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М.В. Цинова, О.Л. Нікуліна,
Г.Б. Кравець

ENGLISH OF INFORMATION TECNOLOGY

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Авторський колектив:

М.В. Цинова, канд. істор. наук, доцент кафедри англійської мови №3 НУ «ОМА»;

О.Л. Нікуліна, канд. філол. наук, доцент кафедри англійської мови №3;

Г.Б. Кравець, ст. викладач кафедри англійської мови №3;

Рецензенти:

Кравченко Н.О. — д.ф.н., завідувач кафедри теоретичної та прикладної фонетики англійської мови Одеського державного університету ім. І.І. Мечникова;

Богомолов О.С. — к.ф.н., доцент кафедри англійської мови №3 Національного університету «Одеська морська академія».

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Посібник має практичну спрямованість і призначений допомогти студентам читати англійські тексти за спеціальністю, а також висловлювати їх думки англійською мовою. У ньому в стислій та дохідливій формі систематично представлені головні правила англійської граматики в обсязі, необхідному для вивчення мови у вищій школі.

Представлений авторами навчальний посібник, розрахований на курсантів та студентів, які вивчають інформаційні технології, а також для широкого кола слухачів, які цікавляться цією сферою.

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ПЕРЕДМОВА

Представлений авторами навчальний посібник, розрахований на курсантів та студентів, які вивчають інформаційні технології, а також для широкого кола слухачів, які цікавляться цією сферою.

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Посібник складається з 10 розділів, що обіймають професійні рубрики теорії інформаційних технологій. Кожний розділ складається з 4х підрозділів: 1) розуміння прочитаного тексту, 2) мовні аспекти, 3) мовленнєві аспекти та аспекти письма. Таким чином матеріал посібника допомагає розвинути три основні навички оволодіння мовою:

- Розуміння прочитаного (reading comprehension)
- Мовлення (speaking)
- Письма (writing)

Щодо четвертої навички – розуміння на слух (listening comprehension) – вона може бути практично розвинена на кожному уроці у класі в процесі спілкування курсантів / студентів між собою та з викладачем.

Характерною особливістю даного посібника є те, що більша частина мовного матеріалу цілеспрямовано базується на оригінальних наукових текстах з інформатики та інформаційних технологій. Спеціально відібраний вокабуляр у вправах дозволяє надати курсантам / студентам не тільки міцні знання у сфері граматики, але й зосередити їх увагу на лексиці, яка найбільш часто використовується у сфері комп'ютерних технологій.

Розташування розділів навчального посібника не передбачає обов'язкової означеної послідовності вивчення граматичних явищ. Послідовність справ усередені тем бажано зберегти через те, що у кожному розділі вони надані за принципом наростання складності, що дозволяє викладачу використовувати посібник для роботи зі студентами /курсантами різного рівня підготовки.

Тексти допомагають систематизувати і реалізувати контроль знань, а також виявити теми, які потребують більш глибокого опрацювання.

Посібник може використовуватися як на заняттях з англійської мови, так і під час самостійної роботи.

Автори посібника сподіваються, що дана розробка допоможе курсантам / студентам ефективно оволодіти знаннями з граматики англійської мови та розвине навички, необхідні для подальшої успішної професійної діяльності.

Unit 1. Personal computer hardware

1. Reading comprehension

A personal computer is made up of multiple physical components of computer hardware, upon which can be installed an operating system and a multitude of software to perform the operator's desired functions.

A **visual display unit**, often called simply a **monitor** or **display**, is a piece of electrical equipment which displays images generated from the video output of devices such as computers, without producing a permanent record. Most newer monitors typically consist of a TFT LCD (thin film transistor liquid crystal display), with older monitors based around a cathode ray tube (CRT). Almost all of the mainstream new monitors being sold on market now are LCD. The monitor comprises the display device, simple circuitry to generate and format a picture from video sent by the signals source, and usually an enclosure. Within the signal source, either as an integral section or a modular component, there is a display adapter to generate video in a format compatible with the monitor.

- A **motherboard** is the central printed circuit board (PCB) in some complex electronic systems, such as modern personal computers. The motherboard is sometimes alternatively known as the mainboard, system board, or, on Apple computers, the logic board. It is also sometimes shortened to mobo.
- A **central processing unit (CPU)** or **processor** is an electronic circuit that can execute computer programs. This topic has been in use in the computer industry at least since the early 1960s (Weik, 1961). The form, design and implementation of CPUs have changed dramatically since the earliest examples, but their fundamental operation has remained much the same.
- **Random-access memory** (usually known by its acronym, **RAM**) is a form of computer data storage. Today, it takes the form of integrated circuits that allow stored data to be accessed in any order (i.e., at *random*). The word *random* thus

refers to the fact that any piece of data can be returned in a constant time, regardless of its physical location and whether or not it is related to the previous piece of data.

- An **expansion card** (also *expansion board*, *adapter card* or *accessory card*) in computing is a printed circuit board that can be inserted into an **expansion slot** of a computer mother board to add additional functionality to a computer system. One edge of the expansion card holds the contacts (the edge connector) that fit exactly into the slot. They establish the electrical contact between the electronics (mostly integrated circuits) on the card and on the motherboard.
- A **power supply unit (PSU)** is the component that supplies power to a computer. More specifically, a power supply is typically designed to convert 100-120 V (North America and Japan) or 220-240 V (New Zealand, Europe, South America, Africa, Asia and Australia) AC power from the mains to usable low-voltage DC power for the internal components of the computer.
- **DVD - drive**(short for "digital versatile disc") is a component of a computer or other electronic device designed specifically to utilize digital versatile discs, or DVDs.
- A **hard disk drive** (often shortened as "hard disk" or "hard drive"), is a non-volatile storage device which stores digitally encoded data on rapidly rotating platters with magnetic surfaces. Strictly speaking, "drive" refers to a device distinct from its medium, such as a tape drive and its tape, or a floppy disk drive and its floppy disk.
- In computing, a **keyboard** is an input device, partially modeled after the typewriter keyboard, which uses an arrangement of buttons or keys, which act as mechanical levers or electronic switches.
- In computing, a **mouse** is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface. Physically, a mouse

consists of an object held under one of the user's hands, with one or more buttons.

- **SSD** stands for "Solid State Drive". An **SSD** is a type of mass storage device similar to a hard disc drive. Unlike hard drives, **SSDs** do not have any moving parts /which is why they are called solid state drives/. Instead of storing data on magnetic platters, **SSDs** store data using flash memory.
- **UPS** stands for "Uninterruptible Power Supply". **UPS** is a type of power supply system that contains a battery to maintain power to provide power to electronics in the event of a power surge or outage.

2. After-reading tasks.

Language- in- use

2.1. Are the following statements true or false? Correct the false ones with the right information.

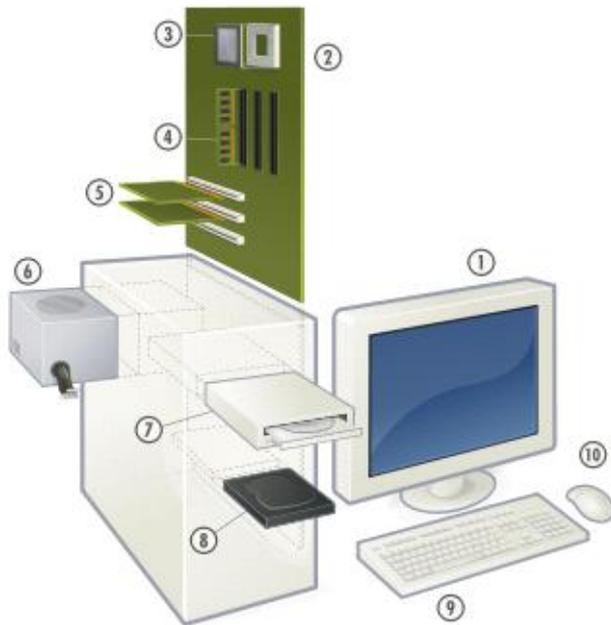
- a) The form, design and implementation of CPUs haven't changed since the earliest examples.
- b) Most newer monitors are based around a cathode ray tube.
- c) A keyboard is an input device which uses an arrangement of buttons or keys.
- d) RAM is an electronic circuit, isn't it?
- e) A mouse is a printing device.

2.2. Match the terms with their definitions.

- | | |
|-------------------|---|
| 1. expansion card | a) an electronic circuit that can execute computer programs |
| 2. keyboard | b) the component that supplies power to a computer |
| 3. CD-ROM | c) a printed circuit board |
| 4. processor | d) an input device |

5. power supply unit e) a pre-pressed compact disc that contains data

2.3. Match the terms to the picture.



1. Monitor
2. Motherboard
3. CPU
4. RAM Memory
5. Expansion card
6. Power Supply
7. CD-ROM Drive
8. Hard Disk
9. Keyboard
10. Mouse

2.4. Look at the text again and answer the questions:

- What is a personal computer made up of?
- What are the parts of a personal computer hardware?
- How is a visual display unit often called?
- How is a motherboard called on Apple computers?

- What tasks does a processor fulfill?
- What does the word ‘random’ refer to?
- Where can we insert an expansion card?
- What are the functions of a power supply unit?
- What does a CD-R0M contain?
- How does a mouse function?

2.5. Read these quotations and say which computer essentials they refer to.

1. This device consists of an object held under one of the user's hands, with one or more buttons.
2. It refers to the fact that any piece of data can be returned in a constant time, regardless of its physical location.
3. It is a piece of electrical equipment which displays images generated from the video output devices.
4. One edge of this device holds the contacts (the edge connector) that establish the electrical contact between the electronics (mostly integrated circuits) on the card and on the motherboard.
5. It is a non-volatile storage device which stores digitally encoded data on rapidly rotating platters with magnetic surfaces.

3. Read the grammar reference. Fulfill the following tasks

<p>Help box</p> <p><i>The Passive</i></p> <p>Passive sentences move the focus of attention from the subject of an active sentence to the object.</p> <p><i>This program is written in a special computer language.</i></p>
--

The Passive is not another way of expressing the same sentence in the active. We choose the active or the passive depending on what we are more interested in. The tense of the verb “to be” changes to give different tenses in the passive. This is followed by the past participle. The Passive is associated with impersonal, formal style.		
it	Is was has been	written
they	are were have been	

3.1. Look at the HELP box and then read the sentences. Fill in the blanks with the correct form of the verbs in brackets.

Example: Houses (design)_____ with the help of computers./*Houses are designed with the help of computers.*

1. Various terminals (connect)_____ to this workstation.
2. Microcomputers (know)_____ as 'PCs'.
3. Magazines (typeset)_____ by computers.
4. When a particular program is run, the data (process)_____ by the computer very rapidly.
5. The Web (use)_____ to search for information and buy products online.
6. The drug-detecting test in the Tourde France (support)_____ by computers.
7. All the activities of the computer system (coordinate)_____ by the central processing unit.

3.2. The words in the boxes appear in the text. Write in the other parts of speech.

adverb	noun	verb
--------	------	------

simply alternatively dramatically specifically digitally additionally		
--	--	--

3.3. How many compounds can you make by combining a word from A with a word from B? There is sometimes more than one for each word in A. Use your dictionary to help

A	B
video, computer, mother, power, key, ray	point, tube, boat, word, data, storage, hood, recorder, shop, circuit, software, board, programs tongue, plant

3.4. Find words in the text with the same and similar meaning to these words.

Generate, consist, unit, contract, carry out, put into, provide, change, set, item

3.5. Read the text again and write out terminological words and word-combinations.

4. Speaking and Writing

4.1. Speak on the constituents of a personal computer hardware using the following constructions:

- a personal computer is made up of.....
- the monitor comprises.....

- a mobo is known as.....
- RAM takes the form of.....
- CD-ROM contains.....
- a hard disk stores.....

4.2. Your company is considering replacing all of the onboard PCs with laptops. Look through the sample and write an email to your head office explaining the benefits for the employees and the company.

Dear Sir/Madam,

I am writing this email/letter to you to request for a laptop to use for work. I personally feel that having a laptop can help me with my work, my productivity and also improve my service to the company.

I hope you will take this request into consideration.

Thank you for your kind attention.

Yours Sincerely,

-yourname-

Unit 2. Input devices

1. Reading comprehension:

The keyboard

In computing, a **keyboard** is an input device, partially modeled after the typewriter keyboard, which uses an arrangement of buttons or keys, which act as mechanical levers or electronic switches. A keyboard typically has characters engraved or printed on the keys and each press of a key typically corresponds to a single written symbol. However, to produce some symbols requires pressing and holding several keys simultaneously or in sequence. While most keyboard keys produce letters, numbers or signs (characters), other keys or simultaneous key presses can produce actions or computer commands.



The pointing device

A **pointing device** is an input interface (specifically a human interface device) that allows a user to input spatial data to a computer. CAD (computer added design) systems and graphical user interfaces (GUI) allow the user to control and provide data to the computer using physical gestures — point, click, and drag — for example, by moving a hand-held mouse across the surface of the physical desktop and activating switches on the mouse.

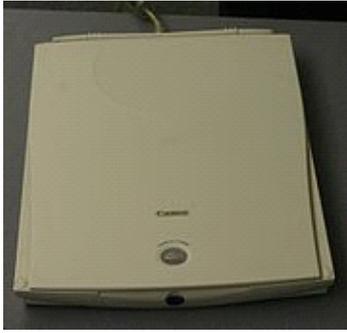
Video input devices

Video input devices are used to digitize images or video from the outside world into the computer. The information can be stored in a multitude of formats depending on the user's requirement.

- **Webcams** are video capturing devices connected to computers or computer networks, often using USB or, if they connect to network or Wi-Fi. The most popular use is for videotelephony, permitting a computer to act as a videophone or video conferencing station. This can be used in messenger programs such as Windows Live Messenger, Skype and Yahoo messenger services. Other popular uses, which include the recording of video files or even still-images, are accessible via numerous software programs, applications and devices.



- In computing, a **scanner** is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. Common examples found in offices are variations of the *desktop (or flatbed) scanner* where the document is placed on a glass window for scanning. Scanners typically read red-green-blue color (RGB) data from the array. This data is then processed with some proprietary algorithm to correct for different exposure conditions, and sent to the computer via the device's input/output interface.



Audio input devices

Audio input devices are used to either capture or create sound. In some cases, an audio output device can be used as an input device, in order to capture produced sound:

- **Microphone** is an acoustic-to-electric transducer or sensor that converts sound into an electrical signal. Microphones are used in computers for recording voice and speech recognition.
- **MIDI (Musical Instrument Digital Interface,)** is an industry-standard protocol defined in 1982 that enables electronic musical instruments such as keyboard controllers, computers, and other electronic equipment to communicate, control, and synchronize with each other.

1. After-reading tasks.

Language- in- use

2.1. Decide if these sentences are True or False. If they are false, correct them.

1. The details detected by a scanner are not determined by its resolution.
2. A barcode scanner is a computer peripheral for reading barcode labels printed on products.
3. Scanners cannot handle optical character recognition.
4. A digital camera uses a light sensitive film instead of a memory card for storing the images.

