Учебно-методическое пособие
по развитию навыков чтения
на английском языке для студентов ФКП

Read and Speak
For full time Students of the
Computer-Aided Design Faculty

Рецензент:
зав.кафедрой иностранных языков №2 БГУИР, кандидат филологических наук, доцент О.В. Пинчук

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Данное пособие включает 4 раздела: Computer-Aided Design, Electronic and Optic Systems and Technologies, Medical Electronics, Information Security.

Единый комплекс упражнений и заданий ориентирован на развитие навыков и умений чтения у студентов ФКП литературы и специальных оригинальных текстов. Авторами учебного пособия реализовано требование профессионально-ориентированного обучения.

UNIT I
COMPUTER-AIDED DESIGN

Part A

add	/æd/	добавлять; складывать; присоединять
adjust	/əˈdʒʌst/	регулировать; настраивать; корректировать
approach	/əˈprəʊtʃ/	подход; метод; технология
assembly	/əˈsemblɪ/	сборка; монтаж
constraint	/kənˈstreɪnt/	ограничение
coprocessor	/ˌkəʊˈprəʊsəsə/	сопроцессор
curve	/kɜ:v/	кривая
draft	/drɑ:ft/	эскиз, проект, чертеж; делать эскиз (проект)
employ	/ɪmˈplɔɪ/	употреблять; использовать; применять
evolve	/ɪˈvɒlv/	развивать(ся)
feature	/ˈfi:tʃə/	особенность; свойство; характеристика
hardware	/ˈhɑ:dweə/	аппаратура
interference	/ˌɪntəˈfɪərəns/	вмешательство; интерференция
kernel	/ˈkɜ:nl/	ядро
package	/ˈpækɪdʒ/	блок; модуль; корпус; пакет (программ)
prototyping	/ˈprəʊtəʊtaɪpɪŋ/	макетирование
provide	/prəˈvaɪd/	снабжать; обеспечивать; предоставлять; давать
range	/reɪndʒ/	диапазон
require	/rɪˈkwaɪə/	требовать; нуждаться
software	/ˈsɒftweə/	программное обеспечение; программные системы
solid	/ˈsɒlɪd/	твердый
subtract	/səbˈtrækt/	вычитать
tablet	/ˈtæblət/	планшет
vector drafting system	/ˈvektə/	векторная система проектирования
verification	/ˌverɪfɪˈkeɪʃn/	проверка; контроль; верификация
via	/ˈvaɪə/	через
wireframe	/ˌwaɪəˈfreɪm/	каркас
workstation	/ˈwɜ:kˌsteɪʃən/	рабочая станция, предназначенная для решения задач пользователя в сети

I. Compare the meanings of the following English words with the Russian ones. They may have different meanings.

Design, construction, effectively, assist, action, activity, solid, system, modeler, user, virtual, component, manner, provide, process, creation, fashion, engineering, object, modification.

II. Read the following words in each line and define their roots. Translate the words into Russian:

a) operate, operator, operative, operation;
b) creation, creative, creator, created, creature;
c) original, originate, originally, originating;
d) adjust, adjustable, adjusted;
e) implement, implementation, implemented;
f) depend, independent, dependence.

III. Fill in the gaps with one of the following words:

drafting, involves, designing, packages, applications, solid, carried out

1. First comercial ... of CAD were in large companies in the automotive and aerospace industries, as well as in electronics.

2. CAD means computer-aided design to reflect the fact that modern CAD tools do more than just ... .

3. Today CAD is one of the main tools used in ... products.

4. Key products for 1981 were ... modelling packages and the release of the surface modeler.

5. Some software ... provide the ability to edit parametric geometry.

6. Today CAD is ... by the use of a wide range of computerbased tools.

7. CAD ... developing work on screen, printing it and, thus, saves time on drawing.

IV. Read the text and find:

a) who and when developed the prototype of graphical user interface;
b) what activities CAD helps to realize;
c) what techniques are used in CAD;
d) what the advantages of CAD over hand drafting are.

V. Read the text and arrange the following items of an outline.

a) Types of systems implemented in CAD
b) 3D solid modelling
c) The development of the graphical user interface prototype in the early 1940s
d) The creation of final product
e) CAD application

TEXT A

Designers have long used computers for their calculations. Initial developments were carried out in the 1960s within the aircraft and automotive industries in the area

of 3D surface construction and NC[1] programming, most of it independent of one another and often not publicly published until much later. Some of the mathematical description work on curves was developed in the early 1940s by Isaac Jacob Schoenberg. Effectively, it was a prototype of graphical user interface, an indispensable feature of modern CAD.

Computer-aided design (CAD) is the use of a wide range of computerbased tools that assist engineers, architects and other design professions in their design activities. It is the main geometry authoring tool which involves both software and sometimes special purpose hardware. Current packages range from 2D vector drafting systems to 3D solid and surface modelers. CAD is used in many ways depending on the profession of the user and the type of software in question. Each of the different types of CAD systems requires the operator to think differently about how he will use them and he must design their virtual components in a different manner for each.

There are many producers of 2D systems, including a number of free and open source programs. These provide an approach to the drawing process without all the fuss over scale and placement on the drawing sheet that accompanied hand drafting, since these can be adjusted as required during the creation of the final draft.

3D wireframe is basically an intention of 2D drafting. Each line has to be manually inserted into the drawing. The final product has no mass properties associated with it and cannot have features directly added to it, such as holes. The operator approaches these in a similar fashion to 2D systems, although many 3D systems allow using the wireframe model to make the final engineering views.

3D "dumb" solids (programs incorporating this technology include AutoCAD and Cadney 19) are created in a similar fashion to the way you would create the real world object. Each object and feature, after creation, is what it is. If the operator wants to change it, he must add material to it, subtract "material" from it or delete the object or the feature and start over. Due to this, it doesn`t matter how the initial operator creates his components, as long as the final product is represented correctly. If future modifications are to be made, the method used to make the original part will not, in most cases, affect the procedure used to make new modifications. Draft views can easily be generated from the models. Assemblies generally don`t include tools to easily allow motion, or identify interference between components.

3D parametric solid modelling[2] requires the operator to use what is usually referred to as "design intent". The objects and features created are adjustable. Parametric solids require the operator to consider the consequences of his actions carefully. What may be simplest today could be worst case tomorrow.

CAD implementations have evolved dramatically. Advances in programming and computer hardware, notably solid modelling in the 1980s, have allowed more versatile applications of computers in design activities.

Notes:
[1]NC (numerical control) – числовое управление;
[2] Solid modelling – объемное моделирование.

