https://ru.wikipedia.org/w/index.php?title=%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BF%D1%80%D0%BE%D1%84%D0%B8%D0%BB%D0%B5%D0%B9&action=edit&redlink=1); [Диаграмма классов](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BA%D0%BB%D0%B0%D1%81%D1%81%D0%BE%D0%B2); [Диаграмма развёртывания](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D1%80%D0%B0%D0%B7%D0%B2%D1%91%D1%80%D1%82%D1%8B%D0%B2%D0%B0%D0%BD%D0%B8%D1%8F); [Диаграмма объектов](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BE%D0%B1%D1%8A%D0%B5%D0%BA%D1%82%D0%BE%D0%B2); [Диаграмма компонентов](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BA%D0%BE%D0%BC%D0%BF%D0%BE%D0%BD%D0%B5%D0%BD%D1%82%D0%BE%D0%B2); [Диаграмма пакетов](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BF%D0%B0%D0%BA%D0%B5%D1%82%D0%BE%D0%B2).

*Диаграммы поведения:*

[Диаграмма последовательности](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BF%D0%BE%D1%81%D0%BB%D0%B5%D0%B4%D0%BE%D0%B2%D0%B0%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D0%BE%D1%81%D1%82%D0%B8); [Диаграмма деятельности](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%B4%D0%B5%D1%8F%D1%82%D0%B5%D0%BB%D1%8C%D0%BD%D0%BE%D1%81%D1%82%D0%B8); [Диаграмма коммуникации](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BA%D0%BE%D0%BC%D0%BC%D1%83%D0%BD%D0%B8%D0%BA%D0%B0%D1%86%D0%B8%D0%B8) / Диаграмма кооперации; [Диаграмма состояний](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D1%81%D0%BE%D1%81%D1%82%D0%BE%D1%8F%D0%BD%D0%B8%D0%B9_(UML)); Диаграмма обзора взаимодействия; Диаграммы взаимодействия; [Диаграмма вариантов использования](https://ru.wikipedia.org/wiki/%D0%94%D0%B8%D0%B0%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%B0_%D0%BF%D1%80%D0%B5%D1%86%D0%B5%D0%B4%D0%B5%D0%BD%D1%82%D0%BE%D0%B2); Диаграмма синхронизации.

**b.** *Study the structure of the UML diagrams.*

****

**c.** *Complete the table, choosing one of the diagram types as shown in the model:*

|  |  |  |
| --- | --- | --- |
| Diagram | Purpose | Elements |
| Class diagram | Shows structure of the designed system, subsystem or component as related classes and interfaces, with their features, constraints and relationships - associations, generalizations, dependencies, etc. | [class](https://www.uml-diagrams.org/class.html), [interface](https://www.uml-diagrams.org/interface.html), [feature](https://www.uml-diagrams.org/uml-core.html#feature), [constraint](https://www.uml-diagrams.org/constraint.html?context=class-diagrams), [association](https://www.uml-diagrams.org/association.html??context=class-diagrams), [generalization](https://www.uml-diagrams.org/generalization.html?context=class-diagrams), [dependency](https://www.uml-diagrams.org/dependency.html). |
| Object diagram |  |  |

**IV. Translation Skills**

*Translate into English:*

Унифицированный язык моделирования — язык [графического](https://ru.wikipedia.org/wiki/%D0%92%D0%B8%D0%B7%D1%83%D0%B0%D0%BB%D0%B8%D0%B7%D0%B0%D1%86%D0%B8%D1%8F) описания для [объектного моделирования](https://ru.wikipedia.org/w/index.php?title=%D0%9E%D0%B1%D1%8A%D0%B5%D0%BA%D1%82%D0%BD%D0%BE%D0%B5_%D0%BC%D0%BE%D0%B4%D0%B5%D0%BB%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5&action=edit&redlink=1) в области [разработки программного обеспечения](https://ru.wikipedia.org/wiki/%D0%A0%D0%B0%D0%B7%D1%80%D0%B0%D0%B1%D0%BE%D1%82%D0%BA%D0%B0_%D0%BF%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%BD%D0%BE%D0%B3%D0%BE_%D0%BE%D0%B1%D0%B5%D1%81%D0%BF%D0%B5%D1%87%D0%B5%D0%BD%D0%B8%D1%8F), для [моделирования](https://ru.wikipedia.org/wiki/%D0%9C%D0%BE%D0%B4%D0%B5%D0%BB%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5) [бизнес-процессов](https://ru.wikipedia.org/wiki/%D0%91%D0%B8%D0%B7%D0%BD%D0%B5%D1%81-%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D1%81%D1%81), [системного проектирования](https://ru.wikipedia.org/wiki/%D0%A1%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%BD%D0%BE%D0%B5_%D0%BF%D1%80%D0%BE%D0%B5%D0%BA%D1%82%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5) и отображения [организационных структур](https://ru.wikipedia.org/wiki/%D0%9E%D1%80%D0%B3%D0%B0%D0%BD%D0%B8%D0%B7%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F_%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%82%D1%83%D1%80%D0%B0).

UML является языком широкого профиля, это — [открытый стандарт](https://ru.wikipedia.org/wiki/%D0%9E%D1%82%D0%BA%D1%80%D1%8B%D1%82%D1%8B%D0%B9_%D1%81%D1%82%D0%B0%D0%BD%D0%B4%D0%B0%D1%80%D1%82), использующий графические обозначения для создания [абстрактной модели](https://ru.wikipedia.org/wiki/%D0%90%D0%B1%D1%81%D1%82%D1%80%D0%B0%D0%BA%D1%82%D0%BD%D0%B0%D1%8F_%D0%BC%D0%BE%D0%B4%D0%B5%D0%BB%D1%8C) [системы](https://ru.wikipedia.org/wiki/%D0%A1%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%B0), называемой *UML-моделью*. UML был создан для определения, визуализации, проектирования и документирования, в основном, программных систем. UML не является языком программирования, но на основании UML-моделей возможна [генерация кода](https://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D0%B4%D0%BE%D0%B3%D0%B5%D0%BD%D0%B5%D1%80%D0%B0%D1%86%D0%B8%D1%8F).

**V. Speaking**

Speak about the UML as the tool for modelling.

**Unit 6**

**.NET Programming**

**Starter**

**-** What is .NET in your opinion?

- What is it created for?

- Do you use this platform and what for?

- Is it necessary for comfortable programming?

**I. Vocabulary**

*Mac OS* – the family of operating systems used on the Apple Macintosh range of computers

*IoT* – abbreviation for the Internet of things

*API* – stands for Application Programming Interface. Most large companies have built API for their customers, or for internal use

*apps* - abbreviation for applications (program or software) – a computer program designed to be used for a particular purpose, e.g. a word processor spreadsheet or database program

*Linux* – a clone of the Unix operating system created by Linus Torvalds for use on personal computers

IDE – abbreviation for Integrated Development Environment

**II. Reading**

*Read the text and find the international words which can be translated without a dictionary.*

**What is .NET?**

.Net is an open source developer platform, created by Microsoft, for building many different types of applications.

With .NET, you can use multiple languages, editors, and libraries to build for web, mobile, desktop, games, and IoT.

*Languages*

You can write .Net apps in C#, F#, or Visual Basic.

*C#* is a simple, modern, object-oriented, and type-safe programming language.

*F#* is a cross-platform, open-source, functional programming language for .NET. It also includes object-oriented and imperative programming.

*Visual Basic* is an approachable language with a simple syntax for building type-safe, object-oriented apps.

*Cross Platform*

Whether you're working in C#, F#, or Visual Basic, your code will run natively on any compatible OS. Different .NET implementations handle the heavy lifting for you:

**.NET Core** is a cross-platform .NET implementation for websites, servers, and console apps on Windows, Linux, and Mac OS.

[**.NET Framework**](https://dotnet.microsoft.com/learn/dotnet/what-is-dotnet-framework) supports websites, services, desktop apps, and more on Windows.

[**Xamarin/Mono**](https://dotnet.microsoft.com/learn/xamarin/what-is-xamarin) is a .NET implementation for running apps on all the major mobile operating systems.

**Unity** is a powerful cross-platform 3D engine and a user friendly development environment. Easy enough for the beginner and powerful enough for the expert, Unity should interest anybody who wants to easily create 3D games and applications for mobile, desktop, the web, and consoles. Unity is a cross-platform game engine with a built-in Integrated Development Environment developed by Unity Technologies. It is used to develop video games for web plug-ins, desktop platforms, consoles and mobile devices.

*One consistent API*

**.NET Standard** is a base set of APIs that are common to all .NET implementations.

Each implementation can also expose additional APIs that are specific to the operating systems it runs on. For example, .NET Framework is a Windows-only .NET implementation that includes APIs for accessing the Windows Registry.

**Libraries**

To extend functionality, Microsoft and others maintain a healthy package ecosystem built on .NET Standard.

[NuGet](https://nuget.org/) is a package manager built specifically for .NET that contains over 90,000 packages.

*Application models*

You can build many types of apps with .NET. Some are cross-platform, and some target a specific OS or .NET implementation.

|  |  |
| --- | --- |
| Web | Build web apps and services for Windows, Linux, Mac OS, and Docker. |
| Mobile | [Use a single codebase to build native mobile apps for iOS, Android, and Windows.](https://dotnet.microsoft.com/apps/xamarin) |
| Desktop | [Create beautiful and compelling desktop apps for Windows and Mac OS.](https://dotnet.microsoft.com/apps/desktop) |
| Microservices | [Create independently deployable micro services that run on Docker containers.](https://dotnet.microsoft.com/apps/aspnet/microservices) |
| Game Development | [Develop 2D and 3D games for the most popular desktops, phones, and consoles.](https://dotnet.microsoft.com/apps/games) |
| Machine Learning | [Add vision algorithms, speech processing, predictive models, and more to your apps.](https://dotnet.microsoft.com/apps/machinelearning-ai) |
| Cloud | [Consume existing cloud services, or create and deploy your own.](https://dotnet.microsoft.com/apps/cloud) |
| Internet of Things | [Make IoT apps, with native support for the Raspberry Pi and other single-board computers.](https://dotnet.microsoft.com/apps/iot) |

*Active community and open-source*

.NET is open source and under the [.NET Foundation](https://www.dotnetfoundation.org/). The .NET Foundation is an independent organization to foster open development and collaboration around the .NET ecosystem.

Because .NET is open source, you can join the 60,000 developers and 3,700 companies already contributing to the .NET platform.

*Tools*

The Visual Studio, developed by Microsoft, is a software development tool used for creating web applications, websites, mobile apps and Windows programs. The development kit consists of the IDE and other testing tools. It includes the Code editor, debugger, designer and needed extensions.

The Visual Studio product family provides a great .NET development experience on Windows, Linux, and Mac OS. The [Visual Studio Marketplace](https://marketplace.visualstudio.com/) has thousands of editor extensions from Microsoft and others.

If you prefer to use a different editor, there are .NET command-line tools and plug-ins for many popular editors.

**III. Comprehension**

*Answer the following questions:*

1. Is .Net a programming language? 2. What was it created by? 3. What is the purpose of its creation? 4. What can you use with .Net? 5. What programming languages can be used in writing .Net apps? 6. What is a cross platform? 7. What cross platforms are mentioned in the text? 8. What are they for? 9. Is there any difference between a library you borrow books from and a library in programming? 10. What types of apps can you build with .Net? 11. What is the Visual Studio? 12. What is Unity?

**IV. Translation Skills**

*Translate into English:*

Интернет вещей— концепция [сети передачи данных](https://ru.wikipedia.org/wiki/%D0%A1%D0%B5%D1%82%D1%8C_%D0%BF%D0%B5%D1%80%D0%B5%D0%B4%D0%B0%D1%87%D0%B8_%D0%B4%D0%B0%D0%BD%D0%BD%D1%8B%D1%85) между физическими объектами (*«вещами»*), оснащёнными встроенными средствами и технологиями для взаимодействия друг с другом или с внешней средой. Предполагается, что организация таких сетей способна перестроить экономические и общественные процессы, исключить из части действий и операций необходимость участия человека.

Концепция сформулирована в 1999 году как осмысление перспектив широкого применения средств [радиочастотной идентификации](https://ru.wikipedia.org/wiki/RFID) для взаимодействия физических предметов между собой и с внешним окружением. Наполнение концепции многообразным технологическим содержанием и внедрение практических решений для её реализации начиная с 2010-х годов считается устойчивой тенденцией в [информационных технологиях](https://ru.wikipedia.org/wiki/%D0%98%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D1%8B%D0%B5_%D1%82%D0%B5%D1%85%D0%BD%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D0%B8), прежде всего, благодаря повсеместному распространению [беспроводных сетей](https://ru.wikipedia.org/wiki/%D0%91%D0%B5%D1%81%D0%BF%D1%80%D0%BE%D0%B2%D0%BE%D0%B4%D0%BD%D1%8B%D0%B5_%D0%BA%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%82%D0%B5%D1%80%D0%BD%D1%8B%D0%B5_%D1%81%D0%B5%D1%82%D0%B8), появлению [облачных вычислений](https://ru.wikipedia.org/wiki/%D0%9E%D0%B1%D0%BB%D0%B0%D1%87%D0%BD%D1%8B%D0%B5_%D0%B2%D1%8B%D1%87%D0%B8%D1%81%D0%BB%D0%B5%D0%BD%D0%B8%D1%8F), развитию технологий [межмашинного взаимодействия](https://ru.wikipedia.org/wiki/%D0%9C%D0%B5%D0%B6%D0%BC%D0%B0%D1%88%D0%B8%D0%BD%D0%BD%D0%BE%D0%B5_%D0%B2%D0%B7%D0%B0%D0%B8%D0%BC%D0%BE%D0%B4%D0%B5%D0%B9%D1%81%D1%82%D0%B2%D0%B8%D0%B5), началу активного перехода на [IPv6](https://ru.wikipedia.org/wiki/IPv6) и освоению [программно - определяемых сетей](https://ru.wikipedia.org/wiki/%D0%9F%D1%80%D0%BE%D0%B3%D1%80%D0%B0%D0%BC%D0%BC%D0%BD%D0%BE-%D0%BE%D0%BF%D1%80%D0%B5%D0%B4%D0%B5%D0%BB%D1%8F%D0%B5%D0%BC%D0%B0%D1%8F_%D1%81%D0%B5%D1%82%D1%8C" \o "Программно-определяемая сеть). (Википедия)

**V. Watching**

**a.** *Watch the video What is .Net? (2:55) (https://dotnet.microsoft.com/) on YouTube and answer the following questions:*1) What is .Net? 2) What is a developer platform? 3) What can you build with .Net? 4) Who builds .Net?

**b.** *Watch the video IoT – Internet of Things/What is IoT/IoT Explained in 6 minutes/How IoT works/Simplilearn (5:51)* on YouTube and say what the benefits of IoT devices for our life are. What are the prognoses for 2025?

**VI. Speaking**

*Speak in brief on:*

1) .Net programming.

2) Unity.

3) Role Internet of things plays for a human being.

**Unit 7**

**Database Systems**

**Starter**

- Do you know what the word *summary* means?

- What is an abstract in your opinion?

- Is there any difference between a summary and an abstract?

I. Scanning reading

**a)** *Read the definition of a summary and give your own one:*

*A summary* is an overview of content that provides a reader with the overarching theme, but does not expand on specific details. A summary describes a larger work (such as an entire book, speech, or research project), and should include noticeably less content then the original work. Summaries can save a reader’s time because it prevents the reader from having to actually go through and filter the important information from the unimportant. (Business Dictionary)

The purpose of a summary is to give a reader a condensed and objective account of the main ideas and features of a text. A summary usually has between one and three paragraphs or one hundred to three hundred words, depending on the length and complexity of the original essay and the intended audience and purpose.

**b)** *Study the structure of a Summary:*

***Structure of a Summary***

**1. Article output data** *(when and where it was published, the title)*

**2. Introduction** *(It is the stage where a reader faces the problem)*

**3. The body** *(It expresses the main facts and problems of the original document).*

**4. The ending** *(It gives recommendations for a definite group of readers)*

**c)**  *Before writing a Summary:*

1. Reread the text attentively.

2. Formulate the main statement in brief.

3. Introduce the author and title of the work in the opening sentence.

4. Underline the relevant/important information in each paragraph.

5. Use *key-patterns* for writing annotation.

6. Make notes about the main points. Leave details (such as examples) and quotations from the text.

7. Mention the important facts in chronological order.

8. Annotation/Abstract should be written in present tense and indirect speech.

9. Avoid repetitions.

10. Link the sentences with connectors (and, but, because, therefore, etc).

11. Write your first draft.

12. Improve your first draft by reducing sentences. For example:

Cut out unnecessary phrases

* Macs were designed **with one clear aim**: to facilitate interaction with the computer.
* *Macs were designed to facilitate interaction with the computer.*

Omit qualifying words (adjectives or modifying adverbs)

* **very** complex – *complex*

Transform relative clauses into –ing participle clauses.

* Double-clicking a folder opens a window **which contains** programs, documents or…
* *Double-clicking a folder opens a window* ***containing*** *programs, documents or*…

13. Write the final version of your annotation. Don’t forget to check the spelling and grammar.

**d)** *Practice using key- patterns for writing a Summary:*

**Key-patterns for writing a Summary**

1. The journal … dated the 10th of October 1989 carries an article headlined …

2. The author of the article is …

3. The article deals with …

4. The article is devoted to the analysis of …/ to the question of …/ to the description of…

5. The article discusses …/ expresses the view that…/ concentrates on …/ focuses the reader’s attention on …/ highlights …/ points out …/ stresses that …/ suggests that …/ sums up/summarizes …/ reveals…/ reviews …/ considers …

6. It should be noted that …

7. It is interesting to note that …

8. … is/are studied / investigated.

9. The following conclusion can be drawn: …

10. In conclusion the article says…

**II. Writing**

*Write a summary of the text after reading it.*

**III. Pair work**

*Ask your partner these questions:*

**-** What are the main subjects you study now?

- Is Database Systems taught at Dagestan State University?

- Who delivers lectures on Database Systems at the faculty of Mathematics and Computer Science?

*You may enlarge the list of questions on the topic.*

**IV. Reading**

*Here is a part of professor Thorn’s lecture on Database systems. Read and answer the following questions:*

1. Why does professor starts his lecture with its aim and plan? 2. Are all the terms given in the plan familiar to you? 3.What is a database? 4. What is it for? 5. What models are used to develop a database? 6. What is hierarchy in your opinion? 7. How are data organized in a hierarchical model? 8. What does this structure help to establish? 9. What is a node? 10. How many parents does each node have? 11. What is the difference between a hierarchical and network models? 12. What is the advantage of the network model? 13. What is the basic data structure of the relational model? 14. What is object-oriented model for? 15. What are the advantages and disadvantages of this model? 16. What is the purpose of a Database Management System?17. What are the functions of a DBMS? 18. What categories do Data management tasks fall into? 19. What are the advantages in DBMS?

- Good morning, class! Today we shall deal with Database Systems. Look at the board, please. Here you can see the aim and the plan of our lecture. Are you all ready to start?

**Aim:** **to provide an overview about Database Management Systems (DBMS) and introduce one of DBMS: SQL**

**Plan:**

**1.Bases of database systems: concept, characteristic, architecture. Data models. Normalization. Integrity constraint on data. Query tuning and their processing.**

**2.Fundamentals of SQL. Parallel processing of data and their restoration.**

**3.Design and development of databases. Technology of programming of ORM. The distributed, parallel and heterogeneous databases.**

- So let’s begin with the first question. What is a database, you may ask?

A database is a structured collection of records or data. A computer database is a kind of software to organize the storage of data. Databases help you organize this related information in a logical fashion for easy access and retrieval. To develop a database, there are several models used such as Hierarchical model, Network model, Relational model, Object-Oriented model etc.

**Hierarchical model.** In a hierarchical model, data are organized into an inverted tree-like structure. This structure arranges the various data elements in a hierarchy and helps to establish logical relationships among data elements of multiple files. Each unit in the model is a **record** which is also known as a **node**. Each record has a single parent.

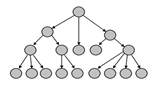


Figure 1- Hierarchical Model

**Network model.** The network model tends to store records with links to other records. Each record in the database can have multiple parents, i.e., the relationships among data elements can have many- to- many relationships. So this model is an expansion to the hierarchical structure, allowing many-to-many relationships in a tree-like structure that allows multiple parents.

The network model provides greater advantage than the hierarchical model in that it promotes greater flexibility and data accessibility.

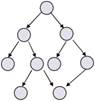


Figure 2- Network Model

**Relational model.** The relational model for the database management is a database model based on relations. The basic data structure of the relational model is a **table** where information about a particular **entity** (say, a student) is represented in columns and rows. The columns enumerate the various **attributes** (i.e. characteristics) of an **entity** (e.g. student name, address, registration number). The rows (also called records) represent **instances** of an entity (e.g. specific student).

**Object –Oriented model.** In this model we have to discuss the functionality of the object oriented Programming. It takes more than storage of programming language objects. It provides full-featured database programming capability, while containing native language compatibility. It adds the database functionality to object programming languages. This approach is the analogical of the application and database development into a constant data model and language environment. Applications require less code, use more natural data modeling, and code bases are easier to maintain. Object developers can write complete database applications with a decent amount of additional effort. But object-oriented databases are more expensive to develop.

**Database Management System.** A Database Management System (DBMS) is computer software designed for the purpose of managing databases based on a variety of data models. A DBMS is a complex set of software programs that controls the organization, storage, management, and retrieval of data in a database. DBMS are categorized according to their data structures or types, sometimes DBMS is also known as a Database Manager. Data management tasks fall into one of four general categories as given below:

Entering data into the database.

Housekeeping tasks such as updating data, deleting obsolete records, and backing up the database.

Sorting the data: arranging or re-arranging the database’s records.

Obtaining subsets of data.

There are several advantages in DBMS such as reduced data redundancy and inconsistency, enhanced data integrity, improved security etc.

**V. Comprehension**

*Describe the advantages and disadvantages of different data models. Try to link some of the advantages and disadvantages as shown in the example.*

|  |  |  |
| --- | --- | --- |
| Model | Advantages | Disadvantages |
|  |  |  |

*Example*: Allow data to be shared. Permit viruses to spread quickly.

– Although networks allow data to be shared, they permit viruses to spread quickly.

You may use *however*, *while etc.*

**VI. Speaking**

Speak on a Database Management System.

**VII. Watching**

*Watch the video* ***Database System Applications – Course Introduction To DBMS*** (7:51) *on YouTube and say, what database applications are mentioned by the lecturer*.

**Unit 8**

**Modern Methods and Types of Data Processing**

**Starter**

- What do you mean by data processing?

- Why is data processing gaining popularity?

- What types of data processing do you know?

