

## Unit 5

### Ex.1 Work in pairs. Discuss the following questions.

- 1/Have you got a computer? Is it a desktop or a laptop?
- 2/ What do you use it for?
- 3/ What types of computers do you know?
- 4/ What are the main applications of computers nowadays?

### Part 1

### Ex.2 Read or listen to the following extracts. <sup>1</sup>Identify which place is described in each extract: a/ a factory; b/ a supermarket; c/ a travel agent; d/ a home

1. We use PC for writing letters, for playing games, to calculate our bills and to connect with the Internet.
2. We've got electronic checkout tills with barcode readers. They read a special barcode on almost everything we sell. They calculate the bill for the customer. At the same time they send information to a larger computer, so we always know what we've got in the store.
3. We make washing machines and refrigerators. The machines we use to make them are controlled by computers. We also use computers to calculate our wages, to look after all materials and parts.
4. Our terminal links to airline offices. If you want to fly everywhere in the world we can supply you with the tickets and we can reserve your hotel – all by computer.

### Ex.3 Learn the following words.

1/rely on (v) /ri 'lai/	полагаться на
2/result in (v) /ri 'zʌlt/	приводить к
3/deal with (v) /di:l/	иметь дело с
4/reduce (v) /ri 'dju:s/	уменьшать, сокращать
5/consume (v) /kən 'sju:m/	потреблять
6/pursue (v) /pə(r) 'sju:/	преследовать (цель), следовать за
7/evolve (v) /i 'vɒlv/	развиваться
8/inspire (v) /ɪn'spaɪə(r)/	вдохновлять, воодушевлять
9/advance (n) /əd'vɑ:ns/	продвижение вперед, прогресс
10/demand for smth (n) /di'mɑ:nd/	требование, потребность

<sup>1</sup> Glendinning E., McEwan J. Basic English for computing. Oxford University Press, 2002. P.129

11/approach (n) /ə 'prəʊtʃ/	ПОДХОД
12/application (n) /,æplɪ 'keɪʃ(ə)n/	ПРИМЕНЕНИЕ
13/reliability (n) /rɪ, laɪə 'bɪlɪti/	НАДЕЖНОСТЬ

#### Ex.4 Read the text and discuss the following topics:

- the main advantages of quantum computers
- the main achievements of biologically inspired computing
- the main benefits of nanocomputing technology

### Radical Next-Gen Computing<sup>2</sup>

In the past half century driven by phenomenal **advances** in microelectronics, computers of different kinds, forms, and shapes have **evolved** and transformed almost everything we **deal with**. However, they still function on the same fundamental computational principles that Charles Babbage and Alan Turing **envisaged** and that John von Neumann and others subsequently **refined**. Do the principles that define modern computing — and that have guided us so far — require revolutionary rethinking?

**Demands for** computing, storage, and communication will continue **to escalate**. We'll use computers for newer applications and computationally more difficult problems that we still haven't addressed satisfactorily. More people, even those at the bottom of the economic pyramid who haven't yet benefitted from IT, and almost everything, including objects, animals, and buildings, will eventually use and **rely on** computers in some form.

Unfortunately, digital computing based on silicon and the conventional architecture is reaching its limits owing to fundamental physical limits, economic considerations, and **reliability** issues. Thus, we must examine and advance new approaches that might seem radical or even difficult to realize.

Researchers and industry are thinking differently about computational principles and **pursuing** new paradigms such as quantum computing, biologically inspired computing, and nanocomputing. We might soon need **to embrace** such **approaches**, particularly for some of the emerging applications. So, we need to understand the principles and potential of these paradigms and be aware of their current status and future prospects.

*Quantum computers*, which represent a new generation of computing based on quantum mechanics rather than electronics, seem increasingly **viable**. Quantum computers based on quantum bits (qubits) **exhibit** astonishingly high-speed

<sup>2</sup> Murugesan S. Radical Next-Gen Computing [Электронный ресурс] //Computing Now. - 2015. - V. 8. № 6.

**processing capabilities.** However, renewed interest in quantum computing has just begun, and researchers have only demonstrated a few of its potential **applications.** Nevertheless, we might well have a general-purpose quantum computer in 10 to 15 years.

