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ENGLISH FOR GRADUATE STUDENTS

Themes Book 2

**АНГЛИЙСКИЙ ЯЗЫК ДЛЯ
СТУДЕНТОВ МАГИСТРАТУРЫ**

Учебное пособие
(часть 2)

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Theme 1. DATA TRANSMISSION ISSUES

Reading, Vocabulary and Listening: types of data transmission, data rate, transmission media

Speaking and Writing: telling about achievements in different aspects of data transmission, translating the text from Russian into English

Recommended Grammar: Reported Speech

Lead in

Decide which phrases refer to Parallel transmission and which – to Serial Transmission

Parallel		Serial
	a. short distance communication b. economical c. slow d. serially, one after the other e. speedy f. long distance communication g. minimal delays h. needs a conversion device i. simultaneously on separate communication lines j. costly	

Can you tell about each type of transmission using phrases from the task?

Reading and Vocabulary

Task 1. a. Before reading the text, make sure you know the following words and phrases.

<u>binary pattern</u>	start bit
<u>transmission medium/media</u>	stop bit
<u>conversion device</u>	bit rate
<u>communication device</u>	overhead of extra bits
<u>communication line</u>	bandwidth
<u>parallel transfer mode</u>	idle time/gap
<u>bit-serial transmission</u>	miss (v)
<u>clock pulse</u>	corrupt (v)
<u>clock frequency</u>	timing
<u>bit synchronization</u>	error-free
<u>timing control</u>	local storage
<u>character (n)</u>	local buffer storage

b. Can you explain the following terms?

binary pattern, transmission media, communication line, clock pulse, bit rate, bandwidth, idle time, local storage

Task 2. Read the text and complete the table after it comparing Asynchronous and Synchronous type of transmission.

Types of Serial transmission

A. There are two types of serial transmission – synchronous and asynchronous. Both these transmissions use “**Bit synchronization**”. Bit synchronization is a function that is required to determine when the beginning and end of the data transmission occurs. Bit synchronization helps the receiving computer to know when data begins and ends during a transmission. Therefore bit synchronization provides timing control.

Asynchronous Transmission

B. Asynchronous transmission sends only one character at a time where a character is either a letter of the alphabet or a number or a control character *i.e.* it sends one byte of data at a time. Bit synchronization between two devices is made possible using start bit and stop bit. Start bit indicates the beginning of data *i.e.* alerts the receiver to the arrival of new group of bits. A start bit, usually 0, is added to the beginning of each byte. Stop bit indicates the end of data *i.e.* to let the receiver know that byte is finished, one or more additional bits are appended to the end of the byte. These bits, usually 1s, are called stop bits. Addition of start and stop increases the number of data bits. Hence, more bandwidth is consumed in asynchronous transmission.

There is idle time between the transmissions of different data bytes. This idle time is also known as Gap. The gap can be of varying intervals. This mechanism is called Asynchronous, because at byte level sender and receiver need not to be synchronized. But within each byte, receiver must be synchronized with the incoming bit stream.

C. Asynchronous transmission is well suited for keyboard-type terminals and paper tape devices. The advantage of this method is that it does not require any local storage at the terminal or the computer as transmission takes place character by character. Besides, asynchronous transmission is best suited to Internet traffic in which information is transmitted in short bursts. This type of transmission is used by modems.

This method of data transmission is cheaper in cost as compared to synchronous *e.g.* If lines are short, asynchronous transmission is better, because line cost would be low and idle time will not be expensive. In this approach each individual character is complete in itself; therefore if character is corrupted during transmission, its successor and predecessor character will not be affected. It is possible to transmit signals from sources having different bit rates. The transmission can start as soon as data byte to be transmitted becomes available. Moreover, this mode of data transmission is easy to implement.

This method is less efficient and slower than synchronous transmission due to the overhead of extra bits and insertion of gaps into bit stream. Moreover, successful transmission inevitably depends on the recognition of the start bits. These bits can be missed or corrupted.

Synchronous Transmission

D. Synchronous transmission does not use start and stop bits. In this method bit stream is combined into longer frames that may contain multiple bytes. There is no

gap between the various bytes in the data stream. In the absence of start & stop bits, bit synchronization is established between sender & receiver by 'timing' the transmission of each bit. Since the various bytes are placed on the link without any gap, it is the responsibility of receiver to separate the bit stream into bytes so as to reconstruct the original information. In order to receive the data error free, the receiver and sender operates at the same clock frequency.

Synchronous transmission is used for high speed communication between computers.

E. This method is faster as compared to asynchronous as there are no extra bits (start bit & stop bit) and also there is no gap between the individual data bytes.

It is costly as compared to asynchronous method. It requires local buffer storage at the two ends of line to assemble blocks and it also requires accurately synchronized clocks at both ends. This leads to increase in the cost. In addition, the sender and receiver have to operate at the same clock frequency. This requires proper synchronization which makes the system complicated.

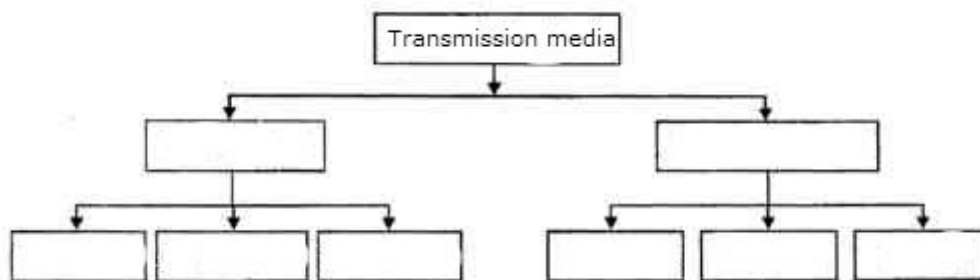
№	Factor	Asynchronous	Synchronous
1.	Data sent at one time		
2.	Start and Stop bit		
3.	Gap between Data units		
4.	Data transmission speed		
5.	Cost		

Task 3. Answer the following questions.

1. What is Bit synchronization? Why is it important?
2. Where is asynchronous transmission used? Why?
3. Where is synchronous transmission used? Why?
4. What are advantages and disadvantages of asynchronous transmission?
5. What are advantages and disadvantages of synchronous transmission?

Task 4. a. Complete the following table with the words or phrases from the list (there are two extra ones which you do not need to use).

twisted pair, physical layer, microwave, wired/guided, coaxial cable, radiowaves, Bluetooth, infrared, wireless/unguided, optical fibers



b. With your partner comment on the diagram explaining each part in detail. Present to the group.

Task 5. Look through the text again and find synonyms to the following words.

- | | |
|----------------------------|-----------------------------|
| 1. to take place (part A) | 8. previous of kin (part C) |
| 2. to indicate (part B) | 9. overload (part C) |
| 3. to give notice (part B) | 10. distinguishing (part C) |
| 4. to append (part B) | 11. synchronizing (part D) |
| 5. different (part B) | 12. to restore (part D) |
| 6. impulse (part C) | 13. correct (part E) |
| 7. next of kin (part C) | 14. complex (part E) |

Specialized Reading

Task 6. Read the text and choose the best title for it.

- A. The discovery of orbital angular momentum.**
- B. Different experiments in sending images over long distance.**
- C. Experiment in Vienna shows that ground-to-satellite communication with twisted light is possible.**

Text 2

The amount of data that a light beam can transmit depends on its frequency range or bandwidth—the wider it is, the more data you can cram into the beam. By manipulating the polarization of photons (a quantum property known as intrinsic spin angular momentum), which can be either horizontal or vertical, you can double the amount of information transmitted by a beam. There is another quantum property of photons, called orbital angular momentum (AOM), which can, in principle, have a ground state and an infinite number of values. Each of these values is associated with an integer indicating its helicity (represented by the integer l). In the ground state, where $l=0$, the wave front of the waves is planar. For all the other states, the wave front rotates along a “twisted” shape reminiscent of fusilli pasta (a helix); the amount of twist increases with increasing l .

In 2001, Anton Zeilinger, a quantum physicist at the University of Vienna, proposed the idea of using the orbital angular momentum of photons to increase the amount of data that can be transmitted by light beams. Several experiments in laboratories confirmed that data could be transmitted via twisted light beams, but the question of whether the quantum states of light photons would survive turbulence in air over long distances remained an open question.

In 2012, a Swedish-Italian research group successfully transmitted twisted microwaves over 450 meters of free space. But microwaves, although they consist of photons, are impervious to air turbulence. Therefore, Zeilinger and his research colleagues in Vienna decided to put the influence of turbulence—especially the turbulence you find above big cities—to the test.

Earlier this month, they reported in the *New Journal of Physics* the successful transmission of OAM modes via laser beam through open space over a distance of 3 kilometers. To make the experiment possible, they had to restrict the light beam to 16 OAM modes. “In principle, each single photon can have an unbounded number of different OAM values. We did our experiment with a laser, so we used a lot of photons, and so we are very far away from the single-photon regime,” explains Mario Krenn, a

physicist at the University of Vienna and lead author of the *New Journal of Physics* paper.

The researchers transmitted the beam from the radar tower of the Central Institute for Meteorology and Geodynamics to the rooftop of their own institute building. To create the OAM modes, they reflected the light of a laser off a so-called spatial light modulator. "It is a usual pixel display with about one thousand by one thousand pixels where you can change the reflective index of each pixel," says Krenn. "This allows us to introduce phase changes of 0 and 2π [pi] for each pixel. When we direct the laser beam at this spatial structure, the laser light undergoes these phase changes and develops specific intensity energy patterns," says Krenn.

A high quality lens (the first trials with a lower quality lens killed the OAM modes right away) focuses the reflected light into a 6-centimeter-wide beam that projects the light patterns on a screen 3 km away. A CCD camera recorded each of the 16 different patterns that resulted from the various OAM modes.

To the relief of the researchers, turbulence did not affect the OAM modes significantly, although it caused the patterns' position on the screen to move. "Some calculations suggested that even after one kilometer, you might have a very big problem because of turbulence," Krenn recalled. "With our method, we show that up to three kilometers of atmosphere does not destroy the OAM modes. Because the effective atmosphere is roughly six km thick, transmitting through it will not be a problem," says Krenn. "This result has interesting implications for future ground-satellite communication."

To ascertain the quality of the transmission, the researchers transmitted small grey-scale images of three famous Viennese: Wolfgang Amadeus Mozart; Ludwig Boltzmann; and of course, Erwin Schrödinger. To recognize the patterns and associate them with the 16 OAM states, the researchers used an artificial neural network. "We recorded some test samples [about 450] of different modes," says Krenn. "This was the input to the network, a so-called unsupervised network. You don't have to tell it how it should learn, you supply the input and it characterizes the different structures by itself," says Krenn.

Task 7. Read and translate the text. Are the following statements True or False?

1. This text tells about two quantum properties of photons - polarization and orbital angular momentum.
2. Orbital angular momentum like polarization also has two states.
3. In 2001, scientists had some problems with transmitting data via twisted light beams.
4. In 2012, scientists successfully experimented with transmitting twisted microwaves over a big city.
5. They used a spatial light modulator because it allows changing the refractive index of each pixel.
6. In their experiment turbulence didn't influence OAM modes at all.
7. With their method, transmitting light through six-kilometer atmosphere is possible.
8. The scientists used artificial neural network for recognizing the images and associating them with 16OAM states.

Task 8. What are Russian equivalents to the following words and phrases?

frequency range, polarization, quantum property, intrinsic spin angular momentum, orbital angular momentum, ground state, infinite number, integer, helicity, wave front, planar, fusilli pasta, twisted light beams, twisted microwaves, air turbulence, impervious, unbounded number, radar tower, spatial light modulator, reflective index, specific intensity energy patterns, effective atmosphere, ground-satellite communication, ascertain, artificial neural network, unsupervised network

Task 9. Match the following terms with their definitions.

OAM	means can be defined as is	a. a combination of the spin and the linear motion of a subatomic particle
polarization		b. the component of angular momentum of a light beam that is dependent on the field spatial distribution
helicity		c. an object that imposes some form of spatially varying modulation on a beam of light
twisted light beams		d. the quantum mechanical description of the classical polarized sinusoidal plane electromagnetic wave
spatial light modulator		e. light waves which form helical patterns rotating about a central axis

Task 10. Give your definitions to the following terms.

- air turbulence
- high quality lens
- reflective index
- artificial neural network

Task 11. Complete the table with appropriate words.

Noun	Verb	Noun	Adjective
1.	transmit	polarization	6.
rotation	2.	horizon	7.
increase	3.	angle	8.
intensity	4.	9.	twisted
5.	record	10.	reflective

Task 12. What part of speech are the following words?

frequency, intrinsic, horizontal, ground, planar, light, vertical, restrict, front, infinite, orbital, reminiscent, open, survive, impervious, single, lead, value, spatial, direct, specific, various, introduce, focus, thick, implication, artificial

Task 13. Which words in box A can't be used with nouns in B?

A	B
quantum, intrinsic, linear, impervious, thermal	property
infinite, quantum, orbital, binary, finite, intrinsic	number
research, scientific, test, support, artificial	group
laser, frequency, light, horizontal, single	beam
OAM, asynchronous, burst, light, display, interactive	mode
central, engineering, intrinsic, lead, well-known	institute
spatial, impervious, complicated, net, planar, sandwich	structure
light, energy, different, thick, specific, horizontal	pattern
direct, neural, communications, single, vertical	network
open, serial, parallel, synchronized, multiplex, sound	transmission

Task 14. Rewrite the following sentences from the text in Reported Speech.

1. "Each single photon can have an unbounded number of different OAM values," said Krenn.
2. "We did our experiment with a laser, so we used a lot of photons," explained Krenn.
3. "When we direct the laser beam at this spatial structure, the laser light undergoes these phase changes and develops specific intensity energy patterns," said Krenn.
4. "Because the effective atmosphere is roughly six km thick, transmitting through it will not be a problem," added Krenn.
5. "This was the input to the network, a so-called unsupervised network," said the scientist.

Recommended function

Read

Function 12 "HOW TO describe an experiment"

and answer the questions about the experiment in the text.

1. What was the aim of the experiment?
2. What devices were used?
3. What were the steps of the experiment?
4. What were the results and conclusions?

Tell about an experiment you took part in or did. Mention all necessary parts of it according to the steps in Function 12.

Listening

Watch a video about **Optical Fiber**. Which of these aspects haven't been mentioned in the video?

- the structure of optical fiber
- the speed of data transmission over optical fiber
- the advantages and disadvantages of transmission along fiber
- the types of fiber
- the main current producers of fiber

Task 15. Answer the questions on the video.

1. What is fiber?
2. What is the fiber comprised of?
3. What are the differences between single-mode and multimode fibers?
4. What causes attenuation, dispersion, micro- and macro bending?
5. What is Total Internal Reflection?
6. What are additional important characteristics of fiber?
7. How does the mode of light depend on the size of cladding?
8. What are advantages of optical fiber over traditional wires?

Task 16. What do these words and phrases from the video mean?

neighborhoods, flexible, strands of light, transmission medium, core, cladding, to escape, simultaneously, path, performance, to cause, single-mode, multimode, length, to travel, spectral components, straight axis, to leak out, to operate, to propagate, acceptable of light, durable, to offer, scalable, unsusceptible of, to corrode, lightning, reliability, cost-effective

Task 17. Give definitions to the following terms

- attenuation
- dispersion
- distortion
- wavelength
- refraction
- refractive index

Task 18. Match the parts of phrases used in the video

- | A | B |
|-------------------------|-----------------|
| 1. transmission | a. capacity |
| 2. information carrying | b. process |
| 3. storage area | c. distribution |
| 4. refractive | d. medium |
| 5. cabling | e. fiber |
| 6. mode field | f. conditions |
| 7. low loss | g. index |
| 8. bend induced | h. network |
| 9. angular | i. loss |
| 10. maintenance | j. diameter |
| 11. deployment | k. range |
| 12. optical power | l. costs |

Task 19. Write down the words that match this phonemics.

1. /'mi:diəm/		9. /leŋθ/	
2. /ə'tenju'eɪf(ə)n/		10. /ʌnsə'septɪb(ə)l/	
3. /,sɪml'teɪməsli/		11. /daɪ'æmɪtə/	
4. /'laɪtnɪŋ/		12. /'bɑ:məri/	
5. /'æŋg(ə)l/		13. /'fɑ:rbə/	
6. /kærəktə'rɪstɪk/		14. /hi:'lɪsɪti/	
7. /'twɪstɪd/		15. /'tɜ:bjʊl(ə)ns/	
8. /'speɪf(ə)l/		16. /'njʊər(ə)l/	

Task 20. Decode one of the parts of the video.

Part 1 - 00.04 “With nearly 2 billion kilometers ...” – 01.26 “... than single-mode fiber.”

Part 2 – 01.27 “Corning invented ...” – 02.51 “... caused by micro bending.”

Part 3 – 02.52 “Optical fibers operate ...” – 04.02 “... in the fiber.”

Part 4 - 04.03 “Multimode fiber has ...” – 05.28 “... leading applications.”

Speaking

Prepare a talk about

1. an experiment done by you or your group. Tell about the following steps of the experiment –
 - a. What was the aim of the experiment?
 - b. What devices or materials were used?
 - c. What were the steps of the experiment?
 - d. What were the results and conclusions?
2. a latest achievement in data transmission technologies.

Recommended function and Writing

Read

Function 3 “HOW TO make a simple translation from Russian into English”

and translate the following text.

Учёные из Датского технического университета установили новый рекорд скорости передачи данных по оптоволокну. Им удалось передать 43 терабита в секунду по одному волокну с помощью одного лазера. Хотя ещё в 2011 был преодолен порог в 100 терабит/с, сделано это было с помощью нескольких сотен лазеров, что малоприменимо в реальных условиях.

Единственная «уловка», к которой прибегли датские учёные — использование недавно разработанного в Японии оптоволокну с несколькими сердцевинами. Внешне оно практически ничем не отличается от обычного и представляет собой монолитное волокно, а не пакет отдельных волокон, но внутри содержит 7 каналов, по которым проходит свет. Таким образом, новый рекорд датчан гораздо ближе к практическому применению, чем демонстрировавшийся ранее в лабораториях скорости в 100 и даже 1000 терабит/с.

Theme 2. NETWORK BASICS

Reading, Vocabulary and Listening: basic knowledge about networks and devices associated with them

Speaking and Writing: telling about a device used in a network

Recommended Grammar: Present Simple and Past Simple Passive

Lead-in

You are going to read the text about network basics. Can you match the English terms with their definitions before reading the text?

1. a network	a. a type of cable that has an inner conductor surrounded by a tubular insulating layer, surrounded by a tubular conducting shield*.
2. Network Interface Card	b. the most used form of Internet access because of its high access speeds; it is offered in four different forms, DSL (or Digital Subscriber Line), also fiber-optic, cable, and satellite.
3. Local Area Network	c. a computer networking device that links network segments or network devices.
4. Broadband Internet service	d. a group of computers connected together in a way that allows information to be exchanged between the computers.
5. a coaxial cable	e. a network of computers that are in the same general physical location, usually within a building or a campus.
6. a Cat-5 cable	f. a number of circuits, usually of the same or similar type, which appear on jacks for monitoring, interconnecting, and testing circuits in a convenient, flexible manner.
7. a hub	g. Every computer (and most other devices) is connected to a network through it. In most desktop computers, this is an Ethernet card (normally 10 or 100 Mbps) that is plugged into a slot on the computer's motherboard.
8. a network switch	h. a twisted pair cable for carrying signals. This type of cable is used in structured cabling for computer networks such as Ethernet. The cable standard provides performance of up to 100 MHz. It is also used to carry other signals such as telephony and video.
9. a router	i. a device for connecting multiple Ethernet devices together and making them act as a single network segment. It has multiple input/output (I/O) ports, in which a signal introduced at the input of any port appears at the output of every port except the original incoming.
10. a patch bay	j. a device that forwards data packets between computer networks, creating an overlay internetwork. A router is connected to two or more data lines from different networks.