5. A digital video (DV) camera is used to take still photographs.
6. Video editing software allows you to manipulate video clips on the computer.

2.2. Analyze the text. Which input device would you use for these tasks?

1. to copy images from paper into a computer
2. to read price labels in a shop
3. to select text and click on links on web pages
4. to enter drawings and sketches into a computer
5. to input voice commands and dictate text
6. to draw pictures or select menu options directly on the screen
7. to take and store pictures and then download them to a computer

2.3. Complete these sentences with the correct 'mouse action': to click, to double-click, to drag, to right-click

1. to start a program or open a document you have..... on its icon - that is, you rapidly press and release the mouse button twice.
2. If you want to find the commands for a particular text, image, etc., you have to.....on it.
3. If you want to select a menu option, you just... on the left button.
4. If you want to move an object, press the button and.....the object to the desired location.

2.4. Match the descriptions with the names of keys on the right.

<p>1. Along key at the bottom of the keyboard. Each time it is pressed, it produces a blank space. (=_____)</p>	<p>arrow keys return caps lock</p>
<p>2. It moves the cursor to the beginning</p>	

<p>of a new line. It is also used to confirm commands. (= _____)</p> <p>3. It stops a program without losing the information from the main memory. Sometimes its use depends on the applications. (= _____)</p> <p>4. It works in combination with other keys to produce special characters or specific actions. (= _____)</p> <p>5. It removes the character on the left of the cursor or any selected text. (= _____)</p> <p>6. It produces UPPER-CASE characters (or the upper-case character of the key). (= _____)</p> <p>7. It produces upper-case letters, but it does not affect numbers and symbols. (= _____)</p> <p>8. It moves the cursor horizontally to the right for a fixed number of spaces (in tabulations and data fields). (= _____)</p> <p>9. They are used to move the cursor, as an alternative to the mouse. (= _____)</p>	<p>shift</p> <p>tab</p> <p>escape</p> <p>space bar</p> <p>backspace</p> <p>alt</p>
--	--

2.5. Look at the text again and answer the questions:

- What does the typewriter keyboard use?
- What does a keyboard typically have?
- What can keyboard keys produce?
- What kind of input interface allows a user to input spatial data to a computer?

- What are video input devices used for?
- Where can the information be stored?
- What is the scanner used for in computing?
- What common examples of scanners can we find in offices?
- What is the purpose of audio input devices?
- What does MIDI stand for?

3. Read the grammar reference and fulfill the following tasks.

Help box	
<i>Uses of –ing form</i>	
1.The –ing form (gerund or present participle) is used after prepositions.	Where is the document placed on a glass window for scanning?
2.The –ing form is used as a subject, an object or an attribute.	It requires pressing and holding several keys simultaneously or in sequence. Webcams are video capturing devices. Scaling is making the object larger or smaller in any of the horizontal, vertical or depth directions.

3.1. Complete the sentences by using an appropriate –ing form from those in the box.

Depending, sharing, containing, typing, creating, using, replacing, printing, representing, videoconferencing

- a) Computer animation is the process of _____ objects and pictures which move across the screen.

- b) You navigate through the Web _____ a program called a “browser”.
- c) _____ programs enable users to talk to and see each other, and collaborate .
- d) Another feature of database programs is that you can automatically look up and find records _____ particular information.
- e) _____ is necessary to put the information into the computer initially.
- f) Icons are graphic images _____ tasks.
- g) CD-ROM is the most economical way of _____ information.
- h) _____ is the final stage in creating a document.
- i) The pointer usually looks like an I-bar, an arrow or a pointing hand, _____ on what you are doing.
- j) Bluetooth is a standard wireless technology designed to connect mobile phones, computers and other devices, _____ direct cable links

3.2. Match the words in the left part of the box with the appropriate ones in the right. Decide what parts of speech they are.

key	writer
web	top
how	work
out	writing
in	bed
flat	side
hand	put
net	ever
desk	camera
type	board

--	--

3.3. English has the largest vocabulary of all languages. This is partly because there are so many synonyms. Match a word in A with its synonyms in B.

A	B
<ol style="list-style-type: none"> 1. device 2. arrangement 3. keyboard 4. character 5. require 6. simultaneously 7. produce 8. user 9. object 10. convert 11. capture 	<p>Item, create, reorganize, grasp, develop, occupant, turn (into), trap, gadget, layout, k/b, image, call for, synchronous, equipment, location, pad, sign, demand, seize, reform, piece, subscriber, set up, occupy, article, generate, at the same time, need, symbol, installation, facility, placement, establish, customer, thing, transform, catch, make, appliance, spacing</p>

3.4. Translate the following adjectives and their corresponding nouns:

a) wide – width, deep – depth, long – length, hot – heat, warm – warmth, high – height;

b) short – shortness, cold – coldness, cool – coolness, round – roundness, shallow – shallowness, soft – softness, hard – hardness, useful – usefulness, complete – completeness.

4. Speaking and Writing

4.1. Using information from the text speak on the most common input device which allows us to enter information into the computer.

4.2. Give the description of one of the onboard video or audio input devices in a written form.

Unit 3. Output devices

1. Reading comprehension:

An **output device** is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) to the outside world.

The most common output devices are monitors, speakers and printers.

- A **visual display unit**, often called simply a **monitor** or **display**, is a piece of electrical equipment which displays images generated from the video output devices such as computers, without producing a permanent record.

When choosing a monitor, you have to take into account a few basics.

■ Type of display

The **Cathode Ray Tube** of a monitor is similar to a traditional TV set. It has three electron guns that strike the inside of the screen, which is coated with substances called phosphors, which glow and create colours. CRTs are cheap, but they are heavy, can flicker and emit radiation. Nowadays CRTs are considered to be obsolete.

A **Liquid Crystal Display** is made from flat plates with a liquid crystal solution between them. The crystals block the light in different quantities to create the image. Active-matrix LCDs use TFT (thin film transistor) technology, in which each pixel has its own transistor switch. They offer better quality and take up less space, so they are replacing CRTs.

- **Screen size** - the viewing area is measured diagonally; in other words, a 22" screen measures 22 inches from the top left corner to the bottom right.
- **Resolution** - the clarity of the image depends on the number of pixels (short for picture elements) contained on a display, horizontally and vertically. A typical resolution is 2048 x 1536. The sharpness of images is affected by dot pitch, the

distance between the pixels on the screen, so a dot pitch of 0.28 mm or less will produce a sharp image.

Brightness - the luminance of images is measured in cd/m^2 (candela per square metre).

Colour depth - the number of colours a monitor can display. For example, a VGA monitor produces 256 colours, enough for home use; a SuperVGA can produce up to 16.7 million colours, so is ideal for photographic work and video games.

■ **Refresh rate** - the number of times that the image is drawn each second. If a monitor has a refresh rate of 75 Hertz (Hz), it means that the screen is scanned 75 times per second. If this rate is low, you will notice a flicker, which can cause eye fatigue.



A 20" LG flat-panel LCD monitor.

- In computing, a **printer** is a peripheral which produces a hard copy (permanent human-readable text and/or graphics) of documents stored in electronic form, usually on physical print media such as paper or transparencies. Many printers are primarily used as local peripherals, and are attached by a printer cable or, in most newer printers, a USB cable to a computer which serves as a document source. Some printers, commonly known as **network printers**, have built-in network interfaces (typically wireless or Ethernet), and can serve as a hardcopy device for any user on the network. Individual printers are often designed to support both local and network connected users at the same time. In addition, a few modern printers can directly interface to electronic media such as memory sticks or memory cards, or to image capture devices such as digital cameras, scanners; some printers are combined with a scanners and/or fax machines in a

single unit, and can function as photocopiers. Printers that include non-printing features are sometimes called Multifunction Printers (MFP), Multi-Function Devices (MFD), or All-In-One (AIO) printers. Most MFPs include printing, scanning, and copying among their features.



A printer.

- **Computer speakers**, or **multimedia speakers**, are external speakers, commonly equipped with a low-power internal amplifier. The standard audio connection is a 3.5mm (1/8 inch) stereo jack plug often colour-coded lime green (following the PC 99 standard) for computer sound cards. A plug and socket for a two-wire (signal and ground) coaxial cable that is widely used to connect analog audio and video components. Also called a "phono connector," rows of RCA sockets are found on the backs of stereo amplifiers and numerous A/V products. The prong is 1/8" thick by 5/16" long. A few use an RCA connector for input. There are also USB speakers which are powered from the 5 volts at 200 milliamps provided by the USB port, allowing about half a watt of output power. The internal amplifiers require an external power source, known as a 'wall-wart'. More sophisticated computer speakers may have a 'subwoofer' unit, to enhance bass output, and these units usually include the power amplifiers both for the bass speaker, and the small 'satellite' speakers.

- | | |
|-------------------|-----------------------|
| 3. resolution | c) 16 million colours |
| 4. contrast ratio | d) 22 inches |
| 5. dot pitch | e) 1280 x 1024 pixels |

2.4. Look at the text attentively and answer the questions:

- What is an output device used for?
- What are the most common output devices?
- Does a monitor produce a permanent record?
- What does a monitor comprise?
- How are printers attached to a computer?
- What do some printers commonly known as network printers have?
- Can some printers function as photocopiers?
- Where are rows of RCA sockets found?
- What can an RCA connector be used for?
- Who and what for may have a ‘subwoofer’ unit?

3. Read the grammar reference and fulfill the following tasks:

Help box		
Comparatives and Superlative		
Number of syllables One syllable tall	Comparative + -er taller	Superlative + -est tallest
One syllable with the spelling consonant + single vowel + consonant: double the final consonant:		
fat big sad	fatter bigger sadder	fattest biggest saddest

Two syllables		
ending in: -y; -ly; -ow+ -er OR more + adj.		+ -est OR most + adj.
ending in: -le; -er, -or; -ur		
These common adjectives: handsome, polite, pleasant, common, quiet		
happy	happier/more happy	happiest/ most happy
yellow	yellower/more yellow	yellowest/most yellow
simple	simpler/more simple	simplest/most simple
tender	tenderer/more tender	tenderest/most tender
If you are not sure, use MORE + OR MOST +		
<i>Note: Adjectives ending in " -y" like happy, pretty, busy, sunny, lucky etc: replace the -y with -ier or -iest in the comparative and superlative form</i>		
busy	busier	busiest
Three syllables or more	more + adj	most + adj
important	more important	most important
expensive	more expensive	most expensive

3.1. Apart from catchy slogans and other persuasive techniques, advertisements often use the comparatives and superlatives of adjectives and adverbs. Read the following examples from advertisements. What can you say from these examples about how comparatives and superlatives are formed?

1. ... only ten times faster.
2. It couldn't be cheaper with...
3. The manufacturers have chosen the highest technology ...
4. The cleverest personal scanner ...
5. The most revolutionary computer peripheral...
6. The best scans with the least effort...
7. Flatbed scanners are more accurate than ...
8. Now you can edit your documents more easily than ever, and they'll look better than ever too with ...

3.2. The class of a word can often be changed by adding a suffix. For example, if –er is added to the verb scan (and the 'n' is doubled) we get the noun scanner.

Common adjectival suffixes are: -ing, -y, -able, -ible, -ive, -al, -ed, -ful

Common noun suffixes are: -er, -or, -ion, -tion, -ation, -ment, -ness, -ity, -ant,

Put the following words into the correct column below:

Computer, self-calibrating, easy, resolution, sharpness, information, printed, personal, capable, compression, technology, calculator, useful, assistant, expensive, possibility, reducible, investment

Adjectives	Nouns

3.3. Some words have been left out of this persuasive advertisement. Read it and complete it with words from the box.

Vivid, easy-to-use, faster, fashionable, wide, shots

If you want great pictures from an (1)... digital camera, you want the Kodak DC215. Now you can capture life's memories in style with this sleek and (2)....digital camera. The camera's 2X (29 mm-58 mm) optical zoom lens lets you get close up and personal without sacrificing image detail or quality while the (3)....angle lens design helps you capture more in each shot. With one million (1152 x 864) pixels, you'll have enough detail to generate crisp, (4)... realistic photos up to 5" x 7". The 1.8" colour LCD lets you preview and review your pictures so you get only the (5)... you want, and lets you delete those you don't. With the included USB COMPACTFLASH Card Reader, you can download pictures up to ten times (6)... than with serial connections for faster image sharing.

3.4. Make new words with the base words, using the suffixes and/or prefixes. Sometimes you need to make small changes to the spelling.

Prefixes	Base	Suffixes
	add	-ing
-un	process	-sion
re-	emit	-tion
	resolve	-th
	deep	-ness
	fresh	-er
	speak	-able
	scan	

3.5. Give derivatives to the following words.

to design, to execute, to calculate, to program, to simulate, to test, to decode, to unpack, to print, to install, to operate, to process

4. Speaking and Writing

4.1. Speak on the main features of the printer you prefer to use. Discuss it with your group-mate. Give reasons.

4.2. A chief officer has asked you to recommend a printer to buy, the Canon SELPHY CP750 or the Brother HL Network Colour Laser Printer. Write an email comparing the two printers. Use the following data to help you.

Canon Compact Photo Printer SELPHY CP750 Photo Printer

An inkjet photo printer with a 2.4" colour LCD for easy viewing, editing and printing of perfect borderless photos. With PictBridge, you can print directly from digital cameras, memory cards or memory phones without connecting to a PC. Resolution: 300x300 dpi, software: easy-photoprint, dimensions:179x127.1x63 mm, weight: 960g

Brother HL Network Colour Laser Printer

The HL-4040CN delivers the perfect balance of quality, workgroup, colour A4 laser printing. It boasts outstanding colour output: 2,400 dpi class colour printing with exceptionally crisp, high-resolution text and graphics driven by Brother's exclusive printing enhancement technologies. Print speed: up to 31 pages per minute mono, 8 ppm colour, compatibility: PCL and PostScript languages, Paper tray capacity: 250 sheets, memory size: 64MB, high-speed USB

Unit 4. Computer data processing

- **Reading comprehension:**

A **central processing unit (CPU)** or **processor** is an electronic circuit that can execute computer programs. This term has been in use in the computer industry at least since the early 1960s.

The fundamental operation of most CPUs, regardless of the physical form they take, is to execute a sequence of stored instructions called a program. The program is represented by a series of numbers that are kept in some kind of computer memory. There are four steps that nearly all CPUs use in their operation: **fetch**, **decode**, **execute**, and **write back**.

The first step, **fetch**, involves retrieving an instruction (which is represented by a number or sequence of numbers) from program memory. The location in program memory is determined by a program counter (PC), which stores a number that identifies the current position in the program. In other words, the program counter keeps track of the CPU's place in the current program. After an instruction is fetched, the PC is incremented by the length of the instruction word in terms of memory units. Often the instruction to be fetched must be retrieved from relatively slow memory, causing the CPU to stall while waiting for the instruction to be returned. This issue is largely addressed in modern processors by caches and pipeline architectures.

