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Методические указания

по развитию навыков чтения и устной речи на английском языке по теме «Outstanding Scientists and Inventors» для студентов 1 курса, изучающих информационные и компьютерные технологии

Часть II

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Методические указания разработаны преподавателями кафедры английского языка естественных факультетов Гончаровой С.А., Самолетовой М.А.

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Методическая записка

Данные методические указания предназначены для аудиторной работы студентов 1 курса в 1 семестре по теме «Outstanding Scientists and Inventors».

Методические указания состоят из 5 разделов, посвященных ученым и изобретателям, которые внесли наиболее значительный вклад в развитие информационных и компьютерных технологий. Основной целью методических указаний является развитие и совершенствование навыков чтения и говорения на основе прочитанного материала.

Методические указания построены на аутентичных материалах, основными источниками которых являются Интернет, британские и американские научно-популярные издания.

Каждый раздел методических указаний включает следующие рубрики:

«Before you start» способствует повышению интереса и мотивации студентов к изучаемому материалу.

«Reading» включает текст, содержащий биографии ученных и изобретателей с рядом заданий, ориентированных на развитие навыков различных видов чтения.

«Vocabulary» содержит задания, направленные как на закрепление активной лексики раздела, так и на расширение словарного запаса по теме.

«Grammar» акцентирует внимание студентов на характерных для биографических текстов сложных грамматических явлениях и предлагает задания, позволяющие устранить трудности, возникающие при чтении и переводе текстов.

«Speaking» предлагает задания, направленные на обобщение прочитанного материала в форме его краткого изложения и формирование умения прокомментировать прочитанные тексты.

«Points for reflection» способствует рефлексии прочитанного и формированию личностного отношения к предложенному материалу.

Раздел 5 методических указаний содержит ряд игровых и творческих заданий, способствующих закреплению полученных знаний и повышению интереса к изучаемому материалу. В раздел также включена ссылка на сайт формата Hotlist (информационно-аналитические сборник) «Outstanding Scientists and Inventors», посвященный ученным и изобретателям в области информационных и компьютерных технологий, физики, радиотехники, системного анализа и математики. Данный сайт имеет своей целью обеспечение широкого спектра дополнительного аутентичного материала по теме, что обеспечивает возможность личного выбора тематики, индивидуальный график подготовки, а также способствуют развитию аналитических и поисково-исследовательских навыков студентов.

Методические указания могут использоваться в работе со студентами с различным уровнем знания английского языка, как для групповой, так и для индивидуальной работы. Методические указания также содержат ключи к наиболее сложным лексическим и грамматическим упражнениям, что позволяет использовать данные материалы для самостоятельной работы студентов.

Unit 5 Claude Shannon (1916-2001)

Before you start

1 You are going to read about life and work of the American scientist, Claude Shannon. Before you read the text answer the following questions.

a) Have you ever heard about Claude Shannon?
b) What field of science did he work in?
c) What is his most significant contribution to the world science?

2 Complete the table about Claude Shannon:

things I know	things I'm not sure about	things I would like to know

Reading

1 Pay attention to the correct pronunciation of the following words:

Claude	[klɔ:d]	code	[kəud]
Shannon	['ʃænən]	relay	[´rɪ:leɪ]
mathematician	[mæθəmə'tɪʃn]	theory	[´θɪərɪ]
physicist	['fɪzɪsɪst]	equation	[ɪ´kweɪʒn]
process	['prəusəs]	reliability	[rɪ laɪə'bɪlətɪ]
honorary	['pnərərɪ]	binary	[´baɪnərɪ]
scientific	[saɪən'tɪfɪk]	thermodynamics	[θɜ:məudaɪ´næmkɪs]

2 Here are some international words from the text. Guess their meaning. Consult the dictionary if necessary.

technology, machine, institute, laboratory, mathematics, engineering, theory, method, publication, information, discipline, modem, file, university

Give some more examples.

3 Read the text about Claude Shannon and comment on the title.

The Father of Information Theory

American mathematician Claude Elwood Shannon was born in Gaylord, Michigan on April 30, 1916. Shannon's father Claude was a judge in a small town of

Gaylord, and his mother Mabel was the principal of the local high school. When a child, Shannon turned out to be mathematically precocious and received scientific encouragement from his grandfather, who was an inventor and a farmer and whose inventions included the washing machine and farming machinery. (1)


Рис.1
Claude Shannon

From an early age, Shannon showed an affinity for both engineering and mathematics, and graduated from Michigan University with degrees in both disciplines. For his advanced degrees, he chose to attend the Massachusetts Institute of Technology. At the time, MIT was one of the prestigious institutions conducting research that would eventually formulate the basis for what is now known as the information sciences. Its faculty included mathematician Norbert Wiener, who would later coin the term cybernetics to describe the work in information theories that he, Shannon, and other leading American mathematicians were conducting. It also included Vannevar Bush, MIT's dean of engineering, who in the early 1930s had built an analog computer called the Differential Analyzer which was developed to calculate complex equations. It was a mechanical computer, using a series of gears and shafts. Its only electrical parts were the motors used to drive the gears. This work formed the basis for Shannon's influential 1938 paper "A Symbolic Analysis of Relay and Switching Circuits," in which he put forth his developing theories on the relationship of symbolic logic to relay circuits. (2)

Shannon graduated from MIT in 1940 with both a master's degree and doctorate in mathematics. After graduation, he spent a year as a National Research Fellow at the Institute for Advanced Study at Princeton University. In 1941, Shannon joined the Bell Telephone Laboratories, where he became a member of a group of scientists charged with the tasks of developing more efficient information transmitting methods and improving the reliability of long-distance telephone and telegraph lines. While working at the Bell Labs they started to develop the theory of the error-correcting code. (3)

One of the most important features of Shannon's theory was the concept of information entropy[1]. Entropy happened to be equivalent to a shortage in the information content in a message and this fact was proved by Shannon. According to physics' second law of thermodynamics, entropy is the degree of randomness[2] in any system which increases over a period of time. Thus, many sentences can be significantly shortened without losing their meaning. Moreover a signal proved to be sent without distortion. So this concept has been developed over the decades into sophisticated error-correcting codes that ensure the integrity of the data on which society interacts. While studying the relay switches on the Differential Analyzer, Shannon noted that the switches were always either open or closed, or on and off. This led him to think about a mathematical way to describe the open and closed states. Shannon theorized that according to a binary system a switch in the on position would equate to one and in the off position, it would be a zero. Reducing information to a series of ones and zeros, he

noticed that it could be processed by using on-off switches .He believed that information was no different than any other quantity and therefore could be manipulated by a machine. (4)

In the late 1940s, Shannon's research was presented in “The Mathematical Theory of Communications”. It was in this work that Shannon first introduced the word 'bit,' comprised of the first two and the last letter of 'binary digit' to describe the yes-no decision that lay at the core of his theories. (5)

Shannon's most important scientific contribution was his work on communication. In 1941 he began a serious study of communication problems, partly motivated by the demands of the war effort. This research resulted in the classic paper entitled "A mathematical theory of communication" in 1948. Combining mathematical theories with engineering principles he set the stage for the development of the digital computer and the modern digital communication revolution. The results were so breathtakingly original, that it took some time for the mathematical and engineering community to realize their significance. But soon his ideas were picked up, elaborated upon, extended, and complemented with new related ideas. As a result a brand-new science had been created in the form of Information theory, with the publication of that single paper, and the frame work and terminology he established remains standard even today. (6)

During the World War II, Alan Turing, a leading British mathematician spent a few months working with Shannon. Both scientists were interested in the possibility of building a machine that could imitate the human brain. In the 1950s, Shannon continued his efforts to develop what was then called "intelligent machines" - mechanisms that emulated the operations of the human mind to solve problems. (7)

Shannon's information theories saw application in a number of disciplines in which a language is a factor, including linguistics, phonetics, psychology and cryptography. His theories also became a cornerstone of the developing field of artificial intelligence, and his famous conference at Dartmouth College in 1956 was the first major effort in organizing artificial intelligence research. He wrote a paper entitled "Programming a computer for playing chess" in 1950, and developed a chess playing computer. (8)

Shannon's interest did not stop with these. He was known to be an expert juggler who was often seen juggling three balls while riding a unicycle. He was an accomplished clarinet player, too. (9)

"Shannon was the person who saw that the binary digit was the fundamental element in all of communication," said Robert Gallagher, a professor of electrical engineering who worked with Shannon at the Massachusetts Institute of Technology. "That was really his discovery, and from it the whole communications revolution has sprung," considered Marvin Minsky of M.I.T., who as a young theorist worked closely with Shannon. (10)

Shannon received a plenty of numerous honorary degrees and awards. His published and unpublished documents (a total of 127) cover an unbelievably wide

spectrum of areas. Many of them have been a priceless source of research ideas for others. One could say that there would be no internet without Shannon's theory of information; every modem, every compressed file, every error correcting code owes something to Shannon. (11)

Shannon died at age 84 on February 27, 2001 in Medford, Mass., after a long fight with Alzheimer's disease. (10)

(Adapted from the Internet sites)

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[1]-энтропия, сбой в любой системе, возникающий с определенной периодичностью
[2]-случайность, беспорядочность (как явление в физике)

4 What do these figures refer to?

1930s 1940 2001 1941 late1940 1956 1950 1916 1938

5 Read the text again and agree/disagree with the following statements:

a) Claude Shannon showed a keen interest for sciences from an early childhood.
b) In the 1930's Massachusetts Institute of Technology was one of the most prestigious scientific and research institutions conducting the work in information theories.
a) The Differential Analyzer was the first electronic computer.
d) Shannon graduated from MIT with only the Master's degree.
e) Shannon's concept of entropy was applied to probability theory.
f) Shannon was the first who introduced the word "bit" to describe the "yes-no" decision.
g) Shannon stopped his scientific activity in the early 1950's.
h) Nowadays we have an opportunity to use the Internet due to Shannon's theory of information.
i) Claude Shannon is one of the most outstanding scientists of the 20th century

6 Answer the following questions.

a) What was Shannon's family background?
b) Who had a strong scientific influence on young Shannon?
c) What fields of science was he interested in?
a) Where did he receive his higher education?
e) What was Shannon's early work devoted to?
f) What work was he involved in working at the Bell Telephone Laboratories?
g) What was his most significant scientific achievement?
h) What kind of mechanism did he try to develop in the 1950's together with Alan Turing?
i) What other sciences was his information theory applied to?
j) What is the title of his most famous paper?