Notes:

shield - тех. ширма, щит, щиток.

layer - слой, пласт; прослойка; прокладка

tubular - трубчатый, в форме трубы

Reading and Vocabulary

Task 1. Make sure you know these words and word combinations.

<u>remote control</u>	stable (adj)	<u>telephone jack</u>
<u>purchase</u> (v, n)	spindle (n)	switch (v, n)
<u>expansion card</u>	<u>reliable</u> (adj)	<u>rectangular</u> (adj)
<u>mold onto</u> (v)	coaxial cable	hub (n)
<u>commonplace</u> (adj, n)	<u>occur</u> (v)	router (n)
<u>suitable</u> (adj)	<u>fiber</u> (n)	<u>flexible</u> (adj)
<u>mainstream</u> (adj)	<u>familiar</u> (adj)	<u>available</u> (adj)
<u>proximity</u> (n)	<u>intend</u> (v)	<u>restoration</u> (n)
<u>broadband</u> (adj)	<u>receptacle</u> (n)	<u>contain</u> (v)
<u>satisfy</u> (v)	<u>reduce</u> (v)	<u>occasionally</u> (adv)
<u>arrange</u> (v)	<u>application</u> (n)	<u>obvious</u> (adj)
<u>plug into</u> (v)	<u>unplug</u> (v)	<u>frequency</u> (n)

Task 2. Read the text and name most common physical components of networks.

NETWORK BASICS

A computer network is created by connecting PCs together via cables, connecting hardware, and network software components (this software is built into Windows). Networks allow the connected computers to share data, software and resources. Computers which are linked together on a network can:

- Exchange files and documents internally.
- Share hard disk space and other drive resources (floppy, CD-ROM, tape backup, etc.)
- Print to shared printers
- Share an Internet connection
- Provide communication (email, audio and video conferencing, network-based fax services, etc.)
- Enable remote control of connected hardware devices (entire offsite computers, cameras, devices installed as expansion cards and peripherals, etc.)
- Run software installed on a separate machine
- Provide data collection, manipulation, use, and storage between machines

Networks have become commonplace in mainstream home/business computing. Broadband (fast) Internet connections are now prevalent in many homes, and most business computing systems make use of a connected network of machines. The Internet itself is a large network which average computer users make use of on a daily basis.

PHYSICAL COMPONENTS OF A NETWORK:

The network infrastructure provides the stable and reliable channel over which our communications can occur. Devices and media are the physical elements or hardware of the network. Hardware is often the visible components of the network platform. And now we will consider some of them.

Network expansion cards:

- Also called “NICs” (network interface cards)
- Network expansion cards have a cable connector which looks similar to those on modems (found on the back panel of the computer - see our network card hardware lesson if this is not familiar). They have a single cable receptacle which is slightly larger than a phone line connector, with 8 connecting wires (rather than the 2 wires found in telephone jacks).
- Modems are a form of network expansion card: they allow computers to connect to distant network machines via a phone line, but they are typically not used when putting machines together to form a LAN.
- Other variations of network cards include wireless network devices that use no physical cabling to transfer data, and special network cards that plug into your existing telephone lines (these cards work differently than a modem, but have a similar connector).

Network cabling:

- Cat 5: The most common type of cabling is called “Cat 5” (category five). Cat 5 cables have a rectangular clip end that looks like an enlarged telephone cable tip. Cat 5 cables contain 8 wires - as opposed to the 2-4 wires found in telephone cables (only 4 are *actually used*). The telephone look-alike clips on Cat 5 cabling are called “RJ-45” connectors (the technical name for telephone connectors is “RJ-11”).
- Cables may be purchased in pre-cut lengths, with the clip ends molded onto each end of the cable. These types of cables are suitable for use when connecting small numbers of machines within close proximity to one another in a home and small office environment. Bulk cable and Cat 5 tips may be purchased separately to satisfy longer and more specific cable length needs. Cat 5 cable is typically sold on a spindle or in a box, in continuous lengths of 1000 feet.
- Coaxial cable (“coax”) is another type of cable used to connect computers together on a network. Coaxial cable is an older standard than Cat 5, but it is still in common use with cable Internet connections. The back of a cable modem is connected to the incoming coax cable provided by your cable company, and the computer is connected to that modem via its network card and a length of cat 5 wire.
- Fast fiber optic cables are used in larger networks, and although they work in much the same way as the above types, they will not be covered specifically in this lesson.

Hubs, routers, and other connectivity hardware:

- Hubs: all of the computers on a network are plugged into a box called the “hub”. Hubs typically contain 4-24 jacks, and can be linked together via an “uplink” port to accommodate larger systems. Another form of hub is called a “Switch”. Switches provide the same basic functionality as a hub, but they are slightly smarter, directing network traffic and information to the specific machines they are intended (rather than broadcasting info to the entire network). Because switches reduce the total amount of information being sent across the network, they perform faster, and are used in situations where speed is critical, or where large amounts of data are being sent between computers. Switches are slightly more expensive than basic hubs.
- Routers: routers are most commonly used to share Internet connectivity. Routers allow you to have a single broadband connection to the Internet (cable, dsl, t1, etc.) and share it between many computers. Many of the small routers available at office supply stores and computer shops *also contain a built in hub or switch* - providing a single piece of hardware that connects all of your networked computers together and to the Internet.
- There are also other components such as patch bays, rack units, and print servers. For example, a patch bay or patch panel allows circuits to be arranged and rearranged manually by plugging and unplugging the patch cords. Equipment can be inter-connected in various configurations. They provide a flexible way of routing restoration for a variety of circuit types. In a typical setup, the connection consists of a shorter cable plugged into the front side of the patch panel and a longer cable plugged into the back.

Occasionally, some components may not be so visible. In the case of wireless media, messages are transmitted through the air using invisible radio frequency or infrared waves. Services and processes are the communication programs, called software, that run on the networked devices. A network service provides information in response to a request. Services include many of the common network applications people use every day, like e-mail hosting services and web hosting services. Processes provide the functionality that directs and moves the messages through the network. Processes are less obvious to us but are critical to the operation of networks.

Task 3. Answer the questions to the text.

1. What actions does a network allow the connected computers to do? What can computers do?
2. What network expansion cards do you know?
3. What is the most common type of cabling?
4. What are the differences between coaxial cable and Cat 5?
5. Where are all of the computers on a network plugged into?
6. What are the differences between switches and hubs?
7. Why are routers needed? What do they allow to do?
8. What can you say about other connectivity hardware?

Task 4. Are the following sentences true (T) or false (F)?

1. Devices and media are often the invisible of the network platform.
2. A phone line connector is slightly larger than a single cable receptacle of modem.
3. Modems allow to connect to distant network machines via a phone line and they are used to form LAN
4. Wireless network devices use physical cabling to transfer data.
5. Cat 5 cables have more wires than telephone cables.
6. If you need longer and more specific cable length you can buy separately bulk cable and Cat 5 tips.
7. Coaxial cable is an older standard than Cat 5 and it is used to connect computers together on a network.
8. Hubs can be connected together via an “uplink” port to accommodate smaller systems.

Task 5. What are Russian equivalents to the following phrases?

to share data, entire offsite computer, to run software, Broadband Internet connection, mainstream home, visible component, rather than, telephone jack, to transfer data, rectangular clip end, enlarged telephone cable tip, pre-cut length, close proximity, bulk cable, “uplink” port, patch bays, rack units, patch cord.

Task 6. Match up the words which have a similar meaning.

1. commonplace	a. to happen
2. prevalent	b. demand
3. to occur	c. adaptable
4. to plug into	d. widespread
5. to purchase	e. appropriate
6. suitable	f. ordinary
7. to reduce	g. to diminish
8. flexible	h. regeneration
9. restoration	i. to embed
10. request	j. to buy

Specialized Reading

Task 7. Check the meaning of the following words from the text.

data packets, to accomplish, embedded security, to forward, to encrypt, full broadband subscription service, to deploy, nominal fee, to configure, vendor, firewall, header, broadband router, broadband modem, private network, unfamiliar, crucial, outstanding, box-shaped hardware device, fax-machine port, wired Ethernet broadband router, built-in switch, embedded security, wireless MAC address filtering, outside wireless clients

Task 8. Read and translate the text. You will see the numbers in the text; you need to match the numbers with the name of the part of the text.

- a. Routers for Home & Small Business
- b. Are Routers Expensive?
- c. Why Would I Need a Router?
- d. Wired and Wireless Routers

ICS Routers

A router is a device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network. Routers are located at gateways, the places where two or more networks connect, and are the critical device that keeps data flowing between networks and keeps the networks connected to the Internet.

When data is sent between locations on one network or from one network to a second network, the data is always seen and directed to the correct location by the router. The router accomplishes this by using headers and forwarding tables to determine the best path for forwarding the data packets, and they also use protocols such as ICMP to communicate with each other and configure the best route between any two hosts. The Internet itself is a global network connecting millions of computers and smaller networks — so you can see how crucial the role of a router is to our way of communicating and computing.

I. For most home users, they may want to set-up a LAN (local Area Network) or WLAN (wireless LAN) and connect all computers to the Internet without having to pay a full broadband subscription service to their ISP for each computer on the network. In many instances, an ISP will allow you to use a router and connect multiple computers to a single Internet connection and pay a nominal fee for each additional computer sharing the connection. This is when home users will want to look at smaller routers, often called broadband routers that enable two or more computers to share an Internet connection. Within a business or organization, you may need to connect multiple computers to the Internet, but also want to connect multiple private networks — and these are the types of functions a router is designed for.

II. Not all routers are created equal since their job will differ slightly from network to network. Additionally, you may look at a piece of hardware and not even realize it is a router. What defines a router is not its shape, color, size or manufacturer, but its job function of routing data packets between computers. A cable modem which routes data between your PC and your ISP can be considered a router. In its most basic form, a router could simply be one of two computers running the Windows 98 (or higher) operating system connected together using ICS (Internet Connection Sharing). In this scenario, the computer that is connected to the Internet is acting as the router for the second computer to obtain its Internet connection.

Going a step up from ICS, we have a category of hardware routers that are used to perform the same basic task as ICS, albeit with more features and functions. Often called broadband or Internet connection sharing routers, these routers allow you to share one Internet connection between multiple computers.



This image shows the flow of data to multiple computers sharing one high speed Internet connection.

Broadband or ICS routers will look a bit different depending on the manufacturer or brand, but wired routers are generally a small box-shaped hardware device with ports on the front or back into which you plug each computer, along with a port to plug in your broadband modem. These

connection ports allow the router to do its job of routing the data packets between each of the computers and the data going to and from the Internet. Depending on the type of modem and Internet connection you have, you could also choose a router with phone or fax machine ports. A wired Ethernet broadband router will typically have a built-in Ethernet switch to allow for expansion. These routers also support NAT (network address translation), which allows all of your computers to share a single IP address on the Internet. Internet connection sharing routers will also provide users with much needed features such as an SPI firewall or serve as a DHCP Server.

III. Wireless broadband routers look much the same as a wired router, with the obvious exception of the antenna on top, and the lack of cable running from the PCs to the router when it is all set up. Creating a wireless network adds a bit more security concerns as opposed to wired networks, but wireless broadband routers do have extra levels of embedded security. Along with the features found in wired routers, wireless routers also provide features relevant to wireless security such as Wi-Fi Protected Access (WPA) and wireless MAC address filtering. Additionally, most wireless routers can be configured for "invisible mode" so that your wireless network cannot be scanned by outside wireless clients. Wireless routers will often include ports for Ethernet connections as well. For those unfamiliar with Wi-Fi and how it works, it is important to note that choosing a wireless router may mean you need to improve your Wi-Fi knowledge-base. After a wireless network is established, you may possibly need to spend more time on monitoring and security than one would with a wired LAN.

Wired and wireless routers and the resulting network can claim pros and cons over each other, but they are somewhat equal overall in terms of function and performance. Both wired and wireless routers have high reliability and reasonably good security (without adding additional products). However —and this bears repeating — as we mentioned you may need to invest time in learning more about wireless security. Generally, going wired will be cheaper overall, but setting up the router and cabling in the computers is a bit more difficult than setting up the wireless network. Of course, mobility on a wired system is very limited while wireless offers outstanding mobility features.

IV. Below is a sample price comparison of routers and expected features as well as current pricing in U.S. dollars from online vendors found through Price Watch in August 2009.

ROUTER	PORTS	Manufacturer Description / Features	PRICE
NetGear WGR614 Wireless Cable/DSL Router	4	802.11g router offers wired and wireless connections. Up to 54 Mbps of wireless throughput. Four RJ-45 Ethernet ports allow for wired connections to the network. It includes a double firewall, WPA and 128-bit WEP encryption	\$25
Linksys WRT110-RM Draft-N 802.11N Wireless Broadband Router	4	Internet-sharing Router with 4-port switch and Wireless Access Point. Much to Wireless-N, but also works great with Wireless-G and - faster than Wireless-G when connected B devices	\$30
Linksys EtherFast BEFSR81 Broadband Router	8	Simply connect the Linksys BEF-SR81 Wireless Router 8 Port 10/100 Switch to your DSL or Cable Modem and all the computers in your home or office can share the Internet all at the same time.	\$80
D Link Systems NetDefend VPN Firewall	8	D-Link answers the need for a Broadband VPN Router. The DIR-130 is a simple-to-deploy routing VPN and firewall solution designed specifically for the Small Office / Home Office	\$90

Today you can purchase a basic sub \$90 broadband router that will enable you to share your broadband Internet connection with multiple computers in your home or small office. Before buying a router, however, you need to take into consideration the type of Internet connect you have, and how many ports you will need for individual computers, and of course, make the choice between wired or wireless. It is always a good idea to purchase a router with extra ports in case you need to connect additional computers at a later date.

Notes to the text

ISP - Internet Service Provider

ICMP - Internet Control Message Protocol

ICS - Internet Connection Sharing

NAT - Network Address Translation

DHCP - Dynamic Host Configuration Protocol

WPA - Wi-Fi Protected Access

MAC address - Media Access Control address

WEP - Wired Equivalent Privacy

DSL - Digital Subscriber Line

VPN - Virtual Private Network

Task 9. Match definitions with their terms (from NOTES).

1. a method for connecting multiple computers in a LAN to the Internet through a single connection and a single IP address.
2. a security protocol for wireless local area networks (WLANs) defined in the 802.11b standard. It was designed to give wireless networks the equivalent level of privacy protection as a comparable wired network.
3. a family of technologies that provide Internet access by transmitting digital data over the wires of a local telephone network.
4. it supports packets containing error, control, and informational messages.
5. a hardware address that uniquely identifies each node of a network.
6. it refers to a company that provides Internet services, including personal and business access to the Internet.
7. a Wi-Fi standard that was designed to improve upon the security features of WEP.
8. an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.
9. a protocol for assigning dynamic IP addresses to devices on a network.
10. extends a private network and the resources contained in the network across public networks like the Internet.

Task 10. Answer the questions to the text.

1. What is the task of the router?
2. For what do home users apply broadband routers?
3. Are all routers created equal? How can you define it is a router?
4. What are Internet connection sharing routers? How do they look? And what are their functions?
5. What are the differences and similarity between wireless broadband routers and wired routers?
6. What is the most expensive router you see in the table? Why does it have such price?

Task 11. Are the following sentences True (T) or False (F)?

1. To determine the best path for forwarding the data packets, router uses headers and forwarding tables.
2. ISP permits you to use a router and connect multiple computers to a single Internet connection and pay a nominal fee.
3. A cable modem can be considered a router.
4. Internet connection sharing routers don't provide users such features as an SPI firewall or serve as a DHCP Server.
5. When a wireless network is set up you need to spend less time on monitoring and security than one would with a wired LAN.
6. Setting up the router and cabling in the computers is a bit more difficult than setting up the wireless network.

Task 12. Complete the tables with suitable words. Pay attention to the part of speech.

Noun	Verb
subscription	1.
2.	accomplish
comparison	3.
4.	determine
choice	5.
6.	differ
configuration	7.
8.	obtain

Noun	Adjective
reason	9.
10.	individual
security	11.
12.	equal
invisibility	13.
14.	important
mobility	15.
16.	typical

Task 13. Match up the words which have a similar meaning.

1. to realize	a. manufacturer
2. to mention	b. as distinct from
3. lack	c. to get
4. to expect	d. outstanding
5. vendor	e. absence
6. amazing	f. to understand
7. as opposed to	g. to suggest
8. to bear	h. to spread out
9. to obtain	i. to refer
10. to deploy	j. to carry

Task 14. Write the words from the text to the following transcriptions.

1. /'pə:tʃɪs/		8. /rɪ'læɪə'bɪlɪti/	
2. /'θru:pʊt/		9. /'i:kw(ə)l/	
3. /'fi:tʃə/		10. /fə'mɪlɪə/	
4. /'menʃ(ə)n/		11. /'ɒbvɪəs/	
5. /beə/		12. /'rɪəlæɪz/	
6. /dɪ'tɜ:mɪn/		13. /'kru:ʃ(ə)l/	
7. /kən'fɪgə/		14. /'mʌltɪp(ə)l/	

Recommended function

Read

Function 12 “HOW TO define a thing...”

and write full sentences with terms in task 3 (exercise below the text ICS Routers) and the terms in Lead in task.

Listening

You are going to listen to *ABC News* about how **NBN pricing speed bumps could slow digital development**.

Task 15. *Check the meaning and stress of these words. Watch the video and underline the words that you hear.*

to warn, to ration out, plain, to undermine, to charge, retail, benefit, wholesale, tier, former chief, to facilitate, consumer, recover cost, artificially, capacity, to replicate, to limit, to reap, to deliver, equal, reward, utility, to sign, to encourage, waste, to take up, household, ADSL broadband, aim

Task 16. *Listen to the recording and match the phrases to make longer ones.*

- | | |
|--------------------------------------|---|
| 1. consumers won't take advantage of | a. charging more for higher speeds |
| 2. encourage consumer | b. making sure |
| 3. choose to ration it out | c. take-up in the early stages |
| 4. recover | d. the increasing speed needs of new applications |
| 5. an important step towards | e. their costs efficiently |
| 6. get use out of the network | f. download speeds |
| 7. it doesn't make | g. which is where the benefits come |
| 8. adapt over time to | h. much sense |
| 9. either through | i. the network's true capacity |
| 10. doubled remote | j. the regulatory process |

Task 17. *Answer the questions on the text.*

1. What will NBN Co's pricing policy undermine?
2. What is the NBC Co's pricing policy?
3. What high speed does the National Broadband Network promise?
4. NBN Co sells wholesale access to the internet service providers. How much is that access currently priced?
5. Why does John de ridder think NBN has got the wrong idea?
6. How much money could NBN waste if the pricing model encourages most households to take up the 12 megabits per second?
7. What does telecommunications analyst Paul Budde say about NBN's policy on price and speed?
8. Is there a political need for the Government to limit speed to 12 megabits?

Task 18. *Decode the part of the recording.*

Part 1 - 2.59 "Telecommunications analyst Paul Budde says...." – 4.18 ".....the minimum service can be lifted to 25"

Task 19. Listen to the recording again and write the words to their transcriptions.

1. /wə:n/		7. /'sɜ:vɪs/	
2. /ɪn'kʌrɪdʒ/		8. /'sætəlɪt/	
3. /kən'sju:mə/		9. /ɑ:trɪ'fɪʃ(ə)l/	
4. /tʃɑ:dʒ/		10. /'prəʊses/	
5. /'æktʃuəli/		11. /ɪg'zekjʊtv/	
6. /fə'sɪlɪteɪ/		12. /pleɪn/	

Speaking

Prepare a talk about one of the most **remarkable routers**. Find information about when, who and where it was made; describe it and tell about its use and advantages over similar ones.