The instruction that the CPU fetches from memory is used to determine what the CPU is to do. In the **decode** step, the instruction is broken up into parts that have significance to other portions of the CPU. The way in which the numerical instruction value is interpreted is defined by the CPU's instruction set architecture (**ISA**). Often, one group of numbers in the instruction, called the opcode, indicates which operation to perform. The remaining parts of the number usually provide information required

for that instruction, such as operands for an addition operation. Such operands may be given as a constant value (called an immediate value), or as a place to locate a value: a register or a memory address, as determined by some addressing mode. In older designs the portions of the CPU responsible for instruction decoding were unchangeable hardware devices. However, in more abstract and complicated CPUs and ISAs, a microprogram often used to assist in translating instructions into various configuration signals for the CPU. This microprogram is sometimes rewritable so that it can be modified to change the way the CPU decodes instructions even after it has been manufactured.

After the fetch and decode steps, the **execute** step is performed. During this step, various portions of the CPU are connected so they can perform the desired operation. If, for instance, an addition operation was requested, an arithmetic logic unit (ALU) will be connected to a set of inputs and a set of outputs. The inputs provide the numbers to be added, and the outputs will contain the final sum. The ALU contains the circuitry to perform simple arithmetic and logical operations on the inputs (like addition and bitwise operations). If the addition operation produces a result too large for the CPU to handle, an arithmetic overflow flag in a flags register may also be set.

The final step, **write back**, simply "writes back" the results of the execute step to some form of memory. Very often the results are written to some internal CPU register for quick access by subsequent instructions. In other cases results may be written to slower, but cheaper and larger, main memory. Some types of instructions manipulate the program counter rather than directly produce result data. These are generally called "jumps" and facilitate behavior like loops, conditional program execution (through the use of a conditional jump), and functions in programs. Many instructions will also change the state of digits in a "flags" register. These flags can be used to influence how a program behaves, since they often indicate the outcome of various operations. For example, one type of "compare" instruction considers two

values and sets a number in the flags register according to which one is greater. This flag could then be used by a later jump instruction to determine program flow.

After the execution of the instruction and write back of the resulting data, the entire process is repeated, with the next instruction cycle normally fetching the next-in-sequence instruction because of the incremented value in the program counter.

Random-access memory (usually known by its acronym, **RAM**) is a form of computer data storage. Today, it takes the form of integrated circuits that allow stored data to be accessed in any order (i.e., at *random*). The word *random* thus refers to the fact that any piece of data can be returned in a constant time, regardless of its physical location and whether or not it is related to the previous piece of data.

By contrast, storage devices such as tapes, magnetic discs and optical discs rely on the physical movement of the recording medium or a reading head. In these devices, the movement takes longer than data transfer, and the retrieval time varies based on the physical location of the next item.

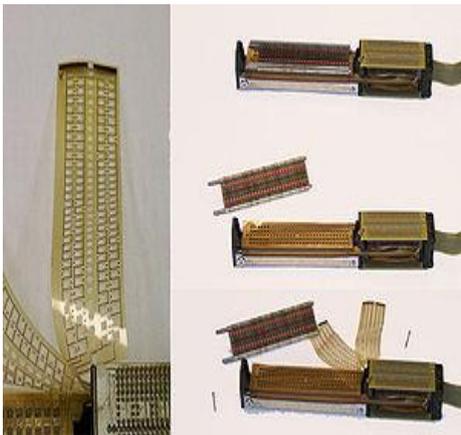
The word RAM is often associated with volatile types of memory (such as DRAM memory modules), where the information is lost after the power is switched off. Many other types of memory are RAM, too, including most types of ROM and flash memory called *NOR-Flash*.



Example of writable volatile random access memory.

Read-only memory (usually known by its acronym, **ROM**) is a class of storage media used in computers and other electronic devices. Because data stored in ROM cannot be modified (at least not very quickly or easily), it is mainly used to

distribute firmware (software that is very closely tied to specific hardware, and unlikely to require frequent updates).



Transformer matrix ROM (TROS), from the IBM System 360/20

In its strictest sense, ROM refers only to **mask ROM** (the oldest type of solid state ROM), which is fabricated with the desired data permanently stored in it, and thus can never be modified. However, more modern types such as EPROM and flash EEPROM can be erased and re-programmed multiple times; they are still described as "read-only memory"(ROM) because the reprogramming process is generally infrequent, comparatively slow, and often does not permit random access writes to individual memory locations.

Units of memory: Computers represent information in binary code, written as sequences of 0s and 1s. Each 1 or 0 is called a **binary digit** or **bit**. Bits are grouped into eight-digit code. Eight bits together are called a **byte**. In order to avoid complex calculations of bytes, we use bigger units. A **kilobyte** (KB) is 1,024 bytes; a **megabyte** (MB) is 1,024 kilobytes; a **gigabyte** (GB) is 1,024 megabytes; a **terabyte** (TB) is 1,024 gigabytes. We use these units to describe the RAM memory, the operating capacity and the size of a program or document.

2. After-reading tasks.

Language-in-use

2.1. Match the sentence beginnings (1-6) with the correct endings (a-f).

1. Many instructions will also change the state in

2. The program counter keeps track of
3. The way in which the numerical instruction value is interpreted is defined ...
4. The inputs provide the numbers to be added, and the outputs....
5. The program is represented by a series of numbers that are kept....
6. If the addition operation produces a result too large for the CPU to handle...
 - a) by the CPU's instruction set architecture.
 - b) in some kind of computer memory.
 - c) an arithmetic overflow flag in a flags register may also be set.
 - d) will contain the final sum.
 - e) the CPU's place in the current program.
 - f) a "flags" register

2.2. Organize the following stages in the computer data processing into the correct order.

- During the next step, various portions of the CPU are connected so they can perform the desired operation;
- The final step, writeback, simply "writes back" the results of the execute step to some form of memory. Very often the results are written to some internal CPU register for quick access by subsequent instructions;
- After the execution of the instruction and write back of the resulting data, the entire process repeats, with the next instruction cycle;
- There are four steps that nearly all CPUs use in their operation;
- In the decode step, the instruction is broken up into parts that have significance to other portions of the CPU. The way in which the numerical instruction value is interpreted is defined by the CPU's instruction set architecture;

- The first step, fetch, involves retrieving an instruction (which is represented by a number or sequence of numbers) from program memory.

2.3. Read this product description and answer the questions below.



Processor and memory.

- Intel Core 2 Duo processor at 2.4 Ghz
- 533MHz Front Side Bus
- 1.024 MB of RAM; can be expanded up to 4 GB
- 200 GB Hard disk
- Double Layer DVD

1. How fast is the CPU?
2. Which term is used to describe the CPU data bus?
3. How much RAM does the computer have?
4. Can you add extra RAM chips? How many?

2.4. Are the following statements true or false? If false, correct the information.

1. The word random refers to the fact that any piece of data can't be returned in a constant time.
2. Today, random-access memory takes the form of integrated circuits that allow stored data to be accessed only in strict order.

3. ROM refers only to mask ROM, which is fabricated with the desired data permanently stored in it.
4. Because data stored in ROM can be modified, it is mainly used to distribute firmware.
5. A gigabyte (GB) is 1,024 bytes.
6. EPROM and flash EEPROM can be erased and re-programmed multiple times.

2.5. One word is wrong in the following sentences. Underline and correct it.

1. Computers represent information in ternary code, written as sequences of 0s and 1s.
2. The word RAM is often associated with permanent types of memory.
3. Random-access memory takes the form of integrated circuits that allow stored data to be accessed in strict order.
4. In storage devices, data transferring takes longer than the movement.
5. The reprogramming process is generally frequent and comparatively slow.
6. Data stored in ROM can be modified very quickly and easily.

2.6. Answer the questions according to the text.

- What are the steps all CPUs use?
- What does a program counter store?
- Where is the instruction broken up into parts?
- What actions are performed during the execute step?
- When is the entire process repeated?

- What does the word 'random' refer to?
- What is the word RAM often associated with?
- Where is read-only memory used?
- What do we call 'firmware'?
- What is the difference between ROM and EPROM?

3. Read the grammar reference and fulfill the following tasks:

Modal verbs		Help box
can	They can control their own budgets. We can't fix it. Can I smoke here? Can you help me?	Ability / Possibility Inability / Impossibility Asking for permission Request
Could	Could I borrow your dictionary? Could you say it again more slowly? We could try to fix it ourselves. I think we could have another Gulf War. He gave up his old job so he could work for us.	Asking for permission. Request Suggestion Future possibility Ability in the past
May	May I have another cup of coffee? China may become a major economic power.	Asking for permission Future possibility
Might	We'd better phone tomorrow, they might be eating their dinner now. They might give us a 10% discount.	Present possibility Future possibility
Must	We must say good-bye now. They mustn't disrupt the work more than necessary.	Necessity / Obligation Prohibition
Ought to	We ought to employ a professional writer.	Saying what's right or correct
Shall	Shall I help you with your luggage? Shall we say 2.30 then? Shall I do that or will you?	Offer Suggestion Asking what to do
Should	We should sort out this problem at once. I think we should check everything again. Profits should increase next year.	Saying what's right or correct Recommending action Uncertain prediction
Will	I can't see any taxis so I'll walk. I'll do that for you if you like. I'll get back to you first thing on Monday. Profits will increase next year.	Instant decisions Offer Promise Certain prediction

Would	Would you mind if I brought a colleague with me? Would you pass the salt please? Would you mind waiting a moment? "Would three o'clock suit you?" - "That'd be fine." Would you like to play golf this Friday? "Would you prefer tea or coffee?" - "I'd like tea please."	Asking for permission Request Request Making arrangements Invitation Preferences
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3.1. Look at the HELP box. Then go to the text in Task 1 and underline the modal verbs.

3.2. Complete the sentences using can, could, may, might, should, can't, must.

1. All HTML documents.....start with <HTML> and end with </HTML>.
2. If I knew the Java language, I.....include some attractive banners on my web page.
3. With a web page editor you.....create a web document easily.
4. That woman speaks with a New York accent, so she.....from the USA.
5. She.....a top model. I know some of her friends.
6. He.....be a good web page designer because he doesn't know the HTML language.
7.I use your laptop? I need to print out this report.
8. Before you start to make a website, you.....decide how to organize the content.

3.3. There are many examples of phrasal verbs. Fill in each of the following sentences with the best phrasal verb.

logged on, power up, scroll down, logged of, back up, print out, click on, key in, set up, shut down, hook up, pull down

1. Do you know how to.....the new printer to the CPU?

2. Do I need the “www” when I.....a web address?
3. I’ve already.....because I didn’t need the network anymore.
4. I’d also like to.....print out a copy of that article to read on the train.
5. Let’sthe report on disk just as a precaution.
6. You have to.....the “send” button if you’re done writing the e-mail.
7. Once you’re.....to the network you can check if you have any e-mail.
8. Do you have the software to.....the CD-ROM drive.
9. The electricity went off and every thing..... .
- 10.....the computer and let’s get to work on the project.
- 11.....the “Tools menu” and select “Language”.
- 12.You have to.....a little more if you want to see the rest of the pictures.

3.4. Read the text, find idiomatic expressions and try to guess their meanings.

Man! My computer crashed again! And I really needed to get some messages out. I couldn’t send them through the US. Postal Service because snail mail just won’t cut it. My whole day’s been like this. When I footed up my computer again I had to wade through all the spam before I could read my e-mail. Then just as I was about to open up a message, the network went down. I guess some hacker had gotten into the company server and messed things up. Later, when I finally went online again, I took care of my e-mail, but then I decided to visit a chat room. I guess not everyone agreed with my opinions, because I really gotflamed! I know I’m no computer geek, but, hey, I do enjoy a little chatting, e-mailing and blogging from time to time.

4. Speaking and Writing.

4.1. Speak on each of these steps in details: - writeback,

- execute,
- decode,
- fetch.

4.2. Work in pairs. Cadet A: Give your partner instructions on Creating a document and saving it on disk. Cadet B: Give your partner instructions on How to insert a picture from the Web into a Word document.

4.3. Rewrite the sentences and fill in the gaps with any suitable words.

The nerve centre of a PC is the central processing unit or CPU. This unit is built into a single microprocessor chip - an integrated circuit - which executes program instructions and supervises (the computer's overall operation). The unit consists of three main parts:

-, which examines the instructions in the user's program, interprets each instruction and causes the circuits and the rest of the components - disk drives, monitor, etc. - to be activated to execute the functions specified;
- unit (ALU), which performs mathematical calculations (+, -, etc.) and logical operations (and, or, etc.);
-, which are high-speed units of memory used to store and control information. One of these registers is the program counter (PC) which keeps track of the next instruction to be performed in the main memory. Another is the instruction register (IR) which holds the instruction that is currently being executed.

One area where microprocessors differ is in the amount of data - the number of bits - they can work with at a time. There are 16, 32 and 64-bit processors. The computer's internal architecture is evolving so quickly that the new 64-bit processors are able to address 4 billion times more information than a 32-bit system. The programs and data which pass through the central processor must be loaded into the(also called the.....) in order to be processed. Thus, when the user runs an application, the microprocessor looks for it on secondary storage devices (disks) and transfers a copy of the application into the RAM area.

Unit 5 .Disks and drives

1. Reading comprehension

Magnetic devices store data magnetically. A disc drive spins the disk at high speed and reads its data or writes new data onto it. **Disk storage** is a general category of a computer storage mechanisms, in which data is recorded on planar, round and rotating surfaces (*disks, discs, or platters*). A **disk drive** is a peripheral device used to record and retrieve information. Main implementations are hard disks, floppy disks and optical disks. Nowadays the term *disk storage* almost exclusively refers to hard disk storage.

A **floppy disk drive** uses 3,5 inch diskettes which can only hold 1.44 MB of data; it's often called A: drive and is relatively slow. Floppy disks are read and written by a floppy disk drive or FDD, the initials of which should not be confused with "fixed disk drive", which is another term for a (nonremovable) type of hard disk drive.

Most PCs have one internal **hard disk**, usually called C: drive, which can hold several gigabytes of data. It's used to keep the operating system, the programs and the user's files easily available for use.

A **portable hard drive** is an external unit with the drive mechanism and the media all in one sealed case. You can use it to make a backup, a spare copy of your files, or to transport data between computers.

Disk drives are block storage devices. Each Disk is divided into logical blocks (collection of sectors). Blocks are addressed using their logical block addresses (LBA). Read from or writing to disk happens at the granularity of blocks.



A typical disk drive.

Originally the disk capacity was quite low and has been improved in one of several ways. Improvements in mechanical design and manufacture allowed smaller and more accurate heads, meaning that more tracks could be used on each of the platters. Advancements in data compression methods created more information in each of the individual sectors, and this was instrumental in allowing drives to store smaller units of data. Sectors of data, the smallest unit stored, were reduced and so less wasted space was created.

The drive stores data onto cylinders, heads and sectors. The sectors unit is the smallest size of data to be stored and each file will have many sectors units assigned to it.