Vocabulary

1 Use the affixes in the table to form nouns from the words below:
farm, compute, reliable, develop, graduate, emulate, inform, communicate, converse, motivate, significant, confer, intelligent, introduce, operate, critic, scholar, transform, exist, conduct, cryptography, distant, generate, appear, partner, define, measure

-ment	-ship	-tion	-ism	-ance/-ence	-er/-or	-ty
encouragement	relationship	application	mechanism	appliance	inventor	possibility

Add at least 3 words of your own to each column.

2 Look back in the text and make a list of terms related to the field of information technologies. Use the dictionary to check their pronunciation. Translate them into Russian. Which of them are international terms?

3 Match words in column A with the words in column B to make the word combinations from the text.

A	**B**
1) to coin	a) the basis
2) to become	b) theories
3) binary	c) the term
3) to lay	d) a cornerstone
4) spectrum	e) operation
5) to emulate	f) at the core
6) to form	g) of areas
7) to set	h) intelligence
8) artificial	i) the stage
10)to put forth	j) digit

4 Look back in the text and find words that have a similar meaning to:

a) got (1)
b) caring out (2)
c) finally (2)
d) suggested (2)
e) was responsible for (3)
f) new and not yet used (6)
g) importance (6)
h) sphere (8)
i) a great number of (9)

5 Complete the sentences with prepositions if necessary.

a) Shannon graduated … Michigan University with degrees in two disciplines.
b) He was charged … a very important task.
c) The word ‘bit’ is comprised … the first two and the last letter of ‘binary digit’
d) The concept of ‘binary digit’ lay … of his theories.
e) Shannon and Turing were interested… the possibility of building ‘intelligent machines’.
f) Soon his original ideas were picked…, extended and complemented… new related ideas.
g) His research resulted… the paper called “A mathematical theory of communication”

6 Give English equivalents to the following words and word combinations:

способный к математике; получить научное вдохновение; проявить склонность; окончить университет; проводить научное исследование; предложить теорию; в конечном итоге; придумать термин; научный вклад; подготовить почву для чего-либо; применение; искусственный интеллект; код с исправлением ошибок, статья, степень доктора наук по математике, в соответствии с

Grammar

1 Change the following sentences according to the model. Translate them.

*Model***:** When a child**,** Shannon **turned out to be** mathematically precocious. –
When a child**,** it **turned out that** Shannon was mathematically precocious. -
Оказалось, что уже с детства Шеннон был математически одаренным.

a) Entropy happened to be equivalent to a shortage in the information content in a message.
b) He seems to have spent much of his free time reading scientific and technical books.
c) He is said to have taught himself to read in three weeks and to have shown an early affinity for numbers and puzzles.
d) Alan Turing is often considered to be the father of modern computer science.
e) Moreover a signal proved to be sent without distortion.
f) He was known to be an expert juggler who was often seen juggling three balls while riding a unicycle.

2 Translate paragraph 4 into Russian.

Speaking

1 Sum up the text using the following key points:

a) Family background
b) Education (degrees)
c) Areas of scientific and research activity
d) Major achievements

2 Comment on the statements:
a) Claude Shannon is considered to be “the father of information theory”.
b) Shannon’s scientific and research contribution to the world science is enormous.
c) There would be no internet without Shannon's theory of information.

3 How do these quotations by Claude Shannon characterize him?
a) “I visualize a time when we will be to robots what dogs are to humans, and I'm rooting for the machines.”
b) “Information is the resolution of uncertainty.”
c) “Information: the negative reciprocal value of probability.”
d) “Use the word cybernetics, Norbert, because nobody knows what it means. This will always put you at an advantage in arguments.”

4 Work in groups of 3-4. Make a list of things you would like to know about Claude Shannon. Choose one, find information and make a poster presentation. (Read instruction on pages 33 task 4)

Points for reflection

1 Have you learnt anything new from the text?
2 Has anything surprised you?
3 What facts were the most amazing?
4 Did you like the text? Why? /Why not?

Unit 2 Norbert Wiener (1894 – 1964)

Before you start

1 You are going to read about life and work of the American theoretical and applied mathematician Norbert Wiener. Before you read the text answer the following questions.
a) What field of science did Norbert Wiener work in?
b) What is his most significant contribution to the world of science?

Reading

1 Pay attention to the correct pronunciation of the following words:

Warsaw	[ˊwɔ:sɔ:]	hypersensitive	[◌ haɪpəˊsensətɪv]
Wiener	[ˊwɪ:nə]	Nazi	[ˊna:tsɪ]
Harvard	[ˊha:vəd]	ancestry	[ˊænsestrɪ]
Cambridge	[ˊkeɪmbrɪdʒ]	ballistics	[bəˊlɪstkɪs]
Jewish	[ˊdʒu:ɪʃ]	amateur	[ˊæmətə]
Stockholm	[ˊstɔkhɔum]	prominence	[ˊprɔmɪnəns]
cybernetics	[◌ saɪbəˊnetɪks]	axiomatic	[◌ æksɪəˊmætɪk]
Leo	[ˊlɪ:əu]	sympathizer	[ˊsɪmpəθaɪzə]

2 Here are some international words from the text. Guess their meaning. Consult the dictionary if necessary.

immigrate, dissertation, pacifist, intrigues, era, potential, uniform, position, communication, to recruit, a pioneer

3 Mach the words in column A with their definitions in column B:

A	B
1) interference	a) teaching, instruction
2) interlude	b) a period of time coming between 2 events or stages
3) tutelage	c) disturbance or interruption to a radio signal, caused by a second signal
4) spouse	d) enough or more than enough
5) ample	e) a husband or wife

4 Read the text about Norbert Wiener and take notes under the following headings:

- Family background
- Early education
- Education (institutions and degrees)
- Early investigations and achievements
- Contribution to science

Norbert Wiener was an American theoretical and applied mathematician. He was a pioneer in the study of noise processes, contributing work relevant to electronic engineering, electronic communication and control systems. Wiener is perhaps best known as the founder of cybernetics, a field that formalizes the notion of feedback and has implications[1] for engineering, systems control, computer science, biology, philosophy, and the organization of society. (1)

Norbert Wiener was the first child of Leo Wiener a Russian – Jewish immigrant

and Bertha Kahn, of German – Jewish decent. Leo Wiener had a major influence on his son. He attended medical school at the University of Warsaw but was unhappy with the profession, so he went to Berlin where he began training as an engineer. This profession seemed only a little more interesting to him than the medical profession, and he immigrated to the United States. Throughout his education Leo was interested in mathematics that was a deep amateur interest to him all through his life, although he never used his mathematical skills in any jobs he held. (2)

Рис. 2
Norbert Wiener

Having arrived in New Orleans in 1880, Leo tried his hand at various jobs in factories and farms before becoming a school teacher in Kansas City. He progressed from being a language teacher in schools to becoming Professor of Modern Languages at the University of Missouri. (3)

Leo educated Norbert at home until 1903, except for a brief interlude when Norbert was 7 years of age. Thanks to his father's tutelage and his own abilities, Wiener became a child prodigy. Although Leo earned his living teaching German and Slavic languages, he read widely and accumulated a personal library from which the young Norbert benefited much. Leo also had ample ability in mathematics, and tutored his son in the subject until he left home. Having graduated from Ayer High School in 1906 at 11 years of age, Wiener entered Tufts College. He was awarded a BA in mathematics in 1909 at the age of 14, whereupon he began graduate studies in zoology at Harvard. In 1910 he transferred to Cornell to study philosophy. Having returned to Harvard next year, he still continued his philosophical studies. Back at Harvard, Wiener came under the influence of Edward Vermilye Huntington, whose mathematical interests ranged from axiomatic foundations to problems posed by engineering. Harvard awarded Wiener a Ph.D. in 1912, when he was a mere 18, for a dissertation on mathematical logic, supervised by Karl Schmidt. (4)