Even so, conventional computers with quantum components aimed at optimization problems are already available from companies such as D-Wave Systems. According to researchers quantum computers could greatly speed up certain machine-learning tasks. In some cases, they could **reduce** computing time from hundreds of thousands of years to mere seconds.

*Biologically inspired designs* adopt nature as a source of analogies. This concept, also called biomimicry or biomimetics has **inspired** many researchers and designers and **resulted in** innovations including retroreflective road markers, fast swimsuits, aircraft, windmill turbine blades, and high-speed trains. Biologically inspired computing has produced such early results as genetic algorithms and neural and sensor networks.

Biological developments exist even at the device level. DNA is a dense, stable information media, and advances in DNA synthesis and sequencing have made it an increasingly **feasible** high-density **digital storage medium.** According to some researchers, the entirety of human knowledge might soon be stored in a few kilograms of DNA, and in the future we might even **store** data in our skin.

Emerging nanotechnologies are **squeezing** more transistors into silicon chips by reducing their physical dimensions to a few nanometers. Such devices can bring increase in computing power while **consuming** far less power per function. Nanocomputing technology could revolutionize how we build and use computers. However, to realize these benefits, research must make major progress in device technology, computer architectures, and integrated-circuit processing, while **addressing** dependability challenges.

**Ex.5 Match the following words to their definitions.**

1/rely on (v)	<i>a/a very firm statement that you want something</i>
2/result in (v)	<i>b/a particular use that something has</i>
3/deal with (v)	<i>c/a particular way of thinking about or dealing with something</i>
4/reduce (v)	<i>d/to trust someone or something to do something for you</i>
5/consume (v)	<i>e/an ability of a vehicle, or a system to work well</i>
6/pursue (v)	<i>f/to give someone the enthusiasm to do or create something</i>

7/evolve (v)	<i>g/to cause something</i>
8/inspire (v)	<i>h/to use a supply of something such as time, energy, or fuel</i>
9/advance (n)	<i>i/to make something smaller or less in size, amount, importance etc</i>
10/demand for smth (n)	<i>j/to take action to do something, especially to solve a problem</i>
11/approach (n)	<i>k/to follow a course of activity</i>
12/application (n)	<i>l/to gradually change and develop over a period of time</i>
13/reliability (n)	<i>m/progress or an instance of progress in science, technology, human knowledge etc</i>

**Ex.6 Match the words to their synonyms.**

1/evolve (v)	<i>a/follow (v)</i>
2/inspire (v)	<i>b/count on (v)</i>
3/pursue (v)	<i>c/develop (v)</i>
4/result in (v)	<i>d/encourage (v)</i>
5/rely on (v)	<i>e/cause (v)</i>
6/advance (n)	<i>f/use (n)</i>
7/demand (n)	<i>g/way (n)</i>
8/approach (n)	<i>h/requirement (n)</i>
9/application (n)	<i>i/progress (n)</i>

**Ex.7 Look through the following words/word combinations.**

envisage (v) / <i>ɪnˈvɪzɪdʒ/</i>	представлять, предвидеть, намечать
refine (v) / <i>riˈfaɪn/</i>	улучшать
escalate (v) / <i>ˈeskəleɪt/</i>	увеличиваться
address (v) / <i>əˈdres/</i>	обращаться к кому-либо (чему-либо)
embrace (v) / <i>ɪmˈbreɪs/</i>	принимать, включать
exhibit (v) / <i>ɪgˈzɪbɪt/</i>	показывать
squeeze (v) / <i>skwiːz/</i>	протискивать, сжимать
feasible (adj) / <i>ˈfiːzəb(ə)l/</i>	возможный, выполнимый, осуществимый
viable (adj) / <i>ˈvaɪəb(ə)l/</i>	конкурентный, жизнеспособный
digital storage medium	носитель информации
processing capabilities	способность обрабатывать информацию

**Ex.8 Decide which statements are true.**

- 1/ Computers still function on the same fundamental computational principles that Charles Babbage and Alan Turing envisaged a lot of years ago.
- 2/Digital computing based on silicon and the conventional architecture will reach no limits owing to fundamental laws of physics.
- 3/ Researchers and industry are thinking differently about computational principles and pursuing new paradigms.
- 4/ Quantum computers, which represent a new generation of computing, are based on electronics.
- 5/ Interest in quantum computing has just begun, but researchers have demonstrated a lot of its potential applications.
- 6/ We might have a general-purpose quantum computer in 50 years.
- 7/Biologically inspired computing hasn't produced any positive results yet.
- 8/According to some researchers, the entirety of human knowledge might soon be stored in a few kilograms of DNA.
- 9/ Emerging nanotechnologies are squeezing more transistors into silicon chips by reducing their physical dimensions to a few nanometers.
- 10/Nanotechnological devices can bring increase in computing power while consuming much more power per function.