VI. Match the letter of the correct answer to the following questions.

1. When were the initial developments held in the area of CAD?
   a) in the early 1950s;
   b) in the 1960s;
   c) in the late 1960s.
2. What is CAD?
   a) It's a tool;
   b) It's computerbased design activity;
   c) It's special purpose hardware.
3. What is the range of systems used in CAD?
   a) CAD uses only one 3D drafting system;
   b) This technology includes AutoCAD;
   c) They range from 2D vector drafting to 3D solid and surface modelers.
4. How can draft views be generated?
   a) They can be generated by using lithography.
   b) They can be generated from models.
   c) They can be generated by using parametric solids.
5. Can an operator change the final drafting product?
   a) Yes, but he can change it only partially.
   b) No, there is no possibility to change it.
   c) Yes, if he wants to change it, he can add and subtract the "material" from it.

VII. Match parts A and B to complete the sentences.

A	B
1. Early developments in the area of 3D surface construction were carried out	a) uses a required software and designs virtual components in a different manner for each.
2. CAD uses a wide range of computerbased tools and ranges	b) in the 1960s.
3. CAD operator	c) from 2D drafting systems to 3D modelers.
4. 2D systems	d) he may subtract or add the "material" to it, or even delete the whole object.
5. If an operator wants to change his final draft,	e) allow easy drawing on screen and making adjustments during creation of final product.

VIII. Read the following statements and say whether they are true or false. Correct the false ones.

1. The application of computers in design activities widened with the development of computer hardware.

2. Using 3D "dumb" solid technology an operator creates the product without any possibilities to make changes in it.

3. Draft views can easily be produced from the models.

4. CAD uses a wide range of software.

5. CAD saves a lot of designer's time on drafting.

6. 3D drafting doesn't differ much from 2D one.

IX. Express your attitude to the importance of knowing the new technologies and incorporated programs by a CAD operator if he wants to make a draft.

X. Make the description of a drafting process. Use the information from the text.

Part B

I. Look at the title. Make your predictions about the contents of the text.

Software, Hardware and OS Technologies

Originally software for CAD systems were developed with computer language such as Fortran, but with the advancement of object-oriented programming methods this has radically changed. Typical modern parametric feature based modeler and freeform surface systems are built around a number of key computer programming language modules with their own APIs[1]. A CAD system can be seen as built up from the interaction of a graphical user interface (GUI) with NURBS[2] geometry and/or boundary representation (B-rep) data via a geometric modeling kernel. A geometry constraint engine may also be employed to manage the associative relationships between geometry, such as wireframe geometry in a sketch or components in an assembly.

Advanced capabilities of these associative relationships have led to a new form of prototyping called digital prototyping. In contrast to physical prototypes, which entail manufacturing time and material costs, digital prototypes allow for design verification and testing on screen, speeding time-to-market and decreasing costs. As technology evolves in this way, CAD has moved beyond a documentation tool (representing designs in graphical format) into a more robust designing tool that assists in the design process.

Today most CAD computer workstations are Windows based PCs. Some CAD systems also run on one of the Unix operating systems and a few with Linux. Some CAD systems such as QCad[3] or NX provide multiplatform support including Windows, Linux, UNIX[4] and Mac OSX[5].

Generally no special hardware is required with the exception of a high end OpenGL based Graphics card. However for complex product design, machines with high speed (and possibly multiple) CPUs and large amounts of RAM[6] are recommended. CAD was an application that benefitted from the installation of a numeric coprocessor especially in early personal computers. The human-machine interface is generally via a computer mouse but can also be via a pen and digitizing graphics tablet. Manipulation of the view of the model on the screen is also sometimes done with the use of a spacemouse/SpaceBall. Some systems also support stereoscopic glasses for viewing the 3D model.

Notes:

[1]API – Application Programming Interface – интерфейс прикладного программирования;

[2] NURBS – Non-Uniform Rational B-Spline – неоднородный рациональный B-сплайн (алгоритм компьютерной графики, используется в МП);

[3] QCAD – двухмерная система автоматизации проектных работ (САПР);

[4]UNIX – сетевая операционная система. Большинство серверов Интернета работают под управлением UNIX или UNIX-подобных операционных систем, например, Linux;

[5] Mac OSX – операционная система для компьютеров Macintosh;

[6] RAM – Random Access Memory – оперативное запоминающее устройство (ОЗУ); запоминающее устройство с произвольной выборкой; оперативная память.

II. Read the text and find out the topical sentences of the paragraphs.

III. Write out key words and phrases revealing the contents of the text.

IV. Divide the text into logical parts. Entitle each part.

V. Find 1 or 2 sentences which can be omitted as inessential in each logical part.

VI. Find the paragraph in the text which describes digital prototyping.

VII. Sum up the text using the key words and word combinations and the topical sentences.

VIII. Express your attitude to the facts given in the text. You may use the following phrases:
- It is full of interesting information…
- I find the text rather / very cognitive…
- I've learnt a lot …
- I don't agree with it…

IX. Say which facts presented in the text you've already been familiar with.

Part C

I. Look through the following text, define the information presented in it and entitle the text.

Text C

Computer-aided manufacturing (CAM) is the use of computer-based software tools that assist engineers and machinists in manufacturing or prototyping product components. CAM is a programming tool that allows you to make 3D models using computer-aided design (CAD). CAM was first used in 1971 for car body design and tooling.

Traditionally, CAM has been considered as an NC programming tool wherein 3D models of components generated in CAD software are used to generate CNC code to drive numerical controlled machine tools. Although this remains the most common

CAM function, CAM functions have expanded to integrate CAM more fully with CAD/CAM/CAE PLM solutions.

As with other "Computer-Aided" technologies, CAM does not eliminate the need for skilled professionals such as Manufacturing Engineers and NC Programmers. CAM, in fact, both leverages the value of the most skilled manufacturing professionals through advanced productivity tools, while building the skills of new professionals through visualization, simulation and optimization tools.

The first commercial applications of CAM were in large companies in the automotive and aerospace industries, for example, UNISURF in 1971 at Renault for car body design and tooling.

Historically, CAM software was seen to have several shortcomings that necessitated an overly high level of involvement by skilled CNC machinists. CAM software would output code for the least capable machine, as each machine tool interpreter added on to the standard g-code set for increased flexibility. In some cases, such as improperly set up CAM software or specific tools, the CNC machine required manual editing before the program will run properly. None of these issues were so insurmountable that a thoughtful engineer could not overcome for prototyping or small production runs; G-Code is a simple language. In high production or high precision shops, a different set of problems were encountered where an experienced CNC machinist must both hand-code programs and run CAM software.

Integration of CAD with other components of CAD/CAM/CAE PLM environment requires an effective CAD data exchange. Usually it had been necessary to force the CAD operator to export the data in one of the common data formats, such as IGES or STL[1], that are supported by a wide variety of software. The output from the CAM software is usually a simple text file of G-code, sometimes many thousands of commands long, that is then transferred to a machine tool using a direct numerical control (DNC) program.

CAM packages could not, and still cannot, reason as a machinist can. They could not optimize toolpaths to the extent required of mass production. Users would select the type of tool, machining process and paths to be used. While an engineer may have a working knowledge of g-code programming, small optimization and wear issues compound over time. Mass-produced items that require machining are often initially created through casting or some other non-machine method. This enables hand-written, short, and highly optimized g-code that could not be produced in a CAM package.