Writing

Read

Function 11 “HOW TO describe a thing”

and write about one of the devices which you deal with. Write about when, who, where it was made; describe it and tell about its use and advantages and disadvantages.

Theme 3. COMMUNICATIONS NETWORK

Reading, Vocabulary and Listening: communications networks, network topologies

Speaking and Writing: telling about a network topology, achievements in networking technologies

Recommended Grammar: Conditional Sentences

Lead-in

What is a telecommunications network?

How does the development of telecommunications technologies influence human life? Tell about advantages and disadvantages of this process.

Reading and Vocabulary

Task 1. You are going to read the text. Make sure you know these words and word combinations.

node (n)	internet relays
<u>o</u> ri <u>g</u> in (n), <u>o</u> ri <u>g</u> inate (v)	real-time fashion
<u>r</u> e <u>f</u> er (v)	set up (v)
switch (v, n)	<u>r</u> e <u>l</u> i <u>a</u> ble (adj)
service provider	multiple locations
residential customer	<u>a</u> pp <u>r</u> o <u>a</u> ch (n)
wireless equipment	<u>m</u> ai <u>n</u> tai <u>n</u> (v), <u>m</u> ai <u>n</u> te <u>n</u> ance (n)
efficient transmission	<u>s</u> ec <u>u</u> re (adj), <u>s</u> ec <u>u</u> ri <u>t</u> y (n)
<u>f</u> u <u>n</u> ction (v, n)	enclosed setting
<u>i</u> n <u>i</u> tiate (v)	<u>e</u> nc <u>r</u> yp <u>t</u> (v), <u>e</u> nc <u>r</u> yp <u>t</u> ion (n)
a given point	be similar to (adj)
<u>t</u> er <u>m</u> inate (v, n), <u>t</u> er <u>m</u> in <u>a</u> tion (n)	wire (v, n), <u>w</u> ir <u>i</u> ng (n)
<u>a</u> ch <u>i</u> e <u>v</u> e (v), <u>a</u> ch <u>i</u> e <u>v</u> em <u>e</u> nt (n)	<u>i</u> n <u>v</u> o <u>l</u> ve (v)
hack (v), <u>h</u> ack <u>e</u> r (n)	<u>c</u> re <u>d</u> en <u>t</u> ial (n)

Task 2. Translate the following word combinations.

as well as, from a point of origin to a point of termination, most people are familiar with, institutions of higher learning, government agencies are also likely to use, extensive use of the Internet, granting users access credentials, the chances for the network to be hacked.

Task 3. Read the text and answer the questions after it.

What is a telecommunications network?

A telecommunications network is a collection of nodes and links that is capable of carrying audio, visual, and data communications. While the term was once used to refer only to the collection of switches and wiring used by telephone service providers to provide audio connectivity to residential and business customers, it is

now understood to include Internet, microwave, and wireless equipment as well as the more traditional forms of telephony. There are several different classes of telecommunication networks, with each of them having a slightly different focus.

The main function of any telecommunications network is to provide efficient transmission of information from a point of origin to a point of termination. A telephone call is the easiest way to understand the function. A call is initiated at a given point, with the signal routed through a series of nodes that may involve a combination of wired switches, Internet relays, and wireless nodes. The signal eventually terminates at a local switch, where it is then routed to the equipment used by the intended recipient. This process takes place within seconds, and establishes a connection that allows the parties to interact in a real-time fashion.

Today, there are several basic types of telecommunications networks in use. Along with the PSTN, or public switched telephone network, that most people are familiar with, there is also the Internet, a medium that is increasingly used for both voice and visual communications. Private computer networks are a common tool in many businesses today, as well as many institutions of higher learning. These basic types are all classified into several categories, which include such options as wide area networks, local area networks, and virtual private networks.

A telecommunications network that is set up as a wide area network or WAN allows for controlled but reliable communication between nodes that are geographically located across large distances. Businesses that operate multiple locations around a country, or even around the world, are likely to make use of this network model. Government agencies are also likely to use this approach to maintaining communications with branch offices and field personnel.

With a local area network, or LAN, the focus is on providing the same secure communications as with a WAN, just on a smaller geographical area. This type of telecommunications network offers phone, data, and Internet capability within an enclosed setting and from a limited number of devices connected to the network. One example would be a hotel, where the phones and Internet access are all routed through a network located within the hotel. Connections to larger networks are only achieved by going through the LAN first.

Virtual private networks, or VPNs, are similar to wide area networks, but with one exception. This type of telecommunications network makes extensive use of the Internet to create and maintain connectivity. Security is established by granting users access credentials. Those credentials can be used from any device capable of connecting with the Internet, but the communications is encrypted in a manner that minimizes the chances for the network to be hacked.

Task 4. Answer the questions to the text.

1. What is a telecommunications network?
2. What things does this term (telecommunications network) include?
3. What is the main function of any telecommunications network?
4. How is a telephone call realized? And how much time does this process take?
5. How many basic types of telecommunications networks are there?
6. What does WAN allow to do?

7. What is the difference between LAN and VPN?

Task 5. Are the following sentences true (T) or false (F)?

1. The PSTN and the Internet are both used for voice and visual communications.
2. A telephone call isn't the simplest way to understand the function of telecommunications network.
3. Private computer networks are a common tool in many businesses and institutions of higher learning.
4. Wide area network allows realizing communication between nodes that are located across small distances.
5. Government agencies use network model for providing communications with branch offices and field personnel.
6. The focus of LAN is on providing the secure communications, just on a smaller geographical area.
7. If you want to connect to larger networks, it isn't achieved by going through a network located within the hotel.
8. With VANs access credentials can be used only from special device which can be connected to the Internet.

Task 6. Complete the tables with suitable words. Pay attention to the part of speech.

Noun	Verb
communication	1.
2.	explain
access	3.
4.	operate
termination	5.
6.	use
7.	achieve

Noun	Adjective
security	8.
9.	reliable
extension	10.
11.	efficient
vision	12.
13.	local
function	14.

Task 7. Choose the best equivalents of the words on the left from the words on the right.

1. access	a. admission	b. approach	c. improvement
2. achievement	a. success	b. goal	c. attainment
3. reliable	a. faithful	b. dangerous	c. safe
4. common	a. general	b. usual	c. simple
5. establishment	a. building	b. institution	c. organization
6. efficient	a. effective	b. outstanding	c. functional
7. origin	a. termination	b. reason	c. beginning
8. wireless	a. no portable	b. cordless	c. copper
9. fashion	a. routine	b. mode	c. schedule

Specialized reading

Task 8. Read and translate the text. Which of these aspects have been mentioned?

- Security
- Equipment
- Bandwidth
- Area of coverage
- Personnel involved
- Speed of data transmission
- Internet protocols used in LANs and WANs

LAN vs. WAN Comparison

The two most popular network types today are LAN (Local Area Network) and WAN (Wide Area Network). These two networks are generally classified on the basis of their coverage area. Given below are few points that differentiate these two networks.

Typically, a local area network exists in a house or a university campus, while a wide area network exists over many office buildings separated by a vast distance. The office buildings in a WAN may be in different countries or even continents. For example, the headquarters may be in USA, the regional office may be in the UK, and the branch office may be in India. The workers in these three buildings use a Wide Area Network to collaborate with each other. The Internet can also be considered as a WAN, with the Ethernet being a classic example of WAN. Let us have a look at the two structures and their differences.

In a LAN setup, devices are connected to a switch or a hub. Shared devices are also connected to a switch that is centrally located. In case the devices need to be connected to the Internet, the switch is then connected to the ISP and thus, to the Internet. The data that is shared amongst these devices is stored in servers. If more devices need to be added, an extra hub or switch can be added.

Local Area Network (LAN) has higher bandwidth, thus is faster when compared to a WAN. The maximum speed of a LAN can be 1000 megabits per second. As LAN is faster, it is widely preferred for sharing computers in a network. The network is easy to set up, most computers and laptops manufactured today come with the RJ45 port built-in on the motherboard, which is used to connect to the network. In case of older machines that do not have this port, a separate NIC (Network Interface Card) will be required to be installed. This card fits in the PCI slot on desktops, and the PCMCIA slot on laptops.

The main advantage of using LAN is the ease of sharing. Computers, if connected to the same LAN, can even share a printer. The biggest hurdle that a firm faces while connecting computers in a LAN is the monitoring of traffic for the Internet. If there is too much load put on only one computer or on a shared device, the network speed may reduce. This can be circumvented by using a LAN traffic monitor, whose function is to keep a track of the bandwidth used. On the basis of setup and maintenance cost breakup, LAN is considered to be cheaper as compared to a WAN setup.

In a WAN setup, computers that are present at different locations are interconnected. The devices are connected to the router and the routers are interconnected via T1 standards. This makes it difficult to expand a WAN network.

Wide Area Network has a lower bandwidth, thus slowing the network. The speed of a WAN can go up to 150 megabits per second. This means the speed of a WAN is one-tenth the speed of a LAN. Though WAN is slower, it is used widely to share data. The best example of WAN is the Internet. The data on the Internet is accessible across continents. However, a WAN cannot share computer peripherals, so a computer in one country cannot use a printer in another country. To set up a WAN, a modem and a router is needed. Thus, if an additional device needs to be added to the network, a router needs to be configured and connected to the others in the network. As the numbers of devices in a WAN are greater than those connected in a LAN, there is a greater need for a monitoring device. A special-purpose computer is used, whose only purpose is to send and receive data from the Internet. Leased lines or satellites are used to connect devices in a WAN.

The main difference between a Local Area Network (LAN) and a Wide Area Network (WAN), besides the technology used, is that generally you have control of all the resources for a LAN, but not for a WAN. For example, for a single company LAN (not connected to another LAN or to the Internet); that company can provide physical security for the entire LAN and all the connected computers. They can provide background checks for all the people that have access to all of the equipment. They can establish security policies and procedures that can be enforced on all the equipment. All of the threats to the system come from within (assuming adequate physical security).

As soon as the LAN is connected to another LAN or the Internet and becomes a WAN, all of that changes. The company does not know what physical protections have been made to the rest of the WAN, only its small portion. In the case of an Internet connection, they have no idea who might try to access their LAN. The entire threat model changes. Not that any of the threats from the LAN-only environment have gone away, but many more have been added. One can think of the threat profile for a LAN as being a subset of the threat profile for a WAN.

This threat profile is what helps to decide what security measures are appropriate. In terms of network management, within a self-contained LAN, there probably is no need to have network management protocols encrypted, or special authentication done for those protocols (unless you are worried that insiders may attempt to "manage" your network for you). On the other hand, you probably do not want your network management protocols to traverse the Internet without protection. Nor do you want your computers on a remote segment to respond to network management requests that are not authenticated. So, as with any computer system or network, the first steps are to identify what the threats to your system or network are and what needs to be protected. Then you can go about devising ways to provide the required protection.

While each of the two have their own advantages and disadvantages, there is also a distinct factor that helps one choose between a LAN and a WAN setup, and that is distance. If the locations to be connected are far apart, there is no point considering a LAN setup, as in spite of whatever advantages it may offer, it is not possible.

Task 9. Make sure you know the following words and phrases.

coverage area, to differentiate, headquarter, to collaborate, setup, hub, shared device, a track of bandwidth, manufacture, motherboard, hurdle, monitoring, circumvent, maintenance cost breakup, router, to share data, leased lines, in spite of, to enforce, threat, to threaten, to fit in a slot, subset, authentication, to traverse, to assume, appropriate, to attempt, attempt, a remote segment, to request, peripheral

Task 10. Answer the questions to the text.

1. Where are WANs and LANs used? Please, give a detailed answer.
2. How can devices be connected in a LAN setup in some cases?
3. What is the main benefit of using LAN?
4. Why is LAN considered to be cheaper than a WAN setup?
5. What is the biggest difficulty of a LAN and how can it be circumvented?
6. How are devices connected in a WAN setup?
7. What is the difference between the speed and security of WAN and LAN?
8. Generally, what security needs have to be considered in a network management environment?

Task 11. Use the expressions from the box and complete the following sentences.

sharing fits bandwidth maintenance cost breakup traffic monitor a switch accessible manufactured a router

1. The function of using a LAN ... is to keep a track of the bandwidth used.
2. The ease of ... is the main advantage of using LAN.
3. Most computers and laptops ... today come with the RJ45 port, which is used to connect to the network.
4. Network Interface Card ... in the PCI slot on desktops, and the PCMCIA slot on laptops.
5. The data on the Internet is ... across continents, but WAN cannot share computer peripherals.
6. A modem and ... is required to set up a WAN.
7. LAN is faster as compared to a WAN because it has higher ...
8. In a LAN setup devices are connected to ...
9. Setup and ... of a LAN are cheaper as compared to a WAN.

Task 12. Complete the tables with suitable words. Pay attention to the part of speech.

Noun	Verb
choice	1.
2.	receive
setup	3.
4.	add
maintenance	5.
6.	store
reduction	7.

Noun	Adjective
continent	8.
locality	9.
10.	different
access	11.
12.	easy
use	13.
region	14.

Task 13. Define the meaning of the following words (the nouns, the adjectives or the verbs, the adverbs) in these sentences. Translate them.

Security wise, LAN can be more **secure** due to the fact that all the computers are within a specific area and are **physically** easier to **secure**. The data on a wide area network needs to pass across public phone lines in order to **reach** its intended **destination**. The data is then **vulnerable** to attack by anyone with the right skills to **penetrate** your network. Unlike LAN, there is just no physical way of securing it, which is why electronic **features** are the only **defense** structure in place.

LANs are very common nowadays, it is commonplace in a work environment and even at home. It is necessary to **implement** a local area network in order to connect **multiple** computers to the internet using a **single** DSL line. With regards to speed, LAN **usually** operates at much higher rates compared to WAN. This is largely due to the **proximity** of the computers and the **lack** of congestion in most cases. It is common to **experience up** to 80 or 90 mbps in a LAN while achieving 10 to 20mbps is already a great **achievement** for WAN.

Task 14. Match up the words which have a similar meaning.

1. to reach	a. to get into
2. vulnerable	b. to perform
3. to penetrate	c. closeness
4. feature	d. usual case
5. security	e. to achieve
6. commonplace	f. characteristic
7. to implement	g. absence
8. multiple	h. protection
9. proximity	i. defenseless
10. lack	j. numerous

Task 15. Write the words from the text to the following transcriptions.

1./'kʌv(ə)rɪdʒ/		13./trə'və:s/	
2./dɪfə'renʃiət/		14./mə'fi:n/	
3./vɑ:st/		15./rɪ'kwʌɪə/	
4./'hedkwɔ:tə/		16./'hə:d(ə)l/	
5./kə'læbərəɪt/		17./'meɪnt(ə)nəns/	
6./aɪ'dentɪfaɪ/		18./sə:kəm'vent/	
7./'meʒə/		19./ə'prəʊprɪət/	
8./prɪ'fə:/		20./'pə:pəs/	
9./pə'rɪf(ə)r(ə)l/		21./kən'fɪgə/	
10./'sætələt/		22./rɪ'sə:s/	
11./prə'si:dʒə/		23./ɔ:θentɪ'keɪʃ(ə)n/	
12./'ædɪkwət/		24./ə'sju:m/	

Recommended function and Writing

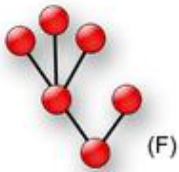
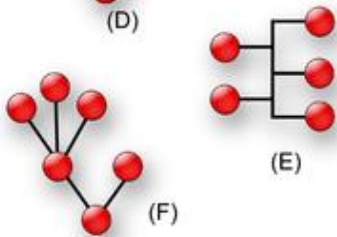
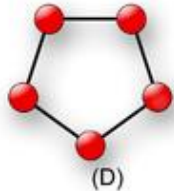
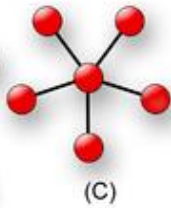
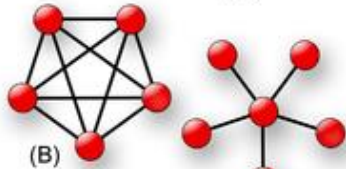
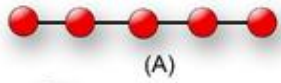
Study

Function 8 “HOW TO make comparison and contrast”

and write some sentences about LAN and WAN making comparison between them.

Listening

You are going to watch a video about **Mesh Network Topology**.



Match the types of network topology with the pictures:

- *ring*
- *bus*
- *line*
- *star*
- *mesh*
- *tree*

What do you know about them?

Task 16. Watch the video and match the words and phrases from A and B to make phrases from and translate them.

A

1. network
2. hub and spoke
3. network
4. routing
5. data
6. wireless
7. hotline
8. wireline
9. long distance
10. emergency

B

- a. access point
- b. algorithm
- c. architecture
- d. situations
- e. traffic
- f. transmission path
- g. router
- h. network
- i. backbone
- j. video chatting

Task 17. Answer the questions to the video.

1. What is “hub and spoke network”?
2. What are examples of nodes in mesh topology?
3. What is a Routing Protocol?
4. What do OLSR, BATMAN and HWMP stand for? What do they mean?
5. What are the benefits of Mesh Network?

6. What are the uses of Mesh Network mentioned in the video?
7. What are the telecommunication applications mentioned in the video?

Task 18. Complete the text with the words and phrases from the box.

physically, the Internet of Things, communicate, a partial mesh topology, a local area network, exchange, wireless personal network, physical, decentralized topology, a full mesh topology,

A mesh network is 1. ... that employs one of two connection arrangements, full mesh topology or partial mesh topology. A mesh network topology is a decentralized design in which each node on the network connects to at least two other nodes. Mesh networks are expected to play an important part in 2. Network nodes can "talk" directly to each other without requiring the assistance of an Internet connection. A big advantage of this 3. ... is that there cannot be a single point of failure. If one node can no longer operate, all the rest can still 4. ... with each other, directly or through one or more intermediate nodes. Mesh networks can use a full mesh topology or a partial mesh topology. In 5. ... , each network node is connected to all the other nodes in the network. In 6. ... , at least one node connects directly to every other node while others may only connect to those nodes they 7. ... data with on a frequent basis.

In the past, when mesh networks were always wired, the topology could be expensive (and complicated. to implement because each node had to be 8. ... connected to the other nodes. Today, however, advances in wireless communication and short-range 9. ... specifications have removed the 10. ... and financial barriers.

Task 19. Decode one part of the video.

Part 1 – 00.03 “To understand Mesh Networks ...” – 01.23 “... to send data across the mesh.”

Part 2 – 01.27 “The node accomplishes ...” - 02.22 “... being connected to the larger Internet.”

Part 3 – 02.23 “The nature of Mesh Networks ...” – 03.09 “... in the developing world.”

Part 4 – 03.10 “In order to solidify understanding ...” – 04.17 “... without an Internet connection.”

Part 5 – 04.18 “In 2010 ...” – 05.04 “... the way people share data.”

Speaking

Prepare a talk about **another network topology**. Tell about the following:

1. Where is it used?
2. How are the devices connected in it?
3. What are its advantages and disadvantages?
4. Are there any problems with speed and security?

Recommended function and Writing

Study

Function 2 “HOW TO distinguish a predicate”

and write out examples of different predicate forms from the text and translate them.

Theme 4. THE INTERNET OF THINGS

Reading, Vocabulary and Listening: network protocols and standards
Speaking and Writing: telling about a network standard, neologisms
Recommended Grammar: Reported Speech

Lead in

What is the Internet of things?