**I. Vocabulary**

batch Processing- пакетная (групповая) обработка данных

ATM – банкомат (automatic telling machine)

payroll – платёжная (расчётная) ведомость, зарплата

at times – иногда, временами, порой (sometimes, from time to time)

lag – задержка

upfront cost – предоплата, аванс

halting - остановка

stacking of jobs – укладка заданий

**II. Reading**

**a.** *Scan the text and point out the methods of data processing which are rarely used nowadays;*

**b.** *Read the text and say what type of data processing is widely used and why.*

Various data processing methods are used to convert raw data into meaningful information through a process. Data is manipulated to produce results that lead to a resolution of a problem or an improvement in the existing situation. Similar to a production process, it follows a cycle where inputs (raw data) are fed to a process (computer systems, software, etc.) to produce output (information and insights).

Generally, organizations employ computer systems to carry out a series of operations on the data to present, interpret, or obtain information. The process includes activities like data entry, summary, calculation, storage, etc. A useful and informative output is presented in various appropriate forms such as diagrams, reports, graphics, etc. Data processing is mainly important in business and scientific operations. Business data are repeatedly processed, and usually need large volumes of output. Scientific data require numerous computations and usually need fast-generating outputs.

*Methods of Data Processing and Data Processing Techniques*

There is a number of methods and types of data processing. Based on the data processing system and the requirement of the project, suitable [data processing methods](https://planningtank.com/computer-applications/data-processing-methods-types) can be used. Three methods of data processing have been presented below:

1. Manual Data Processing
2. Mechanical Data Processing
3. Electronic Data Processing

*Manual Data Processing*

Data are processed manually without using any machine or tool to get the required results. In manual data processing, all the calculations and logical operations are performed manually on the data. Similarly, data are transferred manually from one place to another. This method of data processing is very slow, and errors may also occur in the output. Mostly, data is processed manually in many small business firms as well as government offices and institutions. In an educational institute, for example, marks sheets, fee receipts, and other financial calculations (or transactions) are performed by hand. This method is avoided as far as possible because of the very high probability of error, labor intensive and very time-consuming. This type of data processing forms the very primitive stage when technology was not available, or it was not affordable. With the advancement of technology, the dependency on manual methods has drastically decreased. This also makes processing expensive and requires large manpower depending on the data required to be processed. Example includes selling of commodity on shop.

*Mechanical Data Processing*

In this method, data are processed by using different devices like typewriters, mechanical printers or other mechanical devices. This method of data processing is faster and more accurate than manual data processing. These are faster than the manual mode but still forms the early stages of data processing. With invention and evolution of more complex machines with better computing power this type of processing also started fading away. Examination boards and printing press use mechanical data processing devices frequently. Any device which facilitates data processing can be considered under this category. The output from this method is still very limited.

*Electronic Data Processing (EDP)*

This is a modern technique to process data. The data is processed through a computer; Data and set of instructions are given to the computer as input, and the computer automatically processes the data according to the given set of instructions. The computer is also known as Electronic Data Processing Machine. [Electronic Data Processing](https://planningtank.com/computer-applications/electronic-data-processing) is the fastest and best available method with highest reliability and accuracy. Technology used is the latest as this method uses computers. Manpower required is minimal. Processing can be done through various programs and predefined set of rules. Processing of large amount of data with high accuracy is almost impossible which makes it best among the available types of data processing. For example, in a computerized education environment results of students are prepared through a computer; in banks, accounts of customers are maintained (or processed) through computers, etc.

*Types of Data Processing on the Basis of Process/Steps Performed*

There are number of methods and techniques which can be adopted for processing of data depending upon the requirements, time availability, software and hardware capability of the technology being used for data processing:

Batch Processing

Real time Processing

Online Processing

Distributed Processing

Multiprocessing

Time sharing

*Batch Processing*

This is one of the widely used type of data processing which is also known as Serial/Sequential, Tacked/Queued offline processing. The fundamental of this type of processing is that different jobs of different users are processed in the order received. Once the stacking of jobs is complete they are provided/sent for processing while maintaining the same order. This processing of a large volume of data helps in reducing the processing cost thus making it data processing economical.

Batch Processing is a method where the information to be organized is sorted into groups to allow for efficient and sequential processing. Online Processing is a method that utilizes Internet connections and equipment directly attached to a computer. It is used mainly for information recording and research. Real-Time Processing is a technique that can respond almost immediately to various signals to acquire and process information. Distributed Processing is commonly utilized by remote workstations connected to one big central workstation or server. ATMs are good examples of this data processing method. Examples include: Examination, payroll and billing system.

*Online Processing*

This processing method is a part of automatic processing method. This method is at times known as direct or random access processing. Under this method the job received by the system is processed at same time of receiving. This can be considered and often mixed with real-time processing. This system features random and rapid input of transaction and user defined/ demanded direct access to databases/content when needed.

This is a method that utilizes Internet connections and equipment directly attached to a computer. This allows the data to be stored in one place and being used at an altogether different place. Cloud computing can be considered as an example which uses this type of processing. It is mainly used for information recording and research.

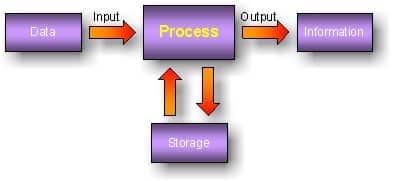
*Real-Time Processing*

As the name suggests this method is used for carrying out real-time processing. This is required where the results are displayed immediately or in lowest time possible. The data fed to the software is used almost instantaneously for processing purpose. The nature of processing of this type of data processing requires use of internet connection and data is stored/used online. No lag is expected/acceptable in this type and receiving and processing of transaction is carried out simultaneously. This method is costly than batch processing as the hardware and software capabilities are better. Example includes banking system, tickets booking for flights, trains, movie tickets, rental agencies etc.

This technique can respond almost immediately to various signals to acquire and process information. These involve high maintenance and upfront cost attributed to very advanced technology and computing power. Time saved is maximum in this case as the output is seen in real time. For example, in banking transactions.

*Distributed Processing*

This method is commonly utilized by remote workstations connected to one big central workstation or server. ATMs are good examples of this data processing method. All the end machines run on a fixed software located at a particular place and make use of exactly same information and sets of instruction.

[](https://planningtank.com/wp-content/uploads/2014/01/Distribution-Process.jpg)

### ***Multiprocessing***

This type of processing perhaps the most widely used types of data processing. It is used almost everywhere and forms the basis of all computing devices relying on processors. Multiprocessing makes use of CPUs (more than one CPU). The task or sets of operations are divided between CPUs available simultaneously thus increasing efficiency and throughput. The breakdown of jobs, which needs be performed, are sent to different CPUs working parallel within the mainframe. The result and benefit of this type of processing is the reduction in time required and increasing the output. Moreover, CPUs work independently as they are not dependent on the other CPU, failure of one CPU does not result in halting the complete process as the other CPUs continue to work. Examples include processing of data and instructions in computer, laptops, mobile phones etc.

***Time sharing***

Time based used of CPU is the core of this data processing type. The single CPU is used by multiple users. All users share the same CPU but the time allocated to all users might differ. The processing takes place at different intervals for different users as per allocated time. Since multiple users can use this type it is also referred as multi access system. This is done by providing a terminal for their link to main CPU and the time available is calculated by dividing the CPU time between all the available users as scheduled.

*Data Processing Cycle*

The [Data Processing Cycle](https://planningtank.com/computer-applications/data-processing-cycle) is a series of steps carried out to extract information from raw data. Although each step must be taken in order, the order is cyclic. The output and storage stage can lead to the repeat of the data collection stage, resulting in another cycle of data processing. The cycle provides a view on how the data travels and transforms from collection to interpretation, and ultimately, used in effective business decisions. There are 6 stages of data processing cycle:

1. Collection
2. Preparation
3. Input
4. Processing
5. Output & Interpretation
6. Storage

*Data Processing System*

It is a combination of machines and people that produces a defined set of outputs for a certain set of inputs. The inputs and outputs are interpreted as data, facts, information, depending on the interpreter’s relation to the system.

A system may involve some combination of:

Conversion is converting data to another format.

Validation – Ensuring that supplied data is “clean, correct and useful.”

Sorting – “arranging items in some sequence and/or in different sets.”

Summarization – reducing detail data to its main points.

Aggregation – combining multiple pieces of data.

Analysis – the “collection, organization, analysis, interpretation and presentation of data.”.

Reporting – list detail or summary data or computed information.

Presentation – [data presentation](https://planningtank.com/planning-techniques/data-presentation) is helpful in taking decisions

*Commercial Data Processing*

Commercial data processing involves a large volume of input data, relatively few computational operations, and a large volume of output. For example, an insurance company needs to keep records on tens or hundreds of thousands of policies, print and mail bills, and receive and post payments.

*Data Analysis*

In a science or engineering field, the terms data processing and information systems are considered too broad, and the more specialized term *data analysis* is typically used. Data analysis makes use of specialized and highly accurate algorithms and statistical calculations that are less often observed in the typical general business environment.

*Almost all fields*

It is impossible to think of any area which is untouched by data processing or its use. Let it be agriculture, manufacturing or service industry, meteorological department, urban planning, transportation systems, banking and educational institutions. It is required at all places with varied level of complexity.

**III. Comprehension**

**a.** *Which paragraph:*

1. is odd since it repeats the information?

2. introduces the topic?

3. speaks about the data processing method used by banking system, tickets booking, rental agencies etc.?

4. highlights the areas where data processing is used?

5. focuses on the method that utilizes Internet connections and equipment directly attached to a computer?

6. says about the stages of data processing cycle?

7. is about the process which saves the time and increases the output?

**b.** *Answer the following questions based on the text:*

1. Why are various data processing methods used? 2. What is data processing method similar to? 3. What activities does the process of data handling include? 4. In what spheres of life is data processing mainly important and why? 5. What methods of data processingdo you know? 6. What methods are considered old and why?7. What method is modern and why? 8. What typesof data processing are mentioned in the text? 9. What is one of the widely used type of data processing and why? 10. What differs online processing from real-time processing? 11. What examples of real-time processing can you give? 12. What is multiprocessing in your opinion? 13. How many stages does data processing cycle consist of? 14. What may data processing system involve? 15. Where is data processing used?

**IV. Writing**

*Write a summary of the text.*

**V. Speaking**

OCR - abbreviation for optical character recognition

DVLC – Driver and Vehicle Licensing Center

Police HQ – Police Headquarter

EPOS till – acronym for electronic point-of-sale till. A computerized cash register that edits records in sales and stock control databases.

EAN – abbreviation for European Article Number system. The European price and item codes commonly used in barcode system.

**a.** *Work in pairs. Speak on the data which is processed in:*

- supermarkets - police headquarters

- hospital - banks

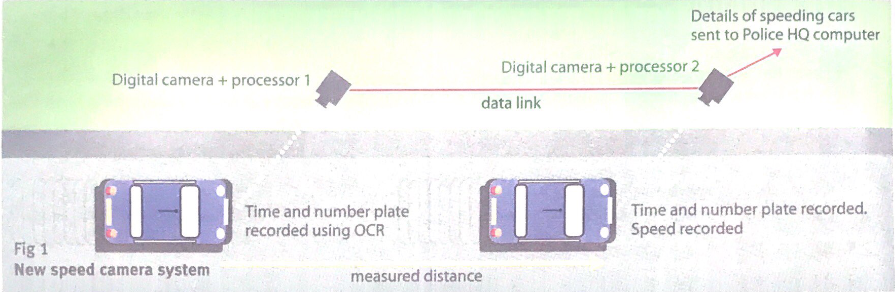
- airports - hotels

**b.** *Study Figures 1 and 2 to describe how the data are processed.*

1) In the last ten years, police have installed speed trap units on many busy roads. These contain a radar set, a microprocessor and a camera equipped with a flash.

*Use the following words and expressions to describe Figure 1:*

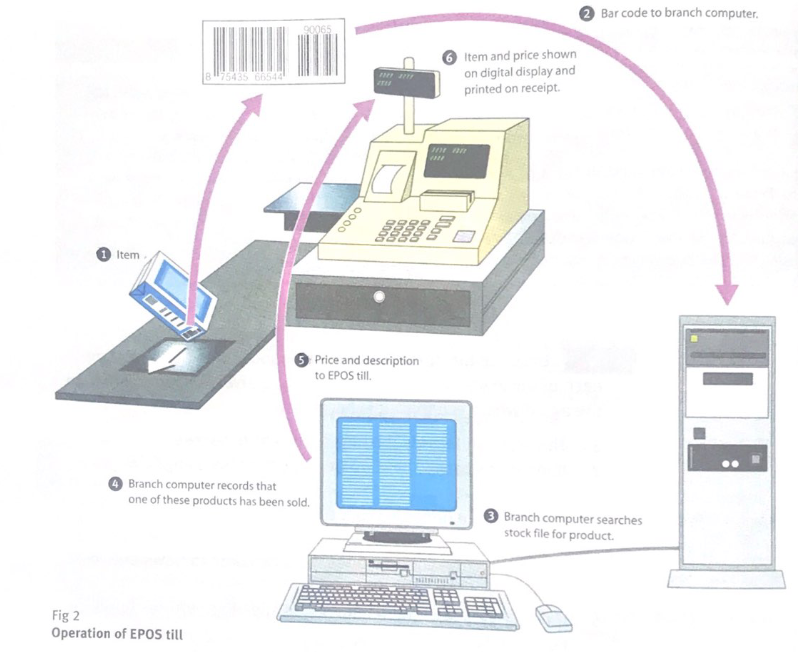
the first unit; to record the time; vehicle; number plates; OCR software; to relay the information; to calculate the time; microprocessor; registration numbers; to match with the DVLC database; print off a letter.



2) With the help of Figure 2 describe steps in the operation of an EPOS till.

*Use the following words and expressions to describe Figure 2:*

scanner; to convert into; electrical pulses; the sale of the product; the checkout operator; to send pulses; match the barcode EAN.

**VI. Listening**

*Listen to the conversation between a system analyst and a hotel owner and answer the following questions:*

1. What system does a hotel owner have at present?

2. What problem is there with the existing system?

3.What form of output does the hotelier want?

4. Who will use the new system?

5. Which members of staff will require the most training?

6. What concerns does the hotelier have about the new system?

7.What kind of hardware will be required?

8. What is the next step?

**Unit 9**

**Data Visualization and Computer Graphics**

**Starter**

- Do you remember what 3D is?

- What are the advantages of creating 3D images?

- Which of the IT professionals can use computer graphics and what for?

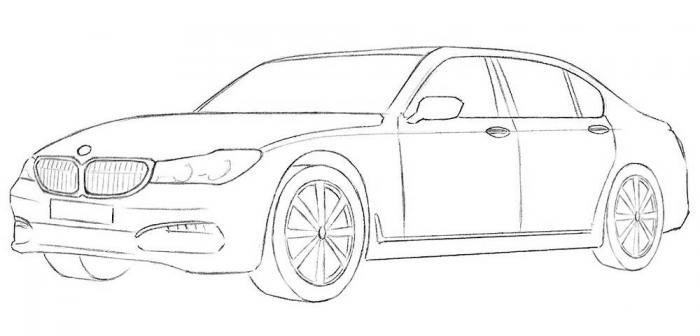
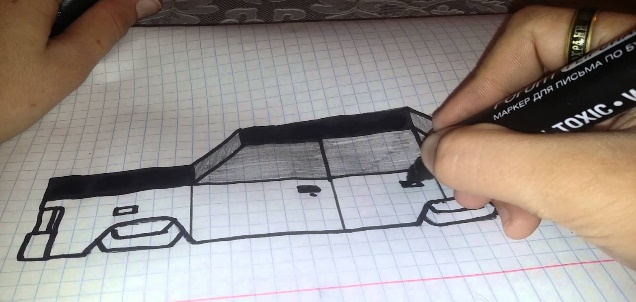
- Who can also use computer graphics in their job?

**I Speaking**

Compare these figures. Say which of them

are three dimensional? What differs them from each other?

a. b.

c. d. 

**II. Scanning reading**

**a.** *Scan the text to find out the main information on data visualization. What data visualization definition do you think is better and why?*

**b***. Choose one of the graph types, find the information about it on the Internet and speak about the cases it is used.*

**c***. Write a brief summary of the text.*

***Data Visualization***

Data visualization is the communication of data in a visual manner, or turning raw data into insights that can be easily interpreted by your readers.

Other definitions include:

Wikipedia: Data visualization refers to the techniques used to communicate data or information by encoding it as visual objects (points, lines or bars) contained in graphics.

Techopedia: Data visualization is the process of displaying data or information in graphical charts, figures and bars.

***What makes data visualization effective?***

Visualizing data is effective when *done right*. We define *right* when the data visualizations have served its purpose. A quick test - when people can interpret your visualization by asking more questions on the information displayed versus how or what is displayed, then you know you are on the right path. So in order to be highly effective, it is important to design the right visualizations for your data to allow yourself and team members to interpret and make decisions based on what they observe. How do we do that? It’s simple. We create the proper visualizations by understanding the different types of visualizations and answering 5 questions.

***5 Types of Big Data Visualization Categories***

***Temporal***

Data visualizations belong to the temporal category if they satisfy two conditions: they are linear, and they are one-dimensional. Temporal visualizations normally feature lines that either stand alone or overlap with each other, with a start and finish time.

The plus? These are familiar charts we can recognize from school and the workplace, which means we have an easier understanding when we read them.

Examples of temporal data visualization include:

* Scatter plots
* Polar area diagrams
* Time series sequences
* Timelines
* Line graphs

***Hierarchical***

Data visualizations that belong to the hierarchical category are those that order groups within larger groups. Hierarchical visualizations are best suited if you’re looking to display clusters of information, especially if they flow from a single origin point.

The downside to these graphs is that they tend to be more complex and difficult to read, which is why the tree diagram is used most often. It is the simplest to follow due to its linear path.

Examples of hierarchical data visualizations include:

* Tree diagrams
* Ring charts
* Sunburst diagrams

***Network***

Datasets connect deeply with other datasets. Network data visualizations show how they relate to one another within a network. In other words, demonstrating relationships between datasets without wordy explanations.

Examples of network data visualizations include:

* Matrix charts
* Node-link diagrams
* Word clouds
* Alluvial diagrams

***Multidimensional***

Just like the name, multidimensional data visualizations have multiple dimensions. This means that there are always 2 or more variables in the mix to create a 3D data visualization. Because of the many concurrent layers and datasets, these types of visualizations tend to be the most vibrant or eye-catching visuals. Another plus? These visuals can break down a ton of data down to key takeaways.

Examples of multidimensional data visualizations include:

* Scatter plots
* Pie charts
* Venn diagrams
* Stacked bar graphs
* Histograms

***Geospatial***

Geospatial or spatial data visualizations relate to real life physical locations, overlaying familiar maps with different data points. These types of data visualizations are commonly used to display sales or acquisitions over time, and can be most recognizable for their use in political campaigns or to display market penetration in multinational corporations.

Examples of geospatial data visualizations include:

* Flow map
* Density map
* Cartogram
* Heat map

***The 17 Most Common Graph Types***

Presentation of data and information is not simply about picking any data visualization design. Matching data to the right information visualization begins by answering 5 key questions:

1. What relationship am I trying to understand between my data sets?

2. Do I want to understand the distribution of data and look for outliers?

3. Am I looking to compare multiple values or looking to analyze a single value over time?

4. Am I interested in analyzing trends in my data sets?

5. Is this visualization an important part of my overarching data story?

With those questions (and your answers) in mind, we’ll dive into the 11 most common graph types you can mix and match to the best data visualization to bring your data story to life.

Feel free to navigate to one of the types you want to explore the most.

[Bar Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz1) [Heat Map](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz9)

[Histogram](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz10) [Line Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz2)

[Box Plot](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz11) [Scatterplot](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz3)

[Maps](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz12) [Sparkline](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz4)

[Tables](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz13) [Pie Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz5)

[Indicators](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz14) [Gauge](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz6)

[Area Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz15) [Waterfall Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz7)

[Radar or Spider Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz16) [Funnel Chart](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz8)

[Tree Map](https://www.klipfolio.com/resources/articles/what-is-data-visualization#DataViz17)

*Tell the class which of these types are not mentioned in the text.*

**III. Vocabulary**

**a.** *Look through the following abbreviations and their meanings. Which of them are commonly used? Which one is not familiar to you?*

JPEG- abbreviation for joint photographic expert group, the committee that devised a common standard for image file format and compression.

GIF – Graphics Interchange Format

TIFF (short for Tagged Image File Format) is an industry standard designed for handling raster and bitmapped images. TIFF files can be saved in a variety of color formats and in various forms of compression.

EPS stands for Encapsulated PostScript. It is a PostScript image file format that is compatible with PostScript printers and is often used for transferring files between various graphics applications.

CAD – Computer Aided Design

GIS – Geographic Information Systems

**b.** *Match the words with their definitions:*

|  |  |
| --- | --- |
| 1. pixel | a. special effects that can be applied to pictures |
| 2. resolution | b. a technique that generates realistic reflections, shadows and highlights |
| 3. jagged | c. geometrical figures with special properties |
| 4. filters | d. irregular or uneven |
| 5. wireframe | e. the number of pixels in an image |
| 6. rendering | f. the drawing of models by using pictures like edges or contour lines |
| fractals | g. a physical dot in a raster image which makes up a picture on a screen |

**IV. Reading.**

***a.*** *Read the text and answer the following questions:*

1. What are the differences between the raster graphics and vector graphics? 2. What graphics file formats are mentioned in the text? 3. What is meant by compositing? 4. What does CAD stand for? 5. What are the benefits of using computer graphics in car industry? 6. What type of graphics software is used to make maps or 3D models of the Earth? 7. What is a fractal? 8. Who uses GIS and what for? 9. Where is computer animation used? 10. Have you ever used computer graphics?

**Computer Graphics**

Computer graphics are pictures and drawings produced by the computer. There are two types of computer graphics: raster and vector.

Raster graphics, or bitmaps, are stored as a collection of pixels. The sharpness of an image depends on the density of pixels, or resolution. For example, text or pictures that are scaled up, i.e. made bigger may show jagged edges. Paint and photo-editing programs like Adobe Photoshop focus on the manipulation of bitmaps. Popular raster formats are JPEG, TIFF and GIF.

Vector graphics represent images through the use of geometric objects, such as lines curves and polygons, based on mathematical equations. They can be changed or scaled without losing quality. Vector data can be handled by drawing programs like Adobe Illustrator, Corel Draw or Macromedia Freehand. EPS is the most popular file format for exchanging vector drawing.

It is interesting to note thatbitmap graphics are composed of pixels each of which contains specific color information, while vector graphics consist of lines and curves which, when combined, can form a complex object.

Almost all computer users apply some forms of graphics. Home users and professional artists use image-editing programs to manipulate images. For example, you can add filters (special effects) to your favorite photos, or you can composite images. Compositing is combining parts of different images to create a single image. Graphic artists and designers use drawing programs to create freehand drawings and illustrations for books or for the Web. Business people use presentation graphics to make information more interesting visually – graphs and diagrams can be more effective ways of communication with clients than lists of figures. Electrical engineers use graphics to design circuits in order to present data in a more understandable form. Mechanical engineers use CAD software to develop, model and test car designs before the actual parts are made. This can save a lot of time and money. CAD is also used in the aerospace, architecture and industrial sectors to design everything from airplanes and buildings to consumer products. Designers start a project by making wireframe, a representation showing the outlines of all edges of a transparent drawing. Then they specify and fill the surfaces to give the appearance of a 3D solid object with the volume. This is known as the solid modelling. Next they add paint, color and filters to achieve desired “look and feel”. This is called texturing the object. Finally, they render the object to make it look real. Rendering includes lighting and shading as well as effects that simulate shadows and reflections.