The information is sent from the computer processor to the BIOS into a chip controlling the data transfer. This is then sent out to the hard drive via a multi-wire connector. Once the data is received onto the circuit board of the drive, it is translated and compressed into a format that the individual drive can use to store onto the disk itself. The data is then passed to a chip on the circuit board that controls the access to the drive. The drive is divided into sectors of data stored onto one of the sides of one of the internal disks.

The controller chip determines available free space by listing sectors in a table of used and unused areas. This list is what determines where each part of a file is kept and where they are relative to track, sector and disk. Different file systems use different types of addressing systems. For example, Vista uses the NTFS system, whereas Windows 98 systems used the LBA system. Two copies of these lists are normally held and are used to ensure data integrity. If a problem occurs with a hard drive, a disk check can be run and it compares these two lists to determine where the problem occurs and rebuild the file structure from them. When a computer drive is formatted, the data are not erased, the lists are simply deleted and so the drive hardware will treat all sectors as clean and overwrite them with new data.

An **optical disk drive (ODD)** is a disk drive that uses laser light or electromagnetic waves near the light spectrum as part of the process of reading or

writing data to or from optical discs. Some drives can only read from discs, but recent drives are commonly both readers and recorders. Recorders are sometimes called burners or writers. Compact discs, DVDs, HD DVDs and Blu-ray discs are common types of optical media which can be read and recorded by such drives.

A **USB flash drive** consists of a flash memory data storage device integrated with a USB (Universal Serial Bus) 3.0 or 3.1 interface. USB flash drives are typically removable and rewritable, and much smaller than a floppy disk. Most weigh less than 30 g (1 oz). Storage capacities in 2010 can be as large as 256 GB with steady improvements in size and price per capacity expected. Some allow 1 million write or erase cycles and have a 10-year data retention cycle.USB flash drives are often used for the same purposes as floppy disks were. They are smaller, faster, have thousands of times more capacity, and are more durable and reliable because of their lack of moving parts.

2. After-reading tasks

Language-in-use

2.1. Choose a term from this word web to complete the sentences below.

controller chip, the data, the access, logical blocks, disk drive

1. The determines available free space by listing sectors in a table of used and unused areas.
2. The data is then passed to a chip on the circuit board that controls..... to the drive.
3. Ais a peripheral device used to record and retrieve information.
4. Disk is divided into(collection of sectors).
5. Onceis received onto the circuit board of the drive, it is translated and compressed.

2.2. Organize the following stages in the drive storing process into the correct order.

The drive stores data onto cylinders, heads and sectors. Once the data is received onto the circuit board of the drive, it is translated and compressed into a format that the individual drive can use to store onto the disk itself. The data is then passed to a chip on the circuit board that controls the access to the drive. The information is sent from the computer processor to the BIOS into a chip controlling the data transfer. This is then sent out to the hard drive via a multi-wire connector.

2.3. Read the text and identify these elements.

disk drive, logical blocks, controller chip, disk storage

2.4. Look at the text again and answer the questions:

- Where is data recorded?
- What is a disk drive used for?
- What does the term 'disk storage' refer to nowadays?
- How does reading from or writing to happen?
- How has the disk capacity been improved?
- Where does the drive store data?
- Where is the information sent from the computer processor?
- What happens when the data is received onto the circuit board of the drive?
- What does the controller chip determine?
- What happens if a problem occurs with a hard drive?

3. Read the grammar reference and fulfill the following tasks:

Help

box

Conditionals

Conditional Sentences are also known as Conditional Clauses or If Clauses. They are used to express that the action in the main clause (without *if*) can only take place if a certain condition (in the clause with *if*) is fulfilled. There are three types of Conditional Sentences.

Conditional Sentence Type 1	It is possible and also <i>very likely</i> that the condition will be fulfilled.	<i>if</i> + Simple Present , will-Future	If I find her address, I'll send her an invitation.
Conditional Sentence Type 2	It is possible but <i>very unlikely</i> , that the condition will be fulfilled.	<i>if</i> + Simple Past , Conditional I (= would + Infinitive)	If I found her address, I would send her an invitation.
Conditional Sentence Type 3	It is <i>impossible</i> that the condition will be fulfilled because it refers to the past.	<i>if</i> + Past Perfect , Conditional II (= would + have + Past Participle)	If I had found her address, I would have sent her an invitation

3.1. Put the verbs in brackets into the correct form.

1. If I (get).....a sound card, I'll be able to create my own music with a MIDI.
2. If the system (have).....a SuperVGA card, we would obtain a better resolution.
3. You won't be able to play CD-ROM disks if you (not have).....a CD-ROM drive.
4. If you (come).....to the annual computer exhibition, you could see the new Macs.
5. If I could afford it, I (buy).....a Multimedia PC.

3.2. Match a line in A with a line in B.

A	B
If you upgrade your PC	you jump to another screen with more information about that subject
If the marketing manager had a multimedia system	you'll be able to run multimedia applications
If you click on a hypertext word	I would invest in a multimedia upgrade kit
If you click on the speaker icon	she could make more effective presentations
If I had the money	a disk check can be run to determine where the problem occurs
If a problem occurs with a hard disk	you'll get a piece of dialogue from the movie

3.3. Do you think these developments will take place in the next ten years? Give your own views using the expressions listed below. What will happen if.....?

1. Computers will replace teachers.
2. Computers will direct surgical operations.
3. Computers will replace bus drivers.
4. Money will be replaced by smart cards.
5. Television sets will also be computers.
6. Speech will be the main way of inputting data.
7. Computers will talk back to you.
8. Most shopping will be done using the Internet.

3.4. Match the base adjectives in A with the strong adjectives in B.

base	strong
tired	exhausted
good	great, superb
bad	horrible, awful
attractive	beautiful
angry	furious
dirty	filthy
surprised	astonished
funny	hilarious

3.5. We can make adjectives more extreme with adverbs such as very and absolutely. We can use very only with base adjectives, absolutely only with strong adjectives, really with both base and strong adjectives.

Which adjectives go with which of the adverbs on the left?

very	good, bad, big, valuable, funny, interesting, incredible,
absolutely	clever, priceless, ridiculous, awful, huge, right, beautiful,
really	surprising

4. Speaking and Writing.

4.1. In pairs, tell each other what you must or mustn't do to protect you data.

4.2. You have received a text from a friend at a computer show. Write a short reply.

Hi! At the computer show in town. Need a new media player. What's the difference between MP3 and MP4 players? What feature should I look for? Thanks!

Unit 6. Graphics and design

1. Reading comprehension

Computer graphics are graphics created with computers. The development of computer graphics has made computers easier to interact with and better for understanding and interpreting many types of data. Developments in computer graphics have had a profound impact on many types of media and have revolutionized the animation and video game industry.

The term computer graphics includes almost everything on computers that is not text or sound. Today nearly all computers use some graphics and users expect to control their computer through icons and pictures rather than just by typing. The term Computer Graphics has several meanings:

- the representation and manipulation of pictorial data by a computer
- the various technologies used to create and manipulate such pictorial data
- the images produced
- the sub-field of computer science which studies methods for digitally synthesizing and manipulating visual content, see study of computer graphics

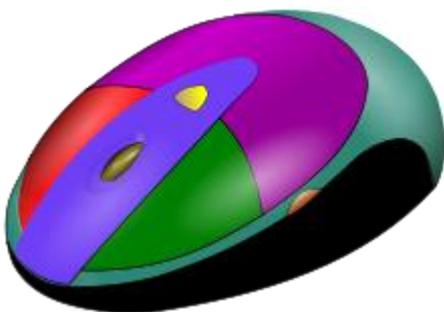
Today computers and computer-generated images touch many aspects of our daily life. Computer imagery is found on television, in newspapers, in weather reports, and during surgical procedures. A well-constructed graph can present complex statistics in a form that is easier to understand and interpret. Such graphs are used to illustrate papers, reports, theses, and other presentation material. A range of tools and facilities are available to enable users to visualize their data, and computer graphics are used in many disciplines.

Many powerful tools have been developed to visualize data. Computer generated imagery can be categorized into several different types: 2D, 3D, 5D, and animated graphics. As technology has improved, 3D computer graphics have become more common, but 2D computer graphics are still widely used. Computer graphics has

emerged as a sub-field of computer science which studies methods for digitally synthesizing and manipulating visual content. Over the past decade, other specialized fields have been developed like information visualization, and scientific visualization more concerned with "the visualization of three dimensional phenomena (architectural, meteorological, medical, biological, etc.), where the emphasis is on realistic renderings of volumes, surfaces, illumination sources, and so forth, perhaps with a dynamic (time) component".

There are different types of graphics software.

- **Image manipulation programs** let you edit your favorite images.
- **Painting and drawing programs** offer facilities for freehand drawing, with a wide choice of pens and brushes, colours and patterns.
- **Business graphic programs** let you create pie charts and line graphs of all kinds for slide shows and reports.
- **Computer-aided design (CAD)** is the use of computer technology for the design of objects, real or virtual. CAD often involves more than just shapes. As in the manual drafting of technical and engineering drawings, the output of CAD often must convey also symbolic information such as materials, processes, dimensions, and tolerances, according to application-specific conventions. CAD may be used to design curves and figures in two-dimensional ("2D") space; or curves, surfaces, and solids in three-dimensional ("3D") objects.



A CAD model of a mouse.

- **Desktop publishing (DTP)** is based around a page layout program, which lets you import text from a word processor, clip-art from graphics packages, and images from scanners or cameras, and arrange them all on a page. There are

two types of pages in desktop publishing, electronic pages and virtual paper pages to be printed on physical paper pages. All computerized documents are technically electronic, which are limited in size only by computer memory or computer data storage space.

- **Digital art, or computer art** is an umbrella term for a range of artistic works and practices that utilize digital technology. Since the 1970s various names have been used to describe what is now called digital art including computer art and multimedia art but digital art is itself placed under the larger umbrella term new media art.
- **Computer animation** is the art of creating moving images with the use of computers. It is a subfield of computer graphics and animation. Increasingly it is created by means of 3D computer graphics, though 2D computer graphics are still widely used for stylistic, low bandwidth, and faster real-time rendering needs.

2. After-reading tasks

Language-in-use

2.1. Read these quotations and say what types of graphic software they refer to.

1. It lets you import text from a word processor, clip-art from graphics packages, and images from scanners or cameras, and arrange them all on a page.
2. It is used to design curves and figures in two-dimensional space or curves, surfaces, and solids in three-dimensional objects.
3. It is used for creating moving images with the help of computers.
4. It offers facilities for freehand drawing.
5. It is the term for a range of artistic works and practices that utilize digital technology.

2.2. Decide if these sentences are True or False. If they are False, correct them.

1. Computerized documents are technically electronic and they are unlimited in size.
2. The term computer graphics includes a text and a sound.
3. Computer Graphics includes methods for digitally synthesizing and manipulating visual content.
4. There are no facilities available to enable users to visualize their data.
5. Computer animation is a subfield of computer graphics created by means of 3D and 2D computer graphics.
6. Pie charts and line graphs of all kinds are created with digital art.

2.3. Look at the text again and answer the questions:

1. What are the computer graphics?
2. What is the result of the development of the computer graphics?
3. Has the animation and video game industry benefitted from the development of the computer graphics?
4. What does the term 'computer graphics' include?
5. How do users expect to control their computers?
6. What are the meanings of the term 'computer graphics'?
7. Where is computer imagery found?
8. What can a well-constructed graph present?
9. What are such graphs used for?
10. Where can we use computer graphics?

3. Read the grammar reference and fulfill the following tasks:

Help box		
Mixed Conditionals and Wishes		
All types of conditionals can be mixed. Any tense combination is possible if the context permits it.		
If-clause	Main clause	
If nobody phoned him, (Type II)	he won't come to the meeting (Type I)	
If he knew her, (Type 2)	he would have spoken to her (Type 3)	
If he had found a job (Type 3)	he wouldn't be searching for one now (Type 2)	
Wishes		
I wish	+ <i>Past Simple</i>	regret about a present situation which we want to be different. I wish I were/was more patient. (It's a pity I'm not patient enough.)
I wish	+ <i>subject + could + bare inf.</i>	wish or regret in the present concerning lack of ability I wish I could ride a bicycle. (But I can't)
I wish	+ <i>subject + would + bare inf.</i>	wish for a future change unlikely to happen or wish to express dissatisfaction; polite request implying dissatisfaction or lack of hope. I wish he would study for his exams. (But I don't think he will) I wish it would stop snowing. (But I'm afraid it won't stop snowing). I wish + Past Perfect regret that

		<p>something happened or didn't happen in the past.</p> <p>I wish I had gone to Ann's party last night. (But I didn't.)</p>
--	--	---

3.1. Read the hypotheses and complete the reality. Add a sentence.

Example: I wish I lived in the countryside, but I don't. I live in the town.

1. I wish our laboratory was provided with the best up-to date machinery, but
2. If only the laboratory were provided with all necessary measuring instruments, but...
3. I wish we managed to solve this problem, but....
4. I wish our plant were provided with various safety devices, but...
5. If only the operator didn't break all the rule of operating the machinery, but...
6. I wish we got permission to work at the computing center, but....

3.2. Fill in the blanks using the verbs in brackets.

1. If it (to be) no computers there, many achievements of modern science would be impossible.
2. If you observed all the rules of operating the machine, you (to increase) its productivity.
3. If you (to look) all the machines people had been using up to 1946, you would certainly notice at a glance that they were rather rude and imperfect.
4. He (not to earn) much money if he hadn't been an experienced worker.
5. You (to solve) this problem if you used a reference-book. But you haven't used it.
6. If computers (to be classify) according to the purpose they could be divided into general and special-purpose ones.

3.3. Find the words in the text, translate them and write in antonyms for these words. Consult a dictionary if necessary.

Word	Antonym
relieve	
redistribute	
easy	
outside	
include	
access	
contain	
rather	
commonly	
request	
share	

3.4. Divide the nouns given in the box into countable and uncountable.

management, activity, application, purpose, service, access, network, source, equipment, manipulation, information, combination, skill, environment, folder, degree

4. Speaking and Writing.

4.1. Name the major types of graphics software and shortly characterize their functions in written form.

4.2. Write a letter of application. Follow these steps:

Paragraph 1. Reason for writing.

I am writing to apply for the position of....

Paragraph 2. Education and training.

I graduated in.... I completed a course in...

Paragraph 3. Work experience.

For the past X years I have been....

Paragraph 4. Personal skills.

Paragraph 5. Why you are applying for this job

I now feel ready to.....

Paragraph 6. Closing

I enclose..... I look forward to..... I will be available for the interview....

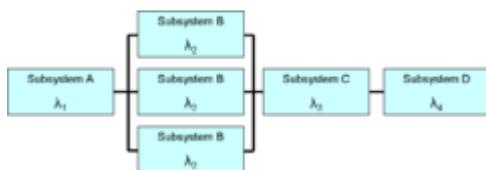
Unit 7. Programming

1. Reading comprehension

Computer programming (often shortened to **programming** or **coding**) is the process of writing, testing, debugging/troubleshooting, and maintaining the source code of computer programs. This source code is written in a programming language. The code may be a modification of an existing source or something completely new. The purpose of programming is to create a program that exhibits a certain desired behavior (customization). The process of writing source code often requires expertise in many different subjects, including knowledge of the application domain, specialized algorithms and formal logic.