Can you match the words in A with the words in B?

A

1. machine to machine
2. data-gathering
3. cloud-based
4. wireless
5. smart
6. traffic flow
7. standards

B

8. sensors
9. applications
10. internet
11. organization
12. optimization
13. communication
14. city grid

Reading and Vocabulary

Task 1. a. These are the most important words from Text 1 and 2. What do they mean?

smart (adj)	specify (v), specification (n)
measure (v), measurement (n)	assure (v)
evaluate (v), evaluation (n)	contribute (v), contribution (n)
value (n, v), valuable (adj)	govern (v), government (n)
gather (v)	approve (v), improvement (n)
leverage (v)	implement (v), implementation (n)
interpret (v), interpretation (n)	grant (v, n)
transmit (v), transmission (n)	promise (v, n)
function (v, n)	datagram (n)
communicate (v), communication (n)	compress (v), compression (n)
hazard (n)	gateway (n)
detect (v), detection (n)	built-in (adj)
achieve (v), achievement (adj)	node (n)
rerouting (n)	deploy (v), deployment (n)
congest (v), congestion (n)	access (v), accessible (n)
disruption (n)	benefit (v, n)
opportunity (n)	interoperable (adj), interoperability (n)

b. Use some of them in the following sentences:

1. Such devices only ... in room temperature.
2. To make things ... a lot of technologies are used.
3. This application ... data from all the sensors.

4. The ... of this machine is its easy-to-use control panel.
5. This system collects all ... and generates the output plot.
6. We couldn't ... the ideal results in our experiment but we could ... important data.
7. The researchers got a lot of benefits from the ... of this project.
8. This phone has a lot of ... applications.
9. He made a big ... into the development of LEDs.
10. These devices are ... due to the latest network protocol.

Task 2. Read the text and answer the question below it.

Text 1

The Internet of Things revolves around increased machine-to-machine (M2M) communication; it's built on cloud computing and networks of data-gathering sensors; it's mobile, virtual, and instantaneous connection; and they say it's going to make everything in our lives from streetlights to seaports "smart". When we talk about making machines "smart," we're not referring strictly to M2M. We're talking about sensors.

A sensor is not a machine. It doesn't do anything in the same sense that a machine does. It measures, it evaluates - it gathers data. The Internet of Things really comes together with the connection of sensors and machines. That is, the real value that the Internet of Things creates is at the intersection of gathering data and leveraging it. All the information gathered by all the sensors in the world isn't worth very much if there isn't an infrastructure in place to analyze it in real time.

Cloud-based applications are the key to using leveraged data. The Internet of Things doesn't function without cloud-based applications to interpret and transmit the data coming from all these sensors.

For example, if there's ice on the bridge, the sensors in the concrete will detect it and communicate the information via the wireless internet to your car. Once your car knows there's a hazard ahead, it will instruct the driver to slow down, and if the driver doesn't, then the car will slow down for him. This is just one of the ways that sensor-to-machine and machine-to-machine communication can take place. Sensors on the bridge connect to machines in the car: we turn information into action.

What can we achieve when a smart car and a smart city grid start talking to each other? We're going to have traffic flow optimization, because instead of just having stoplights on fixed timers, we'll have smart stoplights that can respond to changes in traffic flow. Traffic and street conditions will be communicated to drivers, rerouting them around areas that are congested, snowed-in, or tied up in construction.

But the Internet of Things is not just about bridges, and it's not about cities. This is a huge and fundamental shift. When we start making things intelligent, it's going to be a major engine for creating new products and new services.

Of all the technology trends that are taking place right now, perhaps the biggest one is the Internet of Things; it's the one that's going to give us the most disruption as well as the most opportunity over the next five years.

- What do we mean by the IoT?
- What sort of software is vital for the IoT?
- What are the ultimate results of using the IoT mentioned in the text?
- What examples of “new products and services” can you think of?

Task 3. Read the text about three sensors and complete it with the words and phrases from the list.

visual alarm, energy efficiency, numerical value, moving objects, fire alarm, physical change

- A motion detector is a device that detects a. ... , particularly people. A motion detector is often integrated as a component of a system that automatically performs a task or alerts a user of motion in an area. Motion detectors form a vital component of security, automated lighting control, home control, b. ... , and other useful systems.
- A smoke detector is a device that senses smoke, typically as an indicator of fire. Commercial and residential security devices issue a signal to a c. ... control panel as part of a fire alarm system, while household detectors, known as smoke alarms, generally issue a local audible or d. ... from the detector itself.
- A thermometer is a device that measures temperature or a temperature gradient. A thermometer has two important elements: the temperature sensor (e.g. the bulb on a mercury-in-glass thermometer. in which some e. ... occurs with temperature, plus some means of converting this physical change into a f. ... (e.g. the visible scale that is marked on a mercury-in-glass thermometer..

Recommended function

Read

Function 6 “HOW TO define a thing”

and tell about a sensor that you know.

Specialized reading

Task 4. What do these words and phrases mean?

end-to-end network, standards organization, wired computer network, multiple reviews and edits, interoperability test plan, grant rights, wireless connectivity standard, compression format, TCP/IP, link layer, protocol stack, header compression layer, multiple optional modes, internet application protocol, IP-based server, network auto configuration, application-layer gateway, conversion protocol, mesh network topology, low power consumption, low data throughput, battery-operated application

Task 5. Read the text and decide if the sentences after the text are True or False?

Text 2

One of the biggest challenges in communication systems is interoperability – the ability of devices from different vendors to exchange data. Addressing this challenge is the main goal of many standards organizations that define specifications and testing procedures designed to assure interoperability between devices. Some

standards define one or several network layers, while others define the entire end-to-end network specifications. There are two main standards organizations which develop Network Standards – IEEE and IETF.

The Institute of Electrical and Electronics Engineers (IEEE) is a nonprofit organization formed in 1963. It has a considerable focus on communication and radio engineering, and one of its well-known contributions to the networking technology is the IEEE 802.x family of standards. To name a few members of the 802.x family – 802.3 defines the Ethernet specification, which governs most wired computer networks today, 802.11 defines the WLAN specification, which is the baseline of the Wi-Fi standard, 802.15.4 defines the wireless PAN standard used in ZigBee, 6LoWPAN and WirelessHART.

The Internet Engineering Task Force (IETF) is an open standard organization formed in 1986 that is responsible for development of Internet standards, particularly the TCP/IP suite. IETF specifications are established through the publication of draft specifications under the title “request for comments” (RFCs). An RFC is followed by multiple reviews and edits done by IETF members until the specification is approved to a “best current practice” status. There are thousands of Internet standards defined by RFCs. A few examples are RFC 791, which describes the IPv4 protocol; RFC 793, which describes the TCP protocol, and RFC 2616, which defines the HTTP/1.1 protocol.

The IETF, like the IEEE, does not run certification programs. That is, vendors cannot get recognition from either one of these organizations that their products comply with any of the standards. The IEEE and the IETF standards set good practices for implementation. Other organizations adopt standards from IEEE and IETF and use them to create certification programs. Three well-known organizations that manage certification programs today to assure interoperability between wirelessly connected devices are the Wi-Fi Alliance, the Bluetooth Special Interest Group (SIG) and the ZigBee Alliance. All three organizations provide member companies the option to take products through an interoperability test plan, which grants rights to wear the Wi-Fi, Bluetooth or ZigBee logo.

6LoWPAN is an acronym for *IPv6 over Low power Wireless Personal Area Networks*. The promise of 6LoWPAN is to apply IP to the smallest, lowest-power and most limited processing power device. 6LoWPAN is really the first wireless connectivity standard that was created for the IoT. The term “Personal Area Networks” within the 6LoWPAN acronym can be confusing because 6LoWPAN is typically used to form LANs. The standard was created by the 6LoWPAN working group of the IETF and formalized under RFC 6282 “Compression format for IPv6 datagrams over IEEE 802.15.4-based networks”, in September 2011. As indicated by the RFC title, the 6LoWPAN standard only defines an efficient adaptation layer between the 802.15.4 link layer and a TCP/IP stack.

The term 6LoWPAN is loosely used in the industry to refer to the entire protocol stack that includes the 802.15.4 link layer, the IETF IP header compression layer and a TCP/IP stack. But sadly, there is no industry standard for the entire protocol stack, nor is there a standard organization to run certification programs for a 6LoWPAN solution. Since the 802.15.4 link layer has multiple optional modes,

different vendors can implement solutions that are not interoperable at the local network level, and still call all of them “6LoWPAN networks.” The good news is that 6LoWPAN devices running on different networks can communicate with each other over the Internet, provided that they use the same Internet application protocol. Furthermore, a 6LoWPAN device can communicate with any other IP-based server or device on the Internet, including Wi-Fi and Ethernet devices. IPv6 was chosen as the only supported IP in 6LoWPAN (excluding IPv4) because it supports a larger addressing space, hence much larger networks, and also because it has built-in support for network auto configuration.

6LoWPAN networks require an Ethernet or Wi-Fi gateway to access the Internet. Similar to Wi-Fi, the gateway is an IP-layer gateway and not an application-layer gateway, which allows 6LoWPAN nodes and applications direct access to the Internet. Since most of the deployed Internet today is still using IPv4, a 6LoWPAN gateway typically includes an IPv6-to-IPv4 conversion protocol.

6LoWPAN is fairly new to the market. Initial deployments use both the 2.4-GHz and the 868-MHz/915-MHz ISM bands. Building on the 802.15.4 advantages – mesh network topology, large network size, reliable communication and low power consumption – and on the benefits of IP communication, 6LoWPAN is well positioned to fuel the exploding market of Internet-connected sensors and other low data throughput and battery-operated applications.

1. There are special organizations whose aim is to provide interoperability between devices in the IoT.
2. These organizations produce both network standards and certification programs.
3. 802.15.4 is the standard defines WLAN specifications.
4. 6LoWPAN is the standard for connecting devices in Local Area Networks.
5. Devices running on different networks can't communicate with each other.
6. To access the Internet 6LoWPAN networks need Ethernet or WiFi gateway.
7. 6LoWPAN standard is very promising in the market of Internet-connected sensors.

Task 6. Read again the part about 6LoWPAN and complete the table.

	6LoWPAN
1. What does the name stand for?	
2. What is the purpose of this specification?	
3. Who created this specification? And when?	
4. What communication layers does it address?	
5. What are the crucial requirements for it?	
6. What bands does it use?	
7. What are its advantages?	

Task 7. Match the verbs with the words or phrases used in the text.

- | | |
|------------------|-------------------------------|
| 1. to adopt | a. IETF specifications |
| 2. to define | b. interoperability |
| 3. to govern | c. a network layer |
| 4. to develop | d. specifications |
| 5. to have | e. a computer network |
| 6. to establish | f. Internet standard |
| 7. to do | g. Multiple reviews and edits |
| 8. to define | h. a certification program |
| 9. to run | i. standards |
| 10. to implement | j. solutions |
| 11. to assure | k. certification programs |
| 12. to manage | l. the Internet |
| 13. to access | m. built-in support |

Task 8. Find the sentences with these phrases in the text, translate them and make your own sentences with them.

- ... one of its well-known contributions to ... is ...
- ... comply with any of the standards.
- ... is loosely used to refer to ...
- ... has built-in support for ...
- ... is well positioned to fuel the exploding market of ...

Task 9. What do these acronyms stand for? Give definitions to them
IEEE, IETF, WLAN, PAN, RFC, TCP/IP, WiFi, ISM

Task 10. Complete the tables with appropriate words.

Verbs	Nouns		Nouns	Adjectives
communicate	1.		instance	1.
	2. measurement		2.	valuable
function	3.		3.	interoperability
	4. instruction		4. response	4.
4.	5. specification		5. option	5.
5. optimize	6.		6.	direct
contribute	7.		7. efficiency	7.
8.	8. recognition		8.	intelligent
compress	9.		9. wire	9.
convert	10.		10.	10.

Task 11. What are the words for this phonemics? Translate them.

1. /'meɜə/		8. /'hæzəd/	
2. /ri:'ru:t/		9. /ri:kəg'nɪf(ə)n/	
3. /'li:v(ə)rɪdʒ/		10. /ɒptɪmaɪ'zeɪʃn/	
4. /'waɪəd/		11. /'prɒmɪs/	
5. /ə'ʃʊə/		12. /'lu:slɪ/	
6. /'vendə/		13. /'geɪtweɪ/	
7. /kən'sʌm(p)ʃn/		14. /'θru:pʊt/	

Listening

You are going to listen to the third part of the series of video about the Internet of Things – **Network Protocol and the Internet.**

Match the following terms associated with IoT with their definitions:

- | | |
|-----------------------|--|
| 1. Internet Protocol | a. a normative specification of a technology or methodology applicable to the Internet |
| 2. Internet Standard | b. group communication where information is addressed to a group of destination devices simultaneously |
| 3. Machine-to-machine | c. the principal communications protocol in the Internet protocol suite for relaying datagrams across network boundaries |
| 4. Embedded System | d. technologies that allow both wireless and wired systems to communicate with other devices of the same type |
| 5. Multicast | e. a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints |

Task 12. What do these phrases mean? Watch the video and underline the ones which are not used in the video.

internet protocol suite, reference model, Ethernet frames, ubiquitous IP address, sensor data acquisition, client-server model, data overhead, full-duplex line, bidirectional web communication, remote monitoring, instant messaging, presence information, content syndication, energy harvesting, Internet connection automation, confirmable messages, binary header, constrained network, social-mediate tools, cloud computing

Task 13. Match the parts of phrases from the video and translate them.

- | | |
|---------------|-------------------|
| 1. social | a. bits and bytes |
| 2. incoming | b. IP address |
| 3. machine | c. mediate tools |
| 4. raw | d. connections |
| 5. ubiquitous | e. interaction |
| 6. human | f. devices |
| 7. error | g. checking |
| 8. embedded | h. equivalent |

- | | |
|-----------------|-----------------|
| 9. resource | i. applications |
| 10. constrained | j. requirements |

Task 14. Answer the questions about the video.

1. What examples of Internet Protocols for people and things were mentioned in the video?
2. How can you connect your local network to the Internet?
3. What is the layer where Network Protocols are applied?
4. Can TCP be used for embedded systems? Why (not)?
5. Can you use Web Protocols in IoT networks? What are their disadvantages?
6. What protocols for IoT are advised in the video? What are their main features?

Task 15. In the video there were a lot of acronyms. What do these stand for? What do they mean? What are their Russian equivalents?

CoAP, HTTP, TCP, UDP, XML, MQTT, OSI model, DNS, DHCP, JSON, XMPP, VoIP.

Task 16. What are the words for these transcriptions? Translate them.

1./'mesɪdʒɪŋ/		8./'ɪnst(ə)nt/	
2./'sɪgn(ə)lɪŋ/		9./'keɪblɪŋ/	
3./'sɪŋkrənəs/		10./'bændwɪθ/	
4./træn'spɔ:t/		11./ækwɪ'zɪʃ(ə)n/	
5./swɪ:t/		12./fə'mɪlɪə/	
6./bʌɪdʌɪ'rekʃ(ə)n(ə)l/		13./kən'streɪnd/	
7./'hɑ:vɪstɪŋ/		14./'ɒptɪmɪzɪd/	

Task 17. Decode one of the parts of the video.

Part 1 - 00.20 “Not surprisingly ...” – 01.18 “... directly into your IoT device.”

Part 2 - 01.19 “At the heart of the Internet ...” – 02.15 “... can be overkill.”

Part 3 - 02.16 “UDP is a simpler protocol ...” – 02.53 “... as with the newer protocols.”

Part 4 - 02.54 “Let’s look through some of the options ...” – 04.08 “... in the IoT applications.”

Part 5 - 04.09 “By contrast, CoAP ...” – 05.30 “... by constraints of your network connection.”

Speaking

Read the part about 6LoWPAN and Task 3 and prepare a talk about another certification program. Make sure you answer the following questions:

- What does the name stand for?
- What is the purpose of this specification?
- Who created this specification? And when?
- What communication layers does it address?
- What are the crucial requirements for it?

- What bands does it use?
- What are its advantages?

Recommended function and Writing

Read

Function 16 “HOW TO deal with neologisms”

and write some examples of neologisms associated with the Internet of Things and analyze them.

Theme 5. GADGETS

Reading, Vocabulary and Listening: different gadgets, their characteristics
Speaking and Writing: telling about a gadget, comparing it with other similar gadgets
Recommended Grammar: Future Simple and Going to

Lead-in

Do you know when the first mobile phone was invented? What was your first mobile phone? What could you do with that phone?

Reading and Vocabulary

Task 1. Read the words and give the Russian equivalents.

a press event	to give smb a heads up about smth
<u>ground</u> breaking (adj)	to feature smth
<u>carrier</u> (n)	to be different in every way
dumb phone	to set the standard
<u>smart</u> phone	to drop a call
quaint (adj)	to make a call, to place a call
<u>matter</u> (v, n)	to tuck the antenna inside the handset
means (n)	to have a great run
<u>gateway</u> (n)	to make a hole in smth
<u>awesome</u> (adj)	the tech business
<u>gorgeous</u> (adj)	the likes of AT&T
<u>bezel</u> (n)	addict (v), addiction (n), addictive (adj)
<u>iteration</u> (n)	to run on Android

Task 2. Read the article from “Wired” magazine. What are the main ideas of the article?

Cellphones That Changed Our World Forever

Motorola engineer Martin Cooper made telecommunications history when he placed the first cellphone call 40 years ago. And who did he call, you ask? His rivals at Bell Labs, of course.

Still, it took another decade for the mobile phone to reach the masses, because Motorola didn't make the DynaTAC available until March 1983. And in an example of just how quaint the tech business was back then, Motorola had a press event 10 years *before* the phone was on sale.

This brings us to April 3, 1973, when the company that eventually brought us the Razr and Droid introduced the mobile phone. Forty years later, we're still dropping calls like bad habits and struggling to get a signal inside a supermarket. Not that it matters, because we rarely use our phones to make phone calls. Instead, they're a gateway to our digital lives, a means of doing everything from sending texts to updating our status, to posting photos and listening to music.

Thousands of phones have come and gone, and most of them seem to run on Android. But the number of handsets that could be called truly groundbreaking is surprisingly small. Here they are.

Motorola DynaTAC 8000X -- 1983

The DynaTAC was the first commercially available cellphone and the culmination of all the research Cooper had done since joining Motorola in 1954.

The phone resembled those the military used in the field. The *svelte* handset weighed 28 ounces and was 10 inches tall, not including the antenna nearly as long as the phone. It wasn't exactly something you could *shove* in a pocket or purse. Still, it wasn't attached to a car and you could walk around with it.

Such mobility wasn't cheap. The DynaTAC would make a \$4,000 hole into your bank account. But that didn't stop early adopters from diving into the chic world of mobile calling. The phone had *a cameo* alongside Gordon Gekko in *Wall Street* and with über-preppy Zack Morris on the teen drama *Saved By the Bell*

Nokia 3210 -- 1999

The Nokia 3210 was, for many people, the *gateway drug* of phones. It also was among the first to tuck the antenna inside the handset. (The Toshiba TCP-6000 was the first, but that was the phone's only claim to fame.) The little Finnish *candybar* phone was the first mobile communication device of the masses.

Its monochromatic screen did more than give you a heads up about incoming calls. It introduced a generation to the greatest mobile-phone game ever: *Snake*. The addictive game, based on computer game from the 1970s, featured a snake that grew as it ate pixels. The object was to make the longest snake possible without having it eat itself.

Nokia sold 160 million T9-enabled 3210s before replacing it with 3310 in late 2000.