In 1914, Wiener travelled to Europe, to study under Bertrand Russell and G. H. Hardy at Cambridge University, and under David Hilbert and Edmund Landau at the University of Göttingen. In 1915-16, he taught philosophy at Harvard, then worked for General Electric and wrote for the Encyclopedia Americana. When World War I broke out, Oswald Veblen invited him to work on ballistics at the Aberdeen Proving Ground in Maryland. Thus Wiener the eventual pacifist wore a uniform 1917-18. Living and working with other mathematicians strengthened and deepened his interest in mathematics. After the war, Wiener was unable to secure a position at Harvard because he was Jewish (despite his father being the first tenured[2] Jew at Harvard), and was rejected for a position at the University of Melbourne. At W. F. Osgood's invitation, Wiener became an instructor in mathematics at MIT, where he spent the remainder of his career, rising to Professor. In 1926, Wiener returned to Europe as a Guggenheim scholar. He spent most of his time at Göttingen and with Hardy at Cambridge, working on Brownian motion, the Fourier integral, Dirichlet's problem, harmonic analysis, and

the Tauberian theorems. Wiener's parents did not tell him that he was of Jewish ancestry. In 1926, his parents arranged his marriage to a German immigrant, Margaret Engemann, who was not Jewish; they had two daughters. Margaret was a Nazi sympathizer and did not keep that fact a secret. (5)

During World War II, his work on the automatic aiming and firing of anti-aircraft guns[3] led Wiener to communication theory and eventually to formulate cybernetics. (6)

After the war, his prominence helped MIT to recruit what was perhaps the world's first research team in cognitive science, made up of some of the brightest researchers in neuropsychology and the mathematics and biophysics of the nervous system, including Warren Sturgis McCulloch and Walter Pitts. These men went on to make pioneering contributions to computer science and artificial intelligence. Shortly after this painstakingly assembled research group was formed, Wiener suddenly and inexplicably broke off all contacts with its members. (7)

Speculation still flourishes as to why this split occurred; were the reasons professional, was his hypersensitive personality to blame, or did the split result from intrigues by his spouse Margaret? Whatever the reason, the split led to the premature end of one of the most promising scientific research teams of the era. (8)

Nevertheless, Wiener went on to break new ground in cybernetics, robotics, computer control, and automation. He freely shared his theories and findings, and generously credited the contributions of others. This stance[4] resulted in his being well-disposed towards Soviet researchers and their findings, which placed him under regrettable suspicion during the Cold War. He was a strong advocate of automation to improve the standard of living, and to overcome economic underdevelopment. His ideas became influential in India; whose government he advised during the 1950s.Wiener declined an invitation to join the Manhattan Project, and was arguably the most distinguished scientist to do so. After the war, he became increasingly concerned with what he saw as political interference in scientific research, and the militarization of science. His article "A Scientist Rebels" in the January 1947 issue of The Atlantic Monthly urged scientists to consider the ethical implications of their work. (9)

After the war, he refused to accept any government funding or to work on military projects. The way Wiener's stance towards nuclear weapons and the Cold War contrasted with that of John von Neumann is the central theme of Heims (1980). Wiener’s vision of cybernetics had a powerful influence on later generations of scientists, and inspired research into the potential to extend human capabilities with interfaces to sophisticated electronics, such as the user interface studies conducted by the SAGE program. Wiener changed the way everyone thought about computer technology, influencing several later developers of the Internet, most notably J.C.R. Licklider. (10)

Having won the US National Medal of Science in 1964, he published one of his last books entitled “God and Golem, Inc.: A Comment on Certain Point Where Cybernetics Impinges on Religion.” (11)

The first heart attack having occurred ten years before and in 1964, on March 18,

Norbert Wiener died in Stockholm of a second heart attack. (12)

(Adapted from the Internet sites)

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[1]- вовлечение, причастность, подразумеваемое
[2]- срок пребывания в должности
[3]- автоматически целящееся зенитное оружие
[4]- позиция

5 Look back into the text and make a list of the traditional branches of science and newer fields that you come across in the text. Translate them into Russian.

6 Now read the text again and answer the following questions:

a) What role did Wiener's parents play in his childhood?
b) What educational background does Wiener have?
c) What field of science did he work in?
d) What was his greatest achievement in science?
e) What is the range of his contributions?
f) What famous scientists influenced him greatly?
g) What degrees and awards did Wiener get?
h) Think of a proper title for the text.

Vocabulary

1 Use the affixes **-en**; **-ize**; **en-** form verbs from the words below. Add at least 3 more words of your own to each group.

-en	-ize	en-
deepen	realize	entitle

sympathy, military, formal, super, strength, large, vision, short, theory, courage, sure, wide, minimum, maximum, real, special, critic, roll, close, counter, organ, visage

2 Make word combinations using words below as different parts of speech (noun and verb). Make necessary spelling changes. Pay attention to the word-stress and pronunciation.

Example: Noun a private tutor; to have a harmful influence.
Verb to tutor privately; to be harmful influenced.

process; position; split; progress; contact; credit; comment; pioneer; recruit; advice; blame; increase; advocate; contrast

Write two sentences of your own with 2 pairs of the word combinations.

3 Look back in the text and make a list of mathematical terms. Use a dictionary to check their pronunciation. Translate them into Russian. Which of them are international words?

4 Cross out an odd word in each line.

to accumulate: a lot of books; evidence; flowers; a fortune; interest.
to arrange: a dinner; the CDs; a marriage; meeting; ideas.
sophisticated: manner; taste; novel; traveler; abilities; techniques.
to accept: a present; a post; an offer; a letter; equipment.

5 Explain the italicized parts of the following sentences in your own words.

a) Whatever the reason, the split led to *the premature end* of one of the most promising scientific research teams of the era.
b) *Leo tried his hand at various jobs* in factories and farms before becoming a school teacher in Kansas City.
c) Thanks to his father's tutelage and his own abilities, Wiener became *a child prodigy.*
d) Nevertheless, Wiener went on *to break new ground in* cybernetics.
e) These men went on *to make pioneering contributions* to computer science and artificial intelligence.

6 Complete the sentences with prepositions if necessary:

a) Wiener’s vision of cybernetics had a powerful influence … later generations of scientists.
b) What did lead one of the most promising scientific research team … the split?
c) He was sure that he had benefited … the research.
d) Communication theory resulted … his experimental work.
e) Wiener influenced … Indian government during the 1950s.
f) Weiner inspired researchers … the further development of cybernetics.

7 Give English equivalents to the following words and word combinations:

придавать официальный статус; формирование общества; любитель, непрофессионал; заработать средство к существованию; разразиться (о войне); быть отстраненным от должности; быть сторонником нацизма; хранить что-то в секрете; научно-исследовательская группа; выдающиеся исследователи, сверх восприимчивая личность; преждевременный конец; улучшать жизненный уровень; преодолеть экономически слабое развитие; политическое вмешательство; ядерное оружие; сердечный приступ, собрать частную коллекцию книг, основатель кибернетики, отказаться принимать государственное финансирование

Grammar

1 Change the following sentences according to the model. Translate them.

Model: **Having graduated** from Ayer High School in 1906 at 11 years of age, Wiener entered Tufts College. - **After Wiener had graduated** from Ayer High School in 1906 at 11 years of age, he entered Tufts College. - ***Окончив*** *школу Эйер в 1906 году в возрасте 11 лет, Винер поступил в Тафт колледж.*

a) **Having arrived in New Orleans in 1880,** Leo tried his hand at various jobs in factories and farms.
b) **Having leaved the academy**, Babbage continued to study at home, having an Oxford tutor to bring him up to university level
c) **Having returned to Harvard next year,** he still continued his philosophical studies.
d) **Having won the US National Medal of Science in 1964,** he published one of his last books called "God and Golem, Inc.: A Comment on Certain Point Where Cybernetics Impinges on Religion."
e) **Having reduced information to a series of ones and zeros**, Shannon noticed that it could be processed by using on-off switches.
f) **Having constructed an instrument to receive radio waves in 1896**, Tesla experimented with this device and transmitted radio waves from his laboratory to the hotel he lived in.

2 Translate paragraphs 7-9 into Russian.

Speaking

1 Sum up the text using the following key points:
e) Family background
f) Education (degrees)
g) Areas of scientific and research activity
h) Major achievements

2 Comment on Wiener's quotations:
a) "…mathematics was not only a subject to be done in the study but one to be discussed and lived with."
b) "The more we get out of the world the less we leave, and in the long run we shall have to pay our debts at a time that may be very inconvenient for our own survival"
c) "The nervous system and the automatic machine are fundamentally alike in that they are devices, which make decisions on the basis of decisions they made in the past"

d) “A single inattention may lose a chess game, whereas a single successful approach to a problem, among many which have been relegated to the wastebasket, will make a mathematician's reputation.”