Computer or digital art is used in adverts and TV programs. Artists and scientists use special graphic applets to create amazing fractals. Fractals are geometrical patterns that are repeated at small scales to generate irregular shapes, some of which describe objects from nature. Government agencies use GIS to understand geographic data and then plan the use of land or predict natural disasters. Cartographers use GIS to make detailed maps. Animators use computer animation software to create animated cartoons or add effects in movies or video games.

**b.** *Match a task to the most appropriate graphics software:*

|  |  |
| --- | --- |
| 1. to edit and retouch photos | a. Computer animation software, e.g. 3D Studio Max |
| 2. to create illustrations and drawings for a magazine | b. GIS software, e.g. ArcView |
| 3. to prepare slideshows for training sessions or conferences | c. Presentation software, e.g. PowerPoint |
| 4. to make mechanical designs and architectural plans | d. A CAD package, e.g. AutoCAD |
| 5. to create dynamic simulations and special effects for films, TV, ads and games | e. Vector graphic software, e.g. Freehand |
| 6. to analyze geographic data and make maps | f. A paint and image-editing program, e.g. Photoshop |

**V. Listening**

**a.** *Listen to an extract from the online tutorial about graphics programs* ***The Toolbox*** *and answer the following questions:*

1) What is a toolbox in graphics software?

2) What are graphics primitives?

3) What sort of attributes, or characteristics, can be used in graphical objects?

4) What does translation mean?

5) What is rotation of an object?

**b.** *Listen again and complete the sentences:*

1. Graphic programs usually have a toolbox – a collection of drawing and \_\_\_\_\_\_ tools that enable you to type, \_\_\_\_\_, draw, paint, edit, move and view images on the computer.

2. The basic shapes which are used to \_\_\_\_\_ graphical objects are called primitives. These are usually geometric, such as lines between two points, arcs, circles, polygons, ellipses and even text. Furthermore, you can specify the attributes of each primitive, such as its color, line type, fill area, interior style and so on.

3. The various tools in a toolbox usually appear together as pop-up icons in a menu or palette. To use one, you activate it by \_\_\_\_\_ on it. For example, if you want to \_\_\_\_\_\_ a rectangle, you activate the rectangle tool, and the pop-up options give you a possibility of \_\_\_\_\_\_\_\_ rectangles with square and rounded corners.

4. You can transform an object by translating, \_\_\_\_\_ or scaling it. Translation means moving an object to different location.

5. Rotation is \_\_\_\_\_\_ the object around an axis. For example, you need to rotate an object 90 or 180 degrees to fit the drawing. \_\_\_\_\_\_\_ is making the object larger or smaller.

**VI. Description**

*Look at the images showing the stages of drawing a tank using computer software and describe them. The following speech patterns may be helpful:*

1. This picture shows …

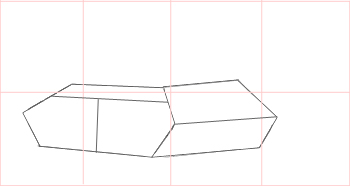
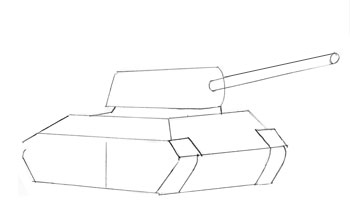
2. In this (next) stage …

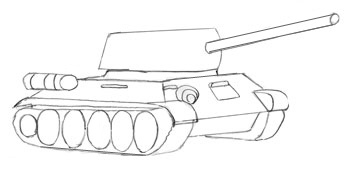
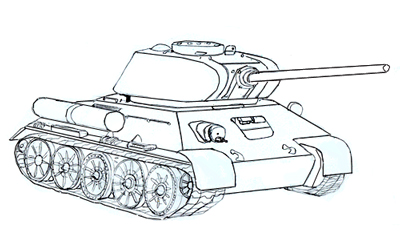
3. The designer has used …

4. This stage is called …

5. Rendering techniques include …

6. As a finishing touch, …

**VII. Watching**

*Watch the video* ***Interactive Computer Graphics. The University of Tokyo. on*** *YouTube (2:04) and tell the class where visual problem solving takes place, what computational tools support the process, what topics are included in the course represented by the speaker.*

**Unit 10**

**Computing Support**

**Starter**

**-** Have you got a computer at home/office?

- Have you ever faced any computer problems?

- Who or what helped you to cope with these problems?

**I. Discussing**

**a.** *Anne works in a large insurance company. She's a computing support*

*assistant. She looks after people and their computers, and she helps with any problems people have. What sort of problems do you think they might have?*

1. paper jamming 6. printer switched off

2. finding options in programs 7. no paper in the printer

3. viruses 8. people forget their password

4. computer freezes 9. no toner in the printer

5. hard disk crashes

**b.** *What do you think are the ways Anne keeps up with new developments in computing?*

1. reading books 5. taking courses

2. reading computer magazines 6. trying programs herself

3. consulting other technicians 7. reading newspapers

4. using the Internet

|  |
| --- |
|  |
| **c.** *Study these extracts from the interview paying attention to the use of the verbs of frequency,:* |
| I: Are you ever bored?  A: No, not really, because it's *never* the same things over and over again; it's different each time.  I:  What kinds of problems do people *frequently* have with their computers? |
| A: People have problems with the hardware, *often* with printers ... paper jamming. They also have problems with finding options in the programs. Mostly with word-processing.  I: Are there any other hardware problems?  A: *Occasionally* a computer freezes, it hangs or freezes. It's *usually* a memory problem.  I: Is it *always* the machine or is it *sometimes* the user?  A: *Sometimes* it's the user. The printer isn't switched on, or there's no paper in it.  I: How *often* does a computer crash?  A: *Sometimes*, not very often.  **d.** *This list shows the number of hardware and software problems Anne had last year. Describe how often these problems happened, using the adverbs of frequency given above.*  *Model:* There were *sometimes* problems with the network.  Printers Network  Monitors Spreadsheet  Cabling Database  Scanners Word processing |

**II. Speaking**

*Work with your partner. Find out:*

**a.** *What are the most common computing problems for him/her?*

**b.** *What are the ways for solving them?*

*Ask questions and fill in the table. The following questions may be helpful:*

1. Have you ever encountered a problem with a virus?

2. Have you ever had a software problem?

3. What kind of problems have you had with any of peripherals?

4. What did you do about it?

5. How did you get help, from a help center or your friend?

|  |  |
| --- | --- |
| Problems | Sources of help |
| 1. viruses  2.hardware disk  3. monitor problems  4. mouse problems  5. computer hanging  6. computer crashing  7. motherboard  8. other |  |

**c.** *Can you enlarge the list of problems further? Do it, please*.

**III. Reading**

*Read the text and*

**a) *Give the definitions of the problems mentioned in the text.***

**b)** *Give a summary of the text:*

Computing support involves setting up and maintaining computing systems and solving **hardware** (the physical components of a computer system) and **software** (programs and data) problems. Common problems include: dealing with **viruses** (programs that can reproduce themselves and are written with the purpose of causing damage or causing a computer to behave in an unusual way); fixing faulty **peripherals** such as monitors, mice or printers; dealing with computers **hanging** (suddenly and unexpectedly stopping processing during the execution of a program); or computers **crashing** (failing suddenly and completely). It is usually the failure of the hard disk inside a computer that is referred to as a crash.

New computers commonly have a one-year **warranty** agreement that allows the purchaser to obtain help with computing problems by telephoning computing support staff at a **help center.** Each computer has its own unique **serial number** that identifies the equipment. It also usually has a **service tag number** that identifies its warranty agreement to the support staff. A **job number** is usually issued by the support staff to uniquely identify the particular fault report. Special fault report forms are often used by the support staff to record the details of the problem. To solve the problem, the support staff usually needs to know the type of a computer, type of processor, amount of **RAM** (random access memory – the memory that stores the user's program and data while they are being used by the computer), the operating system and what type of **LAN** (local area network – a network connected over a small area) it is connected to, if any.

The problem reported to the help center in this unit involves **MIDI** (musical instrument digital interface) sound files. MIDI files are created by connecting a musical instrument to a computer system. This type of music file is commonly found on the Internet and is used in **Microsoft Encarta,** a multimedia encyclopedia program produced by the Microsoft Corporation.

The faulty computer has 128 **megabytes** of RAM (approximately 128 million bytes – a **byte** is the amount of memory required to store one character e.g. a letter, a number or a punctuation mark). The fault is caused by a faulty **sound driver** (an operating system program that controls the sound system in the computer). The help center will usually try to solve the problem over the phone but if that is not possible, the computer may have to be returned for repair or they may send out a **repair technician** to the user's location. Many simple computer problems can be fixed by simply **rebooting** the computer (restarting the computer operating system).

Some computers have programs for testing and diagnosing hardware faults stored in **ROM** (read only memory) on the **motherboard** (the main electronic circuit board inside a computer that holds and connects together all the main electronic components). These stored programs are known as **on-board diagnostic and repair tools.** To save users having to telephone the help center to solve well known common problems, the company selling the computer may have a website with a **FAQs** (frequently asked questions) section that describes common problems and their solutions.

The Microsoft Corporation has a website with a section known as the **Microsoft Knowledge Base** that allows Microsoft software users to find out about known problems with using Microsoft software with certain combinations of hardware. It provides a description of the problem and any known solutions to the problem. The Microsoft software problems used in this unit include a problem using a free Microsoft email program called **Outlook Express** and the **Dial-Up Networking** feature in a Microsoft operating system. Dial-Up Networking allows the user to connect their computer to a network using a modem. The problem occurs with a particular make of **video adapter** (the expansion card that provides the electronics for controlling the monitor screen). The other Microsoft software problem is with **Internet Explorer** (a free **browser** program used for viewing webpages) causing the computer to **hang** (to suddenly and unexpectedly stop processing during the execution of a program). The solution is to change the settings in the program that determine whether the program should **hang up** (disconnect the telephone line when it has finished sending, receiving or **downloading,** i.e. copying data from a server computer to the user's computer).

**III. Comprehension**

**a)** *Answer the following questions:*

1. What is computing support? 2. What are the common problems? 3. What is the usual warranty period for new computers? 4. How can a user obtain help if he/she has a computing problem? 5. What information does a technician usually ask from a user reporting a problem? 6. What are MIDI files? 7. What is the difference between a sound file and a MIDI file? 8. In what way does a technician usually try to solve the problem? 9. When is a technician sent to the user’s location?10. Why do companies have a website?11. Where can you find FAQs?12. What kind of information can you find at the Microsoft Corporation website?13. What are the most common problems reported to Microsoft?

**b)** *Put in the appropriate order the following steps to take, before you call for technical support.*

1. Phone computing support staff at a help center.

2. Write down your system’s model name and serial number.

3. Reboot your PC to see if the problem recurs.

4. Have your system up and running and be near it when you call.

5. Use your PC’s on-board diagnostic and repair tools.

6. Record the details of the problem so you can describe it carefully.

7. Keep at hand notes of software and hardware you’ve installed along with any changes you’ve made to settings.

**c)** *Diagnose the faults given below and give advice on each problem:*

1. It doesn’t seem to be playing MIDI sound files from the Internet.

2. My computer sometimes stops and reboots itself.

3. When I print, some sheets come through the printer at a time.

4. My laser printer produces very faint copies.

5. The time display on my computer is an hour slow.

6. My monitor screen flickers.

7. Everything I type appears in capital letters.

8. My PC is switched on but the monitor screen is blank.

**IV. Listening**

**a.** *Listen to a telephone conversation between a computer support officer, David Lister, and Jennifer, the user. What is the problem? What does David advice Jennifer to do?*

**b**. *Listen again and complete the form to record the main details of the problem.*

|  |  |  |  |
| --- | --- | --- | --- |
| Help Desk Technician’s Name | | Date of Call | Time commenced |
| Reported by | | Address | |
| Under Warranty | Service Tag No. | Make | Model |
| Processor | RAM Size | OS | Network Type |
| Problem Description | | Diagnosis | |
| Cleared by Phone | | Job Number | |
| Passed to Supplier | Time | Ref. No | |
| Passed to Third Party | Time | Ref. No | |
| Requires Visit | Time | Visiting Technician | |
| Equipment Required | | Comments (e.g. case history) | |

**V. Writing**

*Write David’s report on Jennifer’s problem. It should contain three sections:*

paragraph 1. User’s hardware/software, network connections, etc.

paragraph 2. Description of the problem and the possible diagnosis.

paragraph 3. A computing support officer’s actions.

**Unit 11**

**Virus Protection Software**

**Starter**

- How can you protect your computer from viruses and spyware?

- Are we able to protect our email and keep it private?

- What are the most common methods for network security?

- What malware/malicious software programs can you name?

**I. Vocabulary**

**a)** *Study the following words and their meaning:*

***Spyware*** is a computer software that secretly records information about which websites you visit.

***Ransomware***is malicious software that infects your computer and displays messages demanding a fee to be paid in order for your system to work again. It has the ability to lock a computer screen or encrypt important, predetermined files with a password.

***Firewall*** is a combination of hardware and software used to control the data going into and out of a network. It is used to prevent unauthorized access to the network by hackers.

***Malware*** is a computer software program designed specifically to damage or disrupt a system, such as a virus.

***Worm*** is a program that spreads by replicating itself.

***Key logger*** is a piece of software that records the signals sent from a keyboard to a computer usually for the purpose of gaining information about the user without the user’s knowledge.

**b)** *Match the definitions to the types of malware from the box*:

|  |
| --- |
| virus Trojans spyware worm |

1. a computer software secretly installed via the Internet on your computer without your knowledge and used to record information about which websites you visit and to send the information to another computer.

2. a piece of code which is capable of copying itself and typically has a harmful effect, such as corrupting the system or destroying data; it can enter your PC via the Internet or an infected disc drive.

3. a self-copying program that spreads through email attachments; it replaces itself and sends a copy top everyone in an address book.

4. one of the detrimental computer programs which is pretended as a useful program but it may affect and damage computer systems; it is unable to self-copied.

**II. Language skills**

**a)** *What do you know about warnings?*

Warnings are used to ensure safety, to prevent damage to equipment and breaches of security, and to ensure the law is not broken. The simplest warnings are basic instructions NOT to do anything.

Models:

|  |  |
| --- | --- |
| Don’t do anything | Don’t give open access to PCs |
| Avoid + Ving | Avoid giving financial information in a chat room |
| No + Ving | No smoking in the lab |
| Never do something | Never use an IC extraction tool; don’t use a screwdriver |

**b)** *Where can you see these warnings?*

1. Never give out your password.

2.Don’t use out-of-date anti-virus software program.

3. No smoking, eating or drinking at the computer.

4. Avoid turning off main power while computer is running.

**c)** *What preventive tips will you give your friend if you want to protect his/her PC? You may begin with:* Don’t open attachments from strangers*.*

**III. Reading**

*Read the text and find out what warnings are given in the text:*

***What is Virus Protection Software?***

*Virus Protection* is a key to a system or network security to battle against viruses, worms, Trojans and all kinds of malware using different technologies. It integrates technologies like antivirus, anti-spyware, firewalls etc.  
*What are the Measures to be Adopted for the Best Virus Protection?*

* *Use of Antivirus Protection Software*

The first line of defense in PC security is installing an [antivirus](https://www.comodo.com/home/internet-security/antivirus.php?af=7537). It is vital to choose an antivirus that best suits your requirements to protect your computer even from the most dangerous zero day threats, those that have not yet been diagnosed by security analyst. There are many antivirus products, but only Comodo is architected to thwart even zero day threats.

* *Use of Firewall*

[Firewall](https://personalfirewall.comodo.com/?af=7537) along with antivirus for [virus protection](https://antivirus.comodo.com/free-antivirus.php?af=7537) stands as the first line of defense in the mechanism of PC security. Always ensure that the built-in firewall is enabled. It is also important to configure the Firewall correctly. Firewall blocks suspicious programs and hence provides PC security.

* *Keeping Software updated*

It is not just about installing a software and application in your system, be it security software or an operating system or any other application. Software that you install can end up having some security issues. Hence updating the software that is already installed in your system can prevent the hackers from exploiting the system and thereby making it prone to malicious attacks.

* *Download only trusted programs*

Ensure that you download and run programs and applications from a trusted source. Also make sure you do not open any executable software that comes as email attachments.

* *Avoid pirated software*

if you want to ensure *PC security*. It is the best choice to avoid cracked or pirated software. There are culprits who provide malicious programs in the form of useful software that might let a less experienced user to run the program, thereby getting infected.

* *Be cautious about Phishing and Social Engineering*

Do not share sensitive and personal information online. Though there is a protective measure that is offered by Browsers to protect from phishing attacks, they cannot be perfect any day. Make sure that you share your details over the network only to authenticated individuals and websites. Do not dare to click on links that are sent to you through mails, they might direct you to malicious sites.

* *Be wise with Passwords*

It is advisable to use a wise combination of alphabets either big or small, numerals, characters and so on. Do not use the same password for all the accounts that you have over the network. Implement the use of a unique password for each of your accounts.

Consider the following practices as a rule of thumb to aid PC security by protecting and preventing attack of malware like viruses, key loggers, ransomware, computer worms, Trojan horses and more.

**IV. Comprehension**

**a)** *Answer the following questions:*

1. What is Virus Protection Software? 2.What antivirus products do you know? 3. How can you explain the expression “zero day threats”? 4. What is the name of the software which is architected to thwart even zero day threats? 5. What is Firewall for? 6. Why is it necessary to keep software updated? 7. Why should every user avoid pirated software? 8. Why should you not share sensitive and personal information online? 9. What warnings are given about password? 10. What can damage your PC security?

**b)** *Complete the following sentences using the words from the box:*

|  |
| --- |
| Net viruses attachments downloaded disk drive activated storage infected |

\_\_\_\_\_\_\_ can enter your computer system in three different ways: 1. via a \_\_\_\_\_\_, when you insert infected disks or CDs; 2. via files \_\_\_\_\_\_ from the Web; 3.via email \_\_\_\_\_\_. When you open an \_\_\_\_\_ file, the virus is \_\_\_\_\_\_\_ and installs itself in the computer’s memory. Then it spreads to \_\_\_\_\_ devices and may infect your friend’s system through the \_\_\_\_\_.

**V. Speaking**

*Choose any example of computer disaster and say how you can prevent it or limit its effect. Compare your answers within your group.*

*1.* You open an email attachment which contains a very destructive virus.

2. Someone guesses your password and copies sensitive data.

3. Your hard disk crashes and much of your data is lost permanently.

4. Someone enters your computer ab and steals the memory chips from all the PCs.

5. Your backup tapes fail to restore properly.

**VI. Listening**

**a)** *Listen to the part of the lecture about computer viruses. Match the names in* ***A*** *to the facts in* ***B****:*

|  |  |
| --- | --- |
| **A** | **B** |
| 1. John von Neumann | a. created the first ever computer virus |
| 2. Frederic Cohen | b. predicted computer viruses in 1940 |
| 3. Basit and Amjat Alvi | c. allow other people to access your computer |
| 4. Melissa and Love Bug | d. were famous viruses in 1999 and 2000 |
| 5. Sven Jaschan | e. wrote the Sasser Worm virus |
| 6. Trojan Horses | f. first used the word “virus” in 1983 |

**b)** *Listen again and answer the questions:*

1. How are computer viruses similar to flu viruses?

2. Why did Basit and Amjat Alvi create the Brain virus?

3.Was the Brain virus very dangerous?

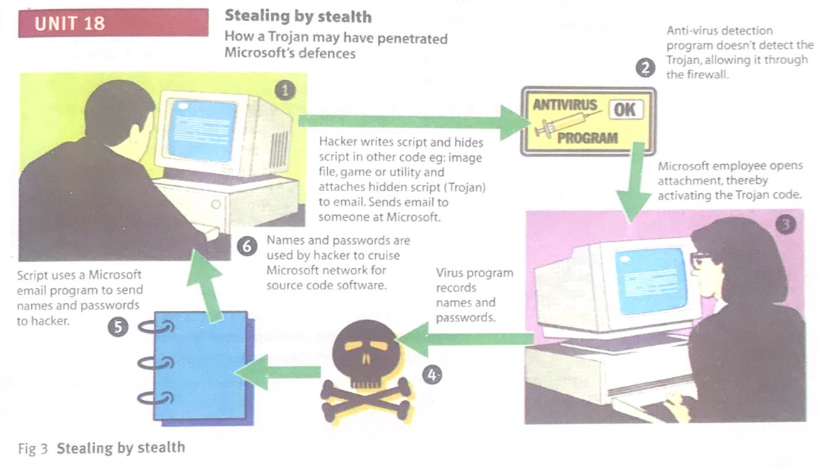
4. Where did Sven Jaschan write his virus?

5. Why was the Sasser Worm virus so dangerous?

6. If there is a Trojan Horse on your computer, what can people steal from you?

**VII. Problem Solving**

*You have the details of a recent computer crime. Study Figure 3 to find out how the crime operated and what its effects are.*



**Unit 12**

**Data Security**

**Starter**

**-** What data security methods are there?

- What are the most popular among them and why?

**-** What forms of security scanning do you know?

- Who is a white –collar and what crimes he/she can commit?

- Do you know what a security matrix is?

**I. Vocabulary**

*Study these words:*

*Encryption* is the transformation of data into coded form to make it secure.

*Decrypt* means to recover the original text from encrypted message.

*Fingerprint* is an impression left by the friction ridges of a human finger.

*Key cards* are used by hotels to authorize their guests only to access their hotel room and the fitness center, set to stop working the morning of checkout.

*Cash-dispensing terminal* is a machine built into the wall of a bank or other building, which allows people to take out money from their bank account using a special card. (Synonyms: cash dispenser, cash machine, cashpoint machine, automated teller machine)

*Complete the sentences using vocabulary words:*

1.According to a published article, the Mafia has kidnapped the IBM executive and cut off his finger because it needed his \_\_\_\_\_\_ to breach a computer security system. 2. \_\_\_\_\_\_\_ changes data into a secret code so that only someone with a key can read it. 3. I want the \_\_\_\_\_\_\_ to have details of all expenditure so if the guest has a drink at the bar, extra meals at the restaurant, anything of that nature. 4. To \_\_\_\_\_\_ means to translate back into plain text. 5. I stopped at a hole in the wall \_\_\_\_\_\_\_\_ and withdrew &500 with my new American Express card.