Sony Ericsson T68I -- 2002

The T68i was the bridge between dumb phones and smartphones and, it could be argued, the most awesome cellphone ever. It included such groundbreaking features as Bluetooth, two-way MMS, simple WAP browsing and e-mail. And it had a cool color screen, a first for Ericsson.

The phone was so far ahead that it appeared in the Bond film *Die Another Day*. If it was good enough for 007, it was good enough for you. And it proved that people wanted more from their phones than calls and texts. Although the phone never saw the sales numbers of the Nokia 3210, it enjoyed a *cultlike* following.

Motorola RAZR -- 2004

The Razr was the first *must-have* phone. The thin flip phone was stylish and, if the commercials were to be believed, would stick like a knife if dropped onto the floor.

While throwing the phone at walls like a knife was a bad idea, the Razr had a great four-year run, selling 130 million units.

The Razr looked like it was straight out of the future. The numerical keyboard was cut from a single piece of metal. Its *clamshell* aluminum body and colored glass screen were gorgeous. And the damn thing worked like a charm. It was the last dumb phone that truly mattered.

Never mind that it also was the last Motorola phone that truly mattered.

Apple iPhone – 2007

This is the phone that changed everything. It was the first smartphone with features people wanted, even if they didn't know it yet. It was different in every way, from its *stunning* design to its ease of use to the things it would allow us to do.

Of course, we didn't see that at first. All we could do was *gripe* about an app store with empty shelves, a single button on the bezel and the fact we couldn't cut-and-paste anything. It seems so quaint now, when so much of what iOS pioneered has become the norm for smartphones.

No less important was how Apple changed how handset makers dealt with carriers. The balance of power shifted from the likes of AT&T and Verizon to Apple and Samsung.

Nearly six years and five iterations later, the iPhone still sets the standard.

Task 3. Find the answers to the questions in the text.

1. What company introduced the first mobile phone?
2. What was the first commercially available cellphone?
3. How did the author describe DynaTAC?
4. What was the most special about Nokia 3210?
5. What groundbreaking features did Sony Ericsson T68i include?
6. Why was RAZR the first must-have phone?
7. Why was the first iPhone different in every way?

Task 4. Match the nouns with their attributes.

- | | |
|------------------------------|----------------|
| 1. the tech | a. calls |
| 2. a press | b. game |
| 3. incoming | c. screen |
| 4. groundbreaking | d. touchscreen |
| 5. bank | e. business |
| 6. the addictive | f. device |
| 7. monochromatic | g. account |
| 8. stunning | h. event |
| 9. capacitive | i. design |
| 10. the mobile communication | j. features |

Task 5. Match the parts of the phrases.

to type on, to post, to update, to give smb, to make, to run on

one's status, smth available, one's phone, a heads up about incoming calls, Android photos

Task 6. *There are some slang words and phrases in the text. Match them with their meanings.*

- | | |
|--|---|
| 1. glossy and slim | a. to throw or put very carelessly |
| 2. a small but very bright and popular thing | b. a device that makes its owner addictive to it |
| 3. a flip-up phone | c. something that becomes a craze for a lot of people |
| 4. to complain about smth | d. shocking |
| 5. strongly advisable to have | e. having the size of a chocolate bar |

Specialized Reading

Task 7. a. *Read and translate these words and phrases.*

affordable gadgets, the best gear, an incredible value, a stunning display, battery life, budget tablet, to increase storage, solid, competitive phone, broke geek, competitive, a great tablet for e-books and watching movies, incredibly glossy design, cheap Android and Windows Phone handsets, responsive keyboard, streaming video, video chatting, work in the cloud, desktop applications, beyond the reach of smb/smith, pre-loaded backup suite, dollar-store headphones

b. *use other adjectives with the following nouns from the box:*

phone, video, applications, display, keyboard, gadgets, design, geek, tablet

Task 8. *Read the article from “Wired” magazine. Make the one-sentence summary.*

9 Awesome Gadgets for Broke Geeks

Gadgets cost money. A lot of money. And now that you’ve paid your taxes, you probably have no money. But that doesn’t mean denying yourself the joy of a shiny new gizmo to replace the worn-out junk you should have thrown last year.

There are plenty of affordable gadgets out there if you know where to look, and they’ll satisfy your geek needs without making your wallet empty. We’re not talking dollar-store headphones and flea market copies, either. We’ve tested this stuff and know it’s all quite reliable. You aren’t getting the best laptop or hottest phone, but none of this stuff will disappoint you.

Tablet: Amazon Kindle Fire HD, \$200

The 7-inch Amazon Kindle Fire HD is an incredible value and a great tablet for e-books, watching movies and consuming the tons of content you can get from Amazon. Don’t look to it for perfect productivity, but you do get a stunning display, around 10 hours of battery life, Amazon goodies like X-Ray and a solid ecosystem of content -- all for as little as \$200. The Google Nexus 7 is another great budget tablet if you’re looking for authentic Android. An entry-level 7 costs as much as the Kindle, but the price rises quickly if you start increasing storage and add mobile data.

Phone: iPhone 4, \$1 with two-year contract

Sorry, but the iPhone 5 is beyond the reach of a broke geek. Accept that fact, move on and get yourself an amazing phone for the cost of a fast-food hamburger.

We hear you came back there complaining that the iPhone 4 is almost three years old. So what? It remains a powerful and competitive phone, with a 3.5-inch

Retina Display, 5MP camera, and incredibly glossy design. You can run the latest version of iOS and access Apple's robust app ecosystem.

Sure, the iPhone 4 is an old phone. But it's a very, very good old phone and better than a lot of the cheap Android and Windows Phone handsets out there.

Laptop: Chromebook, \$250 and up

Put aside the extremely expensive Chromebook Pixel, Google's Chromebooks are almost criminally cheap. Only \$250 gets you a very functional Samsung Chromebook, and another two Benjamins lift you up to the Samsung Series 5 550. These are solid performers with responsive keyboards and trackpads and plenty of battery life. They're great for watching streaming video, video chatting and working in the cloud. And you can share them, too, because Chromebooks support multiple user logins.

You won't be able to run any desktop applications, so forget about Photoshop and the like. But if you're broke and want a solid, cheap laptop that will connect you to all of the Internet goodness, Google's devices are for you.

Portable Storage: HGST Touro Mobile Pro, \$70 to \$90

External hard drives are as expensive as they are necessary. But if you've got a lot of data and not a lot of money, go with the HGST Touro Mobile Pro. It offers performance as well as low price but is a total steal at less than a C-note.

The drive is fast (7,200 rpm) and it comes in 500 GB and 750 GB models. It's a mobile drive in a svelte package that draws power over the USB 3.0 port. HGST has included some extras — you get a pre-loaded cloud backup suite with the drive and 3 GB of free storage to try it out. Plus, the drive is protected with a 2-year warranty. You get a lot for a little with this.

E-Reader: Barnes & Noble Nook Simple Touch GlowLight, \$120

The Barnes & Noble Nook Simple Touch GlowLight is one of the best deals going on e-readers, especially if you read in the dark. Sure, you could get the Kindle Paperwhite, but for the same price, the Nook is totally ad-free. You'll also appreciate the light-up touchscreen and physical page-flip buttons and good library integration. Just keep in mind that Barnes & Noble's ecosystem isn't as strong as Amazon's.

Task 9. Find the answers to the questions in the text.

1. How long is battery life of "Amazon Kindle Fire HD"?
2. Can you run the latest version of iOS at iPhone 4?
3. What is your opinion about the iPhone 4? Is it a powerful and competitive phone?
4. How much is Samsung Chromebook?
5. Can you use Barnes & Noble Nook Simple Touch GlowLight in the dark?

Task 10. Match the gadgets with descriptions.

- | | |
|--|----------------|
| 1. Portable Storage: HGST Touro Mobile Pro; | 4. Nexus 7; |
| 2. Amazon Kindle Fire HD; | 5. Chromebook; |
| 3. Barnes & Noble Nook Simple Touch GlowLight; | 6. iPhone 4 |

a. It was the first mainstream e-reader with a glowing screen. The front-lit display contains LEDs at the top of the screen which illuminate the display so you can continue to comfortably read when the ambient light grows too dim.

b. The changes Amazon has made in order to stay at the head of the budget tablet pack have produced a machine that's just plain better all around.

c. It has a higher-resolution display, a brand-new front-facing camera, an improved back camera with flash, double the RAM of the iPhone 3GS, and the same A4 processor that powers the iPad.

d. It's a mobile drive, so the case is svelte and the available capacities aren't gigantic — 500GB and 750GB. However, it draws its power over the USB 3.0 port, so you won't need to plug it into a wall. The drive is fast (7,200rpm) and it is faster in writing files than reading them.

e. It is not going to fully replace your Mac or Windows PC. It's not going to be your next gaming machine (unless all you do is play Angry Birds, Cut The Rope and other casual games). It won't run Photoshop, Outlook, iTunes and all the rest. The reality is that it wasn't built for any of that. This is simply a relatively cheap, durable, laptop.

f. Most notably, there's Google's own device, a consumer favorite that's set new expectations for how a \$200 tablet should look and perform.

Task 11. Match the words with definitions.

- | | |
|---------------|---|
| 1. headphones | a. costing a lot of money |
| 2. battery | b. a panel of keys that operate a computer or typewriter |
| 3. display | c. a small portable computer that accepts input directly on to its screen rather than via a keyboard or mouse |
| 4. sleek | d. the retention of retrievable data on a computer or other electronic system |
| 5. gadget | e. completely finished by continued use |
| 6. worn-out | f. small mechanical device or tool, especially an ingenious or novel one |
| 7. storage | g. a mobile phone |
| 8. expensive | h. neat or fashionable in appearance |
| 9. keyboard | i. a network of remote servers hosted on the Internet and used to store, manage, and process data in place of local servers or personal computers |
| 10. tablet | j. a container consisting of one or more cells, in which chemical energy is converted into electricity and used as a source of power |
| 11. handset | k. a device consisting of a pair of earphones joined by a band placed over the head, for listening to audio signals such as music or speech |
| 12. the cloud | l. an electronic device for the visual presentation of data or images |

Task 12. Explain what these terms mean.

- trackpad
- retina display
- tablet PC
- cloud
- e-book
- mobile data
- app system
- page-flip buttons

Task 13. Task7. Match the adjectives with their opposites.

expensive, unreliable, best, new, weak, stunning, worst, shiny, worn-out, dim, cheap, powerful, solid

Task 14. Match the words in the text with this phonemics.

1./ɔ:'θentɪk/		6./ɪn'kredɪb(ə)l/	
2./svelt/		7./rɪ'spɒnsɪv/	
3./kəm'petɪtɪv/		8./fli:/	
4./ə'fɔ:dəbəl/		9./'laɪbrəri/	
5./'vɜ:ʃ(ə)n/		10./prɒdʌk'tɪvɪti/	

Recommended function

Read

Function 8 “HOW TO make comparison and contrast”.

Compare the two devices in the box, using adjectives from the list below.

affordable, expensive, best, incredible, great, new, weak, stunning, worst, shiny, worn-out, cheap, powerful, competitive, responsive.

Features	Kindle Fire HD Tablet	Google Nexus 7
Screen Size	7"	7"
Display Technology	HD LCD	HD LCD
Resolution/Pixel Density	1280x800, up to 720p HD	1280x800 (216ppi) HD
Processor	Dual-core, 1.2GHz OMAP4460	Quad-core Tegra 3 this is the first quad-core 7-inch tablet
Storage	16GB on device Plus free cloud storage for all Amazon content	16 GB internal storage (actual formatted capacity will be less)
Operating System	Android	Android 4.1 Jelly Bean this is the first Jelly Bean tablet
Battery	11 hours of continuous use	Up to 8 hours of active use

Listening

You are going to listen to David Pogue’s talk “Pogue tests the Apple iPhone”.

Task 15. Read the words and phrases. Make sure you know their Russian equivalents.

the weekly tech critic, to review gadgets and stuff, the tech trends for next year, carry your voice over the Internet, a phone line, an ordinary telephone, cable modem, a regular phone, hear a dial tone, a fake-out, a WAV file, next door neighbor, dial your home number, add a new feature, VOIP (Voice Over IP) service, land-line home-phone service, make free phone calls, to wear a headset

Part 1. 00.00 - 02.04

Task 16. a. Watch and listen to the beginning of the talk and answer the questions.

1. What does David do? What's his job?
2. Where does he work?
3. What is he mostly doing this year?
4. What questions was he answering?

b. Watch the video again and answer the questions to the video.

- | | |
|-------------|--|
| 00.07-00.20 | What question interests David most?
Where did he find the image of volcano? |
| 00.21-01.14 | What new feature of the Internet is he speaking about?
Does he mention any services or companies? |
| 01.15-01.50 | Which phone service is David talking about?
Which software does he mention?
Why do people prefer Skype to an ordinary phone? |

Part 2. 02.12-05.54

Task 17. a. Be sure you know the words and phrases.

cool features; design the phone; the first thing it changed was that..., another thing was that..., experience being online all the time; 60-dollar-a-month cellular card for laptop; to check one's email; wireless base stations; to broadcast about 150 feet across; to dial a number; at random; to download right to the phone; to erase smth.

b. Listen to David Pogue talk. Answer the questions.

1. What device is he talking about?
2. What does he think about Apple company in the fall of 2006?
3. What famous person does he mention?
4. What services is he speaking about?

Task 18. Decode one of the parts of the presentation:

Part 1 – 00.12 “I think...” – 01.08 “...said OK.”

Part 2 – 01.09 “I’m going to...” – 02.14 “... feet across.”

Part 3 – 02.15 “It’s absurd...” – 03.08 “... like this?”

Part 4 – 03.09 “They have...” – 03.43 “... right.”

Recommended function

Read

Function 10 “HOW TO say numbers and formulas”.

Study the data about Apple iPhone 2007 and Apple iPhone 5. Describe one of these handsets.

Apple iPhone 2007 Announced 2007, January. Released 2007, June			
General	2GNetwork	GSM 850 / 900 / 1800 / 1900	
	SIM	Mini-SIM	
Body	Dimensions	115 x 61 x 11.6 mm (4.53 x 2.40 x 0.46 in)	
	Weight	135 g (4.76 oz)	
Display	Type	TFT capacitive touchscreen, 16M colors	
	Size	320 x 480 pixels, 3.5 inches (~165 ppi pixel density)	
	Multitouch	Yes	
	Protection	Corning Gorilla Glass, oleophobic coating	
Sound	Alert types	Vibration, proprietary ringtones	
	Loudspeaker	Yes	
	3,5 mm jack	Yes	
Memory	Card slot	No	
	Internal	4/8/16 GB	
Data	GPRS	Yes	
	EDGE	Yes	
	WLAN	Wi-Fi 802.11b/g	
	Bluetooth	Yes, v2.0, headset support only	
	USB	Yes, v2.0	
Camera	Primary	2 MP, 1600x1200 pixels	
	Video	No	
	Secondary	No	
Features	OS	iOS, upgradable to iOS 3.1.3	
	CPU	412 MHz ARM 11	
	GPU	PowerVR MBX	
	Sensors	Accelerometer, proximity	
	Messaging	SMS (threaded view), Email	
	Browser	HTML (Safari)	
	Radio	No	
	GPS	No	
	Java	No	
	Colors	Black	
			- Google Maps; Audio/video player; TV-out; Organizer; Document viewer; Image viewer; Predictive text input
	Battery		Non-removable Li-Ion battery
		Stand-by	Up to 250 h
Talk-time		Up to 8 h	

	Music play	Up to 24 h
Misc	SAR US	0.97 W/kg (head) 0.38 W/kg (body)
	SAR EU	0.97 W/kg (head) 0.69 W/kg (body)

Apple iPhone 5 Announced 2012, September	
GSM	GSM model: SM/EDGE
SIM Card	Nano-SIM iPhone 5 is not compatible with existing micro-SIM cards.
Weight and Dimensions¹	Height: 4.87 inches (123.8 mm) Width: 2.31 inches (58.6 mm) Depth: 0.30 inch (7.6 mm) 3.95 ounces (112 grams)
Display	4-inch (diagonal) Retina display 1136-by-640 resolution 326 ppi
Cellular and Wireless	UMTS/HSPA+ DC-HSDPA CDMA model: CDMA EV-DO Rev. A and Rev. B LTE3 2.4GHz and 5GHz) Wi-Fi (802.11a/b/g/n; 802.11n on Bluetooth 4.0 GPS and GLONASS
iSight Camera	8 megapixel; Autofocus; Tap to focus; LED flash; Backside illumination sensor; Five-element lens; Face detection; Hybrid IR filter <i>f</i> /2.4 aperture; Panorama
FaceTime Camera	1.2MP photos ; 720p HD video; Backside illumination sensor
Intelligent Assistant 4	Siri; Use your voice to send messages, set reminders, and more.
Video Calling⁵	FaceTime iPhone 5 to any FaceTime-enabled device over Wi-Fi or cellular
Video Recording	10 80p HD video recording; 30 fps; Tap to focus while recording; LED light; Improved video stabilization; Take still photos while recording video; Face detection
Headphones	Apple EarPods with Remote and Mic; Storage and travel case

Speaking

Advertise **one outstanding gadget that appeared recently**. What are its characteristics? How is it different from its counterparts? What benefits will it bring to its potential owner?

Theme 6. MICROPROCESSOR CONCEPTS

Reading, Vocabulary and Listening: processors, microprocessors, multicore designs

Speaking and Writing: describing a structure of a processor, translating from Russian into English

Recommended Grammar: Present Simple and Past Simple Passive

Lead-in

- What is the main function of a microprocessor?
- What unit of frequency is used to measure processor speed?
- What do you know about Moore's Law?

Reading and Vocabulary

Task 1. a. You are going to read the text about a microprocessor. Make sure you know these words and phrases

<u>calculate</u> (v), <u>calculation</u> (n)	ROM	<u>workstation</u>
<u>configure</u> (v), <u>configuration</u> (n)	RAM <u>controller</u>	<u>perform</u> (v), <u>performance</u> (n)
<u>integrated circuit</u>	<u>transistor</u>	<u>handle</u> (v)
<u>render</u> (v), <u>rendering</u> (n)	CPU	<u>benefit</u> (v, n)
<u>reside</u> (v)	GPU	electronic chip
<u>input</u> (v, n, adj)	<u>enable</u> (v)	high-end
<u>output</u> (v, n, adj)	<u>silicon</u>	binary numeral system
dual-core processor	<u>graphics</u>	<u>motherboard</u>
quad-core processor	video card	<u>multiple</u>
<u>process</u> (v), <u>processing</u> (n)	cache	

b. Compare the following pairs of terms:

- CPU and GPU
- dual-core processor and quad-core processor
- motherboard and video card
- cache and RAM

Task 2. Read the text about different types of microprocessors and say what operations they can perform.

MICROPROCESSOR

A processor, or "**microprocessor**," is a small chip that resides in computers and other electronic devices. Its basic job is to receive input and provide the appropriate output. While this may seem like a simple task, modern processors can handle trillions of calculations per second. Microprocessors operate on numbers and symbols represented in the binary numeral system.

The central processor of a computer is also known as the CPU, or "central processing unit". This processor handles all the basic system instructions, such as

processing mouse and keyboard input and running applications. Most desktop computers contain a CPU developed by either Intel or AMD, both of which use the x86 processor architecture. Mobile devices, such as laptops and tablets may use Intel and AMD CPUs, but can also use specific mobile processors developed by companies like ARM or Apple.

Modern CPUs often include multiple processing cores, which work together to process instructions. While these "cores" are contained in one physical unit, they are actually individual processors. In fact, if you view your computer's performance with a system monitoring utility like **Windows Task Manager** (Windows) or **Activity Monitor** (Mac OS X), you will see separate graphs for each processor. Processors that include two cores are called dual-core processors, while those with four cores are called quad-core processors. Some high-end workstations contain multiple CPUs with multiple cores, allowing a single machine to have eight, twelve, or even more processing cores.