3 Work in groups of 3-4. Make a list of things you would like to know about Norbert Wiener. Choose one, find information and make a poster presentation. (Read instruction on pages 33 task 4)

4 Read the real life story happened to N. Wiener and discuss how this anecdote describes his personality.

After several years teaching at MIT, the Wieners moved to a larger house. Knowing her husband was likely to forget where he now lived, Mrs. Wiener wrote down the address of the new house on a piece of paper and made him put it in his shirt pocket. At lunchtime, an inspiring idea came to the professor, who proceeded to pull out the paper and scribble down calculations, and to subsequently proceed to find a flaw and throw the paper away in disgust. At the end of the day, it occurred to Wiener that he had thrown away his address. He now had no idea where his home was. Putting his mind to work, he concocted a plan: go to his old home and wait to be rescued. Surely Margaret would realize he was lost and come to pick him up. When he arrived at the house, there was a little girl standing out front. "Excuse me, little girl," he asked, "would you happen to know where the people who used to live here moved to?" "It's okay, Daddy," the girl replied, "Mommy sent me to get you." (Decades later, Norbert Wiener's daughter was tracked down by a mathematics newsletter. She said the story was essentially correct, except that Wiener had not forgotten who she was.)

Points for reflection

1 Have you learn anything new about Wiener from this unit?
2 What made the greatest impression on you?
3 Has anything amassed you?
4 Did you like the text? Why? /Why not?

Unit 3 Alan Turing (1912 - 1954)

Before you start

1 You are going to read the text about life and work of the English mathematician Alan Turing. Before you read the text complete the chart.

things I know	things I'm not sure about	things I would like to know

Reading

1 Pay attention to the correct pronunciation of the following words.

cryptographer	[krɪp´tɔgrəfə]	Einstein	[´aɪnstaɪn]
cipher	[´saɪfə]	morphogenesis	[ˌmɔ:fəu´dʒenəsɪs]
emphasis	[´emfəsɪs]	cyanide	[´saɪənaɪd]
distinguished	[dɪ´stɪŋgwɪst]	poisoning	[´pɔɪzənɪŋ]
Mathison	[´mæθɪsn]	intelligence	[ɪn´telɪdʒəns]
Turing	[tju(ə)rɪŋ]	calculus	[´kælkjələs]
purpose	[´pɜ:pəs]	algorithm	[´ælgərɪðm]

2 Here are some international words from the text. Guess their meaning. Consult the dictionary if necessary.

logician, service, to record, commission, to risk, colony, puzzle, natural, elementary, extrapolate, instruction, algorithm, identical, to design, intelligent, equivalent

3 Read the text and think of a proper title for it.

* * *

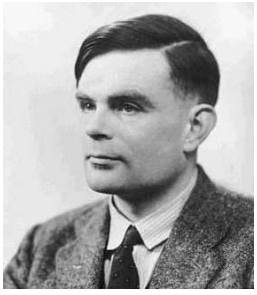


Рис. 3
Alan Turing

A shy, awkward man born into the British upper middle class in 1912, Turing played a seminal role in the creation of computers. To be sure, many other people contributed, from mathematicians Charles Babbage and Ada Lovelace in the 1830s to Herman Hollerith at the turn of the century. But it was Turing who made the critical conceptual breakthrough, almost as an aside in a paper he wrote while in his 20s. (1)

A mathematician, logician, and cryptographer, Alan Mathison Turing is often considered to be the father of modern computer science. (2)

Turing's father, Julius Mathison Turing, was a member of the Indian civil service. Julius and his wife Ethel wanted Alan to be brought up in England, so they returned to Paddington, London, where Alan Turing was born on June 23, 1912. His father's civil service commission was still active, and during Turing's childhood years his parents travelled between Guildford, England and India, leaving their two sons to stay with

friends in England, rather than risk their health in the British colony. Very early in life, Turing showed signs of the genius he was to display more prominently later. He is said to have taught himself to read in three weeks, and to have shown an early affinity for numbers and puzzles. (3)

His parents enrolled him at St. Michael's, a day school, at the age of six. The headmistress recognized his genius early on, as did many of his subsequent educators. At the age of 14, he went on to Sherborne School in Dorset. Turing's natural inclination toward mathematics and science did not earn him respect with the teachers at Sherborne, a famous and expensive public school (a British private school with charitable status), whose definition of education placed more emphasis on the classics. His headmaster wrote to his parents: "I hope he will not fall between two schools. If he is to stay at Public School, he must aim at becoming educated. If he is to be solely a Scientific Specialist, he is wasting his time at a Public School". He was criticised for his handwriting, struggled at English, and even in mathematics he was too interested with his own ideas to produce solutions to problems using the methods taught by his teachers. Despite producing unconventional answers, Turing did win almost every possible mathematics prize while at Sherborne and continued to show remarkable ability in the studies he loved, solving advanced problems without having even studied elementary calculus. At the age of sixteen, Turing encountered Albert Einstein's work; he didn't only understand it, but he extrapolated Einstein's questioning of Newton's laws of motion from a text in which this was never made explicit. (4)

The event which was to greatly affect Turing throughout his life took place in 1928. He formed a close friendship with Christopher Morcom, a pupil in the year above him at school, and the two worked together on scientific ideas. Perhaps for the first time Turing was able to find someone with whom he could share his thoughts and ideas. However Morcom died in February 1930 and the experience was a shattering one to Turing. He had a premonition of Morcom's death at the very instant that he was taken ill and felt that this was something beyond what science could explain. (5)

The computer room at King's is now named after Turing, who became a student there in 1931 and a Fellow four years later. Due to his unwillingness to work as hard on his classical studies as on science and mathematics, Turing failed to win a scholarship to Trinity College, Cambridge, and went on to the college of his second choice, King's College, Cambridge. He graduated it with a distinguished degree, and after that was elected a Fellow at King's. Then he moved on to Princeton University. It was during this time that he explored what was later called the "Turing Machine". (6)

Turing helped pioneer the concept of the digital computer. The Turing Machine that he envisioned is essentially the same as today's multy–purpose computers. He described a machine that would read a series of ones and zeros from a tape. These ones and zeros described the steps that needed to be done to solve a particular problem or perform a certain task. The Turing Machine would read each of the steps and perform them in sequence, resulting in the proper answer. This concept was revolutionary for the time. Most computers in the 1950's were designed for a particular purpose or a limited

range of purposes. What Turing envisioned was a machine that could do anything, something that we take for granted today. He essentially described a machine which knew a few simple instructions. Making the computer perform a particular task was simply a matter of breaking the job down into a series of these simple instructions. This is identical to the process programmers go through today. He believed that an algorithm could be developed for any problem. The hard part was determining what the simple steps were and how to break down the larger problems. (7)

During World War II, Turing used his knowledge and ideas in the Department of Communications in Great Britain. He used his mathematical skills to break German ciphers. The Enigma machines of the German navy were much harder to break as it was able to generate a constantly changing code but this was the type of challenge which Turing enjoyed. Turing contributed several insights into breaking the Enigma machine and was, for a time, head of the section responsible for reading German Naval signals. In 1945, Turing was awarded the OBE for his wartime services. (8)

After World War II, Turing worked for the National Physical Laboratory and continued his research into digital computers. Here he worked on developing the Automatic Computing Engine, one of the first steps at creating a true digital computer. It was during this time that he began to explore the relationship between computers and nature. He wrote a paper called “Intelligent Machinery”. This was one of the first times the concept of artificial intelligence was raised. (9)

Turing believed that machines could be created that would mimic the processes of the human brain. In his mind, there was nothing the brain could do that a well designed computer could not. As a part of his argument, he described devices already in existence that worked like parts of human body, such as television cameras, microphones. (10)

In 1950 he wrote a paper describing what is now known as the “Turing Test”. He proposed a bold measure for machine intelligence: If a person could hold a typed conversation with "somebody" else, not realizing that a computer was on the other end of the wire, then the machine could be deemed intelligent. The test consisted of a person asking questions via keyboard to both a person and an intelligent machine. He believed that if computer's answers could not be distinguished from those of the person after a reasonable amount of time, the machine was somewhat intelligent. This test has become a standard measure of the artificial intelligence community. Since 1990 an annual contest has sought a computer that can pass this "Turing Test." Nobody has yet taken the $100,000 purse. Turing would no doubt be delighted that engineers all over the world are still trying. (11)

Turing left the National Physical Laboratory before the completion of the Automatic Computing Engine and moved on to the University of Manchester. There he worked on the development of the Manchester Automatic Digital Machine (MADAM). He truly believed that machines would be created by the year 2000 that could replicate the human mind. He worked to create the operating manual for the MADAM. (12)

One major aspect of Turing’s life that often goes unnoticed is his work in biology. He worked from 1952 until his death on mathematical biology, specifically

morphogenesis. He published one paper on the subject called "The Chemical Basis of Morphogenesis". Later papers went unpublished until 1992 when Collected Works of A.M. Turing was published. (13)

Turing was himself an enigma. He adored maps and chess as a child and survived the brutal boarding school system by withdrawing into eccentricity. Later he found solace in distance running. Although he was completely open about his sexuality, he lived a secret life forbidden to talk about research he was doing due to the Official Secrets Act. Soon his security clearance was withdrawn. Security officers were now extremely worried that someone with complete knowledge of the new decoding and intelligence work going on at GCHQ was now labelled a security risk. He had many foreign colleagues, as any academic would, but the police began to investigate his foreign visitors. (14)