Whatever the approach to software development may be, the final program must satisfy some fundamental properties. The following properties are among the most relevant:

- *Efficiency/performance*: the amount of system resources a program consumes (processor time, memory space, slow devices such as disks, network bandwidth and to some extent even user interaction): the less, the better. This also includes correct disposal of some resources, such as cleaning up temporary files and lack of memory leaks.
- *Reliability*: how often the results of a program are correct. This depends on conceptual correctness of algorithms, and minimization of programming mistakes, such as mistakes in resource management (e.g., buffer overflows and race conditions) and logic errors (such as division by zero).

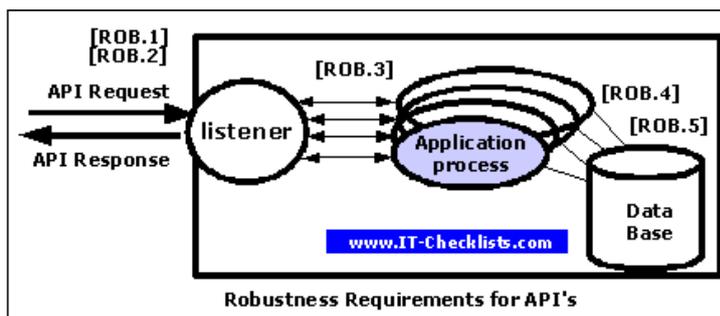


A Reliability Block Diagram

- *Usability*: the ergonomics of a program: the ease with which a person can use the program for its intended purpose or in some cases even unanticipated

purposes. Such issues can make or break its success even regardless of other issues. This involves a wide range of textual, graphical and sometimes hardware elements that improve the clarity, intuitiveness, cohesiveness and completeness of a program's user interface.

- *Portability*: the range of computer hardware and operating system platforms on which the source code of a program can be compiled/interpreted and run. This depends on differences in the programming facilities provided by the different platforms, including hardware and operating system resources.
- *Robustness*: how well a program anticipates problems not due to programmer error. This includes situations such as incorrect, inappropriate or corrupt data, unavailability of needed resources such as memory, operating system services and network connections, and user's errors.



- *Maintainability*: the ease with which a program can be modified by its present or future developers in order to make improvements or customizations, fix bugs and security holes, or adapt it to new environments.

Programming languages:

A **programming language** is a machine-readable artificial language designed to express computations that can be performed by a machine, particularly a computer. Programming languages can be used to create programs that specify the behavior of a machine, to express algorithms precisely, or as a mode of human communication.

Many programming languages have some form of written specification of their syntax and semantics, since computers require precisely defined instructions. Some

(such as C) are defined by a specification document (for example, an ISO Standard), while others (such as Perl) have a dominant implementation.

The earliest programming languages predate the invention of the computer, and were used to direct the behavior of machines such as Jacquard looms and player pianos. Thousands of different programming languages have been created, mainly in the computer field, with many more being created every year.

2. After-reading tasks

Language-in-use

2.1. Are the following statements true or false? If false, correct the information.

1. Robustness shows how often the results of a program are correct.
2. Some languages, for example C, have a dominant implementation.
3. Computers require precisely defined instructions.
4. Portability depends on differences in the programming facilities provided by software
5. Maintain abilities the amount of system resources a program consumes.
6. COBOL issued as a teaching language.
7. The purpose of programming is to create a program that exhibits customization.
8. Robustness shows how well a program anticipates problems due to programmer error.

2.2. Choose a term from this word web to complete the sentences below.

Files, software, languages, code, algorithms, portability

1. This sourceis written in a programming language.

2. Whatever the approach to development may be, the final program must satisfy some fundamental properties.
3. The process of writing source code often requires expertise in many different subjects, including knowledge of the application domain, specializedand formal logic.
4. Performance also includes correct disposal of some resources, such as cleaning up temporary..... and lack of memory leaks.
5. Programmingcan be used to create programs that specify the behavior of a machine.
6.depends on differences in the programming facilities provided by the different platforms, including hardware and operating system resources.

2.3. Look through the text and try to answer the questions:

1. What is the definition of computer programming?
2. What is the purpose of programming?
3. What does the process of writing source code often require?
4. What is a programming language?
5. How can programming languages be used?
6. Why do many programming languages have some form of written specification of their syntax and semantics?
7. How were the earliest programming languages used?
8. What high-level languages do you know?
9. What languages do you personally use?
10. Will more computer programming languages appear in the nearest future?
Why do you think so?

3. Read the grammar reference and fulfill the following tasks:

			Help
Present forms			
Present Simple	Present Continuous	Present Perfect	Present Perfect Cont.
permanent situation or states He <i>works</i> as a computer engineer.	temporary situations They <i>are working</i> in the laboratory now.	recently completed actions She <i>has tidied</i> her room. (You can see it is tidy now.)	actions started in the past and continuing up to the present He <i>has been repairing</i> a computer for two hours)
repeated actions I usually <i>get up</i> at 7.00.	actions happening at or around the moment of speaking. He <i>is looking for</i> a new lap-top.	actions which happened at an unstated past time and are connected with the present. She <i>has lost</i> a disk with important data.	past actions of certain duration having visible results in the present. She <i>has been crying</i> . (Her eyes are red.)
permanent truths or laws of nature Water <i>boils</i> at 100 C.	fixed arrangements in the near future. A system administrator <i>is coming</i> to us tonight.	personal changes which have happened. I <i>have lost</i> 10 kilos.	actions expressing anger, annoyance, criticism. Who <i>has been using</i> my head-phones?
timetables/ programmes The lecture <i>starts</i> at 12.00.	changing or developing situations. His English <i>is getting</i> better.	emphasis on number She <i>has printed</i> ten pages since the morning.	emphasis on duration. He <i>has been calling</i> on clients since this morning.

3.1. Fill in the blanks with the verbs in brackets.

1. For a long time scientists (to look for) ways of increasing the speed of computations.
2. Each specific application (to require) a specific computer.
3. Since then several generations of complex electronic computing equipment (to develop), each was significantly better than the one before it.
4. Today computers (to become) smaller and smaller and are even being put inside other device.

5. Digital and analogue computers (to work) differently and (to yield) different results.
6. With the aid of the firmware and device drivers, the operating system (to provide) the most basic level of control over all of the computer's hardware devices.

3.2. Underline the correct item.

1. The operators **are demonstrating/demonstrate** the work of the computer, with the students watching his actions with great interest.
2. Replaceable parameters **are making/make** batch files more flexible and easy to use.
3. Computers **are used /have been used** to coordinate information between multiple locations since the 1950s.
4. The Trusted Computing Group is an organization that **has been helping / helps** standardize computing security technologies.
5. Hard disk drives **have been/ is** the dominant device for secondary storage of data in general purpose computers since the early 1960s.
6. A typical HDD design consists of a spindle that **is holding /holds** one or more flat circular disks called platters, onto which the data is recorded.
7. The controller **has been separating/separates** the data from the stream of pulses coming from the drive, decodes the data, tests for errors, and sends the data on to the host computer system.

3.3. Make adjectives with the help of the following suffixes. Translate both the initial word and its derivatives into your native language.

- **full** - use; power; meaning;

- **less-** use; help; motion; weight; form; meaning;

- **ic-** bas(e); period; alphabet; electron;

- **able** - valu(e); change; compar(e);
- **ent** - differ; depend;
- **ive** - effect; act; operat(e); instruct; complicat(e);
- **i(al)** - function; addition; different; digit; form.

3.4. Group the equivalents.

robustness	портативность
performance	надёжность
customization	оборудование
application	производительность
implementation	изменение настройки
predate	взаимодействие
portability	приложение
artificial	реализация
environments	предшествовать
anticipate	искусственный
interaction	среда, окружение
facilities	предполагать

4. Speaking and Writing

4.1. Using the terms given below as key ideas make short descriptions of these notions.

High-level languages, performance, maintainability, usability, coding.

4.2. You have been asked to prepare a written proposal to upgrade an electronic communications system. It should have 3 parts:

1. Introduction: Explain the problem

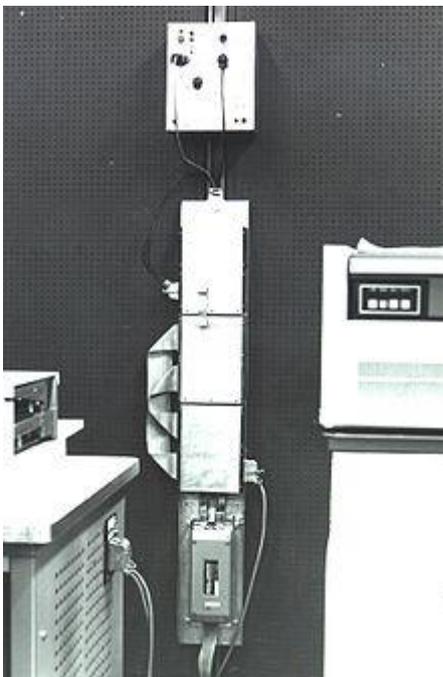
2. Body: Present your proposal

3. Conclusion: Write how much your proposal will help.

Unit 8. Networks

1. Reading comprehension

A local area network (LAN) is a computer network covering a small physical area, like a home, an office, or small group of buildings, such as a school, or an airport. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their usually higher data-transfer rates, smaller geographic place, and lack of need for leased telecommunication lines.



The Cambridge Ring was an experimental [local area network](#) architecture developed at the [Cambridge University Computer Laboratory](#) in the mid-late 1970s and early 1980s.

Switched Ethernet is the most common Data Link Layer implementation on local area networks. At the Network Layer, the Internet Protocol has become the standard. However, many different options have been used in the history of LAN development and some continue to be popular in niche applications. Smaller LANs generally consist of one or more switches linked to each other—often at least one is connected to a router, cable modem, or ADSL modem for Internet access.

Larger LANs are characterized by their use of redundant links with switches using the spanning tree protocol to prevent loops, their ability to manage differing traffic types via quality of service (QoS), and to segregate traffic with VLANs. Larger LANs also contain a wide variety of network devices such as switches, firewalls, routers, load balancers, and sensors.

LANs may have connections with other LANs via leased lines, leased services, or by tunneling across the Internet using virtual private network technologies. Depending on how the connections are established and secured in a LAN, and the distance involved, a LAN may also be classified as metropolitan area network (MAN) or wide area networks (WAN).

Network topology is the study of the arrangement or mapping of the elements (links, nodes, etc.) of a network, especially the physical (real) and logical (virtual) interconnections between nodes. A local area network (LAN) is one example of a network that exhibits both a physical topology and a logical topology. Any given node in the LAN will have one or more links to one or more other nodes in the network and the mapping of these links and nodes onto a graph results in a geometrical shape that determines the physical topology of the network. Likewise, the mapping of the flow of data between the nodes in the network determines the logical topology of the network. The physical and logical topologies might be identical in any particular network but they also may be different.

Any particular network topology is determined only by the graphical mapping of the configuration of physical and/or logical connections between nodes. LAN Network Topology is, therefore, technically a part of graph theory. Distances between nodes, physical interconnections, transmission rates, and/or signal types may differ in two networks and yet their topologies may be identical.

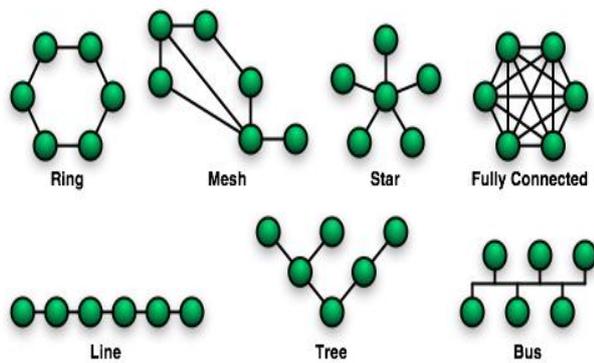
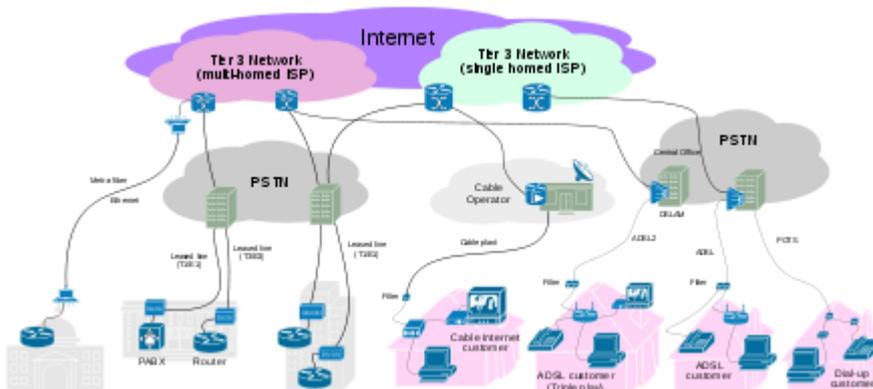


Diagram of different network topologies

Wide Area Network (WAN) is a computer network that covers a broad area (i.e., any network whose communications links cross metropolitan, regional, or national boundaries). This is in contrast with personal area networks (PANs), local area networks (LANs), campus area networks (CANs), or metropolitan area networks (MANs) which are usually limited to a room, building, campus or specific metropolitan area (e.g., a city) respectively. The largest and most well-known example of a WAN is the Internet.



Internet connectivity options from end-user to Tier 3/2 ISP's.

WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations. Many WANs are built for one particular organization and are private. Others, built by Internet service providers, provide connections from an organization's LAN to the Internet. WANs are often built using leased lines. At each end of the leased line, a router connects to the LAN on one side and to the hub within the WAN on the other. Leased lines can be very expensive. Instead of using leased

lines, WANs can also be built using less costly circuit switching or packet switching methods. Network protocols including TCP/IP deliver transport and addressing functions. Protocols including Packet over SONET/SDH, MPLS, ATM and Frame relay are often used by service providers to deliver the links that are used in WANs. X.25 was an important early WAN protocol, and is often considered to be the "grandfather" of Frame Relay as many of the underlying protocols and functions of X.25 are still in use today (with upgrades) by Frame Relay.

2. After-reading tasks

Language-in-use

2.1. Read and correct these false statements.

- a) Switched Ethernet is the least common Data Link Layer implementation on local area networks.
- b) Larger LANS don't contain a wide variety of network devices, they have only one network device.
- c) Distances between nodes, physical interconnections, transmission rates, and signal types can't differ in two networks.
- d) WAN is a computer network that is usually limited to a room, building, campus or specific metropolitan area.
- e) All WANs are built using leased lines.
- f) Leased lines are less expensive than circuit switching or packet switching methods.

