Module 5
Lesson 2

New Computer Technologies

18. Answer the following questions.

1) How have computers changed since the first one was introduced in the early 1940?
2) What new developments in computer technology can change the way people live and work?
3) How often do people usually buy new gadgets and why?
4) What property of silicon chips bounds the spread of computers?

19. Learn the new words

Noun	Translation	Verb	Translation	Adjective	Translation
alternative [ɔːlˈtɜːnətɪv]	вариант, выбор	to accomplish [əˈkʌmplɪʃ]	Выполнять	ambitious [æmˈbɪʃəs]	честолюби-вый
application [ˌæplɪˈkeɪʃn]	применение	to convert [kənˈvɜːt]	превращать	competitive [kəmˈpetətɪv]	конкуренто-способный
approach [əˈprəʊtʃ]	подход	to deliver [dɪˈlɪvə]	доставлять	complex [ˈkɒmpleks]	сложный
capacity [kəˈpæsɪtɪ]	способность, мощность	to embed [ɪmˈbed]	встраивать, вставлять	conventional [kənˈvenʃənl]	традицион-ный
challenge [ˈtʃælɪndʒ]	сложная задача	to encode [ɪnˈkəʊd]	кодировать, шифровать	efficient [ɪˈfɪʃnt]	эффективный
chip [tʃɪp]	чип	to mean [miːn]	значить, означать	expensive [ɪkˈspensɪv]	дорогой
circuit [ˈsɜːkɪt]	схема	to modify [ˈmɒdɪfaɪ]	изменять, преобразовать	flexible [ˈfleksɪbl]	гибкий
component [kəmˈpəʊnənt]	составная часть	to overload [ˌəʊvəˈləʊd]	перегружать	interactive [ˌɪntəˈræktɪv]	диалоговый
computer [kəmˈpjuːtə]	компьютер	to persist [pəˈsɪst]	щставаться	nonvolatile [nɒnˈvɒlətaɪl]	энерго-независимый
emission [ɪˈmɪʃən]	выделение	to reach [riːtʃ]	достигать	ordinary [ˈɔːdnrɪ]	обычный
device [dɪˈvaɪs]	прибор, устройство	to reduce [rɪˈdjuːs]	уменьшать	short-term [ʃɔːt tɜːm]	кратковремен-ный
insulator [ˈɪnsjʊleɪtə]	изолятор, диэлектрик	to refresh [rɪˈfreʃ]	освежать	solid [ˈsɒlɪd]	твердый
research [rɪˈsɜːtʃ]	исследование	to retrieve [rɪˈtriːv]	извлекать	suitable [ˈsuːtəbl]	подходящий
semiconductor [ˌsemikənˈdʌktər]	полупроводник	to spread [spred]	распростра-нять	throwaway [ˈθrəʊəweɪ]	разового пользования
silicon [ˈsɪlɪkən]	кремний	to store [stɔː]	хранить	unique [juˈniːk]	особый, уникальный

storage [ˈstɔːrɪdʒ]	хранение	to surround [səˈraʊnd]	окружать	up-to-date [ˌʌptəˈdeɪt]	современный
technique [tekˈniːk]	методика, способ	to trust [trʌst]	доверять, верить,	wearable [ˈweərəbl]	пригодный для носки
transfer [trænsˈfɜː]	передача	to underpin [ˌʌndəˈpɪn]	поддерживать	virtual [ˈvɜːtjuəl]	виртуальный, фактический

20. Read the following text and discuss technical challenges of using plastic materials in up-to-date computer technology.

Forget silicon: Next-generation computers may boast plastic chips

Two recent developments—a plastic processor and printed memory—show that computing doesn't have to rely on inflexible **silicon**. **Silicon** may **underpin** the **computers** that **surround** us, but the rigid inflexibility of the **semiconductor means** it cannot **reach** everywhere. The first **computer** processor and memory **chips** made out of plastic **semiconductors** suggest that, someday, nowhere will be out of bounds for **computer** power.

Flexible plastic processor **chips** could replace **expensive silicon** in computing **devices**. The result could be **cheap**, almost **throwaway** electronics. U.S. researchers say a new **technique** that uses **flexible** plastic in place of **silicon chips** could lead to much cheaper cell phones, **computers** and other electronic **devices**. A major hurdle in the way of creating such plastic-based **devices** - the relatively high energy levels required to **retrieve stored** information - has been tackled by scientists at the University of Iowa, working with researchers at New York University. **Encoding** information using light that can be transmitted by **fiber optics**[1] is fairly easy and not costly, they say, but the truly **efficient storage** of information requires magnetism that allows data to **persist** for years requiring constant power input. A critical issue is how to **convert** information from one type to another. Although it does not cost a lot of energy to **convert** one to the other in **ordinary** silicon-chip-based **computers**, the energy cost is very high for **flexible** plastic computing **devices** that are hoped to be used for inexpensive **throwaway** information processors.