In 1954, at 41, he died suddenly of cyanide[1] poisoning, from eating a cyanide-poisoned apple. The apple itself was never tested for contamination with cyanide. It is interesting that this method of self-poisoning was similar to Turing's favourite film Snow White and the Seven Dwarfs[2]. The official explanation was that it was a "moment of mental imbalance". But his mother said he used to experiment with household chemicals, trying to create new substances and became careless. Others claimed he was embarrassed about his sexuality. (15)

Whatever the reason for his death, Turing was truly one of the great forerunners in the field of computers leaving the world a permanent legacy. Computers have revolutionised so many aspects of our world that today it is hard to imagine life without them. But today's computer scientists still refer to his papers. The concept of the algorithm lies at the heart of every computer program for any type of digital computer. It is very conceivable that his idea of thinking machines by the year 2000 is not so far from the truth. (16)

Since 1966, the Turing award has been given annually by the Association for Computing Machinery to a person for technical contributions to the computing community. It is widely considered to be equivalent of the Nobel Prize in the computing world. (14)

(Adapted form the Internet sites)

- [1] цианин
- [2] гном

4 Look back in the text and make a list of Turing's inventions and advances.

5 Read the text again and answer the following questions.

a) Where and when was Turing born?
b) What kind of education did he get?
c) What difficulties did he have in education? Why?
d) Did he enjoy his studies at the University? Why?

e) What field did he work in?
f) What contribution did he make into the development of digital computers?
g) What did he mean under the concept of artificial intelligence?
h) Why did he have to live a secret life?

Vocabulary

1 Fill in the table with the missing words. Consult the dictionary if necessary.

action	activity/result of action	person/device	characteristic
publish			
		processor	-
	generality		
		computer	
program			
			creative
	criticism		
		educator	
generate			
			contributed
	experiment		

2 Put the following phrases under the correct heading.

Turing machine, vote recorder, radio wave, anti-craft gun, Fourier integral, tin foil phonograph, code breaker, Touberian theorem, cellular telephone, fluorescent light, nuclear weapon, development laboratory, incandescent lamp, microwave device, control system, Brownian motion, amateur interest, Direchlet's problem, gold medal, Nobel Prize, computer buffs, step-up transformer, alkaline battery, acid storage batteries, wireless message, education problems

a) **name**+noun **Turing** test
b) noun+**part** turbine **engine**
c) **person/activity**+noun **development** laboratory
d) **material**+noun **cyanide** poisoning
e) **function**+noun **attack** vehicle
f) **property**+noun **solar** energy

3 Look back in the text and make a list of education terms.

4 Match a word in column **A** with the word or phrase in column **B** to make word combinations from the text.

A	B
1) solve	a) manual
2) distinguished	b) problem
3) civil	c) degree
4) show	d) time
5) earn	e) service
6) waste	f) affinity
7) concept of	g) respect
8) operating	h) algorithm

5 Look back in the text and find the words that have an opposite meaning to:

a) smart(1)
b) destruction(1)
c) military (3)
d) stupidity (3)
e) illiterate (4)
f) inexact (4)
g) to succeed (6)
h) wish (6)
i) repair (7)
j) approximate(7)
k) natural (9)
l) permitted (14)
m) temporary(16)

6 Complete the following sentences with the prepositions if necessary.

a) Turing's genius did not earn him respect **….**the teachers at Sherborne.
b) Turing aimed ….creating machines that would mimic the processes of the human brain.
c) Alan was awarded …. a distinguished degree after graduating from King's college.
d) Turing contributed …. the development of the digital computer.
e) Turing died suddenly…. cyanide poisoning at the age of 41.
f) During WWII Turing was a head of the section responsible …. reading German Naval signals.

7 Explain the italicized parts of the following sentences in your own words.

a) Very early in life, *Turing showed signs of the genius* he was to display more prominently later.
b) Turing's natural inclination toward mathematics and science *did not earn him respect* with the teachers at Sherborne.
c) What Turing envisioned was a machine that could do anything, *something that we take for granted today.*
d) Machines will be created by the year 2000 that *can replicate the human mind*.
e) The concept of the algorithm *lies at the heart* of every computer program for any type of digital computer.

8 Give the English equivalents to the following words and word combinations:

стеснительный, неуклюжий, поступать в университет, заслуженная степень, склонность, не удаваться получит стипендию, отравление химикатами, ссылаться на, ежегодные соревнования, испытывать смущение по причине чего-либо, решать проблему, заболеть, концептуальный прорыв, делать упор на, природная склонность к, сыграл свою роль, проявил гениальность, предчувствие смерти, выполнять определенные задания, взаимосвязь между природой и машинами

Grammar

1 Write the sentences using the prompts:

*Model***:** A machine **will read** a series of ones and zeros from a tape. (Turing described a machine) - Turing described a machine that **would read** a series of ones and zeros from a tape. - *Тюринг описал машину, которая* ***будет считывать*** *с пленки ряды единиц и нулей.*

will can may Present Simple - *take* Present Prog. - *is doing* Past Simple - *took*	changes to	would could might Past Simple - *took* Past Prog. - *was doing* Past Perfect - *had taken*

a) A machine can do anything, something that we take for granted today. (He envisioned a machine)
b) Machines will be created by the year 2000 that can replicate the human mind.(He truly believed)
c) Wireless waves are not affected by the curvature of the Earth. (Guglielmo Marconi determined to prove)
d) Information is no different than any other quantity and therefore can be manipulated by a machine. (Shannon believed)
e) According to a binary system a switch in the on position will equate to one and in the off position, it will be a zero. (Shannon theorized)
f) He will hear his own words. (Edison knew)

2 Translate paragraphs 7 and 10 into Russian.

Speaking

1 Look through the text and divide it into parts. Summarize the text in no more than 15 sentences using your plan.
2 Comment on the following statements:
   a) Turing is the founder of modern computer science.
   b) Turing's scientific and research contributions to the world science are enormous.
   c) Alan Turing is a man of contrasts.
   d) Alan Turing is a farsighted mathematician.

3 How do these quotations by Alan Turing characterize him?
   a) "Science is a differential equation. Religion is a boundary condition."
   b) "We can only see a short distance ahead, but we can see plenty there that needs to be done."
   c) "A computer would deserve to be called intelligent if it could deceive a human into believing that it was human."
   d) "Mathematical reasoning may be regarded rather schematically as the exercise of a combination of two facilities, which we may call intuition and ingenuity."
   e) "I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted."

4 Work in groups of 3-4. Make a list of things you would like to know about Alan Mathison Turing. Choose one, find information and make a poster presentation. (Read instruction on pages 33 task 4)

Points for reflection

1 Have you learnt anything new about Charles Babbage from this unit?
2 What made the greatest impression on you?
3 Has anything surprised you?
4 Did you like the text? Why? /Why not?

Unit 4 William H. Gates (1955)

Before you read

1 You are going to read the text about life and work of the American outstanding figure Bill Gates. Before you read the text answer the following questions:
a) What do you know about William Gates?
b) Is he a scientist or an inventor?

c) Why is his name famous all over the world?
d) What is the Gates' contribution to the computer science?
e) How has his work changed the way we live?

Reading

1 Read and pay attention to the correct pronunciation of the following words:

executive	[ɪg´zekjətɪv]	Altair	[´ɔ:lteər]
Microsoft	[´maɪkrə´sɔft]	technology	[tek´nɔlədʒɪ]
Seattle	[sɪ´ætl]	success	[sək´səs]
programming	[´prəugræmɪŋ]	piracy	[´paɪrəsɪ]
career	[kə´rɪə]	philanthropy	[fɪlænθrəpɪ]
software	[´sɔftweə]	royalties	[´rɔɪəltɪs]

2 Here are some international words from the text. Guess their meaning. Consult the dictionary if necessary.

office, corporation, elementary, president, version, contact, innovation, investor, role, golf, bridge, business

3 Read the text and think of a proper title for it.

* * *

Рис. 4.
William H. Gates

William (Bill) H. Gates III is co-founder, chairman and chief executive officer of Microsoft Corporation, the world's leading provider of software for personal computers. (1)

Bill Gates was born on October 28, 1955. He and his two sisters grew up in Seattle. Their father, William H. Gates II, is a Seattle attorney[1]. Mary Gates, their mother, was a schoolteacher, University of Washington regent[2] and a chairwoman of United Way International. Gates attended public elementary school before moving on to the private Lakeside School in North Seattle. It was at Lakeside that Gates began his career in personal computer software, programming computers at age 13. (2)

In 1973, Gates entered Harvard University as a freshman, where he lived down the hall from Steve Ballmer, who is now Microsoft's president. While at Harvard, Gates developed a version of the programming language BASIC for the first microcomputer - the MIT's Altair. BASIC was first developed by John Kemeny and Thomas Kurtz at Dartmouth College in the mid-1960s.In his junior year, Gates dropped out of Harvard to devote his energies full-time to Microsoft, a company he had started in 1975 with his boyhood friend Paul Allen. Guided by a belief that the personal computer would be a

valuable tool on every office desktop and in every home, they began developing software for personal computers. (3)