**II. Reading**

*Read the text and identify data security methods. What other methods do you know?*

The computer industry has been extremely vulnerable in the matter of security. At first computer security meant the physical security of the computer itself – guarded and locked doors. Computer screens were given dark filters so others could not easily see the data on the screen. But filters and locks by no means prevented access. More sophisticated security means safeguarding the computer system against such threats as burglary, vandalism, fire, natural disasters, theft of data for ransom, industrial espionage and various forms of white-collar crime. Most computer crimes are “inside jobs”, where staff with access to the company’s computers fiddle with the records.

A computer system needs a sure way of identifying people who are authorized to use it. The identification procedure has to be quick, simple and convenient. It should be so thorough that there is little chance of the computer being fooled by a clever imposter. At the same time the computer must not reject legitimate users. Unfortunately, no identification system currently in use meets all these requirements.

At present, **signatures** are widely used to identify credit-card holders, but it takes an expert to detect a good forgery. Sometimes even a human expert is fooled, and there is no reason to believe that a computer can do any better.

A variation is to make the computer analyze **a person’s hand movements** as he signs his name instead of analyzing the signature itself.

Sometimes **photographs** are also used for identification. But people find it inconvenient to stop by a bank or credit card company to be shot. Companies may lose business if they make pictures an absolute requirement.

**Cash-dispensing system** often uses two identification numbers: one is recorded on a magnetic stripe on the identification card, and the other is given to the cardholder. When the user inserts his card into the cash-dispensing terminal, he keys in the identification number he has been given. The computer checks to see that the number recorded on the card and the one keyed in by the user both refer to the same person. This method is considered to be the most widely used for identifying computer users.

For a long time, **fingerprints** have provided a method of positive identification. But there are two problems concerning it. The technical problem deals with the fact that there is no simple system for comparing fingerprints electronically. The psychological problem is that fingerprints are strongly associated with police procedures.

**Voiceprints** may be more promising. The user has only to speak a few words into a microphone for the computer to analyze his voice. Technically it is easier to take and analyze voiceprints than fingerprints.

**Data Encryption**. When sensitive data is transmitted to and from remote terminals, it must be **encrypted** (translated into a secret code) at one end and **decrypted** (translated back into plain text) at the other. Files can also be protected by encrypting the data before storing it and decrypting it after it has been retrieved. Since it is impractical to keep secret the algorithms that are used to encrypt and decrypt data, these algorithms are designed so that their operation depends on a certain data item called the key. It is the key that is kept secret. Even if you know all the details of the encrypting and decrypting algorithms, you cannot decrypt any messages unless you know the key that was used when they were encrypted. For example, the National Bureau of Standards has adopted an algorithm for encrypting and decrypting the data processed by federal agencies. The details of the algorithm have been published in the Federal Register. Plans are under way to incorporate the algorithm in special purpose microprocessors, which anyone can purchase and install in his computer. But the operation of the algorithm is governed by a 64-bit key. Since there are about 1022 possible 64-bit keys, no one is likely to discover the correct one by chance. And without the correct key, knowing the algorithm is useless.

**IV. Comprehension**

**a)** *Answer the following questions:*

1.What is computer security? 2. What is the most serious problem: the loss of hardware, software or the loss of data? 3. How does a computer system detect if you are the person who should be granted access to it? 4. What are the shortcomings of each biometric means? 5. What steps can be taken to prevent theft of data? 6. What is the weakest link in any computer system? 7. Can the computer industry risk being without safeguards for security and privacy?

**b)** *Are these sentences true or false? If they are false, correct them:*

1. Decryption is the inverse operation of encryption. (T/F)

2. It is quite easy to imitate someone’s voice. (T/F)

3. The identification procedure has to be so complicated that there is no chance of the computer being fooled by a clever imposter. (T/F)

4. Fingerprints can be stolen, forgotten or even copied. (T/F)

5. A cash dispenser is a machine that dispenses money when a personal coded card is used (T/F)

6. It is impossible to forge signatures. (T/F)

7. Photographs is the most convenient and secure method for performing bank operations. (T/F)

**VI. Speaking**

*Choose any form of security scanning and describe steps of the identification procedure. The newspaper article given below may prove helpful.*

1. Eye scanning

2. Fingerprint scanning

3. Voice recognition

4. Hotel key cards

**VII. Writing**

*Scan the newspaper article and write a summary of it.*

***Fingerprints Don’t Lie***

The human fingerprint has long been known to be the ultimate identifier: no one is alike. And unlike passwords or identification cards, fingerprints can’t be stolen, forgotten or even copied. For this reason, banks and companies that store sensitive data in computers have long wondered if fingerprints could be integrated into their security measures to control access to their vaults, automatic tellers and terminals. California inventor Randy Fowler found that they can. His electronic device identifies people by their fingerprints.

The Personal Verification Terminal System consists of one or more terminals and a central computer memory bank that can store thousands of fingerprint images. People who are to be allowed entry to a building or room, or electronic access to a computer, are first “enrolled” into one of the terminals. An optical scanner then takes a high-resolution image of the print which is translated into a mathematical code that is retained in the central memory.Users are also given their own four- or five-digit personal identification number. Later when they want to enter a facility or use a computer, they input the number on the terminal’s keypad and place the same finger in the machine. If the print matches the one on the file, access is given by unlocking a door or allowing the user to log on to a computer. One terminal can service an entire building or computer system but other terminals might be placed on each floor or in each department for greater convenience.

**VIII. Listening**

*Listen to the story “Who’s using your identity?”*

**a)** *Match the names with the descriptions:*

1. Fred \_\_\_\_\_ a) an identity thief

2. Angela \_\_\_\_\_ b) an expert on identity theft

3. Martin \_\_\_\_\_ c) a victim of identity theft

**b)** *Answer the following questions:*

Which of these things did the caller already know?

Which of these things did the caller ask for?

Which of these things did Fred give her?

|  |
| --- |
| - his pin - his address  - the name of his bank - his full name  - his date of birth - his mother’s maiden name  - his account number - his Internet password |

**c)** *Whom do these words belong to?*

1. There isn’t enough money in your account.

2. I want to transfer some money, please.

3.We’re checking our customers’ accounts.

4.The bank never phones or emails people for information like that.

5. I don’t destroy old bank statements.

6. I just need to check your date of birth.

7. I don’t use the Internet.

8. You’ve been very helpful.

**Topics for Essays:**

1. Which of a user’s identifications is best and why?

2. Common means of protecting data.

3. Cryptography.

4. Copyright protection.

5. Computer viruses and their differentiation.

6. What makes a *perfect* virus?

**Unit 13**

**Computer Crimes**

**Starter**

**-** Who is a hacker?

- What is the difference between crackers and hackers?

- Which Internet crimes are the most dangerous?

- What does “piracy” stand for?

**I. Reading**

*Read the text to find out:*

1. What is computer hacking?

2. Why do the hackers do what they do?

3. How seriously do companies take the problem?

**Computer Hacking – High-Tech Crime**

You can rob a bank without leaving the house these days. Who needs stocking masks, guns and getaway cars? If you’re a computer whizz-kid, you could grab your first million armed with nothing more dangerous than a personal computer, a telephone and a modem to connect them.

All you have to do is dial into the networks that link the computers in large organizations together, type in a couple of passwords and you can rummage about in the information that’s stored there to your heart’s content.

Fortunately, it isn’t always easy as it sounds. But, as more and more information is processed and stored on computer, whether it’s details of your bank account or the number of tins of baked beans in the stockroom at the supermarket, computer crime seems set to grow.

A couple of months ago a newspaper reported that five British banks were being held to a ransom by a gang of hackers who had managed to break into their computer. The hackers were demanding money in return for revealing exactly how they did it. In case like this, banks may consider paying just so they can protect themselves better in the future.

No one knows exactly how much money is stolen by keyboard criminals – banks and other companies tend to be very secretive if it happens to them. It doesn’t exactly fill customers with confidence if they think their bank account can be accessed by anyone with a PC! Some experts believe that only a tenth of all computer crimes are actually reported. Insurance company Hogg Robinson estimate that computer frauds cost British companies an incredible &400 million a year.

There are two types of computer criminals: hackers and crackers. Hackers are computer programmers who love to find all about systems and programming. The true hacker, it seems, doesn’t crack the system for financial gain. The thrill appears to be, not in getting rich, but in beating the system and proving themselves.

Whereas, crackers (also known as black hat hackers with extensive computer knowledge) are those who break into computers for criminal gain; those who breach or bypass internet security, those who sell pirated copies of popular software and games, might try to break into a bank’s system, etc.

Internet-based crimes include:

* *scam* – email fraud to obtain money or valuables;
* *phishing -* bank fraud, to get banking information such as passwords of the Internet bank accounts or credit card details by using emails that look like they are from real organizations, but are in fact fake; people believe the message is from their bank and send their security details.
* *piracy* (password harvesting fishing) - the illegal copying and distribution of copyrighted software, games, music or video files;
* *cyber stalking* – online harassment or abuse, mainly in chatrooms or newsgroups.

Prevention is probably easier than detection, and many companies now spend lots of time and money devising programs using passwords and codes. There are plenty of software companies who specialize in writing software to make computers hacker-proof.

**II. Comprehension**

**a.** *Find words or phrase in the text which mean the same as:*

a. expert (especially at a young age)

b. search through

c. as much as you want

d. hackers

e. forgery

f. without permission

g. to make computers secure

**b**. *Complete these statements by choosing the answer which you think fits best:*

1. *Banks may pay computer criminals*

a. to give back information they have stolen.

b. to explain what their technique is.

c. not to commit the same crime again.

d. not to pass on information they have stolen.

2. *Companies don’t always report computer crime because they*

a. think it would create bad publicity.

b. don’t expect the criminals to be caught.

c. don’t want the police to investigate.

d. think the criminals are members of their staff.

3. *The computer hacker’s motive seems to be*

a. to win a competition

b. to make a lot of money.

c. to overcome a challenge.

d. to appear in the newspapers

4. *A true hacker cracks the system for*

a. financial gain.

b. getting rich.

c. beating the system.

d. getting the title of the best hacker.

5. *Crackers are those who break into computers for*

a. criminal gain.

b. popularization of computer games.

c. illegal access to somebody’s computer via the Internet

d. attracting public attention.

**III. Scanning reading**

*Scan the paragraphs from newspaper articles on the history of hacking and find answers to the following questions:*

1) Which of the cases reported here involved teenagers?

2)Which of the hackers is now a law-abiding person?

3) Who was Mad Hacker and what did he do?

4) What crime inspired to shoot a movie?

5) Which of the keyboard criminals is considered to be the true hacker?

***1974***- Kevin Mitnik, a legend among hackers, began hacking into banking networks and altering the credit reports of his enemies. He didn’t expect that his most famous exploit – hacking into the North American Defense Command in Colorado Springs – would inspire the film “War Games” in 1983.

***1981*** - Ian Murphy, a 23—year-old man, known as Captain Zap on the networks, hacked into the White House and the Pentagon. He was about to become the first ever arrested for a computer crime. Today Murphy, like other hackers, runs his own security company – IAM Secure Data Systems, Inc. Murphy’s great love is still hacking into company security systems – with their permission- and helping them guard against potential breakings.

***1990***– Nicholas Whiteley (known as Mad Hacker) is one of the first crackers in Britain to be convicted under the Criminal Damage Act of 1971. He was given a custodial sentence for cracking into a system and causing it to crash, with damages resulting from this incident estimated to be about &25.000.

***1996*** – Edward Singh, a 23—year-old man, used computer networks to break into more than 200 military, corporate and university systems in Europe and the United States during the last five years. ”It has never been my intention to steal anything “, said Singh. “I really see myself as a highly skilled software engineer”. His mission seems to be to prove just how insecure their systems are.

***2001*** – two New York teenagers, one aged 14 and one aged 17, were charged with breaking into a computer system owned by a company that publishes computer magazines. They are alleged to have changed polite recorded greetings to rude messages, added bomb threats and wiped advertisers’ orders. The company estimates that the tampering has cost &2.4 million.

**IV. Listening**

*Before listening answer these questions:*

1. How can one hack into a system?

2. What should you do to stop people hacking into a system?

3. What advice would you give for a young computer geek?

**a.** *Listen to Part I of the recording to check your answers to the previous task and to find the answers to the following questions:*

1. What was Ralph arrested for?

2. What does he do now?

3. Why does he consider people to be too trusty?

4. What passwords does he suggest for trying to get into a system?

5. What is the function of the firewall?

6. What is the advantage of a callback system?

7. What sort of passwords should you avoid to prevent hacking?

8. What do event logs show?

**b.** *Listen to Part II of the recording to find the answers to the following questions:*

1. How did Ralph start thinking about computer security?

2. How did he found the most senior ID in the American company’s system?

3. Why do people hack according to Ralph?

4. Why did Ralph and his friend hack?

5. How did the police find him?

6. Why does he say companies should use his services?

7. Do hackers know each other?

8. What is the difference between Hollywood hackers and the real world?

9. How risky is credit card on the Internet?

10. What advice does he give for those intending to use credit cards over the Internet?

**c**. *Listen to both parts of the recording to find the answers to the following questions:*

1. What evidence did Ralph and his friend leave to show that they had hacked into the American computer’s system?

2. What is a “white hat” hacker?

3. What two ways does Ralph give to hacking into a system?

4. What terms does Ralph use to describe someone obsessed by computers?

5. How does he maintain contact with the policeman who arrested him?

6. How does he describe his lack of enthusiasm for the Hollywood hacker?

7.What does he mean by saying: “It’s the retailers who get done”?

8.What’s the problem with using smart cards for Internet purchases?

**V. Speaking**

*Work with your partner. Act the roles of a policeman and a hacker/ a judge and the accused person/ a journalist and a hacker/ Ralph and his friend. You may use the following topics for your dialogue.*

1. firstinterested in hacking

2. reason for being arrested

3. present job

4. ways to avoid hackers

5.movies sometimes feature hackers

6. safe ways of paying for the Internet shopping

**VI. Translation Skills**

*Translate into English:*

Один из самых известных в мире хакеров

Это Кевин Митник. После знакомства с ПК в 16 лет он взломал сеть Пентагона и противовоздушной обороны штата Колорадо. А после пятилетнего заключения и выхода на свободу Митник стёр из государственного реестра данные о своём тюремном сроке и снял все деньги со счёта судьи, который вынес ему приговор. Сейчас Митник занимается информационной безопасностью на легальной основе.

**VII. Writing**

**Topics for Essays**

1. A day in a hacker’s life.

2. Hackers of today.

3. If I were a hacker.

4. Hacking for fun or running for life?

5. Do we need hackers?

**Unit 14**

**IT Future**

**Starter**

- Have you ever thought of IT future?

- What areas of our life will be improved with the development of IT?

- How will new technologies affect human’s brain and body?

- Can you name any advantages and disadvantages of progress in IT?

**I. Speaking**

**a.** *Read the headlines of the newspaper articles and guess what they are about:*

* Electronic Stapler
* World’s First “Telescribing” Telephone
* Compact Discs for Cars: Sounding Better
* Writing to Your Computer
* Computers to serve Museum Visitors

**b.** *Do you think they were published in the XX-th or XXI-st century? Give your arguments.*

**c.** *Look through the extracts from these articles and choose an appropriate headline from* **a***:*

* To meet these demands, Matsushita Electronic developed a new system, easy to handle, through which both audio and visual information can be sent simultaneously. This is the first of its kind in the world. (Japan Illustrated)
* It consists of an electronic writer slate and a special ballpoint pen. The user places a sheet of paper on the electronic slate to activate the program. If the writer is using the system for the first time, he must “train” it by hand copying two pages of text from the manual. The Program analyzes the individual’s penmanship’s traits and records them in a file.
* With the use of a signal given off by a sensor fitted into the wall next to the painting, the “magic wand” tells the story of the exhibit that you are standing next to.
* A user simply places a few sheets of paper – up to twenty, in fact between its jaws and the machine clips the bunch together without any manual banging.
* The CD player is loaded with convenient features, including forward and reverse scanning at 10 times the normal playing speed, repeat function, bass and treble controls and a sensor that allows a listener to skip almost instantly to the next song.

**d.** *You have never seen or read any of these articles.* *Are you able to speak about the content of any article you like?*

**II. Reading**

*Read the text and find out answers to the following questions:*

1. What is Professor Cochrane completely convinced of?

2. What is stored in the professor's signet ring?

3. What will change dramatically when we start using such rings?

4. What does the ВТ lab develop with artificial intelligence?

5. What effect do the professor's experiments have on evolution?

6. What does the professor see as the negative side of the electronic revolution?

7. What was the result of combining the Internet with TV?

8. What developments does the professor predict in the field of biotechnology?

9. What will happen by the year 2015 according to the professor?

Talking to Professor Cochrane is probably as close as you can get to time travelling without leaving the current dimension, as his vision stretches far into the 21st century and beyond.

His seemingly unshakeable conviction is thatanything is possible if you really put your mind to it. In fact, ВТ is already sitting on a host of innovations poised to blow your mind during this century.

Designed for the 21st century, Peter Cochrane's signet ring is built around a chip that holds all the details of his passport, bank account, medical records and driving license. According to Cochrane, it's set to revolutionize shopping.

The ring is already a fully operational prototype, but it will be some time before you'll be trading your credit card in for the ultimate fashion accessory. It's not just jewelry that's set to get smarter.

One of the biggest projects done at the Lab is looking at artificial intelligence as a way of creating software programs, networks, telephones and machines with a degree of intelligence built in. By sensing their environment, they should be able to develop new capacities as demands change. “I have software that is breeding, which is interchanging genes and creating adaptable behavior. This means you'll see the network come alive – it will watch what you do and it will adapt”.

It doesn't stop there, though, as ВТ has taken artificial intelligence one step further and created machines that are solving their own problems. “We've created solutions that a human being could never have dreamed of. We have solutions, and although we don't understand how they work, they do work. We're effectively increasing the speed of evolution”, says Cochrane. It's already good to talk, but with artificially intelligent phones on the way it will be even better. Cochrane is at present working on smart phones that can translate English into German, Japanese and French in real-time. “Some of it is rocket science, but a lot of it's extremely simple. What we've built is a kernel of understanding inside a machine that extracts meaning from the sentence itself - at the moment we can do simple things such as phrase books”, he says.

The system uses a non-linear approach that sends the English to the understanding kernel in the machine and then fans it out to all the other languages simultaneously.

There's no doubt that Cochrane is putting a lot of faith in intelligent machines, particularly when it comes to cutting through the deluge of information that he says is the downside of the electronic revolution. BT's solution is the development of intelligent agents that watch, learn and start communicating.

It's not all work done at the Lab, though. BT's also involved in an on-going trial that it claims will revolutionize our leisure time, in particular the way we watch TV. “We put people on the Internet and broadcast TV at the same time, so that the people at home could actually influence what was happening on their TV sets. As a result, it became interactive and therefore more active.”

ВТ has its fingers in multiple pies and has made biotechnology another core focus of R&D. “Personally, I think hospitals are very dangerous places to be. There are lots of viable alternatives. For a start, we can stop bunging up hospital wards by putting people online.” ВТ has already developed a pack for heart attack victims that monitors their progress and uploads information via a radio link back to the hospital.

So what will the 21st century hold for us if Peter Cochrane and his futurologists have their way? Well, by the year 2015, it's likely that we will be eclipsed by a supercomputer more powerful than the human brain. And if that's got visions of Terminator dancing in your head, don't worry - Cochrane's got it covered. “I'd really hate one morning to find myself considered an infestation of this planet. Our inclination is to nurture life and not to destroy it. Before we let loose a bunch of artificial intelligence, we ought to be thinking through the necessity of building in a number of rules that hold your life as a human being sacrosanct.”

**III***. Comprehension*

**a.** *Match the terms to their definitions:*

|  |  |
| --- | --- |
| 1. ВТ | a. A computer program that watches, learns and communicates with the user |
| 2. Smart phone | b. The most powerful type of computer |
| 3. Intelligent agent | c. Research and development |
| 4. Rocket science | d. Transfer data from a client device to a server computer |
| 5. R& D | e. A telephone that can translate English into various languages in real-time |
| 6. Upload | f. British Telecom |
| 7. Supercomputer | g. Very advanced study |

**b.** *Define if the statement is true or false. If it is false, correct it:*

1. ВТ has a lot of new ideas that will astound people. (T/F)

2. Jewelry that can store large amounts of personal data has started to replace credit cards (T/F)

3. BT's smart phone can only translate English into one other language at a time. (T/F)

4. Intelligent agents can help users deal with an overload of information. (T/F)

5. Watching TV will be more active pastime in the future. (T/F)

6. The professor thinks that humanity will be destroyed by very powerful computers in the future. (T/F)

**IV. Listening**

*Listen to three experts speaking on the future of IT and answer these questions:*

1. What are Speaker A’s prognoses on the exploration of the human brain by 2030?

2. What does Speaker B say about the differences and similarities between computers and human brain?

3.What is Speaker C worried about?

**V. Writing**

**a***. Read the quotation by Nicholas Carr, American technology writer, who says that if we rely too much on computers we lose something. But what is it? Write your own comments using 200-250 words.*

“The ability of computers to do things we used to do is growing astronomically and we’re rushing to hand over to computers tasks, activities – both in our work lives and in our personal lives – and what you begin to see is what is often called a de-skilling effect. The person becoming reliant on computers; because they are not exercising their own talents, those talents begin to fade. And we begin to lose, as a result, the unique things that human beings can do that computers can’t: feel empathy, take a broad perspective, interpret all the stuff that can’t be turned into data”.

**b.** *Read the quotation and think of arguments for and against the statement given below and write about 200 words.*

“Computers will catch up with the power and speed of the human brain by 2050. Some time after that, they will start outstripping us and taking over from us”.

**VI. Watching**

*Watch the video* ***Top Future Technologies in 2021*** *(5:27) on YouTube and say: How many top technologies are given in the list of the speaker? What are the areas of their use?*

**Unit 15**

**The Internet**

**Starter**

**-** What is the Internet in your opinion?

- How often do you use the Internet and what for?

- Do you think the Internet has any boundaries? Why/Why not?

- What events can break the Internet?

*Read some information about the Internet and ask questions to get more details:*

What is the Internet? This question can have different answers. Somebody would answer: “The Internet is the thing which stands on our worktables, in the kitchen, in our cars and planes …” However, another answer would probably be: “I don’t know what it is, but I heard much about it”. Today the Internet is the connection between plenty of computers and billions of people. It is “the net of the nets”.

Almost 4.66 billion people were active Internet users as of October 2020, encompassing 59% of the global population. According to *Digital 2020* data, the number of Internet users in Russia is equal to 118 million, that is 81% of Russians are the Internet subscribers. Today about 3.2 billion of people or about 40% of the world population are not connected to the Internet yet.