Besides the central processing unit, most desktop and laptop computers also include a GPU. This processor is specifically designed for rendering graphics that are output on a monitor. Desktop computers often have a video card that contains the GPU, while mobile devices usually contain a graphics chip that is integrated into the motherboard. By using separate processors for system and graphics processing, computers are able to handle graphic-intensive applications more efficiently.

A **dual-core processor** is a CPU with two processors or "execution cores" in the same integrated circuit. Each processor has its own cache and controller, which enables it to function as efficiently as a single processor. However, because the two processors are linked together, they can perform operations up to twice as fast as a single processor can.



The Intel Core Duo, the AMD X2, and the dual-core PowerPC G5 are all examples of CPUs that use dual-core technologies. These CPUs each combine two processor cores on a single silicon chip. This is different than a "dual processor" configuration, in which two physically separate CPUs work together. However, some high-end machines, such as the PowerPC G5 Quad, use two separate dual-core processors together, providing up to four times the performance of a single processor.

While a dual-core system has twice the processing power of a single-processor machine, it does not always perform twice as fast. This is because the software running on the machine may not be able to take full advantage of both processors. Some operating systems and programs are optimized for multiprocessing, while others are not. Though programs that have been optimized for multiple processors will run especially fast on dual-core systems, most programs will see at least some benefit from multiple processors as well.

Since the early 1970s, the increase in capacity of microprocessors has followed Moore's law; this originally suggested that the number of transistors that can be fitted onto a chip doubles in one and a half year but present technology doubles every two years, though Moore later refined the period to two years.

Task 3. Answer the questions based on the text.

1. What is a processor?
2. What is the role of the processor in a computer?
3. How many calculations can modern processors handle?
4. What do microprocessors operate on?
5. What handles all the basic instructions, such as processing, mouse and keyboard input and running applications?
6. What are computer instructions processed by?
7. What do most desktop and laptop computers include besides the central processing unit?
8. What is a GPU designed for?
9. What is the advantage of dual-core over single processors?
10. What does Moore's law suggest?

Task 4. Spot 8 inaccuracies in the expression of the information from the text.

1. The central processor of a computer is also known as GPU.
2. Since the early 1990s, the increase in capacity of miniprocessors has followed Cant's law.
3. Processors that include two cores are called triple processors, while those with four cores are called quad-core processors.
4. Modern CPUs include scarce processing cores which work together to process instructions.
5. A GPU is specifically designed for rendering photos that are output on a computer.
6. Some high-end workstations contain multiple CPUs with multiple cores, allowing a single machine to have eight, twelve, or even more processing instructions.

Task 5. Match the beginnings of the sentences with their endings.

- | | |
|---|---|
| 1. Microprocessors operate on numbers and symbols | a. are called dual-core processors. |
| 2. The central processor of a computer | b. which enables it to function as efficiently as a single processor. |
| 3. Most desktop computers contain a CPU | c. resides in computers and other electronic devices. |
| 4. A processor is a small chip that | d. most desktop and laptop computers also include a GPU. |
| 5. Some operating systems and programs are | e. represented in the binary numeral system. |
| 6. Processors that include two cores | f. developed by either Intel or AMD. |
| 7. Besides the central processing unit, | g. is also known as the CPU. |
| 8. Each processor has its own cache and controller, | h. optimized for multiprocessing, while others are not. |

Task 6. Find 10 words connected with microprocessors. The words appear vertically, horizontally, and diagonally.

C	O	N	T	R	O	L	L	E	R
B	I	N	P	U	T	D	I	R	Y
B	U	C	A	C	H	E	O	L	C
I	H	B	J	A	F	S	U	M	I
N	A	N	O	G	S	R	T	A	R
A	E	D	X	E	C	L	P	I	C
R	A	K	C	T	P	M	U	V	U
Y	H	O	A	H	U	Z	T	O	I
S	R	A	P	K	I	U	Y	F	T
P	C	I	L	L	A	P	T	O	P

Task 7. Match the following words with their definitions. Then translate them into Russian.

- | | |
|-------------------------|--|
| 1. microprocessor | a. a portable computer small enough to use in your lap |
| 2. output | b. the information which is presented to the computer |
| 3. motherboard | c. to control; to manage |
| 4. laptop | d. the entire CPU of a computer on a single integrated circuit |
| 5. controller | e. the result of calculating |
| 6. to handle | f. results produced by a computer |
| 7. input | g. the main circuit board for a computer |
| 8. calculation | h. a mechanism that controls or regulates the operation of a machine |
| 9. binary number system | i. a small piece of silicon that has a set of complicated electrical connections on it and is used to store and process information in computers |
| 10. chip | j. a method of representing numbers in which only the digits 0 and 1 are used. |

Task 8. Find five pairs of antonyms, and five pairs of synonyms.

input, monitor, to enable, low-end, multiple, cache, output, video display, quad-core, controller, device, chip, scarce, mainboard, to exclude, regulator, IC, video card, to disable, to develop, high-end, graphics card, to include, multiple, complicated, motherboard, CPU

Specialized Reading

Task 9. Read the following words and expressions, check their meaning and mark the stress.

improve (v)	core (n)	embedded system
prevalent (adj)	chairman (n)	multi-core processor
workstation	announce (n)	signal processing
utilize (v)	obstacle (n)	bus interface
manufacturer (n)	enterprise (n)	facility (n)
integrate (v)	heterogeneous (adj)	shrink (v)
upgrade (v, n)	transition (n)	release (v, n)
microcontroller (n)	execute (v)	implementation (n)
performance (n)	thread (n)	cache
semiconductor (n)		

Task 10. Read and translate the text.

MULTICORE DESIGNS

A different approach to improving a computer's performance is to add extra processors, as in symmetric multiprocessing designs, which have been popular in servers and workstations since the early 1990s. Keeping up with Moore's Law is becoming increasingly challenging as chip-making technologies approach their physical limits. In response, microprocessor manufacturers look for other ways to improve performance in order to hold on to the momentum of constant upgrades in the market.

A multi-core processor is simply a single chip containing more than one microprocessor core. This effectively multiplies the processor's potential performance by the number of cores (as long as the operating system and software is designed to take advantage of more than one processor core). Some components, such as bus interface and cache, may be shared between cores. Because the cores are physically very close to each other, they can communicate with each other much faster than separate processors in a multiprocessor system, which improves overall system performance.

In 2005, the first personal computer dual-core processors were announced. As of 2012, dual-core and quad-core processors are widely used in home PCs and laptops while quad, six, eight, ten, twelve, and sixteen-core processors are common in the professional and enterprise markets with workstations and servers.

The desktop market has been in a transition towards quad core CPUs since Intel's Core 2 Quads were released and now are quite common although dual core CPUs are still more prevalent. This is largely because of people using older or mobile computers, both of which have a much lower chance of having more than two cores than newer desktops and because of how most computer users are not heavy users. AMD offers CPUs with more cores for a given amount of money than similarly priced Intel CPUs but the AMD cores are somewhat slower than Intel cores so the two will trade blows in different applications depending on how well threaded the programs being used are.

Historically AMD and Intel have switched places as the companies with the fastest CPU several times. Intel is currently winning on the desktop side of the

computer CPU market with their Sandy Bridge and upcoming Ivy Bridge series. In servers AMD's new Opterons seem to have superior performance for their price points. This means that AMD is currently more competitive in low to mid end servers and workstations where more cores and threads are more effectively utilized since professional software often uses more, if not all available threads.

A microprocessor is a general purpose system. Several specialized processing devices have followed from the technology. Microcontrollers integrate a microprocessor with peripheral devices for control of embedded system. A digital signal processor (DSP) is specialized for signal processing. Graphics processing units may have no, limited, or general programming facilities.

At a developer's conference hosted by Intel in September 2007, Intel chairman emeritus of the board, Gordon Moore, commented: "We all know there are physical limits to Moore's Law. And Moore's Law will begin to run into these fundamental limitations in another ten to 15 years, I think." This can be interpreted to mean that he expects semiconductor rules to continue to shrink for about another decade. But what types of internal architecture are needed to get past the obstacles to multicoring even as geometry continues to shrink? One answer seems to be to mix several types of core, creating heterogeneous architectures. Floating-point operations, signal processing and other tasks that CPU cores are ill-suited to are instead executed by other cores on the same chip, which can be programmed separately. It appears that the most common implementation for microprocessors in the future will be multiple types of core, with multiple chips for each.

Switching to SoC

Microprocessor manufacturers facing demand for reduced dissipation have managed to evade the issue by multicoring, mounting multiple CPU cores of the same type. The benefits of merely adding more cores, however, begin to drop off rapidly in client systems, and as a result engineers are recognizing the advantages of architectures featuring multiple cores of multiple types. Overall chip performance is being raised by allocating processing tasks to processors designed for them, such as by integrating graphic processing units (GPU). The trend is toward a system-on-chip (SoC) implementation, with the microprocessor incorporating a variety of peripheral circuits.

Task 11. Answer the questions to the text.

1. How can a computer's performance be improved?
2. Why do microprocessor manufacturers look for other ways to improve a computer's performance?
3. What is the advantage of a multi-core processor over a microprocessor?
4. Which processors are more widely used in home PCs: dual-core or from 6 to 16-core processors?
5. By what are floating-point operations, signal processing and other tasks executed in a CPU?
6. What is the job of microcontrollers in a microprocessor?
7. What can you say about a digital signal processor (DSP)?

8. What can you say about the implementation for microprocessors in the future according to the information of the text?

Task 12. *Say whether the statements are true (T) or false (F). Correct the false ones.*

1. Microprocessor manufacturers coped with the demand for reduced dissipation by multicoring, mounting multiple CPU cores of the same type.
2. Symmetric multiprocessing designs have been popular in servers and workstations since the early 1990s.
3. In 2010, the first personal computer dual-core processors were announced.
4. Quad 6-16-core processors are common in home PCs.
5. The desktop market has been in a transition towards quad-core CPUs since Intel's Core 2 Quads were released.
6. New Opterons seem to have superior performance for their price points which means that AMD is currently less competitive in low to mid end servers and workstations where more cores and threads are more effectively utilized.
7. A multi-core processor is simply a single chip containing one microprocessor core.
8. Graphics processing units may have no, limited, or general programming facilities.
9. Keeping up with Moore's Law is becoming increasingly challenging as chip-making technologies approach their physical limits.
10. Dual core CPUs are still more prevalent, because people use older or mobile computers, both of which have a much lower chance of having more than two cores than newer desktops.

Task 13. *Match the abbreviations and their full forms. Translate them into Russian.*

1. PC	a. Graphic Processing Unit
2. CPU	b. System-on-Chip
3. AMD	c. Digital Signal Processor
4. DSP	d. Personal Computer
5. GPU	e. Central Processing Unit
6. SoC	f. Advanced Micro Devices

Task 14. *Match the Russian words with their English definitions.*

- | | |
|-------------------------|--|
| 1. микроконтроллер | a. a computer of a size designed to be used on a desk or table |
| 2. модернизировать | b. a device that is outside the computer's system unit |
| 3. кэш-память | c. integrated circuit semiconductor chip that performs the bulk of the processing and controls the parts of a system |
| 4. встраиваемая система | d. someone who manufactures something |
| 5. производитель | e. a microcomputer on a single chip, used to control some device |

- | | |
|-----------------------|---|
| 6. внешнее устройство | f. to raise to a higher grade or standard |
| 7. настольный ПК | g. a fast storage buffer in the central processing unit of a computer |
| 8. микропроцессор | h. a special-purpose computer system designed to perform one or a few dedicated functions, often with real-time computing constraints |

Task 15. Find the words in the text with the opposite meaning.

1. deteriorate
2. decline
3. disadvantage
4. inferior
5. hold
6. homogeneous
7. public

Task 16. Fill in the gaps. Use the words from the box.

dual-core CPU	chip	processing	bus interface
	performance	microprocessor	

1. In servers AMD's new Opterons seem to have superior _____ for their price points.
2. A _____ is a general purpose system.
3. In 2005, the first personal computer _____ processors were announced.
4. Historically AMD and Intel have switched places as the companies with the fastest _____ several times.
5. A digital signal processor is specialized for signal _____.
6. A multi-core processor is simply a single _____ containing more than one microprocessor core.
7. Some components, such as _____ and cache, may be shared between cores.

Task 17. Put the words into the correct order to make sentences.

1. components, may, shared, Some, software, be, between, cores.
2. cores, very, to, close, The, physically, are, each other.
3. digital, processor, A, for, specialized, signal, is, signal processing.
4. technologies, their, physical, Chip-making, approach, limits.
5. is, general, A, purpose, microprocessor, a, system.
6. integrate, with, a, Microcontrollers, peripheral, microprocessor, devices.
7. is, to make, advantage, Software, more, of, one, than, designed, processor, core.
8. specialized, devices, followed, from, Several, processing, have, the technology.
- 9.

Recommended function

Read

Function 12 "HOW TO define a thing and explain its use and structure"
and tell about main parts of a microprocessor.

Listening

You will hear some information about **Microprocessors**.

Task 18. *Before listening check you know these words and stress them correctly.*

microchip, install, precise, algebra, scientist, transistor, replace, microprocessor, substrate, flux, sticky, integrated circuit, infrared, microscope, dissipate, conduct, vibrate, chemical

Task 19. *Answer the following questions.*

1. What is called a brain inside a computer?
2. When did the scientists build the first computer and what was its function?
3. Why is the creation of computers in 1971 defined as the biggest breakthrough?
4. What is a substrate and with what is it covered?
5. What instrument helps to verify the position of a chip?
6. Does tin conduct electricity?
7. What are tiny cylindrical pieces of tin called?
8. What is used to vibrate the columns until they fall through the holes?

Task 20. *Choose the correct variant to fill the gaps.*

1. A robotic arm picks up _____ caps at a time.
a. 2 b. 4 c. 6
2. The first general computer _____ was the size of 20 refrigerators.
a. in 1946 b. in 1956 c. in 1966
3. A giant suctioning _____ vibrates the columns.
a. seeding-machine b. net c. sieve
4. They place a microchip on each substrate and _____ light guides the machine to place the chip in precisely the right spot.
a. laser b. infrared c. ultra-violet
5. A machine spreads a thick _____, then attaches the vertical columns in it from underneath.
a. adhesive paste b. layer of salt c. varnish
6. The microchips with the positioned caps go into an assorting oven at _____ degrees Celsius for about an hour.
a. 250 b. 150 c. 100
7. During _____ transistors replaced bulky vacuum tubes.
a. the 1960s b. the 1970s c. the 1950s
8. All the microprocessor components are on one _____ chip.
a. miniscale b. maxiscale c. medium scale

Task 21. *Listen to the text again and make the sentences complete.*

1. These lines are made up vertically so they can be attached to the _____.
2. The factory receives the microchips _____.
3. This will hold the microchip in place until it is _____.
4. Flux is a chemical that makes a substrate surface _____.

5. They start with a ceramic square called _____.
6. A robotic arm positions a chip carrying a substrate onto the pasted _____.
7. The finished microchip goes into a bath of _____.
8. At another factory the microprocessor unit is sorted on the electronic card which then goes into _____.

Task 22. Decode one of the 3 parts of the text you listened to.

Part 1 – 00.26 “Scientists built the first ...” – 00.43 “... replaced transistors.”

Part 2 - 02.10 “Next stop ...” – 02.53 “... over the microchips.”

Part 3 – 04.03 “A robotic arm positions ...” – 04.37 “... the substrate.”

Task 23. Write the words from the listening comprehension text to the following transcriptions.

1. /ɔpə'reɪʃ(ə)n/		8. /ə'lʌmɪnəm/	
2. /'delɪkət/		9. /'dʒenəreɪt/	
3. /kəm'pəʊnənt/		10. /'ɪlek'trɪsɪti/	
4. /'sə:fɪs/		11. /kə'nekʃ(ə)n/	
5. /'kemɪk(ə)l/		12. /flʌks/	
6. /'sə:kɪt/		13. /hi:t/	
7. /spɒt/		14. /ɪn'stə:l/	

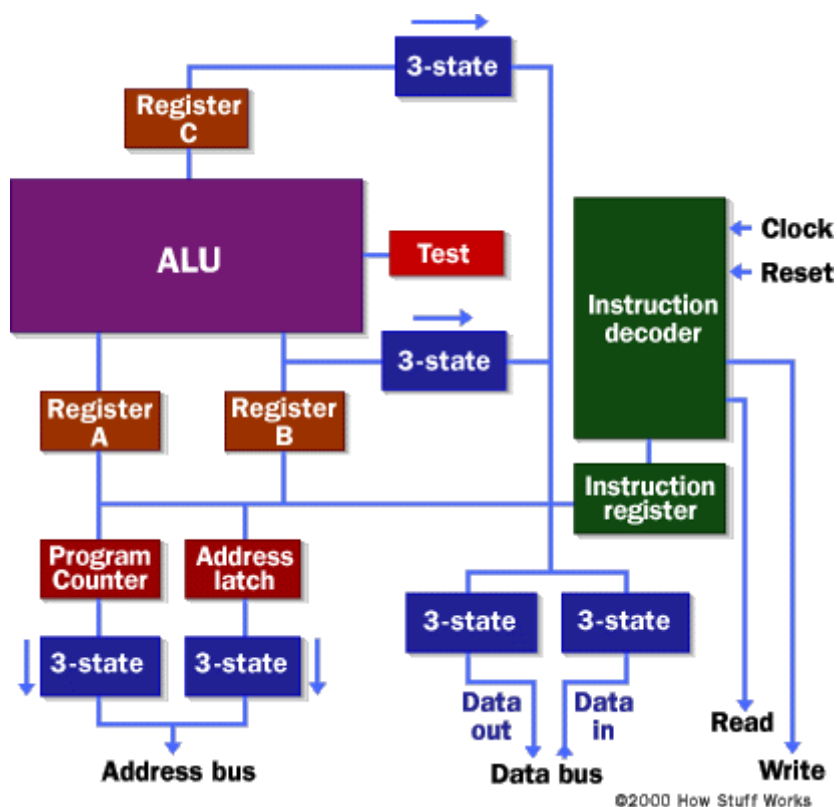
Speaking

You are to deliver a talk on the theme “*Microprocessor*”. The listeners are not much good at the subject. Make your speech most understandable for them using the simplest language. Mention the following items.

- A chip is a small sliver of silicon.
- The appearance of the microchip in the 1970s is an inevitable scientific advance.
- The work of the central processing unit (CPU).
- The division of the processors according to the number of the cores.
- Cache and controller as parts of each processor.

Use the following chart in your talk. You can read

Function 13 “HOW TO comment a visual aid”.



Recommended function and Writing

Read

Function 9 “HOW TO make a simple translation from Russian into English”.

Translate the following text into English

Микропроцессор характеризуется:

1. тактовой частотой, определяющей максимальное время выполнения переключения элементов в ЭВМ;
2. разрядностью, т.е. максимальным числом одновременно обрабатываемых двоичных разрядов.

Разрядность МП обозначается $m/n/k$ и включает:

- m - разрядность внутренних регистров, определяет принадлежность к тому или иному классу процессоров;
- n - разрядность шины данных, определяет скорость передачи информации;

k - разрядность шины адреса, определяет размер адресного пространства.

Например, МП i8088 характеризуется значениями $m/n/k=16/8/20$;

3. архитектурой. Понятие архитектуры микропроцессора включает в себя систему команд и способы адресации, возможность совмещения выполнения команд во времени, наличие дополнительных устройств в составе микропроцессора, принципы и режимы его работы. Выделяют понятия микроархитектуры и макроархитектуры.