At least in the United States, there is a shortage of young, skilled machinists entering the workforce able to perform at the extremes of manufacturing; high precision and mass production. As CAM software and machines become more complicated, the skills required of a machinist advance to approach that of a computer programmer and engineer rather than eliminating the CNC machinist from the workforce.

Notes:
[1] STL (Standard Template Library) – стандартная библиотека шаблонов в языке C++.

II. Find the following information in the text:
- what CAM is;
- if CAM can be integrated with CAD;
- if CAM software has shortcomings;
- what mass-produced items require.

III. Say where the presented information can be used and why it's required of an engineer to possess more skills while handling CAM.

UNIT II
ELECTRONIC AND OPTIC SYSTEMS AND TECHNOLOGIES
Part A

affordable	/əˈfɔːdəbl/	допустимый; по средствам
alignment	/əˈlaɪnmənt/	выравнивание; регулировка
attenuate	/əˈtenjueɪt/	истощать; ослаблять
backbone ~ network	/ˈbækbəʊn/ /ˈnetwɜːk/	главная опора; основа; суть базовая сеть
backplane	/ˈbækpleɪn/	объединительная плата; основная плата; сборочная плата
bandgap direct ~ indirect ~	/ˈbændgæp/ /d(a)ɪˈrekt/ /ˌɪndɪˈrekt/	запрещенная (энергетическая) зона; ширина запрещенной (энергетической) зоны прямая запрещенная зона косвенная запрещенная зона
broadband	/ˈbrɔːdˈbænd/	широкополосный
bus data ~	/bʌs/ /ˈdeɪtə/	шина; канал; линия шина данных
icon laser	/ˈaɪkɒnˌləɪzə/	лазер изображения
incremental	/ˌɪnkrəˈmentl/	постепенно нарастающий; возрастающий; увеличивающийся
lack	/læk/	отсутствие; недостаток
laptop	/ˈlæptɒp/	портативный компьютер
lucrative	/ˈluːkrətɪv/	прибыльный; выгодный
obstacle	/ˈɒbstəkl/	помеха; препятствие
photonics	/fəʊˈtɒnɪks/	фотоника; стекловолоконная оптика
shrink	/ʃrɪŋk/	сокращать(ся); сморщивать(ся); усыхать
transceiver	/trænˈsiːvə/	приемопередатчик
transducer	/trænzˈdjuːsə/	преобразователь
vendor	/ˈvendə/	поставщик; продавец
waveguide	/ˈweɪvgaɪd/	волновод

I. 1. Translate the following international words.

Dilemma, microprocessor, optical, operation, potential, investment, distance, technology, component, company, progress, prototype, laser, progress, commercial, signal, passive, filter, critical, photodetector, efficient.

2. Give Russian words with similar roots.

Data, silicon, communication, distance, combine, fabricate, service, complex, fundamental, convert, limit.

3. Match the English equivalents among the words given above (1, 2).

Расстояние, сложный, кремний, вклад, объединять, данные,

обслуживание, торговый, ограничивать, действие, производить, превращать.

II. 1. Translate the following words paying attention to the suffixes.

Connection, suitable, networking, setting, attempting, equipment, provider, researcher, fundamental, capability, performance, difference, conductive, electronic, optical, physics.

2. Form adverbs and translate the words.

Large, fundamental, tradition, commerce, critical, effect, practice, reliable, erroneous.

3. Find the roots in the following words:

inexpensive, interactions, impractical, improvement, nonconductive, indirect, semiconductor, telecommunication, photodetector, waveguides, optoelectronics, bandgap.

III. Fill in the gaps with words derived from the words in brackets.

Optoelectronics is the study and **(apply)** of electronic devices that interact with light, and thus is **(usual)** considered a subfield of photonics. In this context, light often includes invisible forms of radiation such as gamma rays, X-rays, ultraviolet and infrared. Optoelectronic devices are electrical-to-optical or optical-to-electrical **(transduce)**, or instruments that use such devices in their **(operate)**. Electro-optics is often **(erroneous)** used as a synonym, but is in fact a wider branch of **(physic)** that deals with all **(interact)** between light and electric fields, whether or not they form part of an **(electron)** device. Optoelectronics is based on the quantum **(mechanic)** effects of light on semiconducting materials, sometimes in the presence of electric field.

IV. Find out the equivalents to the following words in paragraphs 1-3 of the text below:

cheap, consumers, enlarge, die, speed, information, apply, contribution, appropriate, apparatus, problem.

V. Translate the following sentences paying attention to the words in bold type.

1. Individual optical filters let only a single set of signals pass onto specific wavelengths **within** a laser beam.

2. **However**, silicon, working with copper wiring, creates the binary ones and zeros of data **via** electronic pulses.

3. Fibers are used instead of metal wires **because** signals travel along them with less loss.

4. **Because** the laser wavelengths intensify each other, they can remain in an unbelievably straight beam for a long distance.

5. This approach appears to offer the best short-term prospects for commercial optical computing, **since** optical components could be integrated into traditional computers to produce an optical/electronic hybrid.

6. **Since then**, three major events have laid the groundwork for the present effort at producing fully photonic (optical) digital computers.

7. Some silicon-optical elements are relatively large and, **thus,** occupy considerable real estate on chips.

8. **Meanwhile**, manufacturers are currently developing new types of modulators that can convert electrical signals to optical.

9. Photonic computers, **therefore**, will be far more valuable than their slower electronic counterparts, and far less expensive to manufacture.

VI. Fill in the gaps with one of the following words:

lack, transceiver, vendors, photonics, alignment, laptop, optical, waveguides, obstacle

1. ... direct the light as it passes through open spaces within a system, leading it along the paths other than a straight line.

2. ... generally design silicon-optical components to fit on a silicon substrate.

3. All-optical components will have the advantage of speed over electro-optical devices, but there is a ... of efficient nonlinear optical materials that can respond at low power levels.

4. In silicon optics, manufacturers built both the ... and electronic components on a single chip.

5. ... development is booming worldwide in optics and optical components for computing and other applications.

6. Intel is working with six building blocks for producing a silicon-optical ... .

7. ... is a portable computer weighing about 2-4 kg.

8. A major ... to achieving true silicon optics has been the lack of a silicon-based laser.

9. Researchers at Osaka City University reported a method for automatic ... of a set of optical beams in space with a set of optical fibers.

VII. Read the following text. Choose the sentences covering the main idea of the text.

Silicon Optics Aims to Combine the Best of Both Worlds

Vendors of computer-, networking-, and telecommunications-related equipment have long faced a dilemma. Much of their equipment is based on silicon and copper wiring, which are inexpensive to use but offer limited data rates. Thus, as microprocessor and networking speeds have increased, the speed of communications within chips, between chips or circuit boards, within LANs[1], or even along the "last mile" from ISPs[2] to customers has not kept pace.