**I. Listening**

**a.** *Listen to the conversation between a customer buying a PC and a sales assistant. Why do you think he has to explain so much about the Internet?*

*Why did the customer decide to make notes?*

**b.** *Listen again and complete the customer’s notes:*

|  |
| --- |
| *To connect to the Internet from home, I need:*  *(1) a\_\_\_\_\_\_\_\_ and a (2) \_\_\_\_\_\_. Also I need an account with an (3) \_\_\_\_\_ (a company that offers connection for a monthly fee).*  *If you want to connect lots of computers without using cables, you can use (4) a \_\_\_\_\_ router.*  *Wi-Fi uses (5) \_\_\_\_\_ waves to send data over medium-range distances.*  *Things I can do on the Internet:*  *(6)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*  *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*  *“Web” or “Internet”? The Web: huge collection of (7) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*  *stored on computers all over the world. The Internet: the network which connects all the computers.* |

**II. Reading**

*Read the text and say who the author of the article is and what acute problem he investigates.*

**The Disastrous Events that Would Break the Internet**

Could the internet ever be switched off – or destroyed? Chris Baraniuk investigates what it would take to bring down the network we all now rely on. The internet is unbreakable. At least, we think it is. And if so, does anyone really know for sure what would happen next?

Part of the answer lies in London’s Docklands district: nestled north-east of Canary Wharf is a large, unassuming building, surrounded by a metal fence and there are security cameras dotted along its windowless walls. No hoarding or signage explains to passers-by what it is, or to whom it belongs.

But it houses a substantial node in the internet. It is called “*Linx*”, the London Internet Exchange, and it is one of the biggest points of traffic exchange on the internet anywhere in the world.

There are bigger exchanges out there. Matthew Prince, CEO of content delivery network CloudFlare, puts the number of large facilities like Linx at “around 30”. These buildings, scattered across the globe, are where networks from providers like Virgin or Comcast come together to exchange their traffic. That, after all, is the whole point of an ‘inter’-net. And if any of them were cut off - by a power cut or earthquake, for instance, - we would know about it. “You would actually see regional disruptions on the internet,” says Prince. “And if you were able to actually take out all 30 of these buildings, the internet itself would probably largely cease to function.”

“This sort of doomsday scenario isn’t very likely or feasible, though. These kinds of important internet facilities are extremely well protected,” says Jack Waters, CTO of Level 3 – one of a handful of “Tier 1” network providers that are also crucial because their big and resilient networks help form the backbone of the internet. “We have surveillance everywhere, we take all the appropriate precautions around barricades and those sorts of things. They are very hardened facilities,” he says. “There has never been a known sabotage at one of Level 3’s many buildings,” he adds.

“What would happen if we cut the cables under the sea? Not as much as you might think”, says Thinkstock. There are uncountable miles of cables wrapped around the globe, and many of the biggest are just lying unprotected under water. Cables do often get severed during earthquakes or when ship anchors slice through them on the seabed. It is believed that significant internet disruptions in 2008 that affected countries including Egypt were caused by these sort of cable breaks.

In the early 1960s a Polish-born American engineer Paul Baran came to the conclusion that a communications network could be designed with significant physical survivability, to withstand even a nuclear attack. Donald Davies, a Welsh computer scientist, came up with the same fundamental idea as Baran, completely independent and at almost exactly the same time. Their idea was called “packet-switching” and describes a communications protocol that breaks messages down into small blocks or packets. These are fired across a network via the fastest route available – whatever that route is – until they all arrive at their destination, where they are then reassembled. Take out one link in the network, even an important one, and messages can still arrive where they are expected by taking one of the many alternative routes. “To disrupt things, you don’t need to cut the cable – just reroute the traffic”, says Thinkstock. It’s really clever. “End-to-end communication where the end points don’t care about what is in the middle is a very powerful idea”, says Waters. That’s why cutting cables or throwing data centers offline does limited damage to the network at large.

Eventually, people realized that the internet’s wonderful capacity to re-route traffic could be used against it. One of such way is *a distributed denial* *of service* (DDoS) attack in which a huge flow of traffic is deliberately sent to servers which can’t cope with the overload. “DDoS attacks are becoming more and more common, and they are one of the threats which CloudFlare and other networks are designed to protect their clients against, says Prince. The ultra-high capacity of the CloudFlare network can simply absorb this “bad” traffic and redirect it so that public websites under attack remain online.

Banks, commerce, government systems, personal communication, appliances – a lot of our modern world relies on the internet staying up. But if the internet really went dark, we’d be in trouble.

The truth is, we need the internet so much that no one wants to think about it not being there. But maybe, one day, that may come back to haunt us.

**III. Comprehension**

**a.** *Answer the following questions:*

1. What is the title of the text? 2. Does it reveal the essence of the text? 3. Who investigates the problem of the internet probable crash? 4. What is Linx? 5. How many internet exchanges are there? 6. What event can make the internet cease to function according to Matthew Prince? 7. What does Jack Waters say about the protection of important internet facilities? 8. What example of the internet disruption does Thinkstock give? 9. Who are the creators of packet-switching? 10. What is the gist of this idea? 11. Is it dangerous to take out just one link in the network? Why/Why not? 12. What isa distributed denial of service attack? 13. What is CloudFlare is designed for? 14. Why is the Internet an indispensable tool of our everyday life?

**b.** *Complete the sentences using the words from the box:*

|  |
| --- |
| hackers got manipulated traffic routers packets hijacking re-directed |

Another major concern is BGP hijacking. BGP stands for “border gateway protocol”. This is a key system which tells internet (1) \_\_\_\_\_ - those billions of packets – where to go. For a long time, it was assumed that the BGP (2) \_\_\_\_\_\_ positioned at various points across the network sent the (3) \_\_\_\_\_\_\_ in the right direction. In recent years, however, it emerged that traffic could be surreptitiously (4) \_\_\_\_\_\_\_\_\_ if the destination information logged in the routers (5) \_\_\_\_\_\_, perhaps by (6) \_\_\_\_\_\_. Such (7) \_\_\_\_\_ would mean that huge swathes of internet data could effectively be stolen, or snooped on by third parties, such as intelligence agencies.

**IV. Speaking**

**a.** *Read what Vincent Chan, a professor at the Massachusetts Institute of Technology (MIT), thinks about the Internet crash and discuss it with your partner.*

“I think a massive attack to bring down the whole internet is actually possible”. He points out that physical attacks on the internet’s infrastructure are unlikely to do much permanent damage. Destroying one node in a 1000-node network won’t take the whole network down, of course. But what if you find a software vulnerability that affects all 1000 nodes? Then you’ve got a problem. “I think there should be discussions of attack and defense of the internet as an entity. That’s never been discussed before adequately”.

**b.** *Read what Danny Hillis, an early pioneer of internet technology, speaks on the problem and discuss it with your partner.*

“Nobody really exactly understands all the things the internet is being used for right now. We don’t know what the consequences of an effective denial of service attack on the internet would be. It’s hard to get people to focus on Plan B when Plan A seems to be working so well”.

**V. Watching**

*Watch the video* ***The Internet could crash. We need a Plan B*** (12:31) on YouTube (ted.com/talks/da) and answer the following questions:

1.What does Danny Hillis speak about the internet at its early stages?

2. Can we say that nothing has been changed since then?

3. What are the reasons of the internet’s vulnerability?

4. How can a router affect the air flight?

5. Why does Hillis call the internet fragile?

6. What attempts to crash the Internet did he mention in his talk?

7. In what way is the internet arranged?

8. Do almost all spheres of our life depend on the Internet?

9. Why do people try to protect their PCs instead of the Internet as a means of communication?

10. What does he suggest to build?

**Unit 16**

**Neural networks**

**Starter**

**-** Have you ever heard about neural networks? If so, what are they in your opinion?

- Are there any differences and similarities between a human brain and a computer?

- How do neural nets work?

- What are they used for?

**A. Vocabulary**

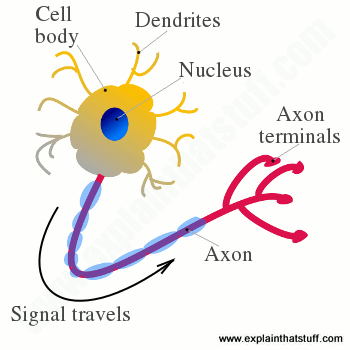
*Scan the information given below and a) copy out the new words; b) ask questions to know the details about a computer and human brain; c) fill in the table:*

|  |  |  |
| --- | --- | --- |
|  | a computer | a human brain |
| similarities |  |  |
| differences |  |  |

Which is better—computer or brain? Ask most people if they want a brain like a [computer](https://www.explainthatstuff.com/howcomputerswork.html) and they'd probably jump at the chance. But look at the kind of work scientists have been doing over the last couple of decades and you'll find that many of them have been trying hard to make their computers more like brains! How? With the help of neural networks—computer programs assembled from hundreds, thousands, or millions of artificial brain cells that learn and behave in a remarkably similar way to human brains. What exactly are neural networks? How do they work? Let's take a closer look!

**How brains differ from computers**

You often hear people comparing the human brain and the [electronic](https://www.explainthatstuff.com/electronics.html) computer and, on the face of it, they do have things in common. A typical brain contains something like 100 billion minuscule cells called **neurons** (no-one knows exactly how many there are and estimates go from about 50 billion to as many as 500 billion). Each neuron is made up of a **cell body** (the central mass of the cell) with a number of connections coming off it: numerous **dendrites** (the cell's inputs—carrying information toward the cell body) and a single **axon** (the cell's output—carrying information away).



*Artwork: A neuron: the basic structure of a brain cell, showing the central cell body, the dendrites (leading into the cell body), and the axon (leading away from it).*

Neurons are so tiny that you could pack about 100 of their cell bodies into a single millimeter. (It's also worth noting, briefly in passing, that neurons make up only 10–50 percent of all the cells in the brain; the rest are [glial cells](https://en.wikipedia.org/wiki/Glial_cell), also called neuroglia, that support and protect the neurons and feed them with energy that allows them to work and grow.) Inside a [computer](https://www.explainthatstuff.com/howcomputerswork.html), the equivalent to a brain cell is a [nanoscopically](https://www.explainthatstuff.com/nanotechnologyforkids.html) tiny switching device called a [transistor](https://www.explainthatstuff.com/howtransistorswork.html). The latest, cutting-edge microprocessors (single-chip computers) contain over 30 billion transistors; even a basic Pentium microprocessor from about 20 years ago had about 50 million transistors, all packed onto an [integrated circuit](https://www.explainthatstuff.com/integratedcircuits.html) just 25mm square (smaller than a postage stamp)! 

That's where the comparison between computers and brains begins and ends, because the two things are completely different. It's not just that computers are cold metal boxes stuffed full of binary numbers, while brains are warm, living, things packed with thoughts, feelings, and memories. The real difference is that computers and brains "think" in completely different ways. The [transistors](https://www.explainthatstuff.com/howtransistorswork.html) in a computer are wired in relatively simple, *serial* chains (each one is connected to maybe two or three others in basic arrangements known as [logic gates](https://www.explainthatstuff.com/logicgates.html)), whereas the neurons in a brain are densely interconnected in complex, *parallel* ways (each one is connected to perhaps 10,000 of its neighbors).

This essential structural difference between computers (with maybe a few hundred million transistors connected in a relatively simple way) and brains (perhaps 10–100 times more brain cells connected in richer and more complex ways) is what makes them "think" so very differently. Computers are perfectly designed for storing vast amounts of meaningless (to them) information and rearranging it in any number of ways according to precise instructions (programs) we feed into them in advance. Brains, on the other hand, learn slowly, by a more roundabout method, often taking months or years to make complete sense of something really complex. But, unlike computers, they can spontaneously put information together in astounding new ways—that's where the human creativity of a Beethoven or a Shakespeare comes from—recognizing original patterns, forging connections, and seeing the things they've learned in a completely different light.

Wouldn't it be great if computers were more like brains? That's where neural networks come in!

**B. Speaking**

**a)** *Describe the picture given above.*

**b)***Work with your partner. Ask and answer questions on how brains differ from computers.*

**C. Reading**

*Read the text and give a brief summary of each of five paragraphs*. *Answer the questions.*

*1. Is the question of a neural network actual today? Why or Why not? 2. What is the most basic idea in the study of a neural network? 3. Is a neural network a brain or a programmer’s creation? 4. What are computer simulations and what do they mean?*

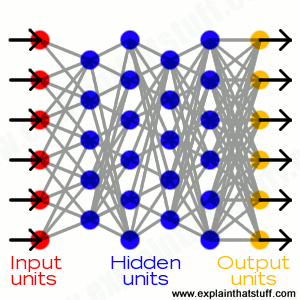
**What is a neural network?**

The basic idea behind a neural network is to *simulate* (copy in a simplified but reasonably faithful way) lots of densely interconnected brain cells inside a computer so you can get it to learn things, recognize patterns, and make decisions in a humanlike way. The amazing thing about a neural network is that you don't have to program it to learn explicitly: it learns all by itself, just like a brain!

But it isn't a brain. It's important to note that neural networks are (generally) software simulations: they're made by programming very ordinary computers, working in a very traditional fashion with their ordinary transistors and serially connected logic gates, to behave as though they're built from billions of highly interconnected brain cells working in parallel. No one has yet attempted to build a computer by wiring up transistors in a densely parallel structure exactly like the human brain. In other words, a neural network differs from a human brain in exactly the same way that a computer model of the weather differs from real clouds, snowflakes, or sunshine. Computer simulations are just collections of algebraic variables and mathematical equations linking them together (in other words, numbers stored in boxes whose values are constantly changing). They mean nothing whatsoever to the computers they run inside—only to the people who program them.

**What does a neural network consist of?**

A typical neural network has anything from a few dozens to hundreds, thousands, or even millions of artificial neurons called **units** arranged in a series of layers, each of which connects to the layers on either side. Some of them, known as **input units**, are designed to receive various forms of information from the outside world that the network will attempt to learn about, recognize, or otherwise process. Other units sit on the opposite side of the network and signal how it responds to the information it's learned; those are known as **output units**. In between the input units and output units are one or more layers of **hidden units**, which, together, form the majority of the artificial brain. Most neural networks are **fully connected**, which means each hidden unit and each output unit is connected to every unit in the layers either side. The connections between one unit and another are represented by a number called a **weight**, which can be either positive (if one unit excites another) or negative (if one unit suppresses or inhibits another). The higher the weight, the more influence one unit has on another. (This corresponds to the way actual brain cells trigger one another across tiny gaps called synapses.)



*Photo: A fully connected neural network is made up of input units (red), hidden units (blue), and output units (yellow), with all the units connected to all the units in the layers either side. Inputs are fed in from the left, activate the hidden units in the middle, and make outputs feed out from the right. The strength (weight) of the connection between any two units is gradually adjusted as the network learns.*

Although a simple neural network for simple problem solving could consist of just three layers, as illustrated here, it could also consist of many different layers between the input and the output. A richer structure like this is called a **deep neural network (DNN)**, and it's typically used for tackling much more complex problems. In theory, a DNN can map any kind of input to any kind of output, but the drawback is that it needs considerably more training: it needs to "see" millions or billions of examples compared to perhaps the hundreds or thousands that a simpler network might need. Deep or "shallow," however it's structured and however we choose to illustrate it on the page, it's worth reminding ourselves, once again, that a neural network is *not* actually a brain or anything brain like. Ultimately, it's a bunch of clever math... a load of equations... an algorithm, if you prefer.

*1. What does a typical neural network consist of? 2. How many layers can a simple neural network consist of? 3. Describe the basic structure of a brain cell and a typical neural network and say in what way they input and output information? 6. What forms the majority of the artificial brain? 7. What is a weight and what role it plays?*

**How does a neural network learn things?**

*1. What is feedback? 2. When do you use feedback? 3. What is backpropagation? 4. How does a neural network learn things?*

Information flows through a neural network in two ways. When it's learning (being trained) or operating normally (after being trained), patterns of information are fed into the network via the input units, which trigger the layers of hidden units, and these in turn arrive at the output units. This common design is called a **feedforward network**. Not all units "fire" all the time. Each unit receives inputs from the units to its left, and the inputs are multiplied by the weights of the connections they travel along. Every unit adds up all the inputs it receives in this way and (in the simplest type of network) if the sum is more than a certain **threshold** value, the unit "fires" and triggers the units it's connected to (those on its right).

For a neural network to learn, there has to be an element of feedback involved—just as children learn by being told what they're doing right or wrong. In fact, we all use feedback, all the time. Think back to when you first learned to play a game like ten-pin bowling. As you picked up the heavy ball and rolled it down the alley, your brain watched how quickly the ball moved and the line it followed, and noted how close you came to knocking down the skittles. Next time it was your turn, you remembered what you'd done wrong before, modified your movements accordingly, and hopefully threw the ball a bit better. So you used feedback to compare the outcome you wanted with what actually happened, figured out the difference between the two, and used that to change what you did next time ("I need to throw it harder," "I need to roll slightly more to the left," "I need to let go later," and so on). The bigger the difference between the intended and actual outcome, the more radically you would have altered your moves.



*Photo: Bowling: You learn how to do skillful things like this with the help of the neural network inside your brain. Every time you throw the ball wrong, you learn what corrections you need to make next time.*

Neural networks learn things in exactly the same way, typically by a feedback process called **backpropagation** (sometimes abbreviated as "backprop"). This involves comparing the output a network produces with the output it was meant to produce, and using the *difference* between them to modify the weights of the connections between the units in the network, working from the output units through the hidden units to the input units—going backward, in other words. In time, backpropagation causes the network to learn, reducing the difference between actual and intended output to the point where the two exactly coincide, so the network figures things out exactly as it should.

**How does it work in practice?**

*1. What does each input unit represent? 2. What does the numeral 1 correspond to in binary numeration system? 3. What does the numeral 0 correspond to? 4. How does the network act during the learning phase?*

Once the network has been trained with enough learning examples, it reaches a point where you can present it with an entirely new set of inputs it's never seen before and see how it responds. For example, suppose you've been teaching a network by showing it lots of pictures of chairs and tables, represented in some appropriate way it can understand, and telling it whether each one is a chair or a table. After showing it, let's say, 25 different chairs and 25 different tables, you feed it a picture of some new design it's not encountered before—let's say a chaise longue—and see what happens. Depending on how you've trained it, it'll attempt to categorize the new example as either a chair or a table, generalizing on the basis of its past experience—just like a human. Hey presto, you've taught a computer how to recognize furniture!

That doesn't mean to say a neural network can just "look" at pieces of furniture and instantly respond to them in meaningful ways; it's not behaving like a person. Consider the example we've just given: the network is not actually looking at pieces of furniture. The inputs to a network are essentially binary numbers: each input unit is either switched on or switched off. So if you had five input units, you could feed in information about five different characteristics of different chairs using binary (yes/no) answers. The questions might be 1) Does it have a back? 2) Does it have a top? 3) Does it have soft upholstery? 4) Can you sit on it comfortably for long periods of time? 5) Can you put lots of things on top of it? A typical chair would then present as Yes, No, Yes, Yes, No or 10110 in binary, while a typical table might be No, Yes, No, No, Yes or 01001. So, during the learning phase, the network is simply looking at lots of numbers like 10110 and 01001 and learning that some mean chair (which might be an output of 1) while others mean table (an output of 0).

**What are neural networks used for?**

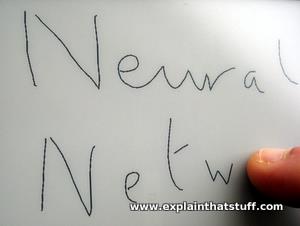
*1. In what spheres of life can neural networks be used? 2. What bank operations can be controlled by neural networks? 3. How do neural networks help us operate*[*radar*](https://www.explainthatstuff.com/radar.html)*scanning systems? 4. In what way does Google use neural networks?*



*Photo: For the last two decades, NASA has been experimenting with a self-learning neural network called*[*Intelligent Flight Control System (IFCS)*](https://www.nasa.gov/centers/armstrong/news/FactSheets/FS-076-DFRC.html)*that can help pilots land planes after suffering major failures or damage in battle. The prototype was tested on this modified NF-15B plane (a relative of the McDonnell Douglas F-15).*

On the basis of this example, you can probably see lots of different applications for neural networks that involve recognizing patterns and making simple decisions about them. In [airplanes](https://www.explainthatstuff.com/howplaneswork.html), you might use a neural network as a basic autopilot, with input units reading signals from the various cockpit instruments and output units modifying the plane's controls appropriately to keep it safely on course. Inside a factory, you could use a neural network for quality control. Let's say you're producing clothes washing [detergent](https://www.explainthatstuff.com/detergents.html) in some giant, convoluted chemical process. You could measure the final detergent in various ways (its color, acidity, thickness, or whatever), feed those measurements into your neural network as inputs, and then have the network decide whether to accept or reject the batch.

There are lots of applications for neural networks in security, too. Suppose you're running a bank with many thousands of credit-card transactions passing through your computer system every single minute. You need a quick automated way of identifying any transactions that might be fraudulent—and that's something for which a neural network is perfectly suited. Your inputs would be things like 1) Is the cardholder actually present? 2) Has a valid PIN number been used? 3) Have five or more transactions been presented with this card in the last 10 minutes? 4) Is the card being used in a different country from which it's registered? —and so on. With enough clues, a neural network can flag up any transactions that look suspicious, allowing a human operator to investigate them more closely. In a very similar way, a bank could use a neural network to help it decide whether to give loans to people on the basis of their past credit history, current earnings, and employment record.



*Photo: Handwriting recognition on a touchscreen, tablet computer is one of many applications perfectly suited to a neural network. Each character (letter, number, or symbol) that you write is recognized on the basis of key features it contains (vertical lines, horizontal lines, angled lines, curves, and so on) and the order in which you draw them on the screen. Neural networks get better and better at recognizing over time.*

Many of the things we all do every day involve recognizing patterns and using them to make decisions, so neural networks can help us out in zillions of different ways. They can help us forecast the stock market or the weather, operate [radar](https://www.explainthatstuff.com/radar.html) scanning systems that automatically identify enemy aircraft or ships, and even help doctors to diagnose complex diseases on the basis of their symptoms. There might be neural networks ticking away inside your computer or your [cellphone](https://www.explainthatstuff.com/cellphones.html) right this minute. If you use cellphone apps that [recognize your handwriting](https://www.explainthatstuff.com/how-ocr-works.html) on a [touchscreen](https://www.explainthatstuff.com/touchscreens.html), they might be using a simple neural network to figure out which characters you're writing by looking out for distinct features in the marks you make with your fingers (and the order in which you make them). Some kinds of [voice recognition software](https://www.explainthatstuff.com/voicerecognition.html) also use neural networks. And so do some of the email programs that automatically differentiate between genuine emails and spam. Neural networks have even proved effective in translating text from one language to another.

Google's automatic translation, for example, has made increasing use of this technology over the last few years to convert words in one language (the network's input) into the equivalent words in another language (the network's output). In 2016, Google [announced](https://ai.googleblog.com/2016/09/a-neural-network-for-machine.html) it was using something it called Neural Machine Translation (NMT) to convert entire sentences, instantly, with a 55–85 percent reduction in errors. This is just one example of how Google deploys neural-network technology: Google Brain is the name it's given to a massive research effort that applies neural techniques across its whole range of products, including its search engine. It also uses deep neural networks to power the recommendations you see on YouTube, with models that "learn approximately one billion parameters and are trained on hundreds of billions of examples." 

All in all, neural networks have made computer systems more useful by making them more human. So next time you think you might like your brain to be as reliable as a computer, think again—and be grateful you have such a superb neural network already installed in your head!