2.2. Match the sentence beginnings (1-6) with the correct endings (a-f).

1. WANs are used to connect LANs and other types of networks together, so that users and computers in one location can

2. Personal area networks, local area networks, campus area networks, or metropolitan area networks are usually limited to

3. A local area network (LAN) is

4. Protocols including Packet over SONET/SDH, MPLS, ATM and Frame relay are often used by service providers

5. LANs, in contrast to wide-area networks (WANs), include their usually higher data-transfer rates, smaller geographic place, and lack of need for leased telecommunication lines.

6. Larger LANs are characterized by their use of

a) both a physical topology and a logical topology.

b) limited to a room, building, campus or specific metropolitan area.

c) redundant links with switches using the spanning tree protocol to prevent loops.

d) one example of a network that exhibits.

e) communicate with users and computers in other locations.

f) to deliver the links that are used in WANs.

2.3. Look at the text again and answer the questions.

1. What is the definition of a 'local area network'?

2. What are the defining characteristics of LANs?

3. What is a network topology?

4. What does a local area network exhibit?

5. What is any particular network topology determined by?

6. What kind of area does a wide network cover?

7. Is the Internet an example of a WAN or a LAN?

8. What are WANs used for?
9. Can you explain what 'a router' means?
10. What do network protocols do?

3. Read the grammar reference and fulfill the following tasks

<i>Future Forms</i>			
Help box			
Tense	Affirmative/Negative/Question	Use	Signal Words
Future I Simple	A: He will speak. N: He will not speak. Q: Will he speak?	- action in the future that cannot be influenced - spontaneous decision - assumption with regard to the future	in a year, next ..., tomorrow (If you ask her, she will help you.) assumption: I think, probably, perhaps
Future I Simple (going to)	A: He is going to speak. N: He is not going to speak. Q: Is he going to speak?	- decision made for the future - conclusion with regard to the future	in one year, next week, tomorrow
Future I Progressive	A: He will be speaking. N: He will not be speaking. Q: Will he be speaking?	- action that is going on at a certain time in the future - action that is sure to happen in the near future	in one year, next week, tomorrow
Future	A: He will have spoken.	- action that will be	by Monday, in

Perfect	N: He will not have spoken. Q: Will he have spoken?	finished at a certain time in the future	a week
Future Perfect Progressive	A: He will have been speaking. N: He will not have been speaking. Q: Will he have been speaking?	- action taking place before a certain time in the future - putting emphasis on the course of an action	for ..., the last couple of hours, all day long

3.1. Fill in the verbs in brackets in the Future Perfect or Future Progressive.

1. They.....their essay by tomorrow. (to write)
2. Tomorrow at nine I.... a test. (to write)
3. This time next week he..... to South Africa. (to fly)
4. Paolo..... the teams. (to manage)
5. Andy..... a video when I arrive tonight. (to watch)
6. If we can do that - then we our mission. (to fulfill)

3.2. Expand the sentences using future tenses:

1. In ten years' time/a lot of people/connect their television to the telephone line.
2. Portable PCs/ replace/ desktop PCs.
3. With the help of computers/doctors/find/cure/AIDS and cancer/by the year 2020.
4. This time next year/ I/use/handheld computer.
5. By this time next year/ software manufacturers/make/ hundreds of new programs.

3.3. Match the terms on the left with the explanations on the right.

protocol	the physical components of a computer system;
interconnect	a device used to connect various LANs;
link	to separate one part of a place or thing from another;
configuration	a set of rules which determine the formats by which information may be exchanged between different systems;
to segregate	

3.4. Write the verbs from the box under the correct prefix to make words connected with change.

Use a good dictionary to help you. Some of the verbs can be used with more than one prefix.

centralize, organize, train, grade, regulate, size, develop, launch, locate, structure

down- de- up- re-

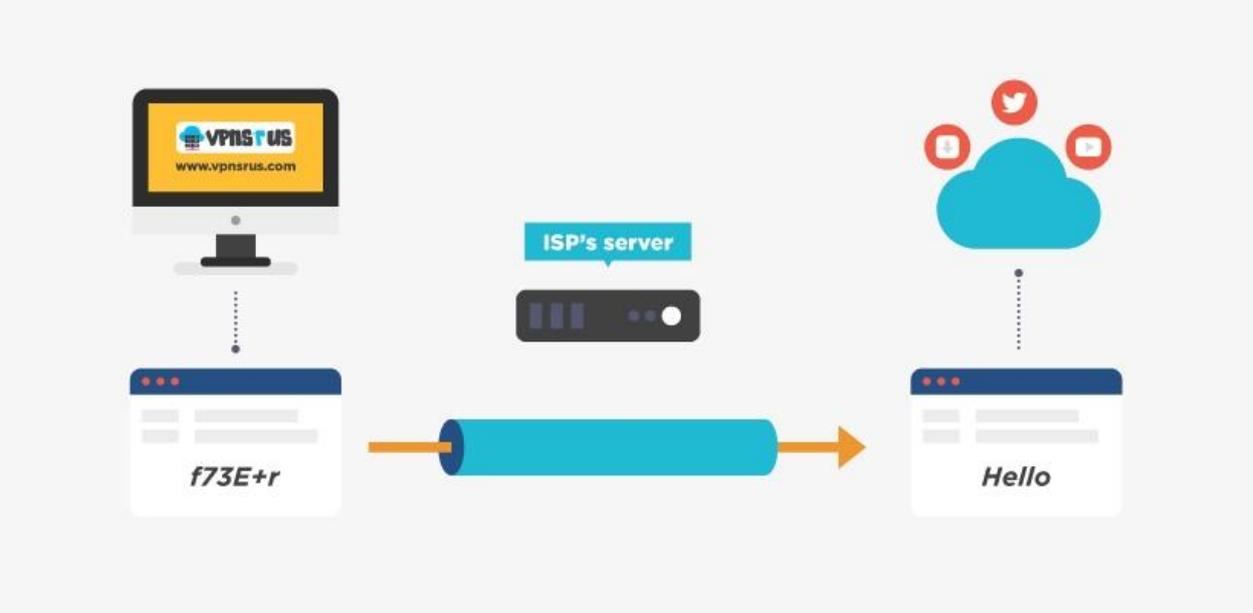
4. Speaking and writing

4.1. Give a short presentation of your local area network.

4.2. In small groups, discuss your predictions on the points mentioned below:

- a) work/jobs,
- b) homes,
- c) education/schools,
- d) money/holidays/.

4.3. Write a paragraph for an internal website about how a VPN works. Use the schematic information given below.



Unit 9 .Multimedia

1. Reading comprehension

Multimedia is media and content that uses a combination of different content forms. The term can be used as a noun (a medium with multiple content forms) or as an adjective describing a medium as having multiple content forms. The term is used in contrast to media which only uses traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, and interactivity content forms. Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be a part of a live performance.



A presentation using *Powerpoint*. Corporate presentations may combine forms of media content.

Multimedia presentations may be viewed in person on stage, projected, transmitted, or played locally with a media player. A broadcast may be a live or recorded multimedia presentation. Broadcasts and recordings can be either analog or digital electronic media technology. Digital online multimedia may be downloaded or streamed. Streaming multimedia may be live or on-demand.

Multimedia games and simulations may be used in a physical environment with special effects, with multiple users in an online network, or locally with an offline computer, game system, or simulator.

The various formats of technological or digital multimedia may be intended to enhance the users' experience, for example to make it easier and faster to convey information.

Enhanced levels of interactivity are made possible by combining multiple forms of media content. Online multimedia is increasingly becoming object-oriented and data-driven, enabling applications with collaborative end-user innovation and personalization on multiple forms of content over time. Examples of these range from multiple forms of content on Web sites like photo galleries with both images (pictures) and title (text) user-updated, to simulations whose coefficients, events, illustrations, animations or videos are modifiable, allowing the multimedia "experience" to be altered without reprogramming. In addition to seeing and hearing, Haptic technology enables virtual objects to be felt. Emerging technology involving illusions of taste and smell may also enhance the multimedia experience.



A laser show is a live multimedia performance.

Multimedia may be broadly divided into **linear** and **non-linear** categories. Linear active content progresses without any navigation control for the viewer such as a cinema presentation. Non-linear content offers user interactivity to control progress as used with a computer game or used in self-paced computer based training. Hypermedia is an example of non-linear content.

Hyper media is used as a logical extension of the term hypertext in which graphics, audio, video, plain text and hyperlinks intertwine to create a generally non-linear medium of information. This contrasts with the broader term *multimedia*, which may be used to describe non-interactive linear presentations as well as hypermedia. It is also related to the field of Electronic literature. A term first used in a 1965 article by Ted Nelson.

The World Wide Web is a classic example of hypermedia, whereas a non-interactive cinema presentation is an example of standard multimedia due to the absence of hyperlinks.

The first hypermedia work was, arguably, the Aspen Movie Map. Atkinson's HyperCard popularized hypermedia writing, while a variety of literary hypertext and hypertext works, fiction and nonfiction, demonstrated the promise of links. Most modern hypermedia is delivered via electronic pages from a variety of systems including Media players, web browsers, and stand-alone applications. Audio hypermedia is emerging with voice command devices and voice browsing.

Hypermedia may be developed by a number of ways. Any programming tool can be used to write programs that link data from internal variables and nodes for external data files. Multimedia development software such as Adobe Flash, Adobe Director, Macromedia Authorware, and MatchWare Mediator may be used to create stand-alone hypermedia applications, with emphasis on entertainment content. Some database software such as Visual FoxPro and FileMaker Developer may be used to develop stand-alone hypermedia applications, with emphasis on educational and business content management.

2. After-reading tasks

Language-in-use

2.1. Are the following statements true or false? Correct the false ones with the right information.

1. Hypermedia is used to describe non-interactive linear presentations.
2. Linear active content offers user interactivity to control progress.
3. Multimedia uses only traditional forms of printed or hand-produced material.
4. Broadcasts and recordings can be only analog electronic media technology.
5. Non-interactive cinema presentation is an example of standard multimedia due to the hyperlinks.
6. Programming tools can be used to write programs that link data from external data files and nodes for internal variables.
7. Multimedia games and simulations can't be used locally.

2.2. One word is wrong in the following sentences. Underline and correct it.

1. The WWW is a hypermedia, whereas a non-interactive cinema presentation is an example of standard multimedia due to the presence of hyperlinks.
2. Linear content offers user interactivity to control progress as used with a computer game.
3. A term “Hypermedia” first was used in 1975 by Ted Nelson.
4. Haptic technology doesn’t allow virtual objects to be felt.
5. One format of technological or digital multimedia may be intended to enhance the users' experience.
6. Multimedia presentations may be viewed in person on stage, projected, transmitted, or played locally with a web browser.
7. Hypermedia is an example of linear content.

2.3. Answer the questions according to the text.

1. What does multimedia use?
2. How can this term be used?
3. What does media use?
4. What does multimedia include?
5. How is multimedia usually accessed?
6. What categories may multimedia be broadly divided into?
7. How does linear active content progress?
8. What does non-linear active content offer?
9. How is hypermedia used?
10. How is most modern hypermedia delivered?

3. Read the grammar reference and fulfill the following tasks

Help box			
Infinitive			
The present Infinitive	the base form of the verb	refers to the present or future	I'd like <i>to go</i> for a walk.
The Present Continuous Infinitive	to be + present participle	is used to describe an action happening now	He must <i>be working</i> in the garden now.
The Perfect Infinitive	to have + past participle	is used to show that the action of the infinitive happened before the action of the verb	He claims <i>to have met</i> the Queen.
The Perfect Continuous Infinitive	to have been + present participle	is used to put emphasis on the duration of the action of the infinitive, which happened before the action of the verb	She seems <i>to have been working</i> all morning.

3.1. Match the sentence halves in order to make logical sentences:

1. The opposition party has called for;
 2. The conference organized has arranged for ;
 3. The production manager has been waiting for;
 4. The shareholders voted for ;
 5. Her father paid for.
-
- a) the company to increase its share capital;
 - b) the spare parts to arrive;
 - c) the prime minister to resign;
 - d) her to go to an American university;
 - e) the delegates to stay in a good hotel

3.2. Using the word in brackets, complete the second sentence so that it has a similar meaning to the first.

1. I have every intention of complaining (intend).

I fully _____

2. We will provide a 24 hour-a-day hot line (undertake).

We _____

3. She should have told them of the potential problem(neglected).

She _____

4. If you like we can send a replacement(offered).

They have _____

5. She says she has the necessary authority(claims).

She _____

3.3. Define the function of the Infinitive in the following sentences by putting questions to each of them.

1. Any programming tool can be used to write programs that link data from internal variables and nodes for external data files.

2. The various formats of technological or digital multimedia may be intended to enhance the users' experience.

3. The various formats of digital multimedia may be intended to make user's experience easier and faster to convey information.

4. Multimedia development software may be used to create stand-alone hypermedia applications.

5. Non-linear content offers user interactivity to control progress as used with a computer game or used in self-paced computer based training.

6. Some database software such as Visual FoxPro and FileMaker Developer may be used to develop stand-alone hypermedia applications.

3.4. Read the sentences and supply the missing letters for each word.

1. For the latest business news, visit the Financial Times _ _ _ s _ _ _ at <http://www.ft.com>.
2. Our computer system _ _ _ s _ _ _ again this morning, and I lost some important files.
3. I often use Yahoo or Google. I think they are two of the best _ _ _ r _ _ _ _ _ g _ _ _ _ .
4. You can _ _ _ _ l _ _ _ _ our annual report in PDF format.
5. Be careful when you download files. Sometimes they have a _ _ r _ _ .

3.5. Match the words 1 to 6 to the nouns a) to f) to make word partnerships.

- | | |
|-----------------|-----------------------|
| 1. to train | a. a vacancy/ a post |
| 2. to shortlist | b. an interview panel |
| 3. to advertise | c. the candidates |
| 4. to assemble | d. references |
| 5. to make | e. new staff |
| 6. to check | f. a job offer |

3.6. Read the international words and guess their meaning.

Decade, operation, to generate, complex, to instruct, multiplication, fraction, type, a result, to result in, coded information, alphabetic, functional, method, to base, binary, signal, automatic, industry, navigation, production, to produce, parallel, physical, voltage, mathematical.

4. Speaking and writing

4.1. Work in groups. Your group has been asked to organise the presentation of a new multimedia game.

The presentation will be in your office, and your group will organise everything. Offer to do as many things as possible.

4.2. A friend who writes a blog has asked you to contribute a post about the use of multimedia now and in the future. Write a post /90-120 words/ summarizing what multimedia is, what it can do, and your predictions for what it might be able to do in the future.

Unit 10. Internet security

1. Reading comprehension

When a computer connects to a network and begins communicating with others, it is taking a risk. Internet security involves the protection of a computer's [internet](#) account and files from intrusion of an unknown user. Basic security measures involve protection by well selected [passwords](#), change of file permissions and back up of computer's data.