Gates' foresight and vision regarding personal computing have been central to the success of Microsoft and the software industry. Gates is actively involved in key management and strategic decisions at Microsoft, and plays an important role in the technical development of new products. Much of his time is devoted to meeting with customers and staying in contact with Microsoft employees around the world through e-mail. (4)

Under Gates' leadership, Microsoft's mission is continuously to advance and improve software technology, and to make it easier, more cost-effective and more enjoyable for people to use computers. The company is committed to a long-term view, which is reflected in its investment of some $2.6 billion for research and development during the current fiscal year. (5)

Microsoft helped to make the computer easier to use with its developed and purchased software, and made it a commercial success. The success of Microsoft began with the MS-DOS computer operating system that Gates licensed to IBM. Gates also set about protecting the royalties[3] that he could get from computer software by aggressively fighting against all forms of software piracy, effectively creating the retail[4] software market that exists today. This move was quite controversial at the time as it was the freedom of sharing that produced much innovation and advances in the newly forming software industry. But it was this stand against software piracy, that was to be central in the great commercial success that Microsoft went on to achieve.(6)

With his great success in the computer software industry also came many criticisms. With his ambitious and aggressive business philosophy, Gates or his Microsoft lawyers have been in and out of courtrooms fighting legal battles almost since Microsoft began. The Microsoft monopoly sets about completely dominating every market it enters through either acquisition, aggressive business tactics or a combination of them. Many of the largest technology companies have fought legally against the actions of Microsoft, including Apple Computer, Netscape, Opera, WordPerfect, and Sun Microsystems.(7)

In 1995 Gates wrote The Road Ahead, his vision of where information technology will take society. Co-authored by Nathan Myhrvold, Microsoft's chief technology officer, and Peter Rinearson, The Road Ahead held the No. 1 spot on the New York Times' bestseller list for seven weeks, and remained on the list for a total of 18 weeks. Published in more than 20 countries, the book sold more than 400,000 copies in China alone. (8)

In 1996, while strategically changing Microsoft to take advantage of the emerging opportunities created by the Internet, Gates thoroughly revised The Road Ahead to reflect his view that interactive networks are a major milestone in human communication. The paperback second edition also has become a bestseller. Gates is donating his money from the book to a non-profit fund that supports teachers worldwide who are incorporating computers into their classrooms. (9)

In addition, Gates is interested in biotechnology. He sits on the board of the ICOS Corporation and is a shareholder in Chiroscience Group of the United Kingdom and its wholly owned subsidiary, Chiroscience R&D Inc. (formerly Darwin Molecular) of Bothell, Wash. He also founded Corbis Corporation, which is developing one of the largest resources of visual information in the world - a comprehensive digital archive[5] of art and photography from public and private collections around the globe. Gates also has invested with cellular telephone pioneer Craig McCaw in Teledesic. (10)

With an estimated wealth of $46.6 billion in 2004, Bill Gates is the richest man in the world and he should be starting to get used to the number spot as he has been there from the mid-nineties up until now. The famous investor Warren Buffett is gaining on Gates though with an estimated 2.9 billion in 2004. According to the Forbes business magazine Paul Allen, Microsoft co-founder is the 5th richest man in the world with an estimated $21 billion. While Bill Gates' long time friend and Microsoft CEO, Steve Ballmer is the 19th richest man in the world at $12.4 billion. (11)

In the dozen years since Microsoft went public, Gates has donated more than $800 million to charities, including $200 million to the Gates Library Foundation to help libraries in North America take advantage of new technologies and the Information Age. In 1994 Gates established the William H Gates Foundation, which supports a variety of initiatives of particular interest to Gates and his family. The focus of Gates' philanthropy is in four areas: education; world public health and population; non-profit, civic and arts organizations; and Puget Sound-area capital campaigns. (12)

Bill and Melinda French Gates were married on January 1, 1994. They have one child, Jennifer Katharine Gates, who was born in 1996. Gates is an avid reader, and enjoys playing golf and bridge. (13)

(Adapted from the Internet sites)

- [1] прокурор
- [2] член совета в университете
- [3] авторский гонорар
- [4] розничная торговля
- [5] архив

4 Read the text again and answer the following questions.

a) What position does Bill Gates hold in Microsoft?
b) What is the range of his contributions?
c) Did he enjoy his studies at the university?
d) Why did he give up his studies at the university?
e) What priorities does Bill Gates have?
f) What people influenced Bill Gates work?
g) What is the area of Bill Gates' philanthropy?
h) Why was Microsoft so successful?
i) Why do you think Bill Gates protects the royalties so strongly?

j) How can you characterize Bill Gates?

Vocabulary

1 Match the prefixes with their meanings.

pre- multi- trans- semi- bi- post- con- inter- micro- fore- mini- co- mono- sub- mega- mid-	size time & order location number together, with

Use the prefixes from the table to change meaning of the words below. Add at least 3 more words to each group.

founder, byte, worker, conductor, night, land, phone, war, level, change, communication, organism, editor, media, processor, script, point, action, system, , Atlantic, computer, cellular, author, purpose, cycle, face, chrome, port, communication, organism, ordinate, father

2 Look back in the text and make a list of terms related to Computer Science.

3 Look back in the text and find words that have a similar meaning to:

a) to create (3)
b) to dedicate (3)
c) staff (4)
d) consumer (5)
e) to make better (5)
f) progress (6)
g) to finance (9)
h) appear (9)
i) gain (9)
j) to maintain (10)

4 Complete the following sentences with the prepositions if necessary.

a) In his junior year Gates dropped …. of Harvard to devote his energies full-time to Microsoft.
b) Gates is actively involved … key management and strategic decisions at Microsoft.
c) Gates devotes a lot of time … meetings with customers.
d) Gates is donating a lot of money … a non-profit fund.
e) Gates invested … a cellular telephone company.
f) Gates foundation supports …. a variety of initiatives of particular interest to Gates and his family.
g) Warren Buffett is gaining …. Gates though with an estimated 2.9 billion in 2004.

5 Explain the italicized part of the sentence in your own.

a) But it was *this stand against* software piracy that was to be central in the great commercial success that Microsoft went on to achieve.
b) He *sits on the board* of the ICOS Corporation and is a shareholder in Chiroscience Group of the United Kingdom.
c) Gates should be starting *to get used to the number spot* as he has been there from the mid-nineties up until now.
d) It *produced much innovation* and advances in the newly forming software industry.

6 Give the English equivalents to the following words and word combinations:

принимать стратегическое решение, главный исполнительный директор, председатель, ведущий поставщик, первокурсник, дальновидность, вдохновленный верой, отражать, разделение, делать пожертвования, вовлекать в работу, филиал, состояние, оценивать, бросить университет, посвятить всю свою энергию и время, переписываться по электронной почте, довольно противоречивый, только что сформировавшееся общество

Grammar

1 Rewrite the sentences to emphasize the words in bold. Use **when**, **that**, **who**, **in which**, etc. Translate the sentences.

Model: **The freedom of sharing** produced much innovation and advances in the newly forming software industry. - **It was** the freedom of sharing **that** produced much innovation and advances in the newly forming software industry. – ***Именно*** *свободный обмен способствовал многим новшествам и разработкам в формирующейся сфере создания программного обеспечения.*

a) In his **work** On the Economy of Machinery and Manufactures Babbage proposed an early form of operational research.
b) **On June 14 1822** Babbage's computing career began.
c) **Turing** made the critical conceptual breakthrough, almost as an aside in a paper he wrote while in his 20s.
d) **During this time** Turing began to explore the relationship between computers and nature.
e) Here Tesla's disagreement with Edison over direct current versus alternating current began and soon led to the war of the currents.
f) **Tesla** figured out why a generator worked.
g) In the **work** "The Mathematical Theory of Communications" Shannon first introduced the word "bit".

2 Rewrite the sentences according to the model paying attention to the part in bold. Translate them into Russian.

Model: **Published** in more then 20 countries, the book sold more than 400,000 copies in China alone. – The book **was published** in more than 20 countries, **and** it sold more than 400,000 copies in China alone. – ***Будучи опубликованной (Когда книгу опубликовали…, при опубликовании…, если …, как только …)*** *в более чем 20 странах мира, только в одном Китае было распродано 400,000 экземпляров.*

a) **Co-authored** by Nathan Myhrvold and Peter Rinearson, The Road Ahead held № 1 spot on the New York Times' bestseller list for seven weeks.
b) **Built** from his original plans, not only did Difference Engine work, it worked exceptionally well.
c) **Seriously disappointed** in the mathematical instruction at Trinity College, Babbage and his friends formed the Analytical Society to bring the modern continental mathematics to Cambridge.
d) **Guided** by a belief that the personal computer would be a valuable tool on every office desktop and in every home, Gates and Allen began developing software for PCs.
e) **Dismissed** as a crackpot during his own lifetime, Babbage has been relegated to the footnotes of history.
f) **Amazed** at the range and potential of Tesla's achievements, the industrialist and inventor George Westinghouse suggested Nikola Tesla a partnership in further development of alternating current systems.
g) **Determined** to prove that wireless waves were not affected by the curvature of the Earth, Marconi used his system for transmitting the first wireless signals across the Atlantic between Cornwall, and Newfoundland.
h) **Educated** by his father, Norbert Wiener benefited much form Leo's wide range interests.