An option is to use optical connections for these communications.

However, optics has been expensive and, therefore, not suitable for any but the largest networking operations with the most traffic and the biggest potential for return on investment. Thus, optics has been used largely in settings such as telecommunications vendors' backbone networks.

Optical connections have been impractical for communications on or between chips because the shorter distances involved yield fewer bandwidth improvements, which don't justify the expense.

Now, though, vendors are attempting to combine the best of both worlds and offer silicon optics, which uses complementary metal-oxide semiconductor (CMOS[3]) technology to fabricate optical components on silicon.

This approach would speed up traditionally silicon-based systems. It could also reduce the cost of optical equipment and bring optical systems within reach of more users, including companies and service providers with networking operations smaller than those of large telecommunications providers.

Combining silicon and optics is a complex process. However, some vendors are already selling some less complex silicon-optical components.

Meanwhile, scientists are making progress on more complicated components. For example, Intel and UCLA[4] researchers have each developed prototype silicon lasers.

Nonetheless, obstacles remain, so while some components are already available, it may be years before silicon optics can be widely and reliably used commercially.

US Air Force researchers pioneered silicon optoelectronics in the mid 1980s for sophisticated communications and signal processing.

Since then, a variety of universities and companies, such as Bookham and Intel, have worked on silicon optics.

In most current silicon-optical devices, such as waveguides and filters, the silicon is used only as a passive medium through which light can be transmitted. These devices do not tackle the more fundamental problem of converting signals from optical to electronic and vice versa. This critical capability maximizes the use of optical technology and increases performance.

Many of today's systems use photodetectors that convert signals only from optical to electronic.

Another key obstacle to achieving true silicon optics has been the lack of a silicon-based laser. Semiconductor physics has limited the ability to build such a laser. The issue is bandgap: the energy difference between a material's conductive and nonconductive state. Direct bandgap semiconductors such as gallium arsenide and other material used in optics are efficient at emitting light, while indirect bandgap semiconductors such as silicon are not.

Some researchers are looking into techniques such as introducing other materials that will make the silicon transmit light more efficiently or adding dopants that themselves transmit light effectively.

Meanwhile, scientists continue looking for other ways to provide silicon optics.

Notes:
[1]LAN – Local Area Network – локальная (вычислительная) сеть, ЛВС;

[2]ISP – Internet Service Provider – Поставщик Интернет-услуг;

[3]CMOS – complementary metal-oxide semicondoctor – комплементарная стуктура "метал-оксид-пролупроводник", дополняющая МОП-структура, КОМП-структура;

[4]UCLA – University of California Los Angeles – Калифорнийский университет /в Лос-Анджелесе/ (США).

VIII. Match the letter of the correct answer to the following questions:

1. What kind of dilemma have vendors of computer -, networking-, and telecommunications-related equipment faced?

    a) Silicon and copper wiring are inexpensive to use and offer unlimited data rates.

    b) Silicon and copper wiring are inexpensive to use but offer limited data rates.

    c) Silicon and copper wiring offer limited data rates but are expensive to use.

2. What are the advantages of silicon optics technology?

    a) It would speed up traditionally silicon-based systems and enable to produce different kinds of consumer goods.

    b) It would speed up traditionally silicon-based systems and enlarge the cost of optical equipment.

    c) It would speed up traditionally silicon-based systems and reduce the cost of optical equipment.

3. Are there obstacles which are necessary to overcome?

    a) One of the obstacles is the lack of a silicon-based laser.

    b) There is no any obstacle to overcome.

    c) One of the main obstacles is to make silicon to transmit light more efficiently.

4. What kind of laser have the scientists developed?

    a) They have developed a silicon laser that can be directly driven by an electrical current.

    b) They have developed a semiconductor laser.

    c) They have developed a prototype silicon laser.

5. How is silicon used in most current silicon-optical devices?

    a) It is used to emit a coherent beam of light.

    b) It is used as a semiconductor to generate relatively low amounts of heat.

    c) It is used as a passive medium through which light can be transmitted.

IX. Read the following statements and say whether they are true or false . Correct the false ones.

1. Vendors are attempting to combine the best of two worlds and offer gallium arsenide.

2. Combining silicon and optics is a difficult problem.

3. As some components are already available, silicon optics has been widely and reliably used commercially.

4. In waveguides silicon is used as a passive element for turning on and off the electrical current.

5. Photodetectors convert signals only from optical to electronic.

6. Direct bandgap semiconductors such as silicon used in optics are efficient at emitting light, while indirect bandgap semiconductors such as gallium arsenide are not.

7. Researchers are looking for other ways to provide silicon optics.

X. Arrange the facts given in the text on degrees of importance.

XI. Make an outline of the text.

XII. Make a short summary of the text in written form using your outline.

Part B

I. Study the key words and word combinations of the following text. Guess the topical question of it.

To be used, near feature, to replace, to improve, lucrative market, instead of, to be faster, development, cost-effective, silicon-optical components, equipment, research, extensive studies.

II. Look through the text and note the title which conveys the contents most of all.
1. Optical Systems
2. Using Silicon Optics
3. Basic Optical Components

III. Divide the text into logical parts. In each part find a key sentence.

IV. Read the outline, define if it fully reflects the contents of the text.
1. Communications among components
2. Replacing components in optical systems
3. LANs
4. Silicon optical components
5. On-chip communications

Text B

Proponents see four primary ways in which silicon optics could be used in the near future.

Silicon-optical components could replace existing transceivers in 1- and 10-Gbit Ethernet LANs. Because LANs typically include many nodes with many connections, the use of silicon optics could improve overall communications enough to justify the expense.

Equipment vendors are interested in building silicon optics for LANs in part because many corporations use these networks and thus represent a lucrative market.

While microprocessors have gotten faster, overall computer-performance increases have been limited because of slower communications via data buses and along copper wiring between chips and circuit boards.

Using optical communications instead of electrical wiring would be faster, and silicon optics could keep the implementation affordable.

Silicon-optical interconnects could replace copper wiring on chips. A single chip would contain most of the basic optical components except for the light source.

Short, high-density interconnects should be left in copper wiring because the necessary optical components would be too large and require too much power.

Research into on-chip silicon optics is ongoing. Prototype waveguides and detectors for optical interconnects are available. However, the necessary extensive studies of reliability and development of cost-effective manufacturing methods have

not been done.

Intel's approach introduces photons onto a chip via a laser. It then uses transistor-like devices to remove the buildup of electrons that the light source creates. If not removed, the electron cloud would absorb light and interfere with the generation of the continuous laser beam that is necessary for proper modulation and data transmission.

Intel expects to have silicon lasers ready for commercial use by the end of this decade.

In addition, researchers have only icon lasers. Manufacturers have had trouble beaming lasers onto a chip without causing heat, alignment, and other problems.