Malware, short for [malicious software](#), is software designed to infiltrate or damage a computer system without the owner's [informed consent](#). The expression is a general term used by computer professionals to mean a variety of forms of hostile, intrusive, or annoying software or program code. The term "[computer virus](#)" is sometimes used as a catch-all phrase to include all types of malware, including true viruses.

Types of malwares include [computer viruses](#), [worms](#), [trojan horses](#), [spyware](#), [crimeware](#) and other malicious and unwanted software. In [law](#), malware is sometimes known as a computer [contaminant](#), for instance in the legal codes of several [U. S.](#) states, including [California](#) and [West Virginia](#).

[Computer viruses](#) are computer programs that can copy itself and infect a computer without the permission or knowledge of the owner. A true virus can only spread from one computer to another (in some form of executable code) when its host is taken to the target computer; for instance because a user sent it over a network or the Internet, or carried it on a removable medium such as a floppy disk, CD, DVD, or USB drive. Viruses can increase their chances of spreading to other computers by infecting files on a network file system or a file system that is accessed by another computer.

[Worms](#) are self-replicating computer programs. They use a network to send copies of itself to other nodes (computers on the network) and they may do so without any user intervention. Unlike a virus, a worm does not need to attach itself to an existing

program. Worms almost always cause at least some harm to the network, if only by consuming bandwidth, whereas viruses almost always corrupt or devour files on a targeted computer.

Trojan horses. A Trojan horse, or trojan for short, is a term used to describe malware that appears, to the user, to perform a desirable function but, in fact, facilitates unauthorized access to the user's computer system. Trojan horses are not self-replicating that distinguishes them from viruses and worms. Additionally, they require interaction with a hacker to fulfill their purpose. The hacker need not be the individual responsible for distributing the Trojan horse. It is possible for hackers to scan computers on a network using a port scanner in the hope of finding one with a Trojan horse installed.



Beast, a Windows-based backdoor Trojan horse.

Spyware is a type of malware that is installed surreptitiously on personal computers to collect information about users, their computer or browsing habits without their informed consent. Spyware is known to change computer settings, resulting in slow connection speeds, different home pages, and/or loss of Internet or functionality of other programs.

Crimeware is a class of malware designed specifically to automate cybercrime. The term was coined by Peter Cassidy, Secretary General of the Anti-Phishing Working Group to distinguish it from other kinds of malevolent programs. Crimeware is designed to perpetrate identity theft in order to access a computer user's online accounts at financial services companies and online retailers for the purpose of

taking funds from those accounts or completing unauthorized transactions that enrich the thief controlling the crimeware. Crimeware also often has the intent to export confidential or sensitive information from a network for financial exploitation. Crimeware represents a growing problem in network security as many malicious code threats seek to pilfer confidential information.

2. After-reading tasks

Language-in-use

2.1. Match the terms with their definitions.

- | | |
|-------------------|---|
| 1. malware | a) it perpetrates identity theft in order to access a computer user's online accounts. |
| 2. crimeware | b) it facilitates unauthorized access to the user's computer system. |
| 3. trojan horse | c) can copy itself and infect a computer without the permission or knowledge of the owner. |
| 4. spyware | d) it collects information about users, their computer or browsing habits without their informed consent. |
| 5. worm | e) it infiltrates or damages a computer system without the owner's informed consent. |
| 6. computer virus | f) it facilitates unauthorized access to the user's computer system. |

2.2. Match the sentence beginnings (1-6) with the correct endings (a-f).

1. Crimeware is designed to perpetrate identity theft in order.....
2. Spyware is known to change computer settings, resulting in.....

3. Trojan horses are not self-replicating that distinguishes them.....
4.a worm does not need to attach itself to an existing program.
5. Viruses can increase their chances of spreading to other computers by infecting files on a network file system.
6. Internet security involves the protection of a computer's internet account and files from....
 - a) intrusion of an unknown user.
 - b) to access a computer user's online accounts.
 - c) unlike a virus
 - d) slow connection speeds, different home pages, and loss functionality of other programs.
 - e) from viruses and worms.

2.3. Look at the text again and answer the questions.

- When is a computer taking a risk?
- What does Internet security involve?
- What does basic security measures involve?
- What is a malware?
- When is the term 'computer virus' used?
- What can computer viruses do?
- What is the difference between computer viruses and worms?

- What distinguishes Trojan horses from worms and viruses?
- Where is a spyware installed?
- What is a crimeware designed for?

3. Read the grammar reference and fulfill the following tasks

Help box			
Past Forms			
Past Simple	Past Continuous	Past Perfect	Past Perfect Continuous
<i>past actions which happened one after the other</i> She sealed the letter, put a stamp on it and posted it.	<i>action in the middle of happening at stated past time.</i> He was playing tennis at 4.30 yesterday.	<i>past action which occurred before another action or before a stated past time</i> He had left by the time I got there.	<i>action continuing over a period up to a specific time in the past</i> She had been working as a clerk for 10 years before she resigned.
<i>complete action or event which happened at a stated past time.</i> She called an hour ago.	<i>past action in progress interrupted by another past action</i> While I was getting dressed the bell rang.	<i>complete past action which had visible results in the past</i> She was sad because she had failed the test.	<i>past action of certain duration which had visible results in the past</i> They were wet because they had been working in the rain.
<i>action which happened at a definite past time although the time is not mentioned</i> Shakespeare wrote a lot of plays.	<i>two or more simultaneous past actions</i> While I was sunbathing , he was swimming .	<i>the Past Perfect is the past equivalent of the Present Perfect</i> He couldn't find his watch. He had lost it.	<i>the Past Perfect Continuous is the past equivalent of the Present Perfect Continuous</i> She went to the doctor. Her lag had been aching for two days.

3.1. Use the Past Continuous or Past Simple.

1. I (browse) through the Web for half an hour and then (begin) writing an e-mail.
2. You (see) him this morning? - Yes, he (surf) the net.
3. He (come) and (see) Lizzy who (sit) in front of her computer drawing a strange picture.

4. I (not understand) what files he (download).
5. What you (do) yesterday? - I (search) the Web for sites on digital cameras.
6. They (e-mail) each other at six yesterday.
7. I (not hear) what he say. I (run) the virus scan.
8. When it (happen)? - It (happen) when he (replace) the motherboard.
9. I (tell) him he should not eat while he (type).
10. While the rest of the nation (e-mail) each other, NSA still (deliver) top-secret intelligence reports to Washington inside pizza boxes.
11. I (work) on my essay for ten minutes, then the screen (go) blank.

3.2. Ask questions to which the underlined words are the answers.

1. Microsoft Corporation purchased and distributed the MSDOS operating system.
2. The installation of the computer took a great deal of time.
3. This science fiction writer gave people the wrong impression of computers.
4. Yesterday she borrowed one of my CDs.
5. I bought a new laptop computer last week.
6. The students worked hard for their exams.
7. I used Macintosh computer yesterday in class.
8. The electronic computer project got under way in April 1943.
9. Pascal calculator consisted of a set of toothed wheels.
10. Different languages express assignment in different ways.
11. A hacker is someone who manages to get information from a computer without permission.

3.3. Put as many questions as possible to each of the following sentences:

1. The term was coined by Peter Cassidy, Secretary General of the Anti-Phishing Working Group.
2. In 1930, man knew four times as much as he did in 1990.
3. By 1960 man's knowledge had grown sixfold.
4. During the last decades, companies were busy installing computers.
5. The abacus came into being some 2,000 years ago.
6. As a matter of interest, the microprocessor was originally developed as the control element for those applications where digital computer function was too large or expensive.
7. It was only 200 years later that computing machines began to be used on a large scale.
8. In the 1940's, 50 years after punched cards were applied to office work, the next major advance in information storage took place.

3.4. Group synonyms. One word may have more than one synonym.

to perform	to extend
to distinguish	to join
to damage	to execute
to change	to plan
to design	to transform
to copy	to fulfill
to increase	to convert
to attach	to repeat

to spread	to differentiate to injury to fasten to grow to connect to recognize to alter to modify to raise
-----------	--

3.5. How many compounds can you make by combining a word from A with a word from B? There is sometimes more than one for each word in A. Use your dictionary to help.

A	B
code, port, settings, network, virus, file, access	malicious, baseband, executable, machine, delayed, build-in, command, final, display, tool, analog, file, killed, attached, , boot, block-type, direct, data,

3.6. Find words in the text with the same and similar meaning to these words.

to link, connecting, defense , leave, information, injury, to raise, interference

3.7. The words in the boxes appear in the text. Write in the other parts of speech.

noun	adjective	verb
connection		
intrusion		
functionality		
protection		
access		
intervention		
exploitation		
contaminant		
interaction		

4. Speaking and Writing

4.1. Read this IT incident.

Incident report

Date 02.05.2019

Report for Miley O'Hara

Report prepared by

Incident employee has installed hostile software

Recommendations:

Write a report to the IT supervisor on this incident. You will need to give recommendations on how to deal with the incident.

4.2. In pairs look at the list of cybercrimes and discuss the following questions.

1. Piracy, 2.Plagiarism, 3. Spreading of malicious software, 4.IP Spoofing, 5. Cyberstalking, 6. Distribution of indecent or offensive materials.

1. Which crimes are the most dangerous? 2. What measures can be taken by governments to stop cybercrime? 3. Have you ever experienced any of these crimes yourself?

SUPPLEMENTARY PART

ADDITIONAL TEXTS FOR HOME READING AND DISCUSSIONS

Computer-aided engineering

Computer-aided engineering (CAE) is the broad usage of computer software to help in engineering tasks. It includes computer-aided design (CAD), computer-aided analysis (CAA), computer-integrated manufacturing (CIM), material requirements planning (MRP), and computer-aided planning (CAP).

[Software](#) tools that have been developed to support these activities are considered CAE tools. CAE tools are being used, for example, to analyze the robustness and performance of components and assemblies. The term encompasses simulation, [validation](#), and [optimization](#) of products and manufacturing tools. In the future, CAE systems will be major providers of information to help support design teams in decision making. In regard to [information networks](#), CAE systems are individually considered a single [node](#) on a total information network and each node may interact with other nodes on the network.

CAE systems can provide support to businesses. This is achieved by the use of reference architectures and their ability to place information views on the business process. Reference architecture is the basis from which information model, especially product and manufacturing models.

CAE areas covered include:

- [Stress analysis](#) on components and assemblies using FEA ([Finite Element Analysis](#));
- Thermal and fluid flow analysis [Computational fluid dynamics](#) (CFD);
- [Kinematics](#);
- Mechanical events simulation (MES);

- Analysis tools for process simulation for operations such as [casting](#), [molding](#), and die press forming;
- [Optimization](#) of the product or process.

In general, there are three phases in any computer-aided engineering task:

- Pre-processing – defining the model and environmental factors to be applied to it;
- Analysis solver (usually performed on high powered computers);
- Post-processing of results (using visualization tools).

Spreadsheet

A spreadsheet is a [computer application](#) that simulates a paper, accounting [worksheet](#). It displays multiple cells that together make up a grid consisting of rows and columns. Each cell contains [alphanumeric](#) text, numeric values or formulas. A [formula](#) defines how the content of that cell is to be calculated from the contents of any other cell (or combination of cells) each time any cell is updated. Spreadsheets are frequently used for [financial](#) information because of their ability to re-calculate the entire sheet automatically after a change to a single cell is made.

VisiCalc was the first [spreadsheet](#) program available for personal computers. It is often considered the application that turned the [microcomputer](#) from a hobby for computer enthusiasts into a serious business tool. VisiCalc sold over 700,000 copies in six years. [VisiCalc](#) is usually considered the first electronic spreadsheet (although this has been challenged), and it helped turn the [Apple II computer](#) into a success and greatly assisted in their widespread application. [Lotus 1-2-3](#) was the leading spreadsheet when [DOS](#) was the dominant operating system. [Excel](#) now has the largest market share on the Windows and Macintosh platforms.

The word "spreadsheet" came from "spread" in its sense of a newspaper or magazine item (text and/or graphics) that covers two facing pages, extending across

the center fold and treating the two pages as one large one. The compound word "spread-sheet" came to mean the format used to present book-keeping ledgers—with columns for categories of expenditures across the top, invoices listed down the left margin, and the amount of each payment in the cell where its row and column intersect—which were, traditionally, a "spread" across facing pages of a bound ledger (book for keeping accounting records) or on oversized sheets of paper ruled into rows and columns in that format and approximately twice as wide as ordinary paper.

Internet security

Internet security is a branch of [computer security](#) specifically related to the [Internet](#). Its objective is to establish rules and measure to use against attacks over the Internet. The Internet represents an insecure channel for exchanging information leading to a high risk of [intrusion](#) or fraud, such as [phishing](#). Different methods have been used to protect the transfer of data, including [encryption](#).

Types of security:

Network layer security

[TCP/IP](#) can be made secure with the help of cryptographic methods and protocols that have been developed for securing communications on the Internet. These protocols include SSL and TLS for web traffic, PGP for email, and IPsec for the network layer security.

IPsec Protocol

This protocol is designed to protect communication in a secure manner using TCP/IP. This is a set of security extensions developed by [IETF](#) and it provides security and authentication at the IP layer by using cryptography. To protect the content, the data is transformed using encryption techniques. There are two main types of transformation that form the basis of IPsec: the Authentication Header (AH) and

Encapsulating Security Payload (ESP). These two protocols provide data integrity, data origin authentication, and anti-reply service.

The set of security services provided at the IP layer includes access control, data origin integrity, protection against replays, and confidentiality. The algorithm allows these sets to work independently without affecting other parts of the implementation. The IPsec implementation is operated in a host or security gateway environment giving protection to IP traffic.

Electronic mail security (E-mail)

Email messages are composed, delivered, and stored in a multiple step process, which starts with the message's composition. When the user finishes composing the message and sends it, the message is transformed into a standard format: an [RFC 2822](#) formatted message. Afterwards, the message can be transmitted. Using a network connection, the mail client connects to a [mail transfer agent](#) operating on the mail server; the mail client then provides the sender's identity to the server. Next, using the mail server commands, the client sends the recipient list to the mail server; the client then supplies the message. Once the mail server receives and processes the message, several events occur: recipient server identification, connection establishment, and message transmission. Using Domain Name System (DNS) services, the sender's mail server determines the mail server(s) for the recipient(s). Then, the server opens up a connection(s) to the recipient mail server(s) and sends the message employing a process similar to that used by the originating client, delivering the message to the recipient(s).

Pretty Good Privacy (PGP)

PGP provides confidentiality by encrypting messages to be transmitted or data files to be stored using an encryption algorithm such [3DES](#) or [CAST-128](#). Email messages can be protected by using cryptography in various ways, such as the following:

- Signing an email message to ensure its integrity and confirm the identity of its sender.

- Encrypting the body of an email message to ensure its confidentiality.
- Encrypting the communications between mail servers to protect the confidentiality of both the message body and message header.

Multipurpose Internet Mail Extensions (MIME)

MIME transforms non-ASCII data at the sender's site to Network Virtual Terminal (NVT) ASCII data and delivers it to client's [Simple Mail Transfer Protocol](#) (SMTP) to be sent through the internet.^[4] The server SMTP at the receiver's side receives the NVT ASCII data and delivers it to MIME to be transformed back to the original non-ASCII data.