In 2011, European researchers reported developing the first **flexible** plastic **computer chip**, featuring 4,000 organic transistors layered onto a **flexible** piece of thin plastic. Those transistors were made by spinning the **plastic foil**[2] to **spread** a drop of organic liquid into a thin even layer. When the foil is heated gently, the liquid **converts** into solid **pentacene**[3], a commonly used organic **semiconductor**. The different layers were then etched using photolithography to make the final pattern for transistors. Compared to using **silicon**, this has the advantage of lower price and that it can be **flexible**.

In the future, such processors could be made more cheaply by printing the organic **components** like ink. The best lab-scale printing methods so far can only **deliver reliable** transistors in the tens of micrometers. Creating a processor made from plastic transistors was a **challenge**, because unlike those made from ordered **silicon** crystals, not everyone can be **trusted** to behave like any other.

Organic materials fundamentally limit the speed of operation. The lower cost of the organic materials used **compared to**[4] **conventional silicon** should make the plastic **approach** around 10 times cheaper. You can **imagine** an organic gas sensor **wrapped** around a **gas pipe**[5] to report on any **leaks** with a **flexible** microprocessor **to clean up**[6] the noisy signal. Plastic electronics could also allow **disposable** interactive displays to be built into **packaging**[7], for example, for food. You might press a button to add up the calories in the cookies you ate. But such **applications** will require more than just plastic processors.

Notes to the text

1) fiber optics – волоконная оптика;
2) plastic foil – полимерная пленка;
3) pentacene - пентацен (полициклический ароматический углеводород);
4) compared to – по сравнению с;
5) gas pipe – газовая труба;
6) to clean up – убирать;
7) packaging – упаковка (тара с упакованным в ней продуктом).

21. State whether the following are true, false or not given.

1) The development of a plastic processor and printed memory shows that computing have to rely on inflexible silicon.
2) The rigid inflexibility of the semiconductor means it cannot reach everywhere.
3) Flexible plastic processor chips could replace expensive silicon in computing devices.
4) The magnetic fields from the magnetic storage device directly modify the light emission from the device.
5) Creating a processor made from plastic transistors was not a challenge because everyone can be trusted to behave like any other.
6) Miniaturization could yield tiny devices operating with the same technique offering high data storage capacities.
7) The lower cost of the organic materials used compared to conventional silicon should make the plastic approach around 20 times cheaper.
8) Plastic electronics could also allow disposable interactive displays to be built into packaging, for example, for food.

22. Read more about modern computer technology based on plastic materials and express your opinion on its advantages and disadvantages.

New technology has display designers thinking outside the rectangle

The need for higher-quality designs for displays has been growing recently. Displays are not evolving merely in terms of their resolution and energy-saving functions; technologies are improving to change their shapes, such as making them edgeless, curved or **flexible**. From smartphones, **computers**, TV sets to car navigation systems, almost every **device's** display shape is rectangular. But this stereotype is likely to change soon, as display-makers work to come up with **unique** designs, such as circular, curved, ultrathin and **flexible**. Such displays are expected to be used more widely in auto interiors, for **wearable devices** and other internet-ready gadgets with the expansion of the Internet of things. **Flexible** LCDs can also be used to produce stylish **wearable devices**, such as those that can be wrapped around a wrist.

Using plastic for making displays offers extra advantages compared with existing glass-based LCDs. Plastic displays can be bent or folded and they won't crack. Laptops with flexible LCDs can be considerably lighter, making it easier for users to carry them around. Manufacturers are developing displays that can be attached to devices or **imbedded** in different home electronics or outdoor spaces. In the coming years, more home electronics, including refrigerators and audio **devices**, are expected to be connected to the Internet. It will mean that the products will need to be equipped with displays, which can be made into a round shape of about 3 inches, for example, to give greater freedom in designing more fashionable products. It will also become possible in auto interiors to come up with a display that matches a curved center console.

Useful expressions

In my opinion, ...	It goes without saying that ...	Speaking personally, ...
From my point of view, ...	As for me / As to me, ...	I would say that ...
To my mind, ...	As far as I am concerned, ...	I hold the view that ...
It seems to me that ...	My impression is that ...	It is my impression that ...
I have no doubt that ...	I am sure / I am certain that...	I have the feeling that ...

I think / consider / find / feel / believe / suppose / presume / assume that ...
My view / opinion / belief / impression / conviction is that …

23. Work in pairs. Give your point of view on the following Internet trends suggested by some computer experts.

Internet Futures. Video interactive multimedia will become **embedded** in everyday objects from paper to clothes to cars all tied to a new communications Internet everywhere architecture. We will be living in the near future in a Blended Reality – part electronic and part physical in the so called "real world".