**Ex.9 Give synonyms to the underlined words in the following sentences. \***

- 1/In the past half century driven by phenomenal advances in microelectronics, computers of different kinds have transformed almost everything we deal with.
- 2/ Demands for computing, storage, and communication will continue to escalate.
- 3/We might soon need to embrace such approaches, particularly for some of the emerging applications.
- 4/ Biomimicry or biomimetics has inspired many researchers and designers and resulted in different innovations.
- 5/Emerging nanotechnologies are squeezing more transistors into silicon chips.
- 6/ To realize these benefits, researchers have to address dependability challenges.

**Ex.10 Answer the questions.**

- 1/ Who was the first to envisage fundamental computational principles?
- 2/ Why will demands for computing, storage, and communication continue to escalate?
- 3/ Why is digital computing reaching its limits?
- 4/ Which new paradigms are researchers and industry pursuing nowadays?
- 5/What do we need these paradigms for?
- 6/What are quantum computers based on?
- 7/ What are the main advantages of quantum computers?
- 8/What results has biologically inspired computing produced?
- 9/ What new digital storage medium is mentioned in the text?
- 10/ Could nanocomputing technology revolutionize how we build and use computers? Why? Give your reasoning.

**Ex.11 Work in pairs. Discuss the facts in the text you find the most interesting ones.** *You may use the following word combinations: to my mind; from my point of view; I think; I consider; on the one hand... on the other hand.*

**Ex.12 Make up sentences using the following word combinations.\***

Demands for computing, storage, and communication; reliability issues; phenomenal advances; fundamental computational principles; rely on computers; embrace a new approach; exhibit high-speed processing capabilities; potential applications; reduce computing time; result in innovations; a feasible digital storage medium; speed up machine-learning tasks; store data; integrated-circuit processing; address/face challenges.

**Ex.13 Comment on the following statement. \***

**Use the following phrases:**

*As far as I know...As far as I remember... I'm (not) sure... I suppose...  
It's clear that... I'm convinced that...I think that...*

*People can't live without computers nowadays.*

**Ex.14 Make up a dialogue.**

*I'm thinking of buying a computer and I need some advice.....*

**Ex.15 Answer the following topical questions.**

1/What is the concept of a new-generation computer? (*E.g. high-speed processing capabilities, potential applications in different fields, reduced computing time, consuming less power per function etc*)

2/What impact on peoples' lives will new-generation computers have? (*E.g. new breakthroughs in science and industry; demands for computing, storage, and communication; innovations in different fields; new challenges to face etc*)

3/ Why are a lot of people addicted to computers? (*E.g. an increase in one's loneliness, spending too much time online, playing offline games, being not interested in the outside world, not spending time with one's friends etc*)

4/What should be done to solve the problem mentioned above? (*E.g. seeing a doctor, changing one's behavior, understanding the causes of one's addiction, regaining control of one's life etc*)

**Ex.16 Speak on the topics. Take advantage of the words in brackets.**

1/ *A new generation computer* (pursue new paradigms in computing; store data; exhibit high-speed processing capabilities; reduce computing time; speed up machine-learning tasks; consume far less power per function; have a lot of potential applications etc)

2/*New challenges in modern computing* (demands for computing, storage, and communication; reliability issues; consumption less power per function; high-speed processing capabilities; innovations in digital storage media etc)

**Part 2 – Listening comprehension.**

**Ex.1 Work in pairs. Discuss the following questions.**

1/ What are the main applications of supercomputers?

2/How do supercomputers differ from personal computers?

3/ Is it possible for a human to surpass a supercomputer? Give your reasoning.