**D. Translation skills**

*Translate into English:*

На сегодняшний день нейронные сети – это одно из приоритетных направлений исследований в области искусственного интеллекта, основанное на попытках воспроизвести нервную систему человека. А именно: способность нервной системы обучаться и исправлять ошибки, что должно позволить смоделировать, хотя и достаточно грубо, работу человеческого мозга.

История развития нейронных сетей берет свое начало с появлением первых компьютеров или ЭВМ как их называли в те времена. В конце 1940-х годов некто Дональд Хебб разработал механизм нейронной сети, чем заложил правила обучения ЭВМ.

Дальнейшая хронология событий была следующей:

- В 1954 году происходит первое практическое использование нейронных сетей в работе ЭВМ.

- В 1958 году Франком Розенблатом разработан алгоритм распознавания образов и математическая аннотация к нему.

- В 1960-х годах интерес к разработке нейронных сетей несколько угас из-за слабых мощностей компьютеров того времени.

- И снова возродился уже в 1980-х годах, именно в этот период появляется система с механизмом обратной связи, разрабатываются алгоритмы самообучения.

- К 2000 году мощности компьютеров выросли настолько, что смогли воплотить самые смелые мечты ученых прошлого. В это время появляются программы распознавания голоса, компьютерного зрения и многое другое.

Под искусственными нейронными сетями принято понимать вычислительные системы, имеющие способности к самообучению, постепенному повышению своей производительности. Основными элементами структуры нейронной сети являются:

- искусственные нейроны, представляющие собой элементарные, связанные между собой единицы.

- [синапс](https://www.poznavayka.org/biologiya/sinaps/) – это соединение, которое используется для отправки-получения информации между нейронами.

- сигнал – собственно информация, подлежащая передаче.

Область применения искусственных нейронных сетей с каждым годом все более расширяется, на сегодняшний день они используются в таких сферах как:

Машинное обучение (machine learning), представляющее собой разновидность искусственного интеллекта. В основе его лежит обучение ИИ на примере миллионов однотипных задач. В наше время машинное обучение активно внедряют поисковые системы Google, Яндекс, Бинг, Байду. Так на основе миллионов поисковых запросов, которые все мы каждый день вводим в Google, их алгоритмы учатся показывать нам наиболее релевантную выдачу, чтобы мы могли найти именно то, что ищем.

В робототехнике нейронные сети используются в выработке многочисленных алгоритмов для железных «мозгов» роботов.

[Архитекторы](https://www.poznavayka.org/obrazovanie/kakie-predmety-nuzhno-sdavat-na-arhitektora/) компьютерных систем пользуются нейронными сетями для решения проблемы параллельных вычислений.

С помощью нейронных сетей математики могут разрешать разные сложные математические задачи.

**E. Watching**

*Watch the videos which will help you to understand the subject matter:*

1) Artificial intelligence explained in 2 minutes: What exactly is AI? https://www.youtube.com/watch?v=UdE-W30oOXo

2) AI Explained: What Is a Neural Net?

https://www.youtube.com/watch?v=xS2G0oolHpox

**Unit 17**

**Technology Addiction**

**Starter**

- How much time should a user spend before a computer monitor in your opinion? Why?

- Why do people become more and more isolated nowadays?

- Why do many prefer to socialize with computer symbols in interactive reality but not with a living soul?

- In what case does a computer become a drug?

**I. Reading**

1. *Read the text and answer the following questions:*

1. What acute problem is discussed in the text? 2. Can the virtual world disturb the balance of the human’s psychology? Why? 3. Why is technology a sort of drug? 4. What precautions would you like to give to an addicted person? 5. What consequences of technology addiction are mentioned in the text? Can you continue the list? 6. Is it possible to overcome digital addiction? What useful tips are given by the author?

Technology addiction refers to the uncontrollable urge or impulse to continue using technology to the point that it starts to interfere with the individual’s mental, physical, and social life. This can be in forms of social media, internet surfing, video games, online gambling, and other related acts. It is also called internet addiction, internet use disorder (IUD), and internet addiction disorder (IAD).

It can cause various psychological and social consequences that can be damaging for the user and his friends and family. Read along further to find out what technology addiction is, the signs and symptoms that someone is addicted to technology, who is at risk to develop this dependence and the treatment options in this regard.

*Technology Addiction Overview*

Technology addiction may be considered a relatively new phenomenon on the radar with the advent and popularity of the internet, various gaming devices, social media, and other similar platforms. It is a [serious problem](http://virtual-addiction.imageworksllc.com/wp-content/pdf/nature_internet_addiction.pdf) where the electronics addict cannot control the use of various kinds of technologies such as the internet, smartphones, tablets, social networking websites such as Twitter, Instagram, and Facebook, and video games. Although technology addiction has not been [classified](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2719452/) as an addiction in the latest Diagnostic and Statistical Manual of Mental Disorders (DSM-5), it still remains a cause of concern among health specialists because of its negative and adverse consequences.

The technology surrounding us makes life easier for us to live and brings new troubles to an end. Mobile phones, tablets, televisions, and electronic games, on which adults tend to be busy for long hours, seem to be inevitable necessities of our time. However, they are slowly becoming inconveniences with the dependence that they create for adults and children.

The addictive effects of technological tools are strong. Due to the so-called ‘technological dependency,’ children spend more and more time with technological gadgets. The signs of technological addiction seen among kids include retreating from social life, inability to sleep, lengthy use of, and excessive reactions when they are cut off from them by parents. Also, depression, autism, attention deficit disorder, and bipolar disorder tend to be more common in this group of children.

[According to a study](https://www.tandfonline.com/doi/abs/10.1080/21641846.2019.1585598), academic success was negatively affected by students who were categorized as internet-addicted and showed greater fatigue levels.

[Another study](https://www.sciencedirect.com/science/article/abs/pii/S0378720611000176) suggests that in a group of 241 organizational users that were studied, the majority showed a dependence on their mobile and technology in general, which increased their perceived workload and technology-family conflict. This, in turn, reduced their performance and productivity.

Yet another [study](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3480687/) found that ınternational pathological internet usage rates range from 1.5 % to 8.2%. However, these numbers would be significantly higher after adding the percentage of other technology-related addictions such as smartphones, games, online sex, and [gambling addiction](https://addictionresource.com/addiction/gambling/).

[Research shows](https://healthjournal.uconn.edu/2018/03/02/internet-gaming-addiction/) that approximately 1 in every 8 US citizens is facing tech addiction.

*Types of Technological Addiction*

The misuse of technology can lead to dependency, and it can assume a nurturing role for other behavioral addictions outside the internet.

*Tech Addiction Covers:*

* Video or computer games
* [Social media addiction](https://addictionresource.com/addiction/social-media/) (Twitter, Facebook, Instagram, Snapchat, etc.)
* Smartphone dependency
* Internet dependency
* Computer addiction
* Compulsive internet use
* Online gambling
* Online shopping
* Virtual sex addiction
* Pornography
* Texting
* Online auctions
* Online betting

According to the investigations made, pathological [gambling](https://addictionresource.com/addiction/gambling/), alcohol dependence, and [drug addiction](https://addictionresource.com/drugs/) have neurobiologically common etiopathogenesis; compulsive shopping, excessive internet use, and compulsive sexual behaviors may also be using the same mechanisms.

*How Does the Brain Work of Someone Addicted to Technology?*

The way digital addiction [affects the brain](http://sitn.hms.harvard.edu/flash/2018/dopamine-smartphones-battle-time/) is similar to that of chemical addictions, where certain acts are followed by rewards, which lead the brain to release dopamine, serotonin, and other neurotransmitters to make one feel good. This reward may be in the form of winning a game, gaining likes and comments on a certain post on social media, or winning in online gambling. With continued use, the flood of dopamine continues to increase, thus compelling the electronics addict to continue using that technology. The user becomes psychologically dependent through this consistent and frequent exposure to the stimuli.

*Signs of Technology Addiction*

Just as with alcohol and drug addictions, technology addiction affects the user physically and psychologically; therefore, there are different types of signs and symptoms which are discussed below:

*Physical Symptoms*

Some of the physical symptoms that a person who is addicted to technology might face include:

* Reduction of self-care
* Dry eyes
* Back and lower back pain
* Weight gain linked to lack of movement
* Carpal tunnel syndrome
* Impaired sleeping patterns
* Head wounds

*Social and Psychological Symptoms*

The social and psychological symptoms that can indicate a digital addiction may include:

* A decline in academic achievements
* Personal, family, and school problems
* Failure to manage time
* Sleep disorders
* Eating disorders
* Reduction inactivity
* Internet friends, outside isolation

*Positive Use of Technology*

Technology can be used in a [positive manner](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5560000/), especially by young users, so that it helps them explore the world and express themselves in a healthier way.

*Some of the Ways that It Can Be Used Positively Are Listed Below:*

It can be used as a source of learning through a wide array of resources for the young, where it provides a platform for education and civic development.

It can be used to foster creativity in individuals so that they can express themselves and build their metacognition skills.

It can be a platform for healthy and productive socializing through mutual friendships and communities.

*Emotional Intelligence and Technology Addiction*

Emotional intelligence, the ability to understand emotions and cope with them, allows us to manage environmental conditions. Surveys conducted on university students show that [internet addiction](https://addictionresource.com/addiction/internet/) is related to introversion and isolation. [According to this study](https://www.iomcworld.org/abstract/the-relationship-between-emotional-intelligence-andtechnology-addiction-among-university-students-18720.html) about the relationship between emotional intelligence and technology addiction, there is an inverse relationship between the severity of internet dependence and emotional intelligence. [Another study suggests](https://link.springer.com/article/10.1007/BF01539189) that dependence is the result of shifts in subjective experience and that new technology and the Internet can provide relatively reliable and potent contemporary vehicles for changing emotional states.

*Risk Factors for Electronics Addict*

Everyone seems to have a reason to use technology, such as a “need” for instant access to the social world. The [risk factors](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4603790/) for being addicted to technology include:

* Genetics and Gender

Some genes are more dispositioned than others to seek compulsive behavior, thus increasing the risk of developing an addiction. Males are more at risk as compared to females. Single people also have a greater tendency to become an electronics addict.

* Previous Mental Health Conditions

People with a mental condition such as anxiety, depression, frustration, stress, and other mental health disorders are also at an increased risk of developing a dependence. Individuals who have suicidal thoughts are more at risk of developing technology dependence.

* Internet Usage Time

The more time a person spends on the internet or using technology, the more chances are for him to be addicted to it. Excessive online gaming also increases the risk of developing an addiction.

*Technological Addiction Diagnosis*

There are several questions that electronics may be asked to diagnose whether or not he is addicted to technology or not.

These include the following:

- Does an addict keep thinking about their previous tech-related activity or expect what the next session is going to be like?

- Does an addict need to use the internet or technology for longer periods to achieve some kind of satisfaction?

- Does an addict feel that they need to limit the usage time but fails to do so?

- Does an addict sue the technology for a longer time than what he had intended?

Apart from these questions, there could be several [behavioral acts](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5329986/) that could point towards a technology dependence. These include:

* Increased time spent on technological activities
* Failure at controlling behavior
* Increased feelings of euphoria when accessing technology
* Excessive craving and desire towards technological activities
* A decrease in interactions with friends and family
* Feeling unrest when not in operation (for example, waking up in the night to be online, resulting in lack of sleep affecting the day)
* Losing integrity in social environments (for example, lying to get out of previous engagements so as to spend more time with technology)
* Problems in performance at work or school
* Losing a job, relationship, or a significant opportunity because of excessive usage
* Spending and losing money on the internet not leading to feeling guilt, shame, anger, or sadness
* Changes in sleep patterns
* Lying to family members and therapists about internet or technology usage
* Weight gain, physical changes such as headaches, back pain
* Withdrawal from other pleasurable activities
* Using technology as an escape from problems or stress

If you think that you suffer from tech addiction, there are behavioral and pharmaceutical treatments. Please ask your doctor or call any help center number to find more information.

*Internet Addiction Treatment*

There are several approaches to treating technology dependency. Some of these are discussed below:

*Psychological and Psychosocial Approaches*

These include [certain therapies](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5844169/) that have been proven successful in treating digital addiction:

- [Cognitive Behavioral Therapy](https://addictionresource.com/treatment/therapies/cognitive-behavioral-therapy/) (CBT) – CBT has shown successful results by which patients are taught to uncover unhealthy patterns and find ways to create healthier thoughts and actions. CBT combined with electroacupuncture has also shown promising results in this regard.

- [Motivational Interviewing](https://addictionresource.com/treatment/therapies/motivational-enhancement-therapy/) (MI) – MI helps patients learn new behavioral skills that can help them give up addictive behaviors.

- Reality Therapy (RT) – RT works by making the patients realize that a problem exists and they have to change their lives through behavioral changes. It also focuses on teaching patients how to pass the time and finding alternative and healthy activities to keep themselves occupied.

- [Counseling](https://addictionresource.com/treatment/addiction-counselors/) – Through counseling, a counselor can help patients cope with stress and negative emotions that they might feel during their recovery journey. Usually, patients also have a co-occurring mental health disorder, which is also dealt with through counseling and other therapeutic approaches.

- Family Therapy – Family interventions play an important role in addressing relationship problems that might have caused or been a result of internet addiction. Marriage counseling may also be helpful when the addiction disrupted the family unit.

*Medication*

Certain medications may also be prescribed to digital addicts to help them recover from technology dependence. These usually include selective serotonin reuptake inhibitors (SSRIs). These work for many addicts who also develop symptoms of depression, stress, and anxiety. SSRIs can help improve mood and decrease cravings for internet usage.

*Support Groups*

There are several support groups that one can join in order to overcome tech addiction. These support groups may also be in the form of [12-step meetings](https://addictionresource.com/treatment/12-step-programs/) and groups based on the Alcoholics Anonymous (AA) model. Through these support groups, addicts can find support and motivation from people who are also in similar situations and consequently move towards recovery together.

*What Can One Do to Avoid Technological Addiction?*

There are some useful tips for an electronics addict who wants to overcome his digital addiction. These include:

**Plan a new schedule** to disrupt patterns

**Change daily internet** and smartphone**usage hours**.

**Set goals** to limit use time.

**Limiting or quitting the use of certain apps** and games.

**Prepare weekly internet usage schedules** and ensure compliance.

**Spend some time with support groups** or other methods, like family therapy.

**Create a list of activities** that were missed because of excessive technological usage.

Make a **list of activities that one would like to do** and adhere to it.

**Remind oneself of the benefits** of stopping excessive usage.

Addiction is a disease that can be overcome with a [recovery plan](https://addictionresource.com/treatment/addiction-recovery/) by evaluating personality dynamics and many variables taken together.

2. *Fill in the table using information from the text:*

|  |
| --- |
| Technology |

**/ \**

|  |  |
| --- | --- |
| Advantages | Disadvantages |

**II. Listening**

**a.** *Listen to three people talking about problems with their health. Which of the speakers is digitally addicted?*

**b.** *Listen again and answer the questions:*

1. How many hours does the first speaker spend on the computer?

2. How does he try to stop getting headaches?

3.What kind of work does the girl’s father do?

4. What does her father wear?

5. What do the third speaker’s friends think about him?

**c.** *Work with your partner. Ask and answer these questions:*

1. What advice would you give to the first speaker?

2. What advice would you give to the girl’s father?

3. What advice would you give to the third speaker?

**III. Speaking**

*Work in pairs*. *Continue the dialogue:*

1. **A:** I think that people today stop personal contacts preferring to stay on the Internet.

**B:** Unfortunately, …

2. **A:** It is really fun when you can chat with a guy, for example, from Australia or Argentina, play a game of chess with a peer from Great Britain, or even make purchases via the Internet.

**B:**

3. **A:** This is the paradox of our modern society: people are becoming more and more isolated from each other.

**B:** You’re right. In spite of all that the technical progress brings them, people …

4. **A:** What do you think of digitally addicted people?

**B:** As far as I can see the number of them increases dramatically.

5. **A:** At the lecture our teacher spoke on social and psychological symptoms of digital addiction.

**B:** Really? It’s interesting to…

**IV. Writing**

Write the summary of the text using the rules and recommendations given in Unit 7.

**Unit 18**

**Women and IT**

**Starter**

**-** Do you often use different types of diagrams during your study?

- What types of diagrams do you know?

- Why do people need diagrams?

*Find answers for the above questions in the text and compare them with your partner’s:*

*Working with diagrams*

In this text you will look at how pictures and diagrams can be used to represent information and ideas. In mathematics, science and technology (MST) subjects, we can often summarize how ideas or processes are connected much more neatly in a diagram than in words, or we can show how something looks and works by drawing a picture of it. This means that, as a learner, you need to be comfortable with pictures and diagrams. You need to learn how to *read* them – how to extract information from them and interpret what they mean. And you need to learn how to *draw* pictures and diagrams of your own, so that you can capture your own ideas and interpretations on paper.

*Types of diagrams*

As there is a great variety in the types of diagrams we use, we need to think more broadly about what pictures and diagrams are trying to represent. You will encounter three main types of diagrams when studying MST subjects.

1. *Pictures* or *pictorial diagrams* that attempt to represent the essential features of a part of reality – for example, diagrams of equipment, molecules or parts of a plant.

2. Diagrams that try to describe *interrelationships* between ideas, processes or concepts using words, lines and various blobs or boxes.

3. *Mathematical diagrams*, such as charts and graphs, that are mainly designed to convey mathematical relationships – for example, comparisons over time.

*Graphs and charts*

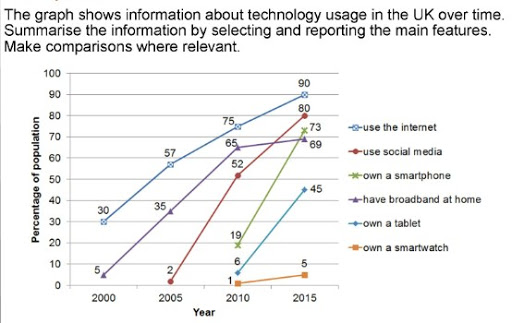
Line graphs, histograms and bar charts are diagrams that show the relationship between two different quantities. For example, in hospital, a patient's temperature is often recorded at regular intervals and plotted as a line graph. This allows medical staff to see at a glance how high the temperature is and how it is changing. You often see graphs and charts in the media summarizing unemployment figures or a company's profits over the last few months.

Whatever form they take, graphs and charts are used because they summarize numerical information in a way that provides a quick, visual overview but still gives you access to large amounts of data in a condensed format. Whereas a line graph or histogram shows continuous data for all intervals, a bar chart is often used for discrete intervals – say, data from every other year – or when there is more than one value for a particular interval. A pie chart is simply a way of indicating the proportions of items, with the size of the slices sometimes providing yet more information.

Some people find it easy to use diagrams in their studies. But there are others who don't take to diagrams at all enthusiastically. Nevertheless, *everyone* can get something from using diagrams to help their thinking. Remember that many assignments in MST subjects will either expect or even require the use of certain types of diagrams, so the skills involved in reading and using all types of diagrams are well worth developing.

**I. Problem Solving**

*Look at the diagram, define its type, read the description and underline words and expressions you will need when working with graphs:*



*The graph shows the rate at which British people adopted new technology over a 15-year period from 2000 to 2015. The figures are given as percentage of the population.*

*Overall, there was widespread adoption of new technology during these years. Nearly nine out of ten people in the UK were online by 2015. The figures for having broadband in the home, ownership of a smartphone and use of social media platforms were all high that year too, at around 70 to 80 %, and nearly half of population owned a tablet. The only exception to this is smartwatch ownership which remained comparatively low at 5%.*

*If we look at the trends over time, we can see that the uptake of new technology increased dramatically in this period. For example, the Internet usage tripled and social media usage grew strikingly by 78 percentage points. Smartphones and tablets appeared in 2010 and, similarly, these followed a steep up trajectory. However, for some products, the graph shows that growth slowed down noticeably after an initial surge. Social media usage, for instance, was near zero in 2005 and shot up to 52% in 2010 before climbing more slowly to 80% in 2015. Also, broadband subscriptions rose steadily by 30 percentage points by every five years to 2010, but by a modest 4 percentage points after then. In contrast, the newer technologies such as tablets showed no sign of leveling off.*

*Ownership of all the technologies was increasing, it will be interesting to see when it peaks.*

**II. Scanning Reading**

*Answer these questions before you scan the text:*

- Who uses computers and the Internet more, men or women (boys or girls)?

- What are reasons for this?

*Read the text quickly.*

**a.** *Write the correct heading above each section.*

***Why are boys better at IT?***

***Why is IT important?***

***Is the world changing?***

***Did you know that...***

1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

· more men use IT than women?

· only 33% of the people studying IT are girls?

· only 4% of computer scientists are women?

This is strange because it's a fact that girls are just as clever as boys in science and mathematics.

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The usual explanation is that boys learn basic computer skills through video games. Girls do not usually like these violent and aggressive games, so boys have earlier experience with computers. What's more, when the Internet started, men did not encourage women to join. Many women who use the Internet complain that men are rude and unpleasant to them.

3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

More than 75% of future jobs will need people with computer skills.

Thousands of companies use the Internet to advertise job vacancies.

Computers are tools, not just toys, and they can help everyone get good jobs.

You don't need to be a genius to learn computing. It just takes practice!

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Yes! 51% of new Internet users are women. More people are using Netiquette, which encourages women and girls to go online. More girls are learning computing, and programmers are designing imaginative and non-violent games that are fun and exciting to play.

**a.** *Match the charts with the figures from the text which they illustrate:*

1. Girls and boys studying IT

2. New Internet users

3. Computer scientists

**b.** *Match the first part of the sentence (1-5) with the second one (a-e).*

1. If you want to learn computing a. girls are as good as boys at IT.

2. Girls prefer playing b. by surfing the Internet.

3. You can find a lot of jobs c. you must practice a lot.

4. It is a fact that d. but they enable you to do many things.

5. Computers are not just toys e. interesting and creative video games.

**c.** *Circle the word in each group that is different.*

1. imaginative creative boring interesting

2. help encourage support stop

3. fact opinion belief idea

4. typical strange unusual unlike

5. aggressive rude unpleasant nice

6. violent peaceful gentle helpful

7. silly genius intelligent clever

8. complain promise guarantee agree

**II. Speaking**

*Work with the partner. Name and describe some computer games that you like. Are they more for boys, girls or both? Say why.*

**III. Reading**

*Read the text and answer the only question:*

Why is it beneficial to hire women in IT?

**Future of Women in IT**THE

*What does the future for women in IT hold? Proportional representation? Equal pay? More female CIOs? Boundless opportunities?*

Computing remains a heavily male-dominated field.  The current stats aren’t particularly optimistic. Only one-in-six tech specialists in the UK are women, only one-in-ten are IT leaders and, worse still, despite significant growth in the number of women working in IT roles, female representation in the technology sector has stalled over the last ten years, research reveals.

There are two clear outcomes for the future of women in IT: stagnation continues or more women enter the IT sector.