In addition to replacing components in silicon-based systems to make them faster, silicon optics can also replace traditional optical components in optical systems to make them more affordable.

For example, Kotura is using silicon optics to make arrays of variable optical attenuators (VOAs[1]), which incrementally adjust the power of the signal passing through an optical system.

Using silicon makes the manufacturing process less expensive and improves the VOAs' performance.

Manufacturers such as Intel are also using silicon optics to make modulators for optical systems.

Note:

[1]VOAs – variable optical attenuators – регулируемые оптические аттенюаторы

V. Find 1 or 2 sentences which we can omit as inessential in each logical part.

VI. Give your point of view on possibility of using presented in the text information in your future profession.

Part C

I. Read the title of the text and say what information is presented in it.

The Future of Silicon Optics

Proponents say that during the next few years, silicon-optical components will shrink in size and become more efficient, which will encourage more widespread use. And, they add, manufacturers and researchers will demonstrate increasingly complex integration of optical technology with electronics.

Meanwhile, usage could increase as more researchers and companies work on silicon optics.

The greatest impact will be in enabling low-cost optical transceivers for communications over short distances such as those in interchip and intrachip interconnects.

Because so many chips are made and sold worldwide each year, the biggest potential market for silicon optics is on-chip interconnects.

Complex commercial silicon-optical devices and applications will hit the market within two years.

In the future, manufacturers could develop ways to use silicon optics on

backplanes and to connect computers and peripherals. Also, ISPs could use silicon optics to cover the last-mile connection between their facilities and their customers. This would be much faster than DSL[1]- or cable-based broadband.

There will be an explosion of interest in silicon photonics in the next few years. Maybe in 10 years, the laptop will rely on silicon photonics as much as it relies on silicon electronics today. Silicon is simply an excellent material for mass production.

Note:

[1]DSL – digital subscriber line – цифровая абонентская линия

II. Prove the following point of view: In future silicon optics will replace some modern materials.

III. Say where the information presented in the text can be used.

UNIT III
MEDICAL ELECTRONICS

Part A

abdomen	/ˈæbdəmən/	брюшная полость; живот
agent	/eɪdʒ(ə)nt/	(зд.) средство
chest	/tʃest/	грудная клетка
dye	/daɪ/	краситель
joint	/dʒɔɪnt/	сустав
liver	/ˈlɪvə/	печень
opt	/ɒpt/	выбирать; делать выбор
pelvis	/ˈpelvɪs/	таз
physician	/fɪˈzɪʃ(ə)n/	врач; терапевт
safety guideline	/ˈseɪftɪˈgaɪdlaɪn/	правило безопасности
tailor	/ˈteɪlə/	приспосабливать; делать на заказ; подгонять
tool	/tuːl/	приспособление; способ; средство
sedation medication	/sɪˈdeɪʃ(ə)n ˌmedɪˈkeɪʃ(ə)n/	успокоительное

I. Compare the following words with the Russian ones. They may have different meanings.

Technique, generate, tolerate, clinical, limited, affect, ideal, intravenous, medication, cylindrical, radiologist, business, resonance, relax, examination, person, expertise, scan, comfort.

II. Define the following words as parts of speech and give the initial words of the following derivatives:

dramatically, exceptional, remove, undergo, application, interaction, usually, inadvisable, treatment, painless, evaluation.

III. Pick out the equivalents of the following words and word combinations in paragraph 2.

Приспосабливать, в большинстве случаев, внутривенное лекарство, контрастное средство, высвечивать, кровеносные сосуды, неподвижный, щелчок, затычка для ушей, наушники, врач, расшифровать/ описать снимок, направить результаты.

IV. Fill in the gaps with one of the following words:

to image, to tolerate, scans, tool, radiologist, exceptional, physician

1. The MRI technology uses the highest magnetic field and stronger waves … patients.

2. It offers … image quality afforded by the latest technology.

3. In recent years the use of MRI as a diagnostic … has increased.

4. The … are completed in 45 to 60 minutes.

5. Experienced … will read the scans and forward the results to your … .

6. Sedation medication allows nearly all individuals … the MRI devices.

V. *Read the text and try to understand it.*

Magnetic Resonance Imaging

1. MRI[1], or Magnetic Resonance Imaging, uses various magnetic fields to produce images of the body from information based on the way the body responds to the magnetic fields, how it relaxes when the magnetic fields are changed, and where the interactions occur in the body. In recent years, the use of MRI as a diagnostic tool has increased. The MRI examination poses no risk to the average person, if appropriate safety guidelines are followed. In 1998 a new type of MRI Siemens 1.5 Tesla Symphony was introduced. This cutting edge technology uses the highest magnetic field and stronger waves to image patients, resulting in maximum patient comfort and shorter exam times. It offers many exceptional advantages including:

- exceptional image quality afforded by the latest high field technology;
- high exam speed with amazing new techniques;
- patient friendly environment designed for patient comfort
- easy electronic transmission of results and images to referring physicians;
- expanded imaging applications, such as angiography (a non invasive method of evaluation of blood vessels), breast, spine, pelvis, and liver imaging.

2. Every patient's procedure is different and tailored to his or her needs. In most cases, the scans are completed in 45 to 60 minutes. Depending on the type of exam you may receive intravenous medication. This is a painless contrast agent sometimes called dye, which highlights organs and blood vessels so images are clearer and easier to read. During the procedure, the part of your body to be scanned will be positioned in the middle of the large cylindrical magnet. The opening, or gantry, is much wider than in the past, making the procedure less confining. It is important that you remain still throughout the procedure. Because the scanner makes a knocking noise, you will be offered to wear earplugs or headphones. Rapid results are essential not only for your peace-of-mind, but also for your physician to begin planning any necessary treatment. Experienced radiologists will read the scans and forward the results to your physician usually by the next business day.

3. MRI scanning facilities vary greatly, with differences in the type of MR scanners and professional expertise. High-Field MRI[2] is the test of choice for nearly all patients who want the highest quality, fastest exam. Open MRI provides a "last resort" option for those who are severely claustrophobic and unwilling to accept sedation medication. Such patients who opt for open MRI must be willing to accept a longer exam that generates less than ideal images, but may still be sufficient to solve the clinical problem. In general, this type of MRI produces superior images in less time, it is not only faster and technically superior but also comfortable compared to Open or Low Field strength techniques.

4. If you instead choose an Open or Low Field MRI[3], you must recognize that the exam will take longer and the image quality will usually be lower compared to High Field strength devices. This may or may not affect the ultimate diagnostic result

and treatment. In addition, some imaging methods such MR angiography[4], detailed brain, spine, joint, chest, and abdomen imaging, may be impossible to perform or limited in quality on some Open or Low Field strength devices. As a result, we believe that such devices should be reserved for only those patients with severe claustrophobia who are unwilling to take sedation medication, which is highly effective in allowing nearly all individuals to tolerate the comfort designed High Field MRI devices.