**Ex.2 Read the vocabulary to the text.**

pit (against) (v)	<i>выставлять в качестве противника</i>
contest (n)	<i>соревнование</i>
breakthrough (n)	<i>прорыв, открытие</i>
contender (n)	<i>соперник</i>

**Ex.3 Listen to the text and say what you learnt about a supercomputer.**

**Ex.4 Decide which statements are true.**

- 1/Jeopardy is one of America's oldest and most popular quiz shows.
- 2/ The programme's producers pitted three of their most successful contestants against a computer.
- 3/ The computer is a small piece of hardware.
- 4/In a minute, the computer is able to digest the question and match it against huge amounts of information.
- 5/ But it isn't able to notice nuances in language.
- 6/TV show with millions of viewers was great publicity for the company that developed the computer.

**Ex.5 Listen to the text again and answer the following questions.**

- 1/What is Watson?
- 2/ What show does Watson take part in?
- 3/How does Watson act during the show?
- 4/What is Watson able to do?
- 5/ What company developed the computer?
- 6/ What does the company say about Watson?

**Ex.6 Look through the following table. Discuss the advantages and disadvantages of different types of microcomputers.\***

<b>Desktop computers</b>	are larger and not meant to be portable, usually sit in one place on a desk or table and are plugged into a wall outlet for power. The case of the computer holds the motherboard, drives, power supply, and expansion cards. A separate keyboard and mouse allow the user to input data and commands.
<b>Notebook or laptop computers</b>	are less powerful and more expensive than typical desktop machines, small and lightweight enough to be carried around with the user; run on battery power, but can also be plugged into a wall outlet; feature a built-in keyboard and some kind of built-in pointing device (such as a touch pad).
<b>Workstations</b>	are powerful, high-end microcomputers; contain one or more microprocessor CPUs; may be used by a single-user for applications requiring more power than a typical PC (rendering complex graphics, or performing intensive scientific calculations); may be used as server computers that supply files to client computers over a network or the Internet.

<b>Tablet Computers</b>	consist of a large LCD touchscreen used for both input and output; typically include a WiFi and/or cellular network data connection to access the Internet; run applications specifically designed for these touchscreen devices; also can do some activities such as word processing or spreadsheets, although the lack of a physical keyboard usually makes such activities less convenient on tablets than they are on desktop or notebook machines.
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## Script

### *Supercomputer beats TV quiz champions*

*Two champion contestants on a popular American quiz show have been easily beaten by a computer. The IBM machine, named Watson, won in three special editions of Jeopardy. One of the men it defeated holds the Jeopardy record of 74 straight wins. Tom Burrige reports.*

Jeopardy is one of America's oldest and most popular quiz shows. But this time, inside the brightly-lit studio, a contest billed as 'man versus machine' - the programme's producers pitted two of their most successful contestants ever against a computer. Known as Watson, the computer is a giant piece of hardware, equivalent in size to several fridges. And over three programmes, Watson beat his human contenders with ease. In a split-second, Watson is able to digest the question and try and match it against huge amounts of information it has at its disposal. It very quickly assesses how good a match it thinks it has and buzzes either very quickly, or not so quickly, reflecting how confident it is that it has the right answer.

Watson is also able to notice nuances in language, between say 'bat' the animal and 'bat' used in sports. On a prime-time US TV show with millions of viewers it was great publicity for IBM. But the company says Watson the computer is an IT genius and a breakthrough in computing.

## References

1. Glendinning E., McEwan J. Basic English for computing. Oxford University Press, 2002. P.129
2. Burrige T. Supercomputer beats TV quiz champions [Электронный ресурс] // bbc.co.uk: сайт новостей Би-би-си URL [http://www.bbc.co.uk/worldservice/learningenglish/language/wordsintheneeds/2011/02/110218\\_witn\\_humanvscomputer\\_page.shtml](http://www.bbc.co.uk/worldservice/learningenglish/language/wordsintheneeds/2011/02/110218_witn_humanvscomputer_page.shtml) (дата обращения – 14.06.2015)
3. Murugesan S. Radical Next-Gen Computing [Электронный ресурс] //Computing Now. - 2015. - V. 8. № 6. URL <http://www.computer.org/web/computingnow/archive/radical-next-gen-computing-june-2015> (дата обращения – 14.06.2015)