The internet is rapidly transforming business, markets, and customers. Every industry from financial services to health care, to electronics to education will be changed. Supply chains in every market throughout the globe will be reshaped. The convergence of computers, networks, and wireless technologies will create both opportunities and threats. Where is it all going? What are the opportunities for mobile e-commerce, trade exchanges and smart networks? What are the **challenges** for the next internet? What does the future hold for your customers, industry and marketplace.

The Next generation Internet will merge telephony and video into a vibrant, interactive, sensory experience that will shape industries such as entertainment, retail, health care and education. Imagine in the future where the Net becomes intuitive, sensory, interactive, aware, adaptive and develops a digital personality that can communicate with billions of people simultaneously in over 200 languages anywhere on the planet or off world? Welcome to the Megaverse, the future of the Internet where culture and business needs are met by a global electronic intelligence.

Internet-Ready Cars. The wireless Internet-ready car is coming as another critical link in the mobile eBusiness network that is being constructed. Voice-recognition systems that find that restaurant, buy that stock, or locate a destination for a trip will be rolled out this year. GPS satellite linked communication will offer location-based services for everyone that wants their car to be tied to the global Net. Car companies may discover that owning the portal for eServices in the car may rival the actual profit from manufacturing the vehicle.

Knowledge-Value Engineering. As the net becomes pervasive driven by the unification of supply chains, shaped by telecom, banks and content players an entirely new paradigm of doing business will emerge. Knowledge-Value engineering is the process of leveraging virtual supply chains to manage, create, sell, distribute, market and finance an entire business online.

Deep Personalization. Bringing human-like intelligence into the "smart portal" of the future, where the portal knows it's you, understands your interests, gives you the personal experience in a virtual world.

The Semantic Web. The Semantic Web will play a vital role in helping consumers find what they want and vendors to find customers. This is the next stage of making information linked more intelligently and efficiently over the Net.

Grammar

RELATIVE PRONOUNS AND CLAUSES

24. Relative pronouns help us to join clauses together.

Pronoun	Usage	Example
who/that	to refer to people	That's the girl **who** used to work in accounts.
that/which	for things	I once had a computer **which** had a tiny green screen.
when	for time	Do you remember the time **when** we got stuck in the lift?
where	for a place	That's the office block **where** your mother used to work.
why	for a reason	She told him the reason **why** he wasn't being promoted.
whose	for possession	He's the manager **whose** secretary complained to the union.
whom	to replace **who** in formal or written English	The woman **whom** we met was the director.

REMEMBER:

whom is rarely used in spoken English. Usually we use **who** or leave out the pronoun.

*The girl **(who)** you were talking to is my cousin.*

whom can also be used after prepositions in formal writing

*The man **to whom** you spoke was my manager.*

But in everyday speech: *The man **who** you spoke to…* It is also used as an introduction to impersonal letters: *To **whom** it may concern.*

Defining and non-defining relative clauses

25. Defining (restrictive) relative clauses give information essential to the meaning of the sentence. It cannot be left out. Relative pronouns ***who*** and ***which*** can both be replaced by ***that***. Do not use commas before or after defining clauses or phrases when they fall within the main clause or follow the main clause.

*He gave me the file **which** had their account details in it* (not a file with any other information in it).

You must use ***who/that/which*** when it is the subject of the relative clause. When ***who/that/which*** is the object, you can leave it out. Notice that you cannot omit ***whose***:

*Have you ever had one of those days **that** start bad and get worse? (**that** refers to the subject)*
*Have you ever thought (**that**) things couldn't get worse? (**that** refers to the object)*

Similarly, you can omit ***when*** and ***why*** if they refer to the object:

*Sit down and tell me the exact time (**when**) it happened.*
*Tell me the exact reason (**why**) you want to leave.*

You can omit ***where***, but only if you add an appropriate preposition:

*The old fisherman's hut (**where** we stayed) we stayed in was small and warm and it smelt of fish.*

You can omit the ***relative pronoun*** and the ***auxiliary verb***, but only when the relative pronoun refers to the subject:

*Buildings (**that were**) constructed before 1960 will be demolished.*

26. Non-defining (nonrestrictive) relative clauses give us extra information about the subject or the object. This clause can be removed from the sentence without destroying the central meaning. In non-defining relative causes we use ***who*** for people and ***which*** for things. You cannot replace either of them with ***that*** and you cannot omit them. Use commas both before and after non-defining clauses and phrases.