Notes:
[1]MRI (Magnetic Resonance Imaging) – МРТ (магнитная резонансная томография)
[2]High-Field MRI – МРТ в сильном магнитном поле
[3]Low-Field MRI – МРТ в слабом магнитном поле
[4]Angiography – ангиография, рентгенография кровеносных сосудов

VI. Read the text and name the key points raised in it.

VII. Read the text. There are 4 paragraphs in it. Match an appropriate title with the corresponding paragraph and write the correct number in each box. One title is odd.

	What is MRI
	Low-Field MRI
	High-Field MRI
	Essence of the procedure
	Non-medical uses of MRI

VIII. Read paragraph 1 and describe the essence of MRI.

IX. Using information of paragraph 1, name advantages of the MRI procedure.

X. Choose and circle the letter of the correct answer to the following questions to paragraph 2.

    1. How long does the MRI procedure last?
     a) It is completed in no time.
     b) It takes from 45 to 60 minutes.
     c) It is completed in about 90 minutes.
    2. What for may a patient receive intravenous medication?
     a) Patients who are severely claustrophobic receive intravenous medication.
     b) Some patients receive intravenous medication to highlight organs and blood vessels.
     c) Patients receive certain intravenous medication not to hear a knocking noise.
    3. In what position will a patient remain throughout the procedure?
     a) People undergoing MRI scanning usually sit during it.
     b) Patients remain still throughout the procedure.
     c) Patients, especially children, can take any comfortable position.
    4. Who will interpret results of an examination?

a) Your physician will read the scans.
b) Any educated person is able to interpret the result of MRI scans.
c) An experienced radiologist will interpret the results.

XI. Look through paragraphs 3 and 4 again and fill in the table.

PERFORMANCE	HIGH FIELD STRENGTH MRI	OPEN MRI
Field Strength (the higher the field strength, the higher the image signal)	High	Low or Mid
Speed of Exam		
Image Quality		Not as good, may be adequate for many exams.
Cost of the Scanner	Expensive, high-level technology	Lower cost, lower field strength
Ability to Perform More Advanced Studies		
Patient Comfort		
Acceptable Images for your Referring Doctor		

XII. Make a description of the two types of MRI. Use information from the table.

Part B

I. Study the words and word combinations to the following text. Point out the main question of it.

Type, radiation, x-ray machine, burst, pass, film, developed, body, radiologist, test, painless, to diagnose, luggage, airport, crystallography, astronomy, microscopic analysis, paintings.

II. Scan the text and choose the best title.
1. X-ray Equipment
2. Medical Electronics
3. X-rays in Our Life
4. X-ray Crystallography

III. Divide the text into logical parts.

Text B

X-rays are a type of high energy radiation. The rays pass easily through fluids and soft tissues of the body. However, dense tissue such as bone will block some of the x-rays. The denser the tissue, the less x-rays pass through.

A film, similar to a photographic film, is placed behind the part of the body being x-rayed. The x-ray machine fires a short burst of x-rays through part of your

body. The x-rays hit the film which is then developed. The more x-rays that hit the film, the blacker it develops. So, dense parts of the body that block many of the x-rays show up white (such as bones). Hollow or air filled parts of the body show up black (such as parts of the lung). Soft tissues such as muscle and body organs show up as various shades of grey, depending on how dense they are. The developed film is studied by an x-ray doctor (radiologist) who sends a report to the doctor who requested the test.

An ordinary x-ray test is painless. You cannot see or feel x-rays. You should stay still when the x-ray beam is 'fired' as otherwise the picture may be blurred.

An ordinary x-ray is a quick, easy and cheap test. It may be all that is needed to diagnose or assess various problems.

There is very little risk with having one x-ray test. However, with repeated tests there is a risk that the x-rays may damage some cells in the body, possibly leading to cancer in the future. The dose of x-ray radiation is always kept to the minimum needed to get a good picture of the particular body part being checked. (Also, radiographers who take the x-ray pictures always wear lead aprons or go behind a protective screen when the x-rays are fired to avoid repeated exposure to x-rays.)

X-ray machines are used to screen objects non-invasively. Luggage at airports is examined for possible bombs and weapons. These machines are very low dose and safe to be around.

Other notable uses of X-rays include:

• X-ray crystallography in which the pattern produced by the diffraction of X-rays through the closely spaced lattice of atoms in a crystal is recorded and then analyzed to reveal the nature of that lattice (most notably used by Rosalind Franklin to discover the double helix structure of DNA).

• X-ray astronomy, which is an observational branch of astronomy, which deals with the study of X-ray emission from celestial objects.

• X-ray microscopic analysis, which uses electromagnetic radiation in the soft X-ray band to produce images of very small objects.

• X-ray fluorescence, a technique in which X-rays are generated within a specimen and detected. The outgoing energy of the X-ray can be used to identify the composition of the sample.

• Paintings are often X-rayed to reveal the underdrawing or alterations in the course of painting, or by later restorers. Many pigments such as lead white show well in X-ray photographs.

IV. Find the sentences containing:
a) the main idea of the text;

b) specifying information (risks with having x-ray tests; use of x-ray technology in health care; x-ray equipment; medical electronics; x-ray in our life).

V. Say which facts presented in the text you've already been familiar with.

Part C

I. Read the title of the text and express your point of view on its main idea.

II. Scan the following text and say what problem is described in the text.

III. Find the information about the medical equipment based on information systems and software engineering.

Software Engineering for Future Healthcare and Clinical Systems

Systems and software engineering contribute not only to advancing and improving the delivery of healthcare but also to doing it more safely than has been the case in the past.

Turning "To err is human, but to really screw up, you need a computer" on its head, the Institute of Medicine named *To Err Is Human: Building a Safer Health Care System* recommended that healthcare professionals focusing on patient safety should increase their understanding of how information technology could be applied to deliver safer care.

Much of the subsequent response to that challenge has focused on increasing the capabilities of enterprise hospital and clinical information systems – for example, implementing order-entry systems to check for drug allergies when writing prescriptions. But IT and patient care also come together at the bedside in the medical equipment and instrumentation systems used to deliver direct patient care – for example, smart infusion pumps that help ensure that the right dose of the right drug is administrated to the right patient.

Providing care to any one patient is likely to require multiple devices, particularly for the more acutely ill. The instrumentation at an intensive care bedside will minimally include a physiologic monitoring system to acquire, process, communicate, display blood pressure, oxygen saturation, cardiac output, respiration, and other key parameters. Other devices likely to be in use will include infusion pumps (smart or otherwise) and ventilator. Equipment that can be brought in as needed includes dialysis system and laboratory equipment such as automated blood chemistry analyzers. Some patient will need all of the above and perhaps more; others will present different needs.

Responding to the demands of the patient care environment requires hospital medical equipment inventories that are not only well-stocked but fairly dynamic as well.