**I know which future I would like and, thank goodness, I’m not alone.**

The UK economy would benefit from an extra £2.6 billion each year if we increase the number of women working in tech to fill the prevalent IT skills shortage. Improved communication skills, innovative ideas and boosted morale were named as the core benefits most likely to come from hiring more women in the workforce, according to a report from Nominet.

The business world is starting to act on this fact. There has been a slow and steady stream of work to improve the recognition and representation of women in IT [from big businesses and outreach organizations alike](http://www.technojobs.demomycms.co.uk/increasing-demand-for-women-in-it).

Some of technology’s biggest companies, including Apple, Facebook, Google and Intel, have also pledged to improve the future of women in IT.

Small changes are starting to manifest in the tech sector for women, which provide a glimpse into what the future may hold. Here are a few predictions:

**Solid Career Progression**

A survey of 1,500 women working in technology found more than half aged between 18 and 39 reported good opportunities to advance their career. This provides a glimmer of hope and suggests Silicon Valley is changing its attitude to recognize and reward female workers.

But we still need to provide a wide range of career options in IT, as Dave Gibbs, STEM computing and technology specialist at the National STEM Learning Centre and Network says: “People and project management are areas in the sector where women succeed now – they just aren’t highly visible or obvious paths in tech companies, which are still regarded by many as different to other companies.”

The tech industry needs to brush up on the way it assesses and rewards staff to further improve career progression, as Gillian Arnold, chair of BCSWomen, said: “Effective monitoring is key. When we are monitoring then we can build business cases and take action. In terms of the future of women in IT, the next 10 years is all centered around whether we can attract women and keep them in IT.”

**Improved Rates of Pay**

The gender pay gap in the tech industry is actually smaller than in other sectors, research reveals. Big tech businesses are also eager to close the gender pay gap with the likes of Intel and Salesforce.com pledging to pay the same wage to women and men doing the same work.

With women with less than two years of experience better at negotiating pay than their male coworkers and a continuing skills shortage in the tech sector, it seems that the only way is up for rates of pay for female techies.

**A Mindset Reboot**

To build a viable future for women in IT, there must be a cultural shift. Arnold said: “There are some mindsets which need changing, so the more unconscious bias training which can be done, the more we can break down institutional barriers to the acceptance and progression of women in IT.”

Silicon Valley’s big hitters are championing unconscious bias training that can prevent men from seeing their female colleagues’ contributions. It’s part of a wider move to promote further equality in the tech workforce, which means women will find themselves working as part of a more diverse team in the future.

**Endless Opportunities**

Thanks to better recognition from the business sector, the possibilities for women in the IT industry are endless, according to Gibbs, who said: “There is so much opportunity out there for women going to work in information technology. Now that the companies are beginning to wake up to the value of women in the industry, both as customers and employees, there are endless possibilities to explore.”

While [these opportunities are bountiful](http://www.womenintech.co.uk/why-work-in-technology), the future for women in tech depends on the IT industry’s ability to inspire young women to study computing and technology throughout their school careers, and then go on to apprenticeships and degrees in these subjects.

The work does not end here. The tech sector must continue to encourage women to apply to the industry and then retain the female demographic.

Technology’s future depends on it.

**IV. Writing**

*Write the brief summary of the text.*

**V. Speaking**

*a. Read some statistical data and make comparison:*

1. In [the USA](https://tadviser.com/index.php/Article:United_States_of_America_(USA)), according to the research of recruiting company Burtch Works published in 2018, only 15% of specialists in the theory and methods of data analysis are women. And the research conducted by AI Now Institute in 2019 showed that less than 20% of researchers in the field of [the artificial intelligence (AI)](https://tadviser.com/index.php/Artificial_intelligence_(AI,_Artificial_intelligence,_AI))submitting applications for participation in prestigious conferences in this sphere are female and only about a quarter of the students studying AI at Stanford University – girls.

2. Similar situation is in Britain. There the recruiting company Datatech Analytics found out in 2019 that women hold about a quarter of all positions connected with Data Science.

3. Estimates of a number of respondents of TAdviser of employees of research teams in universities indicate that [Russia](https://tadviser.com/index.php/Russia) in this respect, one may say, is in a trend. They estimate a share of women occupied in researches in the field of data, on average in 15% though in certain areas call also higher percent – to 35-40%, for example, in the field of research and development in a scope of the artificial intelligence (AI) for the problems connected with environmental protection and agriculture.

*b. Design a bar chart using the data given above.*

*c. Look through the quotation and say what the author thinks about woman’s role in the development of science and technology:*

*“It is considered that such work is complex for women. I do not agree with it: there are more and more female research teams working in scientific and analytical community. I think that it was affected by the high level of education in Russia in natural and technical science. Everything in the world begins with the idea as still the ancient Greek philosopher Plato showed. He also argued on the capacity of the society to generate and realize these ideas. The person can develop, will always pull the person to novel areas: and in external space, and in internal intellectual space”* (Tatyana Podladchikova, the senior teacher of the Space center of Skoltech, Candidate of Technical Sciences)

**VI. Presentation**

*Make a presentation about Russian women conducting researches in the field of Big Data, artificial intelligence and machine learning. Use information from the Internet. See how to make an effective presentation in the blog*

*maths-dgu.blogspot.com*

**Unit 19**

**TheLetterof Application**

**Starter**

- Have you ever written the letter of application?

- Is it always necessary to write the letter of application? Why or Why not?

- What information should be written in the letter of application?

- What is the letter of application usually accompanied by?

**I. Scanning Reading**

**a.** *Scan the job advertisement and say what specialist is required. What is this position dealt with?*

|  |
| --- |
| DTP operator is required for a leading financial magazine. We are looking for a bright, competent QuarkXPress operator with, at least, three years’ experience in design and layout. Skills in Photoshop, Freehand or Illustrator (an advantage). Ability to work in a team and to tight deadlines is vital.  *Please apply in writing, with CV and samples of your work to Tom Parker, Production Manager, Financial Monthly, Stockton Street, London, EC1A 4WW or apply online.* |

**b.** *Imagine you have been asked to publish a job advertisement on the Internet. Choose any vacancy you like. You may use the following tips which will help you.*

|  |  |  |
| --- | --- | --- |
| 1. Systems Manager Programmer | 2.Support Analyst: IBM Mainframe MVS | 3. Programmer |
| -technical specialist  -min.2 yrs in systems programming  - plus exp.of Netview/automation design and support | - IBM MVS support technician  - 1 yr exp. of VTAM, NCP, SSP, NPM, IBM 3745-900 hardware  -authorized to work in the EU | - 3 yrs exp. SAP Basic Technical Environment  - team player with strong analytical and problem-solving s-skills  - ability to communicate issues and solutions and manage time effectively |

|  |  |  |
| --- | --- | --- |
| 4. Webmaster | 5. Cisco Technician | 6. IS Manager |
| - strong Unix experience  - able to use HTML, DHTML and JavaScript  -knowledge of Shell Scripts | - CCNA qualified  - excellent skills in the surrounding technologies  - min 2 yrs work in support | - knowledge of NT and Netware  -experience of ERP systems implementation  -very strong managerial skills |

**II. Reading**

*Read the letter of application and say why it is necessary for a candidate to write the letter of application properly. Answer the questions given below:*

|  |
| --- |
| Dear Mr. Scott,  I am writing to apply for the position of Senior Programmer, which was advertised on March 28 in **The Times** *Jobs.*  I graduated in May 2018 and did a work placement with British Gas as part of my degree. Before taking my present job I worked for a year with *NCR*, I stayed in this job until March 2020.  For the last three years I have been working as a software engineer for *Intelligent Software*. I have designed four programs in *COBOL* for commercial use, and since January I have been writing programs in *C* for use in large retail chains. These have been very successful and we have won several new contracts in the UK and Europe on the strength of my team’s success.  Two years ago I spent three months in Spain testing our programs and also made several visits to Italy, so I have a basic knowledge of Spanish and Italian. I now feel ready for more responsibility and more challenging work, and would welcome the opportunity to learn about a new industry.  I enclose my CV. I will be available for an interview at any time.  I look forward to hearing from you.  Yours sincerely,  Sarah Brown |

1. Which job is Sarah applying for? 2. Where did she see the advert? 3. What company did Sarah do a study-course for her degree? 4. How long has she been working as a software engineer? 5. What types of programs has she written? 6. What countries did her team and she win new contracts? 7. How long did it take her to test programs in Spain? 8. What level of Spanish and Italian has she got? 9. What kind of work is she ready to start? 10. What personal qualities does she possess?

**b.** *Work in pairs. Refer back to the letter of application. Do you think Sarah has a chance of being invited for the interview? Why or Why not?*

**c.** *Think of the ideal job you would like to have and write the letter of application.*

**III. Speaking**

*Work in pairs. Rank the things you want from your future job: 1 = most important, 10 – least important. Speak about the advantages and disadvantages of your job.*

|  |
| --- |
| high salary \*flexible working hours \* responsibility\* interest or enjoyment \* a nice office \* telecommuting \* long holidays \* working with people \* security \* excitement/risk \* good benefits (e.g. a company car, gym membership) |

**IV. Writing**

**a.** *Study Sam’s CV who was interviewed in Unit 2. Then write your own CV. It is supposed you have passed all your exams and got a Diploma.*

|  |
| --- |
| Curriculum Vitae  ***Personal details***  Name: Sam Knight  Address 27 Richmond Road, Stonebridge EG28ZT  Telephone: 0123456789  Email:samnight0582@hotmail.com  Date of birth 30/05/79  ***Education***  1996 – 1997 HNC in Computing Maxwell College  1997 – 1999 HND in Computing Support Maxwell College  ***Work experience***  1999 – present IT consultant Rondosystems  Rondosystems is an IT company that provides a complete range of computing services for its corporate clients  My experience includes:   * Advising clients on IT issues and strategies * 1st line customer telephone support * Database design * Configuration and installation of hardware and software to client’s specifications * Network administration and implementation * PC assembly   I have knowledge of these areas:   * Windows 2000 Server/Professional * Office 97, 2000 * Sage line 50 & 100 * Windows 95/98 * TCP/IP Networking * Windows NT4 Server/Workstation * Exchange Server 5.5 * Veritas Backup Exec for NT   Hobbies and interests   * Baseball * Reading IT journals * Driving license and car racing   Referees  1. Academic Dr D. Mitchel, IT Department, Maxwell College  2. Work Ms M. Ling, Personnel Officer, Rondosystems |

**V. Watching**

*Watch the video* ***How to write a CV in 2020? (10:38)*** *on YouTube and copy out the main rules for writing a good CV.*

**Unit 20**

**A Job Interview**

**Starter**

- What is a job interview in your opinion?

- Do you think a job interview is a necessary procedure? Why/Why not?

- Have you ever had an interview? If so, what sort of questions were you asked?

- What are the peculiarities of an IT specialist’s interview?

**I. Vocabulary**

**a.** Match the synonyms:

1. applicant a. commission

2. CV b. job

3. recruit c. candidate

4. position d. interlocutor

5. a panel e. hire

6. interviewer f. résume

**b** *Complete the sentences with the words from the box:.*

|  |
| --- |
| candidate interview interviewer a panel CV recruit position a short list |

1. When a company or organization needs to \_\_\_\_\_\_ or employ new people, it may decide to advertise the job or \_\_\_\_\_\_in the appointments section of a newspaper.

2. A letter of application is often accompanied with a \_\_\_\_\_\_\_ containing details of applicant’s education and experience.

3. The company’s Human Resources department will then select the most suitable applications and prepare a **\_\_\_\_\_\_\_\_**of **\_\_\_\_\_\_\_\_\_**, who are invited to attend an **\_\_\_\_\_\_\_**.

4. With so many potential questions that could be asked during the interview by \_\_\_\_\_\_ that could number anywhere between six and twelve individuals, it’s important to relax and consider every answer.

5. The \_\_\_\_\_ presents a problem and then asks a series of questions to find out how the candidate would approach the problem.

**II. Reading**

*Read the guide for Human Resources managers and say what questions asked during the interview depend on. Do you think this text will be helpful for the candidate?*

**Job Interview for IT Pro: Guide for HR Managers**

For an [IT company](https://cactussoft.biz/), the search for talent is like going through the nine circles of Hell. The trouble is not about the necessity to be fluent in a high tech environment (or, at least, not mixing up C++ and C#), but more about tuning in to the same wavelength as the candidate. It’s no secret that IT people think in their own way. This unusual way of conducting a job interview is also a must if you want to see whether you need this particular person to dive in your code debris.

We’ve prepared a few questions for a job interview for IT pro, so you can familiarize yourself with your candidate, to see his or her way of thinking. This list does not include any tech questions: these depend on the job offer, the job position, your knowledge and many other factors. So let us go through the basics.

Do you get bored easily?

A million-dollar question, since there are two absolutely opposite answers, both of which are good in their own ways. It mostly depends on the position this job interview is for. If your business is looking for a guy for a project-based job, the “yes” answer is preferred, since your candidate will get on well with switching duties on the go without losing interest.

If you’re looking for someone with the ability to handle a boring, routine job, the “no” answer is your best bet.

Could you please explain any programming principle so that even a child could understand it?

This question provides a great opportunity to check your candidate’s creativity. It’s purely a creative test, so any programming aspect will do. At the same time this question can be dangerous, since some candidates might be unable to provide an answer due to professional conditioning and inability to speak in simple terms.

At any rate, you’ll find out about the candidate’s flexibility.

***Ask a “tough situation” question.***

This is straightforward. This way, you are able to assess the flexibility of your candidate. See if the candidate asks relevant questions about the situation, and how many. Follow their logical process and methods of finding a solution, and decide whether or not the newcomer fits into your system.

Do you follow modern IT trends? How do you think they will change workflow for IT employees in the future?

Simple one.

Even if you don’t go further than the Internet browser, it’s important to know if your candidate follows technology advancement and the world around him in general. These questions are simply to check if your guest is comfortable with technological developments.

Of course, your candidate might have been reading news feeds just before coming to the interview, but why don’t we think positively?

*What types of activities would you expect and prefer this role to entail?*

This is a tough question! It’s a test of whether your candidate is aware of the duties he might be expected to perform in the position he is applying for. It’s a test for you too, so you can see if your expectations are the same as your candidate’s. If those expectations can’t mix – well, sorry, but you might expect to end the job interview right here.

*If you could make a few changes at your former place of employment, what would they be?*

This is a magnificent question that many HR managers tend to ignore at their peril. This one magically solves several issues at the same time.

Firstly, you can follow your candidate’s logic and way of thinking. This is an important point, since all [IT](https://cactussoft.biz/) jobs are built upon a delicate balance of methods, results and logic that vary from task to task. In other words, it’s an essential trait for an IT specialist. Secondly, you can rate strategic thinking; and thirdly, you will find out how good your candidate is at keeping corporate secrets!

*Ask your candidate to provide examples of previously completed projects.*

This step is basic and essential. After all, you must find out how talented your newbie is.

*Ask your candidate to tell you about his/her hobbies.*

Look at this guy (or girl!): young; passionate; skillful. But what is hidden under the shell of professionalism and code wizardry? Ask him or her to tell you about free time, so you can see the personality within.

There is a catch, though: You’re not asking this to make a friendly impression on your candidate but to see if there is a hidden ability to tell other people about a product, or maybe even a passion to present something onstage.

Now you’ll have a good idea of your candidate’s views on life and everything.

WHAT NOT TO ASK

*Why did you choose our company? Why must we give you this job?*

The problem here is not visible to the civil sector, since it’s a standard question in job interviews. But since we’re here to talk about IT jobs, remember that the bubble of the IT field is *huge*, and that it doesn’t look as though it’s going to explode anytime soon. If you’ve found a really good candidate for this job, [avoid these two questions](https://wispapp.com/blog/2016/03/31/interview-questions/) during a job interview for IT pro at all cost – if he or she doesn’t like you, there are competitors on the market who will gladly pick up this talent.

The demand for code wizards is higher than ever, so if you take too long considering options, your candidate will simply go elsewhere.

Try not to give your candidate any cause to suspect your company is selective or picky, especially when it comes to really good talent going to waste. Your candidate will certainly find a job, but will you find another with these qualities?

**III. Comprehension**

**a.** *Explain in your own words what the following expressions mean:*

*-* acode wizard

- the bubble of the IT field

- to go through the nine circles of Hell

- fit into the system

- to ignore at smb’s peril

- a newbie

- to go to waste

**b.** *Answer the following questions:*

1. Who is this guide for? 2. What role do HR managers play in the company? 3. Is it difficult to recruit qualified professionals in IT? Why?/Why not? 4. Why is conducting a job interview a must? 5. What does a list of questions for the interview depend on? 6. Which of the questions given in the text would you like to exclude and why? 7. Can questions asked, put an applicant in a pretty uncomfortable situation? What are they in your opinion? 8. Which of the questions confuses you mostly and why? 9. Do you think interviewing is stressful for a candidate?10. What question can check your candidate’s logic and way of thinking? 11. What are the questions on candidate’s hobbies for? Do you think them relevant? 12. Why are some questions not to be asked?13. Do you think the interviewer should ask a candidate to solve any IT problem? 14. What question can frighten the candidate?

**c.** *Work with your partner. Write a list of questions for the interview. Then compare your questions with those of your partner.*

**IV. Listening**

**a.** *J. Chris Scott, the Personal Manager at Digitum-UK, is interviewing Sarah Brown. Listen to part of the interview and complete his notes.* (Infotech.St.b.Un.26Task 4, Tr.32)

|  |
| --- |
| Name: Sarah Brown  Qualifications:  Degree in (1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Aston University)  Languages (2): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Work experience:  NCR (3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (one year)  Software for (4): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Programs for (5): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Database knowledge (6): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Present job (7): Works for Intelligent Software \_\_\_\_\_\_\_\_  Reasons for applying (8): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**b***. Do you think Sarah has a chance of getting the job? What are her strengths and weaknesses in your opinion?*

**V. Speaking**

*Work with your partner. Prepare a short* ***role play*** *between an interviewer and applicant. Try to use some of the expressions from the text and interview you have already listened to****.*** *Then act it out.*

**VI. Watching**

*Watch the video film* ***IT (Information Technology) Interview Questions and answers*** (8:53) *on YouTube and make a list of questions Richard McMunn gives in his lecture. Is there any difference between the information given in the text and the lecture you have just listened to?*

**Glossary**

**of abbreviations and acronyms**

**API**stands for Application Programming Interface. Most large companies have built API for their customers, or for internal use.

**apps** abbreviation for applications (program or software) – a computer program designed to be used for a particular purpose, e.g. a word processor spreadsheet or database program.

**ASP** abbreviation for application service provider.

**ATM** abbreviation for automatic telling machine.

**CAD** abbreviation for Computer Aided Design.

**CCNA** abbreviation for Cisco Certified Network Associate. A starting level networking qualification offered by Cisco, a major network equipment vendor.

**CEO** abbreviation for a chief executive officer, the highest-ranking executive in a company, whose primary responsibilities include major corporate decisions, managing the overall operations and resources of a company, acting as the main point of communication between the board of directors and corporate operations and being the public face of the company.

**CTO** abbreviation for a chief technology (or technical) officer, a senior executive with responsibility for managing the technological requirements of a company or other institution.

**DBMS** abbreviation for database management system.

**DHTML** abbreviation for dynamic hypertext markup language. A development of HTML that allows the creation of more dynamic and user-interactive web pages.

**DTP** abbreviation for desktop publishing. A process of designing documents for publishing using a computer system.

**DVLC** abbreviation for Driver and Vehicle Licensing Center.

**EAN** abbreviation for European Article Number system. The European price and item codes commonly used in barcode system.

**EPOS** till acronym for electronic point-of-sale till. A computerized cash register that edits records in sales and stock control databases.

**EPS** stands for Encapsulated PostScript. It is a PostScript image file format that is compatible with PostScript printers and is often used for transferring files between various graphics applications.

**ERP** abbreviation for enterprise resource planning.

**GIF** acronym for Graphics Interchange Format

**GIS** acronym for Geographic Information Systems

**HTML** abbreviation for hypertext markup language. A page description language that uses a system of tags for creating web pages.

**IDE** abbreviation for Integrated Development Environment

**IoT**abbreviation for the Internet of things.

**IS Manager** an abbreviated form of information systems manager. A person who manages a computer-based service that provides information that is useful to a particular organization.

**J2EE** abbreviation for Java2Platform Enterprise Edition. J2EE is a platform-independent, Java-centric environment from Sun/Oracle for developing, building and deploying Web-based enterprise applications online.

**JPEG** abbreviation for joint photographic expert group, the committee that devised a common standard for image file format and compression.

**Linux** a clone of the Unix operating system created by Linus Torvalds for use on personal computers.

**Mac OS** the family of operating systems used on the Apple Macintosh range of computers.

**MVS** abbreviation for multiple virtual storage. It is the name given to a family of operating systems used on IBM mainframe computers.

**NCP** abbreviation for Network Control Program/Netware Core Protocol.

**NCR** abbreviation for corporation National Cash Register.

**NetWare** a widely-used LAN operating system produced by Novell incorporated.

**NPM** is a package manager for Node.js packages or modules.

**OCR** abbreviation for optical character recognition.

**ORACLE** a widely used database management system.

**RDBMS** abbreviation for relational database management system. A database system that links files together as required.

**SAP** a widely used enterprise resource planning tool program.

**Shell Script** a text file that contains a sequence of commands for a UNIX-based operating system. In DOS operating system a shell script is called a batch file.

**SQL** abbreviation forStructured query language. A language used for searching database.

**SSP** abbreviation for Supply/Sell Side Platform.

**TCP** abbreviation for transfer control protocol. A part of the of the TCP/IP protocol used on the Internet.

**TCP/IP** abbreviation for transmission control protocol/Internet protocol. The official set of standards for determining the form of the signals used for transmitting data on the Internet.

**Telecommute** to communicate with your office by computer, telephone and fax while working a distance from your office, e.g. at home.

**Tier 1 network** is an internet Protocol (IP) network that can reach every other network on the internet solely via settlement-free interconnection. Tier 1 networks can exchange traffic with other Tier1 networks without having to pay any fees for the exchange of traffic in either direction.

**TIFF** (short for Tagged Image File Format) is an industry standard designed for handling raster and bitmapped images. TIFF files can be saved in a variety of color formats and in various forms of compression.

**Unix** a popular multi-user multitasking operating system originally designed for mainframe computers. A wide variety of versions exist.

**UML** abbreviation for unified modeling language.

**URL** abbreviation for uniform (or universal) resource locator.

**VTAM** abbreviation for virtual telecommunications access method. It is the IBM subsystem that implements Systems Network Architecture for mainframe environments.

**VB** abbreviation for Visual Basic.

**Audio script**

**Unit 1***(Infotech.St.b.Task 1.Tr.31)*

**Speaker 1**: I’m 35 years old and I really enjoy working on the Web. I use Macromedia Dreamweaver to design, develop, market and maintain web pages. For the last two years, I’ve been working for a successful TV company, where I’m responsible for updating their website regularly.