3 Match the parts of the sentences:

MIT		Microsoft Disk Operating System
D.C.		direct current
BASIC		binary digit
R&D	stands for	Manchester Automatic Digital Machine
Ltd		International Business Machine
MADAM		Incorporated
IBM	means	personal computer
Inc.		Microcomputers software
PC		alternating current
Bit	is shortened from	Research and development
MS-DOS		Limited
A.C.		Massachusetts Institute of Technology
Microsoft		Beginner's All-purpose Symbolic Instruction Code

4 Translate paragraphs 3 and 4 into Russian

Speaking

1 Sum up the text using the following key points:

a) Gates' origin
b) Gates' interests
c) His achievements
d) Gates' philanthropy

2 Comment on the following statements:

a) Gates' foresight and vision have been central to the success of Microsoft and the software industry.
b) Microsoft greatly company affected life of people.
c) Bill Gates is the richest man in the world.
d) Gates is a co-founder of Microsoft.

3 Work in groups of 3-4. Make a list of things you would like to know about Bill Gates. Choose one, find information and make a poster presentation. (Read instruction on pages 33 task 4)

Points for reflection

1) Have you learnt anything about Gates from the text?

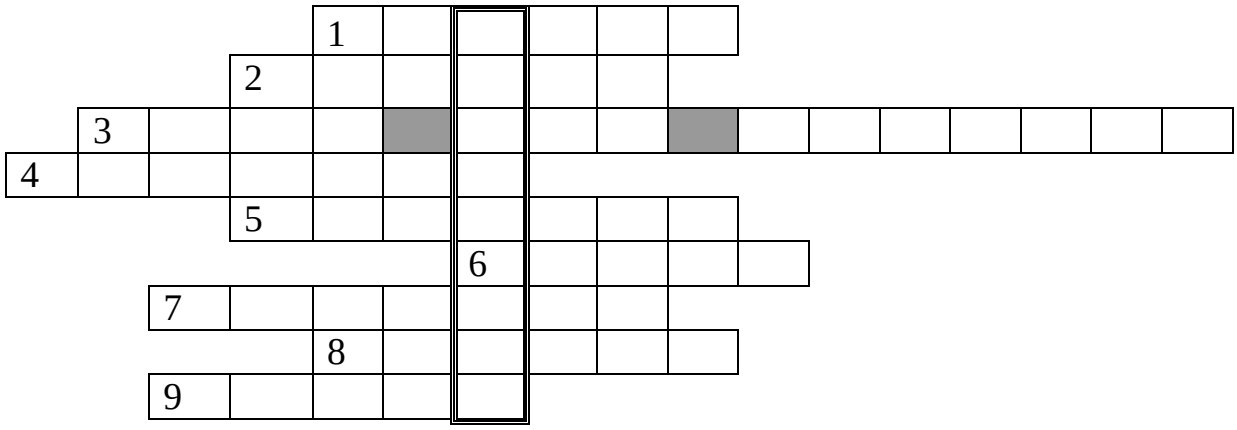
2) What makes the greatest impression on you?
3) Has anything amazed you?
4) Did you like the text? Why? /Why not?

Unit 5 Follow Up Activities

1 Match the scientists and their achievements.

Thomas Edison	MS operating system
Nikola Tesla	the Difference Engine
Guglielmo Marconi	alkaline battery
Norbert Wiener	the Theory of Information
Charles Babbage	the Automatic Computing Engine
Alan Turing	terrestrial stationary waves
Bill Gates	cybernetics
Claude Shannon	radio

2 Do the crossword to write the word in bold.



1) The inventor who said: “Genius is 1 percent inspiration and 99 percent perspiration”.
2) The Jew who was a pacifist but had to wear a uniform during the World War II.
3) The mathematician who has given his name to modern computers.
4) An inventor whose amazing ideas were ridiculed by contemporaries but have been viable by modern scientists and engineers.
5) The mathematician whose work saw application in the disciplines in which a language is a factor.
6) An American of Serbian ancestry who never put a sketch on paper until the whole idea of a device was worked out mentally.
7) The most famous “looser” awarded the Nobel Prize.
8) The mathematician who is credited with breaking the Enigma machine codes.

9) The richest philanthropist in the world.

3 Every scientists/inventor has his/her own peculiarities, e.g.: Alfred Nobel is known as a man of contrasts. What would you say about the scientists and inventors you have read. Give reasons for your opinion.

E.g.: Nikola Tesla - a man out of time
Alan Turing - the man who knew too much

4 Make a poster presentation (group work)

Step One - Brainstorm and discuss the ideas on what points to highlight in your poster.

Step Two - Develop the materials you want to include in your poster into separate paragraphs. Write each paragraph on a separate piece of paper.

Step Three - Structure your text. Discuss the order and place of each paragraph on your poster.

Step Four - Proofread the material checking the spelling, punctuation, grammar and vocabulary.

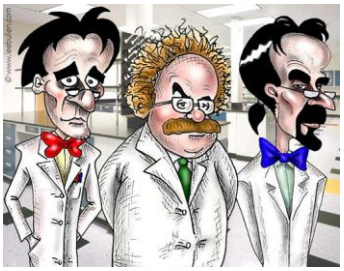
Step Five - Choose a person to design the poster. Help him/her to make necessary additions (photos, diagrammes, etc.)

Step Six - Choose a person to present your poster in class. Help him/her with the pronunciation and intonation.

Step Seven - Pin the poster on the wall of the classroom and make your presentation.

5 To find information on other scientists and inventors in the fields of information technologies, physics, mathematics, engineering, use Hotlist «Outstanding Scientists and Inventors».

Outstanding Scientists and Inventors



"Genius is 1 percent inspiration and 99 percent perspiration" - T.A. Edison

Individual reading is an integral part of the English language course that allows you to widen the limits of any topic you study. The hotlist "Outstanding

Scientists and Inventors" brings you face-to-face with the extraordinary scientists, thinkers and pioneers who have shaped our world. It is an index of supplementary reading material.

Individual reading class takes place once a month. The requirements are:

1) Choose a scientist or inventor who made a significant contribution into further development of physics, engineering, mathematics, computer science, information technology, systems analysis.

2) Read and translate into Russian the biography of the scientist/inventor (5000 characters).

3) Sum up the information you have read in no more than 10 sentences, highlighting the most important and interesting facts in the scientist/inventor's life and work.

4) Practice reading aloud one of the paragraphs – check the pronunciation of the proper names, terms, etc.

Links:

- Eric Weisstein's World of Scientific Biography - A database of very brief biographies for over 1,000 figures in science
  http://scienceworld.wolfram.com/biography/

- The MacTutor History of Mathematics archive - Comprehensive collection of biographies and history of mathematics articles
  http://www-history.mcs.st-and.ac.uk/

- Academy of US Achievement: Science and Exploration - Collection of Biographies of US explorers, profiles and interviews with them.
  http://www.achievement.org/autodoc/halls/sci

- Biographies PolySearch Engine - Search for biographical information, sketches, and full biographies of famous and infamous scientists.
  http://www2.hawaii.edu/~jacso/extra/egyeb/poly-bio.htm

- Scientists, Inventors and Explorers - Guide to science biography indexed by subject and academic level, timelines and science on stamps
  http://www.juliantrubin.com/sciencebiography.html

- Nobel prize.org - All related information on all Nobel Prize Laureates,

biographies, autobiographies, interviews and lectures
http://nobelprize.org/nobel_prizes/

- About:Inventors - A collection of biographies of famous inventors indexed in alphabetical order
  http://inventors.about.com/library/bl/bl1_1.htm

- Cybernetics and Systems Thinkers - a list of the most influential theorists in the field of cybernetics and systems theory and related domains
  http://pespmc1.vub.ac.be/CSTHINK.html

- Inventor of the Week Archive
  http://web.mit.edu/invent/iow/i-archive-ct.html

- John von Neumann - Genius of Man and Machine
  http://light-science.com/vonneumann.html

- Ludwig von Bertalanffy
  http://www.isss.org/lumLVB.htm

- John Nash – Autobiography

http://nobelprize.org/nobel_prizes/economics/laureates/1994/nashautobio.html

- Wernhen von Braun
  http://history.msfc.nasa.gov/vonbraun/bio.html

- Free Russian English Dictionary and English to Russian online
  http://www.rustran.com/

- Online Dictionary, Language Guide, Foreign Language and Etymology - allows sound
  http://www.allwords.com/

- Dictionary - MSN Encarta - Online dictionary with over 100000 entries, definitions, and pronunciation
  http://encarta.msn.com/encnet/features/dictionary/dictionaryhome.aspx

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http://wizard.4teachers.org/builder/worksheet.php3?ID=97886

This site was created by HPR*TEC Web Worksheet Wizard 3.0.
2007

6 Participate in a Student Conference

Hold a mini-conference in your group devoted to the outstanding people in your field of science (information technologies, mathematics, physics, engineering, systems analysis). Prepare a five-minute presentation on the scientist's biography and work.

a) Find information on any scientist or inventor who is the most interesting from the point of view of the biography and contribution. Think of bits that might get listeners interested.
b) Develop the materials into separate paragraphs. Write each paragraph on a separate piece of paper.
c) Structure your text. Decide on the order of each paragraph.
d) Write the text as a whole, adding introduction, conclusion and links between paragraphs.
e) Think of a "catchy" beginning and an interesting ending but be brief.
f) Proofread the material checking the spelling, punctuation, grammar and vocabulary
g) Practise to be very precise with time: rehearse it.
h) Don't forget you must speak, not read.
i) Use various visual aids (handouts, PowerPoint, photos, sound) to make your presentation interesting and captivating.
j) Be ready to answer any questions that might arise.