Микроархитектура микропроцессора - это аппаратная организация и логическая структура микропроцессора, регистры, управляющие схемы,

арифметико-логические устройства, запоминающие устройства и связывающие их информационные магистрали. Макроархитектура - это система команд, типы обрабатываемых данных, режимы адресации и принципы работы микропроцессора.

В общем случае под архитектурой ЭВМ понимается абстрактное представление машины в терминах основных функциональных модулей, языка ЭВМ, структуры данных.

Theme 7. ROBOTS

Reading, Vocabulary and Listening: the history of robots, their types
Speaking and Writing: different robots, their use and operation
Recommended Grammar: Present Simple and Past Simple Passive

Lead-in

- When was it the first time that you have learnt any information about robots (in a film, in a book, on TV)?
- Can you give examples of any robot in your life?
- What exactly do robotics engineers do?

Reading and Vocabulary

Task 1. You are going to read the text about robots. Check if you understand the following words and expressions.

coin (v, n)	labour (n)	advance (v, n)
challenge (v, n)	autonomous (adj)	march into (v)
drudgery (n)	hazardous (adj)	resist (v), resistant (adj)
humanoid (n)	vehicle (n)	robotic butler
operate (v), operation (n)	desert racer	robonaut
explore (v), exploration (n)	shipwreck	artificial intelligence
slave (n)	spy plane	rover (n)
household (adj)	brainless (adj)	smart (adj)
entertain (v), entertainment (n)	unmanned (adj)	probe (n)
industry (n), industrial (adj)	monitor (v)	patrol (v, n)

Task 2. Read the text about robots and comment on their role in human life.

ROBOTS

Ever since the Czech writer Karel Capek first coined the term "robot" in 1921, there has been an expectation that robots would someday deliver us from the drudgery of hard work. The word - from the Czech "robota", for hard labour and servitude - described intelligent machines used as slaves in his play R.U.R. (Rossum's Universal Robots).

Today, over one million household robots, and a further 1.1 million industrial robots, are operating worldwide. Robots are used to perform tasks that require great levels of precision or are simply repetitive and boring. Many also do jobs that are hazardous to people, such as exploring shipwrecks, helping out after disasters, studying other planets and defusing bombs or mines. Robots are increasingly marching into our lives. In the future, robots will act as carers, medics, companions, entertainers, security guards, traffic police and even soldiers.



Domestic invasion

Despite the longevity of the robot concept, robotic butlers that roam our homes and relieve us from housework still seemed far from reality until very recently. Instead, the vast majority of robots worked in factories performing the industrial functions of brainless machines.

However, a combination of increased computing power and advances made in the field of artificial intelligence, or AI, have now made software smart enough to make robots considerably more useful. A recent report published by the United Nations revealed that sales of domestic robots had tripled in a single year. What's more, they were well on their way to outstripping their industrial cousins.

While a large portion of the household robots were made up of robotic vacuum cleaners, mops, lawn mowers, pool cleaners, security bots and even robotic baby-rockers - the real boom was in entertainment robots. Suddenly people were happy to pay for robots that had no specific functional value. Instead these bots, such as Sony's Aibo robotic dog and its robo-pups served as robo-pets and companions, rather than slaves. This is partly because many domestic chores still pose a real challenge for robots, in terms of dexterity and intelligence, even with seemingly simple chores such as ironing.

Movers and shakers

Away from the domestic front, the modern bot can take many other forms. Some are even designed to change their form, such as shape-shifting tetrabots or self-cloning robots. And while we often think of robots being humanoid, such as Honda's Asimo and Sony's Qrio, there is as much interest, if not more, in emulating other creatures like insects, lobsters, alligators, snakes and fish. A robot guard dragon has even been created.

Whether they have two legs, many legs, or no legs at all, considerable advances have been made in robot locomotion, including bipedal walking, rambling, crawling, rock-climbing, slithering and swimming.

There are also wheeled bots that work as autonomous vehicles, such as the desert racers that compete in the DARPA Grand Challenge to be the fastest to cross a desert without any human control.

Robot wars

One area where even more advances in autonomy have been made is the development of unmanned aerial vehicles, or UAVs. These are essentially remotely-controlled spy planes that are capable of flying themselves if they lose contact with their pilot. These planes can also be used to monitor forest fires. Some robots have even learnt to fly of their own accord.

The Pentagon has started arming some UAVs, making them capable of responding with firepower against aggressive attacks - so-called unmanned combat vehicles, or UCVs. Robots that act as battlefield spies have also been designed. Also aiming to remove humans from dangerous situations are space agencies, such as NASA (National Aeronautic and Space Administration), who have developed many space exploration robots. For example, the robonaut is a remotely-operated robot, designed to perform dangerous space walks in the place of an astronaut.

In addition, NASA has already sent robotic rovers to Mars, developed robotic dirt scoopers, "flying eyes" and probes for interplanetary exploration and even sent droids off to try to explore asteroids. Space probes such as Huygens (which landed on Titan) and Russia's Venera 9 (which landed on Venus) are sometimes considered robots too.

And it's not just other planets that robots are good for exploring. Robotic submarines, also known as remotely operated vehicles, or ROVs, have now become important way of exploring the deep ocean or ice-capped waters, while heat resistant robots are now used to patrol and monitor the activity in volcanoes. A robotic rover has even been used to explore Egyptian pyramids.

Task 3. Read the following sentences and decide if they are True or False.

1. Many robots do jobs that are dangerous to people such as exploring shipwreck.
2. In the future robots will act as security guards, traffic police and even soldiers.
3. A combination of increased computing power and advances made in the field of artificial intelligence are an obstacle in the creation of useful robots.
4. According to the recent report published by the United Nations, the sales of domestic robots had doubled in a single year.
5. First robots were described as intelligent machines used as slaves in the play by Karel Capek "Rossum's Universal Robots."
6. The Pentagon has started arming some UAVs making them capable of responding with water against aggressive attacks.
7. The vast majority of robots worked in factories performing the industrial functions of brainless machines.
8. ROVs are remotely operated vintages.
9. Cold resistant robots are now used to patrol and monitor the activity in volcanoes.
10. NASA has already developed robotic dirt scoopers for interplanetary exploration.

Task 4. Choose the best answer (A, B or C) to the following questions.

1. What kind of robots have produced real boom of late?

a. household	b. space	c. entertainment
--------------	----------	------------------
2. What do entertainment robots serve as?

a. slaves	b. companions	c. cleaners
-----------	---------------	-------------
3. What kind of tasks are robots used to perform?

a. repetitive	b. impressive	c. constructive
---------------	---------------	-----------------
4. What are wheeled bots the fastest to cross?

a. a swamp	b. a mountain	c. a desert
------------	---------------	-------------
5. Which of the following is not used in the text as a characteristic feature of robots?

a. heat resistant	b. remotely-operated	c. motor-driven
-------------------	----------------------	-----------------
6. How many household robots are operating worldwide today?

a. over 5 million	b. over 1 million	c. over 2 million
-------------------	-------------------	-------------------
7. Which of the kitchen utensils are not mentioned in the text?

a. vacuum-cleaners	b. ovens	c. mops
--------------------	----------	---------
8. To which planet have robotic rovers been sent already by NASA?

a. Mars	b. Jupiter	c. Venus
---------	------------	----------

9. Which of the following wonders of the world has a robotic rover been used to explore?

a. *Niagara Falls*

b. *Pizza Tower*

c. *Egyptian pyramids*

10. What does the abbreviation UAV mean?

a. *universal artificial vehicle*

c. *unaccompanied combat vehicle*

b. *unmanned aerial vehicle*

Task 5. Match the words from the text with their synonyms.

1. household	a. progress
2. hazardous	b. to observe
3. to explore	c. work
4. to perform	d. amusement
5. labour	e. clever
6. advance	f. domestic
7. intelligent	g. to investigate
8. vehicle	h. dangerous
9. entertainment	i. to execute
10. to monitor	j. transport

Task 6. Replace the underlined words with the words from

1. What are your household duties?
2. We live in an age of rapid technological advance.
3. The price will include the labour and materials.
4. Each student's progress is closely monitored.
5. Are you the driver of this vehicle?
6. A computer can perform many tasks at once.
7. It was typical family entertainment.
8. It would be hazardous to invest so much.
9. These ideas will be explored in every detail in Chapter 7.
10. She was intelligent but suffered from a lack of ambition.

Task 7. Choose one word in each line that is semantically different from the rest.

Here is an example for you.

- | | | | |
|----------------|----------------|--------------|----------------|
| 1. dangerous | <u>gleeful</u> | risky | hazardous |
| 2. shipwreck | catastrophe | lobster | disaster |
| 3. rod | rover | scooper | probe |
| 4. form | compile | coin | flee |
| 5. vehicle | transport | spinach | carrier |
| 6. riot | advance | progress | success |
| 7. independent | profound | autonomous | self-governing |
| 8. operate | run | control | smack |
| 9. movement | locomotion | convergence | conveyance |
| 10. kernel | reason | intelligence | mind |

Specialized Reading

Task 8. a. Make sure you know these words.

military application, wire, advanced, conduct, environment, accurate, accuracy, inaccessible, utilize, endure, endurance, transplant, assemble, hazardous, palletize, monitor, package, space shuttle, goods, conceive, circuit board, laparoscopic surgery, automation, automated, sophisticated, dispensing job, humanoid, longevity, navigate, facility, dispense

b. Which of them are nouns, verbs and adjectives?

Task 9. Read and translate the text.

TYPES OF ROBOTS

Robots are used for a variety of purposes in today's society. Industrial robots have played critical roles in manufacturing plants since the 1980s and have been increasingly used in military and medical applications. Today's robots are known to be more efficient and accurate than human beings in conducting repetitive tasks that require a high degree of accuracy. Such tasks include assembling components, painting, and conducting very precise operations that humans cannot perform.

Given below are some of the types of robots that have been conceived by humans, many of which are already in active use.

Industrial Robots

Robots today are being utilized in a wide variety of industrial applications. Any job that involves repetitiveness, accuracy, endurance, speed, and reliability can be done much better by robots; which is why many industrial jobs that used to be done by humans are increasingly being done by robots. For example, for the past 30 years or so robots have progressively taken over the *fully automated production lines of the automobile industry*, wherein a chassis of a vehicle is transported along a conveyor belt and is welded, affixed, painted, and assembled by a succession of robot stations. Some of the other industrial jobs robots are performing are palletizing and packaging goods, dispensing jobs, laboratory applications, and robots that pick miniscule electronic components from trays or strips and accurately place them on printed circuit boards in the electronics industry.

Mobile Robots

Also known as Automated Guided Vehicles, or AGVs, mobile robots are used for transporting material over large building complexes, such as hospital grounds, container ports, and warehouses, using wires or markers placed in the floor, or lasers, or vision, to sense the environment they operate in. An advanced form of the AGV is the SGV, or the Self-Guided Vehicle, like PatrolBot Gofer, Tug, and Speci-Minder, which can be taught to autonomously navigate within a space, or do it by being given a map of the area. These robots can conduct non-repetitive tasks in complex environment, and have gained the label "intelligent robots" in recent years.

Robots Used in Agriculture

Although the idea of robots planting seeds, plowing fields, and gathering the harvest may seem straight out of a futuristic science fiction book, nevertheless there are several robots in the experimental stages of being used for agricultural purposes,

such as robots that can pick apples, prune grapevines, transplant seedlings, and so on. In fact, there already is a type of robot that shears sheep in Australia.

Telerobots

These robots are used in places that are hazardous to humans, or are inaccessible or far away. A human operator located at a distance from a telerobot controls its action, which was accomplished with the arm of the space shuttle. Some other examples of telerobots are *laparoscopic surgery* being done with the help of a telerobot, or doctors using remotely located robots to communicate with their patients, which enables them to treat patients anywhere in the world. This has the potential of patients in remote places of the world, without adequate medical facilities, being able to consult doctors across the world, or even in the next town, and the doctors in turn having the ability to monitor them.

Service Robots

The Japanese are in the forefront in these types of robots. Essentially, this category comprises any robot that is used outside an industrial facility, although they can be sub-divided into two main types of robots: one, robots used for professional jobs, and the second, robots used for personal use. Amongst the former type are the above mentioned robots used for military use, then there are robots that are used for underwater jobs, or robots used for cleaning hazardous waste, and the like.

Personal use robots

Personal use robots are becoming more and more popular, with increased sophistication in Artificial Intelligence and with them becoming increasingly affordable, and are being seen in areas like care giving, pet robots, house cleaning and entertainment. Although it is more expensive and difficult to make highly intelligent and sensitive machines, but service robots designed with minimal intelligence are already fairly common, such as the vacuum cleaning robots.

Another area where personal use robots are being introduced is in the care for the elderly. In countries where there are increasing numbers of the aged with comparatively fewer numbers of young people to provide them with care, due to low birth rate and increased longevity, such as is the case in Japan and a growing number of Western countries, robots are increasingly thought to be the answer. These robots are being designed to provide physical services such as carrying bedridden elderly people (or even the handicapped), or washing for them, and doing various other day-to-day tasks. And then there are robots being designed to provide mental services, such as offering the therapeutic effect of interacting with the often lonely elderly people.

Hence, the trend is towards developing more and more sophisticated humanoid types of robots, with human-like physical features and intellectual abilities.

Task 10. Answer the questions based on the text.

1. What is the characteristic of the jobs that can be done by robots in industry?
2. In what industry are robots most progressively used?
3. In the construction of what detail of a car or a plane are robots being especially utilized?

4. Into what operations are robots involved when a chassis is transported along a conveyor?
5. What are mobile robots used for?
6. What can you say about the use of robots in agriculture?
7. Is the use of telerobots in laparoscopic surgery possible?
8. What are other examples of the use of telerobots in medicine?
9. What nation is in the forefront of the use of service robots?
10. What kind of robots does the category of service robots comprise?

Task 11. *Look at the statements below. Decide if each statement is correct (A) or incorrect (B).*

1. Service robots can be sub-divided into 3 main types of robots.
2. Robots used for professional jobs can be utilized for military use, underwater jobs, cleaning hazardous waste.
3. Scientists fully gave up the idea of creating robots planting seeds, plowing fields, and gathering the harvest.
4. There is already a type of robot that shears sheep in Australia.
5. Some mobile robots can be taught to autonomously navigate within a space, or do it by being given a map of the area.
6. For the past 10 years or so robots have progressively taken over the fully automated production lines of the automobile industry.
7. People do not control telerobots in action.
8. Personal use robots are becoming increasingly affordable, and are being seen in areas like caregiving, house cleaning and entertainment.
9. In Japan the longevity is decreasing due to high birth rate.
10. The trend, today, is towards developing more and more sophisticated humanoid types of robots with human-like physical features and intellectual abilities.

Task 12. *In the text find the English equivalents to the words below.*

- | | |
|-----------------------|------------------------|
| 1. предприятие | 7. недоступный |
| 2. повторяемый | 8. телеробот |
| 3. эффективный | 9. первый план |
| 4. область применения | 10. включать |
| 5. сваривать | 11. уровень сложности |
| 6. вспахивать | 12. «электронный мозг» |

Task 13. *Match the verbs (1-10) with the nouns (A-J) and make up sentences of your own with each combination of the words.*

- | | |
|-----------------|---------------|
| 1. to assemble | a. fields |
| 2. to conduct | b. popular |
| 3. to package | c. sheep |
| 4. to transport | d. the label |
| 5. to gain | e. machines |
| 6. to plow | f. components |
| 7. to shear | g. operations |

8. to treat
9. to become
10. to make

- h. goods
- i. patients
- j. material

Task 14. Match the words with the opposite meaning.

- | | |
|------------------|--------------------|
| 1. accuracy | a. disassemble |
| 2. advanced | b. expiration |
| 3. hazardous | c. immovable |
| 4. repetitive | d. amateur |
| 5. assemble | e. inaccuracy |
| 6. inaccessible | f. retard |
| 7. professional | g. non-repetitive |
| 8. mobile | h. unsophisticated |
| 9. sophisticated | i. safe |
| 10. endurance | j. accessible |

Task 15. Make up questions to which the following statements will be the answers.

1. In manufacturing, medical and military industries.
2. Palletizing and packaging goods, dispensing jobs, laboratory applications.
3. Self-Guided Vehicle.
4. "Intelligent Robots."
5. Robots that can pick apples, prune grapevines, transplant seedlings.
6. In laparoscopic surgery.
7. Japan is.
8. Robots used for professional jobs, and robots used for personal use.
9. Vacuum cleaning robots.
10. In the care for the elderly.

Task 16. Translate the following sentences into Russian.

1. Most robots today are programmed to complete tasks on their own or via human direction.
2. Mobile robots are referred to as autonomous or self-gained vehicles and are taught to navigate the space they are required to work around or in.
3. Telerobots are also useful in nuclear power plants where they, instead of humans, can handle hazardous material or undertake operations potentially harmful for humans.
4. The Japanese were the first to invest heavily in the development and commercial deployment of service robots.
5. The creation of the amazing walking humanoid named Asimo gave the impetus for several others, such as the house-helping robot named Wakamaru, and Aibo, the robot dog.
6. Telerobots are also being increasingly used for military purposes, for instance the Unmanned Aerial Vehicle used for surveillance and also fire at targets.
7. Robots have progressively taken over many of the production line roles in the automobile industry than human operators previously dominated.

Listening

You are going to listen to a talk about the **Origin of Robots**.

Task 17. *Before listening to the text, match the words in the left column with their definitions in the right one.*

- | | |
|-----------------|---|
| 1. servitude | a. to produce again |
| 2. origin | b. productive work |
| 3. cognate | c. to oppose or refuse to accept something |
| 4. labour | d. the point at which something comes into existence or from which it derives |
| 5. conduct | e. the act, manner, or process of carrying on |
| 6. to inundate | f. the state of subjection to a master; slavery |
| 7. serfdom | g. related or analogous in nature, character, or function |
| 8. to reproduce | h. . the feudal system that includes serfs |
| 9. to revolt | i. the process of being extinct |
| 10. extinction | j. to fill or cover completely |

Task 18. *Listen to the talk and answer the questions.*

1. Who is invited to the studio and to what is the programme devoted?
2. How often do the talks take place?
3. How does Prof. Markel describe robots?
4. In what field of medicine do some scientists think to create robots as helping hands?
5. Who is the father of the brainchild called “robot”?
6. In what play was the word “robot” used for the first time?
7. What does the word “rabota” mean in Old Church Slavonic?
8. In what other languages does the word “rabota” have its cognates?
9. What does Flatow mean by asking “wasn’t Capek on Hitler’s most-wanted list?”
10. What idea is hidden in the words “...he frustrated Hitler.”
11. What information about Karel Capek and the origin of the word “robot” have you derived from the conversation?

Task 19. *Choose the correct variant and complete the following sentences.*

1. The programme of the talk is called _____.
a. *Science World* b. *Science Diction* c. *Science Today*
2. The programme is conducted on _____.
a. *Sunday* b. *Friday* c. *Saturday*
3. Prof. Markel is the director at the center _____.
a. *for history of biology* b. *for history of literature*
c. *for history of medicine*
4. According to the description of Prof. Markel robots are mechanical beings clad in _____.
a. *cotton* b. *wood* c. *metal*
5. The word “robot” is the brainchild of the novelist and playwright Karel Capek who lived in _____.
a. *Poland* b. *Hungary* c. *Czechoslovakia*

6. The title of the play “RUR” can be deciphered: _____.
a. Real Universal Rest b. Rats Use Ropes
c. Rossum’s Universal Robots
7. The word “robot” has _____.
a. a Latin origin b. a Greek origin c. a Slavonic origin
8. The play in which the word “robot” first appeared was titled _____.
a. RUR b. Louvre c. Tour
9. Karel Capek died of _____.
a. a war wound b. flue c. cholera
10. Capek did not name robots “labours” because _____.
a. the word “labour” sounded too bookish in his opinion
b. the word “labour” was a bit outdated
c. the word “labour” was a jargon word

Task 20. Listen to the text again and complete the following sentences.