**Speaker 2:** I started working in a computer support center about 3 years ago. People phone and ask for help with things like: my internet connection doesn’t work, my hard drive has crashed, I think I’ve got a virus, I get a lot of error messages, etc. I talk to the users, identify the problem and try to fix it. It’s called troubleshooting.

**Speaker 3:** I’ve got a degree in Electronic Engineering and I’ve now been with International Mercury Computers for 2 years. In my job, I design, develop and test computer components, microprocessors, sound boards, etc. I work closely with a software engineer to ensure that the software is compatible with the hardware.

**Speaker 4:** I’ve never been working for Novell, a leading provider of Net services software, since 2006. I plan and carry out measures to make networks more secure. In other words, I try to protect information from viruses and system crashes. I’m also in charge of assigning access passwords to employees.

**Unit 2** *(Oxford English for Information Technology. U5)*

Interview: Former Student

**PART 1**

**Interviewer:** What was your course called?

**Paul:** The first one was a Higher National Certificate in Computing. That was mainly programming.

**I:** Uhum.

**P:** And the second one was a Higher National Diploma in Computing Support.

**I:** Ah, that's quite a change. Did you originally think of being a programmer?

**P:** Yeh, but when I finished the course there weren't a lot of jobs in programming and there seemed to be more in support. So support seemed a better career move.

**I:** Erm, what were the main subjects in your diploma course?

**P:** Hardware, Planning, Design, Software development, Applications, Communication. We did some programming too.

**I:** Communication, anything to do with Telecommunications?

**P:** No, it's, er, language skills. How to get your point over. How to make a presentation. We also had Maths. I've always liked Maths.

**I:** Was there a practical component in the course?

**P:** Yes, we had to assemble computers.

**I:** And how small were the components you started with? Was it down to the level of the motherboard, for example?

**P:** Yes, we had to link the motherboard and the CPU and all the other components of a computer and make it run.

**PART 2**

**I:** How up to date did you feel the course was?

**P:** I always felt it was a bit behind current developments.

**I:** That question really relates to my next one. Is there anything that you would add to or take away from the course?

**P:** Erm, I would change the programming component. We did Pascal. That's one reason I didn't want to continue with programming because you never saw any jobs which asked for Pascal. We did COBOL also but that was quite old too and even the banks were stopping using it. A more up to date language like C++ would've been better. And I would add work experience. I always felt they should have given some sort of work experience. I know some colleges do.

**I:** Erm, that would be a great thing because most students have paper qualifications and no practical experience.

**P:** I think that even if it was just summer work it would be really useful. Employers are looking for qualifications and experience.

**I:** Which of the subjects you studied have you found most useful in your work?

**P:** Erm, Learning Access. I've had to do database designs for a couple of customers. Systems Building as well. I've had to go in and replace components for customers and we've had to build computers from scratch. Last Christmas I had to assemble fifty in a four week period.

**I**: Hm! What about Communication? I'm sure a lot of students would see Communication and say that's really the least important thing in the course.

**P:** Oh, I've found it very useful. I have to go to customers I've never met before and put my points across. It's been helpful too in going for job interviews. Just getting confidence in presenting yourself.

**I:** Did they give you any practice in explaining things to non-specialists? In simple, non-technical ways to users?

**P:** Erm, what you had to do in front of a video camera, was to choose a subject and, erm, break it down so that everyone could understand it. Even though your classmates were all technically-minded, you had to make it so that the teacher could understand it. The teacher who was marking it had to understand. If she didn't, she wouldn't pass you.

**PART 3**

**I:** Now that the course is over, how do you keep up?

**P:** That's the difficult thing. You get a lot from work when you're thrown into situations you don't know much about. You have to learn fast.

**I:** Uhum.

**P:** I've noticed a few times when I've gone to customers who want something fixed that I don't know about that I learn really fast.

**I:** So you're teaching yourself.

**P:** Yes. You have to do this from books and manuals and by reading the PC magazines.

**I:** Did the college give you any advice on the best magazines to read?

**P:** No.

**I:** So how did you get that information? How did you know where to look for help?

**P:** There was one lecturer. He used to work for a chip company. Even the college technical staff used to ask him for advice. He gave us some advice on where to look. The magazines themselves often recommend books to buy. The Internet's good. You go to the Microsoft websites and the manufacturers' websites also help.

**I:** That's not something the college gave you. They didn't say, er, 'Here are a useful set of Web addresses'?

**P:** No. There was a set book on support which was useful but it was full of mistakes so you had to check it against other books to make sure what was right.

**I:** OK. One last question. Would you ever go back to college?

**P:** Yes, I'd like to do my degree some time but it's getting the time and the money to do this.

**Unit 4** *(Infotech.St.b.Task 1.Tr.30)*

Programming languages

The idea of Java started in 1990, when a team of software engineers at Sun Microsystems decided to create a language for a handheld device that could control and interact with various kinds of electronic appliances ranging from Nintendo Game boys to VCRs and TV set- top boxes. They developed an object-oriented programming language that one of the engineers, James Gosling, called Oak, after the tree outside the window. The device even had an animated character named Duke, who would go on to become Java’s mascot.

With the advent of the Web in 1993, the company made a web browser based on the Oak language. Later on, this language was adapted to the Internet and renamed Java. The 1,0 version of Java was officially introduced by Sun in May 1995.

At that time web pages could only display text, pictures and hyperlinks. With the arrival of Java, web designers were able to include animation and interactive programs on web pages. The first major application created with Java was the HotJava browser. The Java language began to attract serious attention from the internet community and was soon supported by Netscape navigator and MS Internet Explorer. Today, Java is a hot technology that runs on multiple platforms, including smart cards, embedded devices, mobile phones and computers.

**Unit 7** *(OEfIT. U21)*

Software Engineering

**Analyst:** If I could find out what you do at present. What kind of system do you have at the moment?

**Hotel owner:** Well, we introduced erm a computerised system about five years ago but I'm not very happy with it. What we've got is erm, just a system that allows us to enter bookings as they come in.

**A**: So is everything computerised or... ?

**H:** No, it's only the reservations system.

**A:** So what features would you like to add to this?

**H:** Well, there are a number of things. I would like a more sophisticated system that would allow me to link reservations and invoicing. I'd like the system to handle invoices also.

**A:** OK. Now the output. What kind of output are you looking for from this?

**H:** Erm, well there are a number of things I'd like. One is of course the total invoice, a bill for the guests. I'd like it also to display room bookings so that if someone phones up it's easy for the reception staff to identify quickly which rooms are occupied and which are available.

**A:** Is that on the screen?

**H:** Yes, I would like it to be on the screen if possible. A sort of room chart on the screen.

**A**: And the invoices, is it pre-printed forms you use?

**H:** Would pre-printed forms be useful?

**A:** Well, if you have a coloured logo, it's better to have the forms pre-printed.

**H:** Yes, I'd like that. And of course I want the invoice to have details of all expenditure so if the guest has a drink at the bar, extra meals at the restaurant, anything of that nature, it's all detailed. I'd also like the system to generate lists of previous guests so I can send them news of special offers.

**A:** Has the system to print out addressed envelopes?

**H:** If it could, that would be very useful.

**A:** Now, who's going to be inputting the information?

**H:** Right, the main users would be the reception staff. They would be dealing with bookings, largely by phone but some by fax or letter. The accountant, of course, would be using the system to create bills. And, erm, bar and restaurant staff would have to enter sales.

**A:** Are the staff experienced in using computers or would they need a lot of training?

**H:** Reception staff are quite experienced, however, our accountant would need some training as she's used to a paper system.

**A:** What about the bar and restaurant staff?

**H:** Well, I suppose they would be entering only very restricted information on sales.

**A:** Hm. What computer hardware do you have at the moment?

**H**: Er, we've got one PC at reception and one in the office. What would I need?

**A:** One for the accountant, one in the bar and restaurant. And they would have to be networked.

**H**: If they're networked together, that doesn't mean that people can get into the accounts, does it?

**A:** No, it would be password-protected. And the printers?

**H:** I don't want anything too noisy.

**A:** Laser printers tend to be quieter. Now, it would be useful to talk to the receptionist to get details of the input for the guest records and to the accountant to find out what she needs.

**H:** Great, I'll set up meetings for you. What's the next step?

**A:** I'll come back to you with a plan and we'll check through to make sure it has all the features you want. Then we'll create a program and try it out. We'll have to keep adapting it depending how well it works. And once you're happy with it, we'll put it into service and I'll fix some training for the staff.

**H:** Thanks very much.

**Unit 10** (OEfIT. U17)

Computing Support

**David:** Hello, this is Apricot Computers Service Division. My name's David, how can I help you?

**Jennifer:** Hello, my name is Jennifer and we're having a problem with one of our Apricot computers.

**D:** Now can you tell me what model of computer you have?

**J:** Yeh, it's an Apricot LS 550.

**D:** An Apricot LS 550. OK, is the computer still under warranty?

**J:** Yes, we only got it a month ago. So it should still be covered.

**D:** Can you give me the service tag number?

**J:** Yes, let me have a look. It's AM 964 ... 70.

**D**: That's AM96470. Wait a moment and I'll just look it up in my database.... Is that University of Edinburgh, 21 Hill Place?

**J:** Yes, that's us.

**D**: So can you describe what the problem is.

**J:** Well it doesn't seem to be playing MIDI sound files from the Internet.

**D**: Erm, MIDI sound files. Does it play other types of sound files?

**J:** Yeh.

**D:** And is it only when you're in the browser on the Internet that you're having this problem?

**J:** No, we're getting the same fault when we use other programs like ... erm ... Microsoft Encarta.

**D:** Right. What operating system are you using?

**J:** Microsoft Windows.

**D:** Which version of Windows?

**J:** It's Windows 2000.

**D**: And what type of processor do you have in the computer?

**J:** It's got a Pentium 3.

**D:** And how much RAM is installed?

**J:** Let's see ... 128 Megabytes.

**D:** Is the computer connected to any kind of network?

**J:** Yes, we have a LAN.

**D:** What type of network?

**J:** It's a Windows NT network.

**D:** OK. Right. It sounds as if you may have a driver fault. Do you still have the original driver disk you got with the machine?

**J:** Yes, we've only had it a month so it's all there.

**D:** Well, you could try to reinstall the sound drivers and see if that cures the problem. If that doesn't cure the problem, can you contact us again and we'll send you out some new drivers to try.

**J:** OK, I'll give that a try and get back to you if we have a problem.

**D:** Er, if you're going to contact us again with this problem, can you quote this job number.If's E83095.

**J:** Er, just a moment. I need to get a pen. Can you repeat that? D OK, E ... 83095. ) E83095.

**D:** That's correct

**J:** Can I take down your name?

**D:** Yes, my name's David, David Lister.

**J:** OK, thank you, David and ... er... we'll be in touch if there's any further problems.

**D:** OK.

**J:** Bye.

**D:** Bye.

**Unit 10** *(R7.8.F2F.St.b.Intermediate. U7C.)*

Internet Security

These days, computer viruses are part of everyday life. But as early as 1940, a man called John von Neumann predicted that computer programs would be able to make copies of themselves – and he was right. This ability has meant that people have been able to create viruses which can travel from computer to computer. As we all know, computer viruses can cause a huge amount of damage – but what’s the history of these viruses, and what kind of people write them?

The word virus was first used by a computer scientist called Frederick Cohen in 1983. He noticed that a computer virus travels from computer to computer in the same way as a flu virus travels from person to person. The first virus travelled from PC to PC was called Brain in 1986. Its creators, Basit and Amjat Alvi, owned a computer store called Brain Computer Services in Pakistan. They created the virus so they could find out how many people were amazed when their virus spread all over the world and became international news.

Fortunately, Brain didn’t do any damage and was easy to remove, but later viruses were much more dangerous. The famous Melissa and Love Bug viruses, for example, made headline news in 1999 and 2000 and caused enormous problems for computer systems everywhere. And in 2004 an 18-year-old from Germany, Stev Jaschan, created a virus called the Sasser Worm, which he wrote in his bedroom on a homemade computer. It caused tens of millions of computers to crash all around the world and affected banks, airlines, hospitals and government buildings worldwide, The Sasser Worm was particularly dangerous because it could infect any computer online and didn’t need to travel via email, unlike earlier viruses.

Of course, viruses aren’t the only thing computer users have to worry about. Trojans Horses, for example, are attached to software that you can download from the Internet, such as computer games. When you open the software, the Trojans Horse loads itself onto your hard disk. It can then allow other people to access your computer without you knowing about it, for example, to steal your passwords and credit card details or to send junk emails.

So what do we know about the young men who write these viruses, people like Stev Jaschan? Well. It seems that most of them are people who …

**Unit 12** *(Tr.79.1. EfL.Intermediate.St.b.)*

**Data Security**

Who’s using your identity?

One afternoon last year Fred Payne had a phone call. He tells us what happened: “It was a young woman. She said her name was Angela. I think, and that she was from my bank. She told me that they’d had a problem with their computers, so they were checking all their customers’ accounts. She was so friendly and polite, and she already knew my full name and address, the name of my bank, and even my account number. She said that she just needed to check my date of birth, my mother’s maiden name, and my PIN. She asked for my Internet password, too. But I told her that I didn’t use the Internet. Well, I gave her the information and she said that I’d been very helpful.”

Two weeks later, however, Fred went to his bank. “I told the cashier that I wanted to transfer some money, but she said that there wasn’t enough money in my account. She said that almost everything - &2.000 – had been withdrawn ten days before. Then, of course, I remembered the phone call. The cashier said that the bank never phoned or emailed people for information like that. I couldn’t believe that I had been so stupid”.

Fred had been the victim of identity theft – a crime that costs billions of dollars worldwide every year. Martin Smart is an expert on this modern crime: ”People should be very careful with any information about themselves. Criminals can use it to withdraw money from accounts, buy things on the Internet, and even open new accounts in someone else’s name. Sometimes they steal documents, like passwords and driving licenses. But we also make things very easy for them. For example, Fred told me that he didn’t destroy old bank statements, credit card receipts, gas, telephone and electricity bills, etc., but just threw them in the rubbish bin. That’s probably how the thieves got his name, address, and account number. People also dump old computers with all their personal and financial information still on them, because they don’t delete the data first. Your identity is very important. Protect it!”

**Unit 13** (OEfIT. U20)

**Interview: The ex-hacker**

**PART 1**

**Interviewer:** Ralph was one of two 18- year-olds arrested in the 1990s for hacking into a large American company. They got into the CEO's personal files and left a very rude message. Well, he's grown up a bit and has been putting his knowledge to very good use. He's now a computer security expert, a 'white hat" hacker who uses his skills to make cyberspace safer. Ralph, what exactly is hacking and how do you go about hacking into a system?

**Ralph:** Hacking simply means getting into computer systems... you don't have permission to get into. Erm, there are various ways of doing it. You can get in by trying to guess somebody's password. Or you find a bug in a computer system that will allow people with certain passwords to get in where they shouldn't.

**I:** So you're sitting in front of your computer... somewhere, how do you set about getting into someone else's system?

**R:** Sometimes it's very simple. People who hack into systems for a living because they're employed by companies to test their systems - would say the first thing you do is to phone up someone who uses the system and you say 'Hello, I'm from your company. We want to test a new system.... We need your password, please, so that we can include you in the trial.' People are too trusting. They normally hand it over. That's the easy way. If that doesn't work, then you find out by trying to connect to it over the Internet. And normally that's not desperately difficult. Once you connect to the computer it will... ask you to ... log on and type an ID and password. You might at the simplest level try typing in 'guest' or 'demo' or 'help' and see what it gives you.

**I:** How can you avoid being hacked into?

**R:** There's a lot you can do but you have to keep at it to keep ahead of the hackers. Erm, you can install firewalls to restrict access to a network. You can have a callback system to make sure remote clients are who they say they are. Having really secure passwords helps. Don't use a common name or a dictionary word or anything short. Check the system regularly using event logs to find failed access attempts.

**PART 2**

**I:** How did you get into this business in the first place? Were you a computer geek at school?

**R:** I was a computer geek, a young anorak. I got into computers at school. I discovered that what the computers in the lab would let me see depended on what password I typed in and that's really where I started thinking about security.

**I:** And how did you manage to get into the American company's files?

**R:** I guessed some passwords and so on and because of various very silly mistakes the operators of the system made I managed to get right into the system at the highest level.

**I:** And managed to get into the CEO's personal files.

**R:** Yes, what happened there was I got into part of the system that said 'Please enter your ID and then underneath that on the same screen told you what the ID was. It was the most senior ID on the system so I typed it in. It said 'You're logged on as systems manager what would you like to do?' And I said, I'll have some passwords please. And because I was logged on at the highest level it said 'Whose do you want?' And I said 'The CEO' because there was an account on the system in his name. And it gave it to me.

**I:** Did you feel terribly excited?

**R:** Yes, absolutely. People sometimes hack for money, for criminal purposes or for political purposes ... they want to expose something. But often you hack because you're challenged. Because it's exciting. It is a very big challenge for a couple of 18-year-olds working on a basic PC to link directly to a very powerful machine that they've completely penetrated. It was great fun and it's a wonderful feeling and that's why we did it. We never thought about the legal side of it. My parents knew that the phone bill was horrendous and that I spent an awful lot of time in my LISTENING SCRIPT 201 bedroom on the computer but they didn't know quite what I was doing.

**I:** How did they track you down?

**R:** Well, because we never really tried to cover our tracks. We would boast to our friends, we would boast to girls. That got us known to the police and the computer crime unit. They arrested us. The guy who arrested us, the detective inspector, I'm now quite friendly with. I see him at computer conferences all over the world. But I met him first when he knocked at my door and took away the contents of my bedroom in black plastic bags.

**I:** Now you're helping companies to avoid people like you.

**R:** Yes, if you want to protect your systems it's a good idea to talk to people like myself rather than big city consultants... because I know the ways in which I would try to break into your system.

**I:** Do you hackers know each other? Is there a competitive element to all this? Is there a kind of rivalry?

**R:** I think in the beginning people did. Er, they would ... sit round ... talking about hacking and sharing passwords but nowadays because of the Internet... hackers are all over the world and they tend not to know each other and you tend not, because it's so illegal now and so many people are scared of it, people tend not to want to be known. There is rivalry. Everyone wants to be the first to hack into a really powerful system. The Pentagon gets something like 200 attempts a day to break into their systems.

**I:** Movies sometimes feature hackers.

R: I don't go much for the Hollywood ... hacker. They show hackers coming into your system via the Internet and stealing all your data. That's not generally what happens. In reality about 75% of all hacks into company computers are done by current staff who are simply misusing the privileges you've given them ...

**I:** A recent survey found that four out of ten UK consumers are reluctant to use credit cards for Internet purchases. How risky is it really?

**R:** Some people are nervous about giving their credit card number on the Internet. We've seen in the press, partly due to hackers, partly due to the incompetence of people who are running websites, that you can get databases of credit card numbers. But usually it's the retailers, not the buyers, who get done by people using fake or stolen cards. Using your credit card on the Internet is no more dangerous than giving your credit card number down the phone or paying at the supermarket with a credit card, throwing the receipt away where somebody can pick it up and then they've got your credit card number and a copy of your signature. The Internet is not as dangerous as that. My advice is, if you want to buy things on the Internet, get a separate credit card. Ask for a small limit. Then if it gets misused, you've cut your losses. You can buy a pre-paid charge card for small purchases. Long term, smart cards are probably the answer but you would need a reader on your PC.

**Unit 14** *(OEfIT. U24)*

The Future of IT

**Speaker A:** To recreate human intelligence we need speed, we need memory capacity to match the human brain and we need the right hardware. We'll have all this by 2020 but these things aren't enough. We also need to capture the complexity, range and richness of human intelligence. That's more difficult... but we will do it. And we'll do it by reverse engineering of the human brain. What I mean is that we'll explore the human brain from the inside and find out how it works, how it's connected, how it's wired up. We're already well on the way to this. With brain scanning we can see inside the brain. But by 2030 we'll have another instrument for exploring the brain. We'll be able to send tiny scanning robots along blood vessels to map the brain from the inside. This will give us all the data on how the brain is connected and all the features which enable it to perform as it does. When we know how the brain works, we'll be able to recreate its operation using the powerful computers which will've been developed even before this date.

**Speaker B**: The most important difference at the moment between computers and brains is that computers work in serial and brains work in parallel. This means that we can do incredible amounts of processing compared to what a computer can achieve running for weeks, or even months. What's interesting is not so much that the brain is fast, it's the fact that it operates in parallel. If you look at the way a signal flows down neurons, they don't move extraordinarily quickly. But there are billions of them doing it all at once, whereas in a computer everything has to be done one thing after another. Many people say we will never have an intelligent computer. They say it's not possible to have a computer that thinks. My own view is that it is possible but not with computers as they are today. If we start having parallel computers, only then I feel will we even start to approach the kind of computing power necessary to begin to make a start to reproducing some of the higher functions of the human brain. But we'll never be able to program in human emotions, moral responsibility and the uniqueness of the individual.

**Speaker C:** What people really don't realize is the accelerating speed of change. They think that a hundred years from now we'll have made a hundred years of progress at today's rate. But we'll see a hundred years of progress at today's rate in twenty-five years because the speed of technical progress is accelerating. Right now we're doubling the rate of technical progress every decade so the next decade will mean twenty years of progress; and the following decade will be like forty. We'll make two thousand years of progress at today's rate this century. Things are changing faster and faster. Erm, we already have computers that run factories and computers which help to build other computers. It's only a matter of time before these artificial children of ours are able to outdo us. They will think faster than we do. They will make smarter decisions than we do. Who then will be the masters - us or the machines? If we play it right, machines will look after us. If we get it wrong, machines may replace us. And it could happen sooner than we imagine

**Unit 20** (Infotech.St.b.Un.26Task 4, Tr.32)

**A Job Interview**

**Mr. Scott:** I see you did a Computer Science degree at Aston University and did a work placement for a year with British Gas. What was it like?

**Ms. Brown:** It was great. I really enjoyed it. It was really good to get some work experience and apply some of the ideas I was learning at college.

**Mr. Scott:** And the you went to NCR. What did you do there?

**Ms. Brown:** I worked as an analyst programmer for a year. I wrote software for general commercial use. The programs were for use on IBM mainframes.

**Mr. Scott:** Right. That’s good to know. And have you ever worked with databases?

**Ms. Brown:** Yes, quite the bit. I usually work with Microsoft Access and dBase 5.

**Mr. Scott:** Good. And what about your present job? What do you do at Intelligent Software?

**Ms. Brown:** Well, I wrote programs in COBOL and C for commercial use. I write instructions. Test the programs and prepare the documentation.

**Mr. Scott:** That sounds the soft of experience we’re looking for. What about foreign languages? Do you have any?

**Ms. Brown:** Yes, I can speak Spanish and basic Italian. I have been studying Italian for the last 8 months.

**Mr. Scott:** Good. Just one more thing. Your current job sounds quite interesting. Why do you want to leave it?

**Ms. Brown:** Well, I’ve been there for 3 years, and I want something more demanding and with more responsibility. I’d also like to learn about a new industry and have the chance to work with …

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