*His car, **which** broke down yesterday, is nearly ten years old.*
*He gave me the file, **which** was very heavy, with their account details in it.*

We can use **whose**, **whom** and **where:**
*Richard, **whose** father is Greek, speaks both Greek and English fluently.*
*The manager, to **whom** I spoke about my complaint, is going to give me a refund.*
*I'm going to spend a few days in Paris, **where** I first met Mary.*

Use ***none/one/two/most of whom, which*** to identify a certain number of people or things from a group:

*She walked into a room that was full of teenagers, n**one of whom** looked up from their work.*

REMEMBER: In speech we tend not to use non-defining clauses because they sound too formal.

He gave me the file with their account details in it. It was very heavy.

COMPARE THE MEANINGS: 1) *In 1998–1999, we observed a significant reduction of the river area occupied by young salmon.* [restrictive: This refers to specific area of the river occupied by young salmon.]
In 1998–1999, we observed a significant reduction of the river area, occupied by young salmon. [nonrestrictive: Additional information about the river is given, that it was occupied by young salmon.]
*2) The products **that** were produced at high temperatures were unstable.* [restrictive]
*The products, **which** were produced at high temperatures, were unstable.* [nonrestrictive]

27. Join a clause in Column A to a clause in Column B with an appropriate relative pronoun to make a complete sentence. Use each clause once only.

A	B
1 We went to the Italian restaurant	a) dog was barking all night
2 Where's the book	b) I first met Andrew.
3 They are the people	c) had the biggest screen.
4 Could you tell me the nearest place	d) stole my bag.
5 That boy is the thief	e) has noticed my new haircut.
6 The disco over there is	f) I picked from the garden.
7 I bought the TV	g) they sell stamps?
8 You are the only person	h) you said you would lend me?
9 These are the flowers	i) they have fantastic pizzas.

28. Join the following pairs of sentences to make one sentence with a non-defining relative clause. Use commas appropriately.

EXAMPLE: I lent my car to my next door neighbor. My car has a large boot.
I lent my car, which has a large boot, to my next door neighbor.

1 We went to Spain. There are fantastic beaches in Spain.
2 I'm looking forward to my birthday. My birthday is next month.
3 I'm seeing Carol this evening. Her parents are on holiday.
4 My boss wants to see me. I don't get on with him.
5 I read that new book and enjoyed it. Pete lent it to me.
6 Thank you for the birthday card. I got it on Friday.

29. Read the following sentences and decide which of the relative pronouns are essential and which can be omitted.

a) My best friend, **who** I've known for ten years, now lives in Italy.
b) One thing **that** makes me really angry is people **who** drop litter in the street.
c) I rarely go back to the town **where** I was born.
d) I've lost contact with all the people **who** I was close to at school.
e) The single object **which** I treasure the most is a ring **that** my girlfriend gave me.

30. In each situation, decide whether the relative clause in bold is defining or non-defining. Use commas appropriately.

1) Peter made some sandwiches. They have all been eaten. You made some too. Your sandwiches have not been eaten
*The sandwiches **which Peter made** have all been eaten.*
2) There was only one park in this town. Someone has built over it. We used to play in the park when we were children
*The local park **where we played as children** has been built over.*

3) There were a lot of candidates in the presidential election. Three of them were women. The winner was one of them. She had campaigned for better housing conditions

*The woman **who led the campaign for better housing conditions** has been elected President.*

4) Only my boyfriend sent me flowers, but I had some other presents, including a vase. I put the flowers in the vase

*The flowers **which my boyfriend sent** look beautiful in my new vase.*

5) I took two cameras away with me. You lent me one of them. That's the one that got broken.

*The camera **which you lent me** has been broken.*

31. Translate the following sentences from English into Russian paying attention to relative clauses.

1. Life has a purpose that must be fought for. 2. A man is known by the company he keeps. 3. Everything comes to him who knows how to wait. 4. It all has something to do with the way he was brought up. 5. There are some infinite numbers which are larger than any number we can possibly write no matter how long we work. 6. This is the only way by which we can distinguish which of the two events came first. 7. Most laboratories have small machines which are being used for demonstration purposes. 8. These quantities were to be determined correctly, for which purpose we used their technique. 9. If a student is ill and cannot appear before the examination board he is to present a medical certificate, in which case the examination has to be postponed. 10. There is no particular reason why this should be so. 11. The characteristics we are interested in are shape and size. 12. Every task a computer does must be programmed. 13. People often view problems the way they want to view them. 14. This question will be taken up in Chapter 6 where the whole subject of the study will be discussed.

Home assignment after Lesson 2:

1. Exs 30, 31 (can be started in the classroom and finished at home).
2. Read and translate the text from Lesson 3 'The Language of E-Mail' using the Internet resource http://lingualeo.com/ru/jungle/the-language-of-e-mail-387682#/page/1