To reach the goals, numerous advances in software engineering include the growth of the subdisciplines of requirements engineering (focused on the gathering, documentation, and analysis of user requirements), user-interface design (focused on the design and construction of intuitive and safe user interfaces), and usability engineering (focused on the study of ease of use and suitability for purpose). In addition to an improved software engineering paradigm, software engineers should focus more attention on the usability aspects of medical systems.

IV. Say where the information presented in the text can be used.

UNIT IV
INFORMATION SECURITY

Part A

access	/ˈækses/	доступ
acquire	/əˈkwaɪə/	получать; приобретать
attempt	/əˈtempt/	пытаться; стараться; прилагать усилия
benign virus	/bɪˈnaɪnˈvaɪrəs/	неопасный вирус
bug	/bʌg/	ошибка (в программе); сбой; дефект
consider	/kənˈsɪdə/	полагать, считать; рассматривать, обсуждать
decrease	/dɪˈkriːs/	уменьшаться; убывать
denial	/dɪˈnaɪ(ə)l/	отказ (в доступе)
exploit	/ˈeksplɔɪt/	средство (программа) атаки
gain	/geɪn/	получать, приобретать
increasingly	/ɪnˈkriːsɪŋlɪ/	все больше и больше; в большей степени; в большей мере
inherent	/ɪnˈherənt/	присущий; собственный; неотъемлемый
legitimate	/lɪˈdʒɪtɪmɪt/	легальный; законный
log in log out	/lɒg/	входить в систему выходить из системы
malicious ~ software (malware)	/məˈlɪʃəs/ /ˈsɒftweə(r)/	злонамеренный; злоумышленный вредоносные программы
means	/miːnz/	средство; способ; метод
patch	/pætʃ/	заплата; вставка в программу (с целью исправления или изменения)
possess	/pəˈzes/	иметь; обладать
replicate	/ˈreplɪkɪt/	повторять; воспроизводить
seek	/siːk/	искать; разыскивать
source	/sɔːs/	источник
tamper	/ˈtæmpə/	вмешиваться; портить; наносить ущерб
variety	/vəˈraɪətɪ/	многообразие, разнообразие; ряд, множество
vulnerability	/ˌvʌln(ə)rəˈbɪlɪtɪ/	уязвимость; слабое место

I. Fill in the gaps with one of the following words:

> passwords, decrease, social, unauthorized, malicious, protecting

1. Physical attacks to acquire sensitive information are sometimes considered a type of … engineering.

2. … confidential information is a business requirement and in many cases an ethical and legal requirement.

3. Computer … provide computer access that may be used to disable a company or a person electronically.

4. People who wish to obtain secret information are called crackers, corporate spies or other … individuals.

5. There are practices to … the possibility of someone physically tampering with computer equipment.

6. Information security means protecting information and information systems from … access, use, disruption, modification or destruction.

II. Define the following words as parts of speech.

Security, perspective, devote, variety, acquire, competitive, malicious, indirectly, exploitation, increasingly, restrict, decrease, source, partially, request.

III. Compare the following words with the Russian ones. They may have different meanings.

Information, electronic, individual, company, perspective, resources, attack, physical, social, secret, person, document, engineering, disk, situation, copy, original, alternatively, systematically, actually, collect, practice, operate, identification.

IV. Read paragraph 1 of the text and find out the words to prove the title of the text.

V. Read the text and name the problems considered in it.

VI. Look through the text and find:

a) techniques used to obtain information through physical attacks;
b) reasons for protecting information by individuals and companies;
c) common physical information security practices.

Physical Information Security

1. Physical information security is concerned with physically protecting data and means to access that data (apart from protecting it electronically). Many individuals and companies place importance in protecting their information from a software and/or network perspective, but fewer devote resources to protecting data physically. However, physical attacks to acquire sensitive information do frequently occur. Sometimes these attacks are considered a type of social engineering.

2. Many individuals and companies consider it important to protect their information for a variety of reasons, including financial, competitive, and privacy-related purposes. People who wish to obtain this information may be computer crackers, corporate spies, or other malicious individuals. This information may be directly beneficial to them, such as industrial secrets or credit card numbers. It may also be indirectly beneficial to them. For example, computer passwords do not have inherent value. However, they provide computer system access that may be used to get other information or to disable a person/company electronically. Sometimes these malicious individuals use electronic means or social engineering to gain information. However, sometimes they use direct physical attacks.

3. There are several ways to obtain information through physical attacks or exploitations. A few examples are described below.

Dumpster diving is the practice of searching through the trash of an individual or business in attempt to obtain something useful. In the realm of information

security, this frequently means looking for documents containing sensitive information. However, as more and more information is being stored electronically, it is becoming increasingly useful to those seeking information through this means to search for computer disks or other computer hardware which may contain data. Sometimes this data can be restored to provide a wealth of information.

4. Overt document stealing Sometimes attackers will simply go into a building and take the information they need. Frequently when using this strategy, an attacker will masquerade as someone who belongs in the situation. The thief may pose as a copy room employee remove a document from someone's desk, copy the document, replace the original, and leave with the copied document. Alternatively, the individual may pose as a janitor, systematically collecting information and "throwing it away." The individual may then be able to walk right out of the building with a trash bag containing documents that were left out in the open or a sticky note which had been left in a partially open desk drawer on which a user had written his/her passwords.

5. There are many practices commonly used to decrease the possibility of success for these kind of attacks. Document shredding has become common, and the practice is still growing. Also electronic storage media are often prepared for disposal by purging, which erases files which may have been "deleted" by an operating system but never overwritten with other data.

6. Many choose to restrict access to areas where information is kept to those possessing a proper identification badge and/or other form of authorization. This attempts both to decrease the ease with which someone could access documents and to decrease the possibility of someone physically tampering with computer equipment. Along the same lines, many companies train their employees to physically protect documents and other sources of sensitive information on an individual level by locking the information in a file cabinet or by some other means. Also, companies request that employees memorize their passwords rather than writing them down as the paper with the password could be seen or stolen.

VII. Mark the following statements as True or False in relation to the text. If a statement is false, change it to make it true.

a) Many individuals and companies devote resources to protecting data physically.

b) The data obtained by the attackers may be directly or indirectly beneficial to them.

c) Computer disks found in the trash may contain sensitive information that cannot be restored.

d) There exist many practices to decrease the possibility of stealing data.

e) In many companies employees are requested to learn their passwords by heart.

VIII. Match the terms in A with the statements in B.

A	B
a) social engineering;	1. The removal of sensitive data from a system or storage device with the intent that the data cannot be reconstructed by any known technique.
b) overt document stealing;	2. The practice of searching through the trash in attempt to get documents containing important data.
c) dumpster diving;	3. A collection of techniques used to manipulate people into performing actions or divulging confidential information.
d) purging;	4. Cutting paper into very fine strips for destroying private, confidential or sensitive documents.
e) document shredding.	5. Practice for looking for useful information by pretending to be someone who belongs in the situation.