Secure/Multipurpose Internet Mail Extensions (S/MIME)

S/MIME provides a consistent means to securely send and receive MIME data. S/MIME is not only limited to email but can be used with any transport mechanism that carries MIME data, such Hypertext Transfer Protocol (HTTP).

Electronic mail

Electronic mail, commonly called **email** or **e-mail**, is a method of exchanging [digital](#) messages across the [Internet](#) or other [computer networks](#). Originally, email was transmitted directly from one user to another [computer](#). This required both computers to be [online](#) at the same time, a la [instant messaging](#). Today's email systems are based on a [store-and-forward](#) model. Email [servers](#) accept, forward, deliver and store messages. Users no longer need be online simultaneously and need only connect briefly, typically to an [email server](#), for as long as it takes to send or receive messages.

An email message consists of two components, the message *header*, and the message *body*, which is the email's content. The message header contains control information, including, minimally, an originator's [email address](#) and one or more recipient addresses. Usually additional information is added, such as a subject header field.

The history of modern, global Internet email services reaches back to the early [ARPANET](#). Standards for encoding email messages were proposed as early as 1973 ([RFC 561](#)). Conversion from ARPANET to the Internet in the early 1980s produced the core of the current services. An email sent in the early 1970s looks quite similar to one sent on the Internet today.

Network-based email was initially exchanged on the ARPANET in extensions to the [File Transfer Protocol](#) (FTP), but is now carried by the [Simple Mail Transfer Protocol](#) (SMTP), first published as [Internet standard 10](#) ([RFC 821](#)) in 1982. In the process of transporting email messages between systems, SMTP communicates delivery parameters using a message envelope separate from the message (header and body) itself.

Troubleshooting

Troubleshooting is a form of [problem solving](#), often applied to repair failed products or processes. It is a logical, systematic search for the source of a problem so that it can be solved, and so the product or process can be made operational again. Troubleshooting is needed to develop and maintain complex systems where the symptoms of a problem can have many possible causes. Troubleshooting is used in many fields such as [engineering](#), [system administration](#), [electronics](#), [automotive](#) repair, and [diagnostic medicine](#). Troubleshooting requires identification of the malfunction(s) or symptoms within a system. Then, experience is commonly used to generate possible causes of the symptoms.

In general, troubleshooting is the identification of, or [diagnosis](#) of "trouble" in the management flow of a corporation or a system caused by a failure of some kind. The problem is initially described as symptoms of malfunction, and troubleshooting is the process of determining and remedying to the causes of these symptoms.

A system can be described in terms of its expected, desired or intended. Events or inputs to the system are expected to generate specific results or outputs. (For example selecting the "print" option from various computer applications is intended to result in a [hardcopy](#) emerging from some specific device). Any unexpected or undesirable behavior is a symptom. Troubleshooting is the process of isolating of the specific cause or causes of the symptom. Frequently the symptom is a failure of the product or process to produce any results. (Nothing was printed, for example).

The methods of [forensic engineering](#) are especially useful in tracing problems in products or processes, and a wide range of analytical techniques are available to determine the cause or causes of specific [failures](#). Corrective action can then be taken to prevent further failures of a similar kind. Preventative action is possible using [failure mode and effects analysis \(FMEA\)](#) and [fault tree analysis \(FTA\)](#) before full scale production, and these methods can also be used for [failure analysis](#).

Debugging

Debugging is a methodical process of finding and reducing the number of [bugs](#), or defects, in a [computer program](#) or a piece of [electronic hardware](#), thus making it behave as expected. Debugging tends to be harder when various subsystems are [tightly coupled](#), as changes in one may cause bugs to emerge in another.

As software and electronic systems have become generally more complex, the various common debugging techniques have expanded with more methods to detect anomalies, assess impact, and schedule [software patches](#) or full updates to a system. The words "anomaly" and "discrepancy" can be used, as being more neutral terms, to avoid the words "error" and "defect" or "bug" where there might be an implication that all so-called errors, defects or bugs must be fixed (at all costs). Instead, an [impact assessment](#) can be made to determine if changes to remove an anomaly (or discrepancy) would be cost-effective for the system, or perhaps a

scheduled new release might render the change(s) unnecessary. Not all issues are [life-critical](#) or [mission-critical](#) in a system. Also, it is important to avoid the situation where a change might be more upsetting to users, long-term, than living with the known problem(s) (where the "cure would be worse than the disease"). Basing decisions of the acceptability of some anomalies can avoid a culture of a "zero-defects" mandate, where people might be tempted to deny the existence of problems so that the result would appear as zero defects. Considering the collateral issues, such as the cost-versus-benefit impact assessment, then broader debugging techniques will expand to determine the frequency of anomalies (how often the same "bugs" occur) to help assess their impact to the overall system.

Android

Android is a [mobile operating system](#) initially developed by Android Inc. Android was purchased by [Google](#) in [2005](#). Android is based upon a modified version of the [Linux kernel](#). Google and other members of the [Open Handset Alliance](#) collaborated to develop and release Android to the world.^{[5][6]} The Android Open Source Project (AOSP) is tasked with the maintenance and further development of Android. Unit sales for Android OS smartphones ranked first among all [smartphone](#) OS handsets sold in the U.S. in the second and third quarters of 2010, with a third quarter market share of 43.6%.

Android has a large community of developers writing [application programs](#) ("apps") that extend the functionality of the devices. There are currently over 100,000 apps available for Android. [Android Market](#) is the online app store run by Google, though apps can be downloaded from third party sites (except on AT&T, which disallows this). Developers write in the [Java language](#), controlling the device via Google-developed Java libraries.

The unveiling of the Android distribution on 5 November 2007 was announced with the founding of the [Open Handset Alliance](#), a consortium of

79 [hardware](#), [software](#), and [telecom](#) companies devoted to advancing [open standards](#) for mobile devices. Google released most of the Android code under the [Apache License](#), a [free software](#) and [open source license](#).

The Android operating system [software stack](#) consists of [Java applications](#) running on a Java based [object oriented application framework](#) on top of [Java core libraries](#) running on a [Dalvik virtual machine](#) featuring [JIT compilation](#). Libraries written in C include the surface manager, OpenCore [media framework](#), [SQLite](#) relational [database management system](#), [OpenGL ES 2.0 3D graphics API](#), [WebKit layout engine](#), [SGL](#) graphics engine, [SSL](#), and [Bionic libc](#). The Android operating system consists of 12 million lines of code including 3 million lines of [XML](#), 2.8 million lines of [C](#), 2.1 million lines of [Java](#), and 1.75 million lines of [C++](#).

The early feedback on developing applications for the Android platform was mixed. Issues cited include bugs, lack of documentation, inadequate QA infrastructure, and no public issue-tracking system. The first publicly available application was the [Snake game](#). The [Android Dev Phone](#) is a [SIM](#)-unlocked and hardware-unlocked device that is designed for advanced developers. While developers can use regular consumer devices purchased at retail to test and use their applications, some developers may choose not to use a retail device, preferring an unlocked or no-contract device.

Future Internet

Future Internet is a summarizing term for worldwide research activities dedicated to the further development of the original [Internet](#).

While the technical development of the [Internet](#) has been an extensive research topic from the beginning, an increased public awareness of several critical shortcomings in terms of performance, reliability, scalability, security and many other categories including societal, economical and business aspects, has led to Future Internet research efforts.

Given the diversity of technologies related to the [Internet](#), extended by lower and higher [layers](#) and applications, the related research topics are wide spread.

The approaches towards a Future Internet range from small, incremental evolutionary steps to complete redesigns (clean slate) and architecture principles, where the applied technologies shall not be limited by existing standards or paradigms such as client server networking, which, for example, might evolve into co-operative peer structures. The fact that an IP address denotes both the identifier as well as the locator of an end system, sometimes referred to as [semantic overload](#), is an example of a conceptual shortcoming of the [Internet](#) protocol architecture. The clean slate types of approaches are based on the experience that supplementary or late additions to an original and established design are limited in their acceptance and introduction. Technical examples for evolutionary approaches include supplements to existing Internet technology, such as MobileIP, IPSec, DiffServ, HIP, [RSerPool](#), [SCTP](#), Shim6 or IPv6. Illustrative examples for alternatives that follow the clean slate idea can be found by using search engines.

Regarding the current status of Future Internet, it seems too early to identify any technical consensus or even standardization. Therefore, the term ***Future Internet*** should be used with caution only, especially not as a specific technology but instead as an abstract referrer to the visible, worldwide activities in this direction.

The non-technical aspects of the Future Internet span large areas such as socio-economics, business and environmental issues.

The time horizon of Future Internet studies is typically considered to be long term, taking several years before significant results can be expected or corresponding deployments take place in the real world.

Basic Computer Terminology

access time - the performance of a hard drive or other storage device - how long it takes to locate a file.

alert (alert box) - a message that appears on a screen, usually to tell you something went wrong.

alias - an icon that points to a file, folder or application.

application - a program in which you do your work.

background - part of the multitasking capability. A program can run and perform tasks in the background while another program is being used in the foreground.

bit - the smallest piece of information used by the computer.

backup - a copy of a file or disk you make for archiving purposes.

boot - to start up a computer.

bug - a programming error that causes a program to behave in an unexpected way.

bus - an electronic pathway through which data is transmitted between components in a computer.

byte - a piece of computer information made up of eight bits.

card - a printed circuit board that adds some feature to a computer.

cartridge drive - a storage device, like a hard drive, in which the medium is a cartridge that can be removed.

Clipboard - a portion of memory where the Mac temporarily stores information. Called a Copy Buffer in many PC applications because it is used to hold information which is to be moved, as in word processing where text is "cut" and then "pasted".

command - the act of giving an instruction to your Mac either by menu choice or keystroke.

command (apple) key - a modifier key, the Command key used in conjunction with another keystroke to activate some function on the Mac.

compiler - a program that converts programming code into a form that can be used by a computer.

compression - a technique that reduces the size of a saved file by elimination or encoding redundancies (i.e., JPEG, MPEG, LZW, etc.)

CPU - the Central Processing Unit. The processing chip that is the "brains" of a computer.

crash - a system malfunction in which the computer stops working and has to be restarted.

cursor - the pointer, usually arrow or cross shaped, which is controlled by the mouse.

database - an electronic list of information that can be sorted and/or searched.

data - (the plural of datum) information processed by a computer.

desktop - 1. the finder. 2. the shaded or colored backdrop of the screen.

dialog box - an on-screen message box that appears when the Mac requires additional information before completing a command.

digitize - to convert linear, or analog, data into digital data which can be used by the computer.

disk - a spinning platter made of magnetic or optically etched material on which data can be stored.

disk drive - the machinery that writes the data from a disk and/or writes data to a disk.

document - a file you create, as opposed to the application which created it.

DOS - acronym for Disk Operating System - used in IBM PCs.

download - to transfer data from one computer to another. (If you are on the receiving end, you are downloading. If you are on the sending end, you are uploading).

drag - to move the mouse while its button is being depressed.

drag and drop - a feature which allows one to drag the icon for a document on top of the icon for an application, thereby launching the application and opening the document.

driver - a file on a computer which tells it how to communicate with an add-on piece of equipment (like a printer).

Ethernet - a protocol for fast communication and file transfer across a network.

expansion slot - a connector inside the computer which allows one to plug in a printed circuit board that provides new or enhanced features.

extension - a startup program that runs when you start the Mac and then enhances its function.

file - the generic word for an application, document, control panel or other computer data.

floppy - a 3.5 inch square rigid disk which holds data. (so named for the earlier 5.25 and 8 inch disks that were flexible).

folder - an electronic subdirectory which contains files.

font - a typeface that contains the characters of an alphabet or some other letterforms.

footprint - the surface area of a desk or table which is occupied by a piece of equipment.

fragmentation - the breaking up of a file into many separate locations in memory or on a disk.

freeze - a system error which causes the cursor to lock in place.

hard drive - a large capacity storage device made of multiple disks housed in a rigid case.

highlight - to select by clicking once on an icon or by highlighting text in a document.

icon - a graphic symbol for an application, file or folder.

initialize - to format a disk for use in the computer; creates a new directory and arranges the tracks for the recording of data.

insertion point - in word processing, the short flashing marker which indicates where your next typing will begin.

installer - software used to install a program on your hard drive.

interrupt button - a tool used by programmers to enter the debugging mode. The button is usually next to the reset button.

landscape - in printing from a computer, to print sideways on the page.

launch - start an application.

memory - the temporary holding area where data is stored while it is being used or changed; the amount of RAM a computer has installed.

menu - a list of program commands listed by topic.

menu bar - the horizontal bar across the top of the screen that lists the menus.

multi tasking - running more than one application in memory at the same time.

operating system - the system software that controls the computer.

optical disk - a high-capacity storage medium that is read by a laser light.

palette - a small floating window that contains tools used in a given application.

partition - a subdivision of a hard drive surface that is defined and used as a separate drive.

paste - to insert text, or other material, from the clipboard or copy buffer.

PC - acronym for personal computer, commonly used to refer to an IBM or IBM clone computer which uses DOS.

PCI - acronym for Peripheral Component Interconnect - the newer, faster bus architecture.

peripheral - an add-on component to your computer.

port - a connection socket

Power PC - a processing chip designed by Apple, IBM and Motorola (RISC based).

print spooler - a program that stores documents to be printed on the hard drive, thereby freeing the memory up and allowing other functions to be performed while printing goes on in the background.

QuickTime - system extension that gives one the ability to compress, edit and play animation, movies and sound on the computer.

RAM - acronym for Random-Access Memory.

reset switch - a switch on the computer that restarts the computer in the event of a crash or freeze.

resize box - the small square at the lower right corner of a window which, when dragged, resizes the window.

RISC - acronym for Reduced Instruction Set Computing; the smaller set of commands used by the PowerPC.

ROM - acronym for Read Only Memory; memory that can only be read from and not written to.

root directory - the main hard drive window.

save - to write a file onto a disk.

scroll - to shift the contents of a window to bring hidden items into view.

scroll bar - a bar at the bottom or right side of a window that contains the scroll box and allows scrolling.

scroll box - the box in a scroll bar that is used to navigate through the window.

server - a central computer dedicated to sending and receiving data from other computers (on a network).

software - files on disk that contain instructions for a computer.

spreadsheet - a program designed to look like an electronic ledger.

start up disk - the disk containing system software and is designated to be used to start the computer.

System file - a file in the System folder that allows your computer to start and run.

System folder - an all-important folder that contains at least the System file and the Finder.

title bar - the horizontal bar at the top of a window which has the name of the file or folder it represents.

upload - to send a file from one computer to another through a network.

virtual memory - using part of your hard drive as though it were "RAM".

WORM - acronym for Write Once-Read Many; an optical disk that can only be written to once (like a CD-ROM).

zoom box - a small square in the upper right corner of a window which, when clicked, will expand the window to fill the whole screen.