- That means it’s time for our monthly, well, sort of _____, as we call it.
- When Capek named these _____, he first came up with the Latin word “labouri”, for “labour.”
- The word also has _____ in German, Russian, Polish and Czech.
- Well, it comes from an Old Church Slavonic word, _____, which means _____ of forced labour.
- They couldn’t have _____.
- And even some people think about _____ robots, which help in modern _____ or even the conduct of surgery.
- It was the _____ of a wonderful Czech _____, novelist and journalist named Karel Capek.

Task 21. Decode one of the 3 parts of the text.

Part 1 – 00.47 “Well, you know, we all think ...” – 01.21 “... Universal Robots.”

Part 2 - 02.20 “But he worried ...” – 03.02 “... killed in this play.”

Part 3 - 04.00 “And he was a very active ...” – 04.29 “... Thank you, Howard.”

Task 22. Write the words from the listening comprehension text to the following transcriptions.

1. /'rɒɪdʒɪn/		8. /'sə:vɪtʃu:d/	
2. /sʌɪən'tɪfɪk/		9. /'leɪbə/	
3. /mɪ'kæɪnɪk(ə)l/		10. /bʌɪətɛk'nɒlədʒi/	
4. /'sə:dʒ(ə)ri/		11. /fɪzɪ'nɒlədʒi/	
5. /endʒɪ'nɪəriŋ/		12. /'kri:tʃə/	
6. /'pleɪɹʌɪt/		13. /ɪk'stɪŋ(k)ʃ(ə)n/	
7. /'breɪntʃʌɪld/		14. /dɪ'mɒkrəsi/	

Recommended function and Speaking

Read

Function 3 “HOW TO deal with modal verbs”

and prepare a talk about *a robot* which you deal with in your studies or any robot you like. Include the following:

- describe a robot
- tell about its use
- tell about why it was made this way
- compare it with similar ones

Recommended function and Writing

Read

Function 5 “HOW TO talk about cause and effect”.

Write 10 sentences about different robotic devices and why they are used.

Theme 8. ROBOTICS TECHNOLOGIES

Lead in

Look at the picture. What type of robot is it? What do you know about technologies used in such robots?

Reading and Vocabulary

Task 1. a. Read and translate the following words and phrases from the text.

<u>advance</u> (v, n),	<u>track</u> (v, n)	<u>real-time navigation</u>
<u>advanced</u> (adj)	<u>overview</u> (n)	<u>walking system</u>
<u>flexible</u> (adj)	<u>navigation</u> (n)	<u>self-driving vehicle</u>
<u>flexibility</u> (n)	<u>localization</u> (n)	<u>augmented reality</u>
<u>robust</u> (adj)	<u>3D vision</u>	<u>complex algorithm</u>
<u>absorb</u> (v)	<u>mapping system</u>	<u>tendon-drive actuator</u>
<u>absorption</u> (n)	<u>autonomous robot</u>	<u>torque-controlled actuator</u>
<u>advance</u> (v, n),	<u>track</u> (v, n)	<u>real-time navigation</u>
<u>advanced</u> (adj)	<u>overview</u> (n)	<u>walking system</u>
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<u>robust</u> (adj)	<u>3D vision</u>	<u>complex algorithm</u>
<u>absorb</u> (v)	<u>mapping system</u>	<u>tendon-drive actuator</u>
<u>absorption</u> (n)	<u>autonomous robot</u>	<u>torque-controlled actuator</u>

b. Can you explain the technologies named in the box?

Task 2. Read the text and check your ideas about the picture.

Text 1

I. Humans have sensors and a memory to scan the environment and remember when they return to the same place. The human system for navigation can be replicated to robots using many electronics and programming lines.

Researchers from Bristol University have been working together with Samsung Electronics since 2009 and the result is an advanced humanoid robot Roboray with real-time navigation with 3D vision capabilities and a memory to remember places from where it has been before.

Its efficient movements are based on maps. These maps are built with 3D visual real-time systems developed in the labs of Bristol University. The system stores information with places to be used next time when the robot operates in the same place.

This new mapping system means a step closer to the next generation of autonomous robots that can operate in new places without any other information stored in his memory.

II. Navigation. Samsung Roboray has a flexible and more stable walking system with instability in relation to the ground.



Mapping in real-time for a human-like robot involve a higher complexity, compared with a self-driving vehicle, which shows a greater stability in relation to a fixed point while a robot has a less contact with the ground. Technology developed at Bristol University was used in robotics as well as augmented reality or commercial applications, a rapid 3D system that creates a map of environment while moving. A high definition camera and complex algorithms are key attributes of the advanced navigation system. SLAM (simultaneous localization and mapping) uses real-time technology for mapping based on Kalman filter with features including a robust localization in 6D and loop closing for relocalization.

III. Design. It has a height of 140 centimeters and weight 50 kilograms. Up to 53 actuators work intensively aiming to ensure a high flexibility in the movements. Each leg has six actuators while in each hand there are twelve actuators. All tendon-drive actuators are torque controlled

and can absorb impact for more natural walking and energy efficient behavior.

On its head there is a stereo camera that captures image from the environment. Since the robot has a human-like walking system that uses gravity and falling at every step, objects from the environment are found in constant motion from up to down and left to right. The computer vision algorithm has to track all these objects for a clear overview. Inside of his brain the robot maps the environment and navigates without traditional technology for navigation like GPS.

With an advanced design, movement systems, and no GPS system for navigation, Samsung Roboray can be used in research to understand how similar robots work with tools or in fields typically meant for people.

Task 3. Answer the questions to the text.

1. In what way is Roboray different from its analogues?
2. What sort of navigation is used in Roboray?
3. What are the robot's dimensions?
4. Where can this robot be used?
5. Do you what Kalman filter and localization in 6D are?

Task 4. Match the parts of phrases.

- | | |
|----------------------------------|----------------------|
| 1. simultaneous localization and | a. algorithm |
| 2. computer vision | b. behavior |
| 3. high definition | c. mapping |
| 4. energy efficient | d. navigation system |
| 5. human-like | e. capabilities |
| 6. advanced | f. walking system |
| 7. 3D vision | g. camera |

Task 5. Find the words similar to the following.

- | | |
|--------------------------------|---------------------------|
| 1. surroundings (part I) | 5. activity (part III) |
| 2. to function (part I) | 6. catch (part III) |
| 3. characteristics (part II) | 7. instruments (part III) |
| 4. position updating (part II) | |

Task 6. Think of some more examples of robots and technologies used in them. Use these phrases and tell about them:

- be based on
- in relation to
- be aimed at smth
- can be used in/to

Specialized reading

Task 7. Read the text and summarize the content of it in 3 sentences.

What is FlowBotics Studio?

FlowBotics Studio is a new robotics software development platform: it boasts the powerful FlowStone graphical programming language, and includes many demo robotics projects to get you started. It can be used to control just about any robotics platform, data acquisition board, motor controller, servo board, sound card, or webcam.

FlowBotics Studio includes hundreds of built-in components that allow you to interface your PC to many of the standard computer peripherals and, using the FlowStone programming language, you can quickly create new components for new hardware. 1. ...

Using the FlowStone programming language is as easy as dragging new components out of the library into the project's schematic, and making green links to connect one component's output of another one's input. FlowStone even has support for writing custom modules in Ruby, a traditional procedural language.

FlowBotics Studio Demo Projects

There is a growing collection of pre-made demo projects for use with your robotics hardware: the demos range from GUIs for simple interface card and sensor — 2. ... — to full-blown robotics control applications — 3. ... the project calculates the inverse kinematics and moves the robot immediately.

The projects also have a powerful pattern sequencer component that is used to build reusable patterns that allow you to program the gait of a walking robot within minutes or hours, instead of days or weeks.

Since the demo projects are open source, they can be modified to tailor a specific purpose or parts can be extracted for use in new projects, and the new demos will be available through FlowBotics updates.

Graphics in FlowStone

The FlowStone programming language includes a powerful graphics engine that allows you to make custom graphical objects by using standard bitmaps or by drawing your own shapes on the screen. 4. ...

Video in FlowStone

Using FlowStone, you can record and playback video from your webcam and, using some of the video processing modules, can do motion detection, colour detection and facial recognition. The graphics engine you can even display live video inside your project's GUI.

Audio in FlowStone

FlowStone also has a powerful audio engine that allows you to record and playback sounds, and even generate some of your own. You can import WAV and MP3 files and process the audio using signal processing modules like EQ: 5. ...

Interface to the outside world

FlowStone has a huge range of supported computer interfaces, from data acquisition boards, home automation, webcams, soundcards, networking, serial ports and USB devices. There are thousands of supported devices, including parts from Lynxmotion, Phidgets, Pololu, and Robot Electronics and also parts implementing standard Bluetooth, Xbee, Modbus, TCP/IP, UDP/IP, HID, RS232, RS485, CAN Bus, SPI, I2C, X10, DMX512, and other popular protocols.

Applications

Hobby Robotics

Use FlowBotics Studio to control your hobby robotics, using the pre-made demo projects for many of the Lynxmotion kits or build your own projects just for fun.

STEM Education

FlowBotics Studio is the perfect tool for education. 6. ... The rapid development capabilities of the software mean that you can achieve much more in a short lesson than you could with traditional programming tools.

Science: Use FlowBotics Studio to create applications for science experiments, test and measurement, data logging, graphs, saving files to disk and more.

Technology: FlowBotics Studio can be the heart of your design for things like home automation, A/V recording, video processing, audio processing, more.

Engineering: Use FlowBotics Studio to create mechatronic engineering systems including control systems, SCADA (supervisory control and data acquisition), human-machine interface, and autonomous robot systems.

Math: Use FlowBotics Studio to teach mathematics, from binary numbers and boolean algebra to trigonometry functions and graphs.

Data Acquisition

Want an easy way to capture data from the outside world? The FlowStone language has built in support for many popular data acquisition devices: for example, you can use a Phidgets Sensor Interface Kit 8/8/8 to sample analog and digital signals.

Robotics

The serial port communication in FlowStone allows you to connect to a wide range of low-cost robots. You can use Inverse Kinematics (IK) and Proportional Integral Derivative (PID) modules to manage movement and create impressive interactive user interfaces to control your robot live.

Digital Signal Processing

By connecting to external analog I/O devices, you can stream high data rate signals directly into FlowStone. The Stream data components and DSP code component can then be used to create complex signal processing, and all this happens in real time.

You can even tweak your algorithms and user interface live – while your data continues to stream. 7. ...

Image Processing

The FlowStone language has many video functions built in. You can easily connect to external webcams, record video to disk and perform complex tasks like motion, colour and face detection with ease.

Home Automation and Security

Using the X10 home automation system, you can create a completely customized home automation or alarm system.

Using passive infrared sensors, check for motion and trigger lights and cameras. Use FlowBoard and the GSM module to send SMS alerts back to you if key events occur. 8. ...

Industry

FlowStone is even used in industry for creating complex applications from test and measurement, SCADA, data logging, machine control and even UAVs.

Task 8. Insert these parts of the text in appropriate places.

1. ... you can even create your own synthesizer sounds using the built in oscillators and filters.
2. You can also easily create new projects with custom GUI screens, knobs, buttons, switches, etc. that will run live from within FlowBotics Studio without needing to wait for compilation.
3. It is simple enough that it can be used by children from secondary and high school, but also powerful enough to be used by university students for undergraduate and graduate studies.
4. ... that have visual representations of your robots that can be manipulated directly with the mouse:...
5. Switch on and off appliances or lighting.
6. ... that give you access to real-time analogue and digital signals...
7. Using this system, you can build entirely custom interfaces for your projects and integrate photographs, drawings, and graphs.
8. This makes the development process extremely quick as you see the effects straight away.

Task 9. Are the sentences true (T) or false (F)?

1. You can use FlowBotics Studio to control all robotics platforms and many more devices.
2. If you need to use your own switches or buttons, you have to compile them before using FlowBotics Studio.
3. You can find different demo projects even if you have very complicated robotics hardware.

4. All FlowBotics updates are free.
5. Using FlowStone programming language you can create your own interfaces with graphs or drawings.
6. You can import WAV or MP3 files but you can't process sounds.
7. FlowBotics Studio isn't powerful enough to be used in graduate studies.
8. Unfortunately, there are no features to control movements of robots.
9. In home automation this software is usually used in alarm systems.
10. The use of FlowBotics Studio in industry and engineering is very limited.

Task 10. Give Russian equivalents to the following terms from the text.

robotics platform, data acquisition, motor controller, servo board, custom GUI screen, procedural language, full-blown robotics control application, inverse kinematics, pattern sequencer component, powerful graphics engine, video processing module, home automation, mechatronic engineering system, Boolean algebra, proportional integral derivative, stream data component, DSP code component, alarm system

Task 11. Mark the stress in these words and translate them.

programming, component, dragging, schematic, analogue, manipulated, reusable pattern, updates, facial recognition, engine, synthesizer, oscillator, implementing, capability, measurement, mechatronic, phidget, sample, interactive, stream, customized, trigger, compilation

Task 12. Find the words in the text that are similar to these ones.

- | | |
|-----------------------|----------------------------|
| integrated (part I) | produce (part II) |
| user-written (part I) | accomplish (part III) |
| compute (part II) | self-controlled (part III) |
| walking (part II) | catch (part III) |
| change (part II) | transfer (part III) |
| adjust (part II) | tune (part III) |
| take out (part II) | turn on (part III) |
| add (part II) | take place (part III) |

Task 13. What do these acronyms stand for? Give their Russian equivalents.
 GUI, TCP/IP, UDP/IP, HID, RS232, CAN bus, DMX512, SCADA, DSP, UAV.

Task 14. Complete the table with appropriate words.

Noun	Verb	Adjective
1.	-	ease
vision	-	2.
3.	4.	modified
interaction	5.	6.
customer	7.	8.
		9.
impression	10.	11.

12.	move	-
13.	oscillate	-
14.		
15.	apply	applied

Task 15. Find the words in the text that match this phonemics.

1./'si:kw(ə)nsə/		10./'endʒɪn/	
2./ɔ:'tɒnəməs/		11./rekəg'nɪf(ə)n/	
3./'ækwɪ'zɪf(ə)n /		12./'sɜ:vəʊ/	
4./'sɪnθɪsaɪzə/		13./'ɒsɪleɪtə(r)/	
5./ɪn'vɜ:s/		14./pə'rɪf(ə)r(ə)l/	
6./bəʊst/		15./mekə'trɒnɪk/	
7./'trɪgə'nɒmɪtri/		16./prə'sɪ:dʒərəl/	
8./'kæptʃə/		17./'ælgərɪð(ə)m/	
9./ə'lɜ:t/		18./ə'plaiəns/	

Recommended function

Read

Functions 3 “HOW TO deal with modal verbs”

and write 10 sentences with modal words and phrases to tell about possibilities with FlowBotics Studio.

Listening

You are going to watch a video about **Computer Vision**.

Task 16. a. Read and translate the words.

research, location, brains, automation, obstacle, flexibility, resolution, dangerous, graphics, pattern, recognize, unmanned, downsampled, navigation, vision, triangulate, schematic, patrol, picture, aircraft, zip-code, vehicle, identify, representation, optical, number, broadside, mail, envelope, figure out

b. Which of them are nouns, verbs, adjectives?

Task 17. Watch the video and underline the words you hear.

Task 18. Answer the questions to the video.

1. Why is it important to improve computer vision technologies?
2. What is pattern recognition?
3. What is optical character recognition?
4. How are scientists developing computer vision?
5. How is this work realized in robots?
6. What is the ultimate goal for robots with a good computer vision system?

Task 19. Complete the phrases used in the video.

- | | |
|------------------------|----------------------------|
| 1. to patrol | a. character recognition |
| 2. unmanned | b. a zip-code |
| 3. to recognize things | c. vehicle |
| 4. to do optical | d. dangerous locations |
| 5. to extract out | e. image |
| 6. to identify | f. from an image |
| 7. high-resolution | g. domain |
| 8. low-resolution | h. the patterns and images |

Task 20. Complete this extract from the video with the following phrases.

- recognize the images, big step, get around,
human vision, stereo vision, identify obstacles

The team is also planning to put these programs in robots. So they will be able to 1. _____ while they do their jobs. This little guy has two eyes, just like a person, so he sees in 2. _____. “Stereo vision works like 3. _____ – the robot has two cameras, two eyes. It can use those two cameras to triangulate on objects to know how far they are. They robots will ultimately be able to 4. _____ in their path, be able to know what the obstacle is, where it is and how to 5. _____ it.” Teaching a machine to recognize images takes a lot of maths and a lot of hard work but it’s a 6. _____ towards making computers even smarter.

Task 21. Match the words from the video with this phonemics.

1./tæŋk/		7./'rekəgnaɪz/	
2./'brɔ:dsaid/		8./'eəkɾɑ:ft/	
3./'neɪvɪ /		9./,reɪzɪzen'teɪʃ(ə)n/	
4./'envələʊp/		10./'vi:ɪk(ə)l/	
5./ə'dres/		11./'pɪks(ə)l/	
6./traɪ'æŋgjʊləɪt /		12./'ɒbstək(ə)l/	

Task 22. Decode one of the parts of the video.

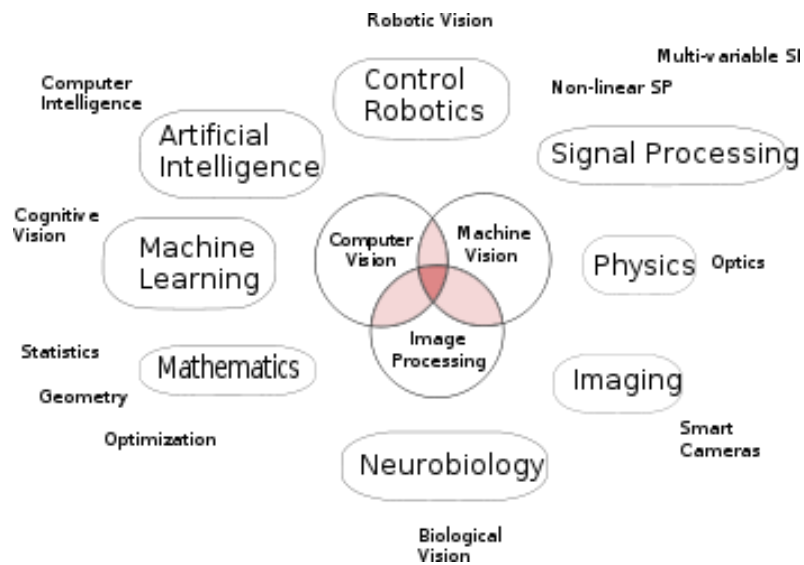
- Part 1 – 00.11 “This week LabTV travels to ...” – 00.56 “... just from an image.”
 Part 2 – 00.57 “Pattern recognition ... ” – 01.22 “... one goes there.”
 Part 3 – 01.23 “Computers are pretty good at ...” – 01.52 “...who that is.”
 Part 4 – 01.53 “That’s because ...” – 02.23 “... we were looking at.”
 Part 5 – 02.24 “The team is also ...” 02.53 “... less pixels.”

Recommended function and Speaking

Read

Function 13 “HOW TO comment on a visual aid”

and prepare a talk about **Computer Vision**. Use this diagram and some ideas given.



- What is it? What is it for?
- What areas are related to it?
- What are its specific parts?
- Where is it used?

Writing

Study

Function 7 “HOW TO deal with neologisms”

and write out all neologisms you have come across in your study and work.