KEYS

Unit 1 Claude Shannon

Reading

5) a) True
b) True
c) False
d) False
e) False
f) True
g) False
h) True
i) True

Vocabulary

1

-ment	-ship	-tion	-ism
encouragement development measurement	*relationship* scholarship partnership	*application* graduation introduction emulation information motivation operation generation definition	*mechanism* criticism

-ance/-ence	-er/-or	-ty
appliance significance conference intelligence existence distance appearance	*inventor* farmer computer conductor cryptographer generator	*possibility* reliability

3 1) c 2) d 3) j 4) f 5) g 6) e 7) a 8) I 9) h 10) b

4 a) received
b) conducting
c) eventually
d) put forth
e) charged with
f) brand-new
g) significance
h) field
i) plenty of

5 a) from b) with c) of d) at e) in f) up, with g) in

6 mathematically precocious, received scientific encouragement, showed an affinity for, graduated from university, conduct scientific research, eventually, coin the term, put forth theories, paper, doctorate in mathematics, error-correcting code,

according to, binary digit, set the stage, lie at the core, scientific contribution, artificial intelligence, application

Grammar

1

a) It happened that entropy was equivalent to a shortage in the information content in a message.
b) It seemed that he has spent much of his free time reading scientific and technical books.
c) It was said that he has taught himself to read in three weeks and has shown an early affinity for numbers and puzzles.
d) It is often considered that Alan Turing is the father of modern computer science.
e) Moreover it proved that a signal was sent without distortion.
f) It was known that he was an expert juggler who was often seen juggling three balls while riding a unicycle.

Unit 2 Norbert Wiener

Reading

5 1c 2b 3a 4e 5d

Vocabulary

1

-en	-ize	en-
deepen	*realize*	*entitle*
strengthen	sympathize	encourage
shorten	militarize	ensure
widen	formalize	enrol (l)
	visualize	enclose
	theorize	encounter
	minimize	envisage
	maximize	
	realize	
	specialize	
	criticize	
	organize	

3 Brownian motion, the Fourier integral, Dirichlet's problem, harmonic analysis, mathematical logic, the Tauberian theorems

4 to accumulate flowers, to arrange ideas, sophisticated abilities, to accept a letter

6 a) on b) – c) to d) from e) from f) into

7 to formalize; the organization of society; amateur; to earn one's living; to break out; to be rejected for a position; to be a Nazi sympathizer; to keep in a secret; scientific research team; the brightest researchers; hypersensitive personality; the premature end; to improve the standard of living; to overcome economic underdevelopment; political interference; nuclear weapons; heart attack, to accumulate a personal library, the founder of cybernetics, to refuse to accept any government funding

Grammar

1

a) **After Leo had arrived to New Orleans in 1880,** he tried his hand at various jobs in factories and farms.
b) **After Babbage had leaved the academy**, he continued to study at home, having an Oxford tutor to bring him up to university level
c) **After Wiener had returned to Harvard next year,** he still continued his philosophical studies.
d) **After Wiener had won the US National Medal of Science in 1964,** he published one of his last books called "God and Golem, Inc.: A Comment on Certain Point Where Cybernetics Impinges on Religion."
e) **After Shannon had reduced information to a series of ones and zeros**, he noticed that it could be processed by using on-off switches.
6) **After Tesla had constructed an instrument to receive radio waves in 1896**, he experimented with this device and transmitted radio waves from his laboratory to the hotel he lived in.

Unit 3 Alan Mathison Turing

Vocabulary

1

action	activity/result of action	person/device	characteristic
publish	**publication**	**publisher**	**public**
process	**process**	processor	**-**
generalize	generality	**general**	**general**
compute	**computation**	computer	**computational**
program	**program**	**programmer**	**programmed**
create	**creation**	**creator**	creative
criticize	criticism	**critic**	**critical**
educate	**education**	educator	**educated**
generate	**generation**	**generator**	**generated**

contribute	**contribution**	**contributor**	contributed
experiment	experiment	**experimentalist**	**experimental**

2

a) Turing Machine, Fourier integral, Touberian theorem, Brownian motion, Direchlet's problem, Nobel Prize
b) amateur interest
c) amateur interest, computer buffs, education problems
d) tin foil phonograph, , gold medal
e) anti-aircraft gun, step-up transformer, acid storage batteries, control system, vote recorder, code breaker,
f) fluorescent light, radio wave, microwave device, incandescent lamp, alkaline battery, nuclear weapon, cellular phone, wireless message

5

a) awkward
b) creation
c) civil
d) genius
e) educated
f) explicit
g) to fail
h) unwillingness
i) break
j) particular
k) artificial
l) forbidden
m)permanent

6 a) with b) at c) - d) into e) of f) for

Grammar

1

a) He envisioned a machine that **could do** anything, something that we **took** for granted today.
b) He truly believed that machines **would be created** by the year 2000 that **could replicate** the human mind.
c) Guglielmo Marconi determined to prove that wireless waves **were** not affected by the curvature of the Earth.
d) Shannon believed that information **was** no different than any other quantity and therefore **could be manipulated** by a machine
e) Shannon theorized that according to a binary system a switch in the on position **would equate** to one and in the off position, it **would be** a zero.
f) Edison knew that he **would hear** his own words.

Unit 4 William H. Gates

Vocabulary

1

size	time & order	number	location	together, with
semi-	pre-	mono-	inter-	co-
mini-	post-	bi-	trans-	con-
micro-	fore-	multi-	sub-	
mega-	mid-		mid-	

co-founder, megabyte, co-worker, semiconductor, midnight, midland, microphone, pre-war/post-war, multilevel/sublevel, interchange, intercommunication, microorganism, co-editor, multimedia, co-processor, postscript, midpoint, interaction, micro-system/subsystem, transatlantic, minicomputer/microcomputer, cellular, co-author, multi-purpose, bicycle, interface, monochrome, transport, co-ordinate, forefather

Grammar

1

a) **It was** his **work** On the Economy of Machinery and Manufactures **in which** Babbage proposed an early form of what today we call operational research.
b) **It was** on June 14 1822 **when** Babbage's computing career began.
c) **It was** Turing **who** made the critical conceptual breakthrough, almost as an aside in a paper he wrote while in his 20s.
d) **It was** during this time **when** Turing began to explore the relationship between computers and nature.
e) **It was** here **that** Tesla's disagreement with Edison over direct current versus alternating current began and soon led to the war of the currents.
f) **It was** Tesla **who** figured out why a generator worked.
g) **It was** the work "The Mathematical Theory of Communications" **in which** Shannon first introduced the word "bit".

2

a) **The book** The Road Ahead **was co-authored** by Nathan Myhrvold and Peter Rinearson **and** held № 1 spot on the New York Times' bestseller list for seven weeks.
b) **The Difference Engine was built** from his original plans **and** not only did it work, it worked exceptionally well.
a) **Babbage was seriously disappointed** in the mathematical instruction at Trinity College **and with** his friends formed the Analytical Society to bring the modern continental mathematics to Cambridge.
b) **Gates and Allen were guided** by a belief that the personal computer would be a valuable tool on every office desktop and in every home **and/when they** began developing software for PCs.
c) **Babbage was dismissed** as a crackpot during his own lifetime **and** was relegated to the footnotes of history.

d) **The industrialist and inventor George Westinghouse was amazed** at the range and potential of Tesla's achievements **and** suggested Nikola Tesla a partnership in further development of alternating current systems.
e) **Marconi was determined** to prove that wireless waves were not affected by the curvature of the Earth **and** used his system for transmitting the first wireless signals across the Atlantic between Cornwall, and Newfoundland.
f) **Norbert Wiener was educated** by his father **and** benefited much form Leo's wide range interests.

Unit 5 Follow Up Activities

1

Thomas Edison	alkaline battery
Nikola Tesla	terrestrial stationary waves
Guglielmo Markoni	radio
Norbert Wiener	cybernetics
Charles Babbage	the Difference Engine
Alan Turing	the Automatic Computing Engine
Bill Gates	MS operating system
Claude Shannon	the Theory of Information

2 Do the crossword to write the word in bold

				1E	d	**i**	s	o	n						
			2W	i	e	**n**	e	r							
	3J	o	h	n		**v**	o	n		N	e	u	m	a	n	n
4B	a	b	b	a	g	**e**										
			5S	h	a	**n**	n	o	n							
						6**T**	e	s	l	a						
		7M	a	r	c	**o**	n	i								
				8T	u	**r**	i	n	g							
		9G	a	t	e	**s**										