IX. Find out the equivalents to the following words and word combinations in paragraphs 2 and 3.

Поиск, секретная информация, взломщики, мусор, восстанавливать, злонамеренный, обеспечивать доступ, средство, разгребание мусора, получать, цель, присущий, однако, область.

X. Find words and phrases in the text which mean:

confidential, take place, goals, profitable, in an effort, supply, pretend, diminish, limit, ask.

XI. Choose the correct answer to the following questions.

1. What is physical information security concerned with?
    a) protecting data from a software/network perspective;
    b) physically protecting information and means to access it;
    c) designing techniques for breaking into computer systems.

2. Which information may be directly beneficial to crackers?
    a) computer passwords;
    b) industrial secrets, finances, new products;
    c) phone numbers of company's employees.

3. Which of the physical information security practices are not mentioned in the list?
    a) document shredding;
    b) locking documents in a file cabinet;
    c) memorizing passwords.

XII. Characterize the techniques used by attackers for obtaining sensitive information.

XIII. Speak about the necessity of physically protecting information and security practices suggested using the information from the text.

Part B

I. Read the text and write out key words and word combinations revealing the contents of the text.

II. Divide the text into logical parts. Entitle each part.

Text B

A computer virus is a computer program that can copy itself and infect a computer without permission or knowledge of the user. Computer viruses are called viruses because they share some of the traits of biological viruses. A computer virus passes from computer to computer like a biological virus passes from person to person. However, the term "virus" is commonly used to refer to many different types of malware programs. The original virus may modify the copies, or the copies may modify themselves. A virus can only spread from one computer to another when its host is taken to the uninfected computer, for instance by a user sending it over a network or the Internet, or by carrying it on a removable medium such as a floppy disk, CD, or USB drive[1]. Additionally, viruses can spread to other computers by infecting files on a network file system or a file system that is accessed by another computer. Some viruses are programmed to damage the computer by damaging programs, deleting files, or reformatting the hard disk. Others are not designed to do any damage, but simply replicate themselves and perhaps make their presence known by presenting text, video, or audio messages. Even these benign viruses can create problems for the computer user. They typically take up computer memory used by legitimate programs. As a result, they often cause erratic behavior and can result in system crashes.

Traditional computer viruses were first widely seen in the late 1980s, and they came about because of several factors. The first factor was the spread of personal computers (PCs). Prior to the 1980s, home computers were nearly non-existent or they were toys. Real computers were rare, and they were locked away for use by "experts." The second factor was the use of computer bulletin boards. People could dial up a bulletin board with a modem and download programs of all types. Games were extremely popular, and so were simple word processors, spreadsheets and other productivity software. Bulletin boards led to the precursor of the virus known as the Trojan horse. Trojan horses only hit a small number of people because they are quickly discovered, the infected programs are removed. The third factor that led to the creation of viruses was the floppy disk. In the 1980s, programs were small, and you could fit the entire operating system, a few programs and some documents onto a floppy disk or two. Many computers did not have hard disks, so when you turned on your machine it would load the operating system and everything else from the floppy disk. Virus authors took advantage of this to create the first self-replicating programs. Early viruses were pieces of code attached to a common program like a popular game or a popular word processor. A person might download an infected game from a

bulletin board and run it. A virus like this is a small piece of code embedded in a larger, legitimate program. When the user runs the legitimate program, the virus loads itself into memory and looks around to see if it can find any other programs on the disk. If it can find one, it modifies the program to add the virus's code into the program. Then the virus launches the "real program." The user really has no way to know that the virus ever ran. Unfortunately, the virus has now reproduced itself, so two programs are infected. The next time the user launches either of those programs, they infect other programs, and the cycle continues. If one of the infected programs is given to another person on a floppy disk, or if it is uploaded to a bulletin board, then other programs get infected. This is how the virus spreads.

Note:

[1]USB drive (another name for flash drive) - флэш-память.

III. Find the sentences containing:
a) the main idea of the text;
b) the nature of viruses;
c) the ways of spreading computer viruses;
d) the ways to escape viruses.

IV. Correct the outline of the text presented below.
1. Appearance of viruses
2. Spreading of viruses
3. Functions of viruses
4. Types of viruses

V. Make a questionnaire to the text and interview your partner on the problems raised in the text.

VI. Say which facts presented in the text you've already learnt.

Part C

I. Look through the following text and find information about the ways of classifying exploits.

Text C

An exploit is a piece of software, a chunk of data, or sequence of commands that take advantage of a bug, glitch or vulnerability in order to cause unintended or unanticipated behavior to occur on computer software, hardware, or something electronic (usually computerized).

There are several methods of classifying exploits. The most common is by how the exploit contacts the vulnerable software. A 'remote exploit' works over a network and exploits the security vulnerability without any prior access to the vulnerable system. A 'local exploit' requires prior access to the vulnerable system and usually increases the privileges of the person running the exploit past those granted by the system administrator. Exploits against client applications also exist, usually consisting of modified servers that send an exploit if accessed with client application. Another classification is by the action against vulnerable system: unauthorised data access, code execution, denial of service.

Many exploits are designed to provide superuser level access to a computer system. However, it is also possible to use several exploits, first to gain low-level access, then to escalate privileges repeatedly until one reaches root.

Normally a single exploit can only take advantage of a specific software vulnerability. Often, when an exploit is published, the vulnerability is fixed through a patch and the exploit becomes obsolete for newer versions of the software. This is the reason why some blackhat hackers do not publish their exploits but keep them private to themselves or other malicious crackers. In computer security, logging (or signing) in and is the process by which individual access to a computer system is controlled by identification of the user in order to obtain credentials to permit access. It is an integral part of computer security. A user can log in to a system to obtain access, and then log on when the access is no longer needed.

To log into a system usually requires: a user name, a unique sequence of characters the user chooses to represent himself or herself with. A user name can be the user's real name, but is more often a short nickname or screen name. The term User ID is also used on some systems. Many websites now use emails in place of the username, which are not publicly available, making password guessing much more difficult (the hackers need to guess the email as well). A password, another sequence of characters which provides the user with a key to the system and is kept secret from others. Logging out may be done explicitly by the user performing some action, such as entering the appropriate command, or clicking a website link labeled as such. It can also be done implicitly, such as by powering the machine off, closing a web browser window, leaving a website, or not refreshing a webpage within a defined period.

Logging out of a computer when leaving it is a common security practice, preventing unauthorized users from tampering with it. There are also people who choose to have a password-protected screensaver to activate after some time of inactivity, requiring the user to log in again to regain access.

II. Say why some hackers don't publish their exploits.

III. Say where the information presented in the text can be used.

IV. Speak on one of the following points to your partner:
   a) methods of classifying exploits;
   b) types of exploits;
   c) how one can log in;
   d) how one can log out.

СОДЕРЖАНИЕ

Учебное издание

Учебно-методическое пособие
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