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THE HISTORICAL BACKGROUND OF INFORMATIONAL TECHNOLOGIES

*Утверждено редакционно-издательским советом университета
в качестве практикума*

УДК 2/3
ББК 81.2 Англ.
    Б 19

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Б 19
        The historical background of informational technologies : практикум / И. Г. Баканова. – Самара : Издательство «Самарский университет», 2010. – 52 с.

        В данном практикуме представлены тексты, направленные на подготовку студентов к практической деятельности: умению работать с научной литературой, осмысливать и интерпретировать аутентичные тексты по компьютерной специальности, вести беседу по профессиональной тематике. Предлагаемый материал разработан на основе оригинальных текстов, знакомящих с историей развития информационных технологий, а также биографическими данными известных ученых, их великими открытиями, представляющими практический и познавательный интерес для обучающихся. Практикум ориентирован как на занятия в аудитории, так и на самостоятельную работу.
        Предназначен для студентов, аспирантов и всех, имеющих базовые знания английского языка и интересующихся актуальными проблемами, связанными с возникновением, развитием и будущим компьютеров.

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МЕТОДИЧЕСКИЕ УКАЗАНИЯ

Практикум «История развития программирования» предназначен для использования на практических занятиях по английскому языку в неязыковых вузах.

Цель данного курса – обучить языковым средствам для эффективного общения с компьютером; пониманию специальных научно-технических текстов в области компьютерных технологий; умению свернуть и развернуть информацию при подготовке рефератов и аннотаций на русском и английском языках; развить творческий потенциал.

Пособие состоит из семи уроков. Первые шесть уроков содержат базовые специальные тексты, снабженные тематическим словарем, а также упражнения, обучающие работе с текстом, извлечению базовой информации, ее обобщению, анализу и устному общению. Лексические упражнения обеспечивают эффективную повторяемость лексических единиц в пределах тематического комплекса. Грамматические упражнения построены на лексике предложенных аутентичных текстов.

В седьмом уроке представлены разнообразные творческие задания, основанные на тематике предшествующих шести уроков. Творческие задания направлены на совершенствование иноязычных навыков и умений по всем видам речевой деятельности. Выполнение этих заданий позволяет закреплять изученный материал и способствует развитию креативных способностей обучающихся по специальности «Компьютерная безопасность».

Ознакомление с историей развития информационных технологий способствует расширению спектра профессиональных знаний у студентов, а выполнение творческих заданий является актуальным для развития креативных способностей.

UNIT 1

PREHISTORY

Think about and discuss the following questions:

1. What are tools?
2. What was the first tool?
3. What helped ape-like creatures evolve into human beings?
4. What is technology?
5. What machines classify and modify information?

Scan the text "From the Abacus to the Computer" to find the author's answers to these questions. Were your answers the same?

Make another prediction. How long do you think it will take you to read through this text?

Read the text. Time yourself.

Text 1. FROM THE ABACUS TO THE COMPUTER

Tools are any objects other than the parts of our own bodies that we use to help us do our work. Technology is nothing more than the use of tools. When you use a screwdriver, a hammer, or an axe, you are using technology just as much as when you use an automobile, a television set, or a computer.

We tend to think of technology as a human invention. But the reverse is closer to the truth. Stone tools found along with fossils show that our ape-like ancestors were already putting technology to use. Anthropologists speculate that using tools may have helped these creatures evolve into human beings; in a tool-using society, manual dexterity and intelligence count for more than brute strength. The clever rather than the strong inherited the earth.

Most of the tools we have invented have aided our bodies rather than our minds. These tools help us lift and move and cut and shape. Only quite recently, for the most part, have we developed tools to aid our minds as well. The so-called mind tools are the machines that classify and modify information rather than merely transmitting it or preserving it. The machines that do this are the computers and the calculators. The widespread use of machines for information processing is a modern development. But simple examples of information-processing machines can be traced back to ancient times. The following are some of the more important forerunners of the computer.

The astrolabe – a historical astronomical instrument used by astronomers, navigators, and astrologers. Its many uses include locating and predicting the positions of the Sun, Moon, planets, and stars; determining local time given local latitude and vice-versa; surveying; and triangulation. It was invented in the first or second centuries BC

The Antikythera mechanism – an ancient mechanical calculator, also described as the first known mechanical computer, designed to calculate astronomical positions. It was discovered in 150-100 BC.

The "castle clock" – an astronomical clock invented by Al-Jazari in 1206 is considered to be the earliest programmable analog computer. It displayed the zodiac, the solar and lunar orbits, a crescent moon causing automatic doors to open every hour and five robotic musicians playing music when they were struck by levers operated by a water wheel. The length of day and night could be re-programmed every day in order to account for the changing lengths of day and night throughout the year.

The abacus – a counting frame that was widely used in parts of Asia for performing arithmetic processes. Early versions of the abacus consisted of a board with grooves in which pebbles could slide. The Latin word for pebble is calculus, from which we get the words abacus and calculate. The Latin word 'abacus' dates before 1387 AD.

The slide rule – a mechanical analog computer which is used for multiplication and division, and also for "scientific" functions such as roots, logarithms and trigonometry, but does not generally perform addition or subtraction. It dates to 1600s.

The Jacquard Loom – an automated machine that used a series of punched paper cards as a template to allow his loom to weave intricate patterns automatically. Jacquard Looms came into widespread use in the early nineteenth century, and their descendants are still used today. The resulting Jacquard loom was an important step in the development of computers because the use of punched cards to define woven patterns can be viewed as an early, albeit limited, form of programmability.

The Difference Engine – an automatic, mechanical calculator designed to tabulate polynomial functions. Both logarithmic and trigonometric functions can be approximated by polynomials, so a difference engine could compute many useful sets of numbers. It was Charles Babbage who obtained a government grant to build the Difference Engine in 1823. He ran into difficulties, however, and eventually abandoned the project. In 1854, a Swedish printer built a working Difference Engine based on Babbage's ideas.

The Analytical Engine – the first programmable computer, complete with punched cards for data input which was designed by Charles Babbage. Babbage gave the engine the ability to perform different types of mathematical operations. The machine was not confined to simple addition, subtraction, multiplication or division. It had its own "memory", due to which the machine could use different combinations and sequences of operations to suit the purposes of the operator The Difference Engine could only compute tables (and only those tables that could be computed by successive additions). But the Analytical Engine could carry out any calculation, just as Jacquard's loom could weave any pattern. All one had to do was to punch the cards with the instructions for the desired calculation. This machine,

which Babbage showed at the Paris Exhibition in 1855, was an attempt to cut out the human being altogether, except for providing the machine with the necessary facts about the problem to be solved. Charles Babbage never finished this work, but many of his ideas were the basis for building today's computers. It is for the Analytical Engine that we honor Charles Babbage as "father of the computer".

How long did it take you to read the passage? (For your information: an American university student could easily read the text in 2 minutes. [758 words])

Vocabulary list:

A calculating device – вычислительное устройство
the abacus – счеты
the slide rule – логарифмическая линейка
the astrolabe – астролябия
analog computer – аналоговый компьютер
the textile loom – ткацкий станок
a machine readable medium – машинно-считывающее средство
key punch machines – клавишно-перфораторные машины
a punched card – перфокарта
relay-based calculator – вычислительное устройство, основанное на реле
a stored program computer – компьютер с занесенной в память программой
difference engine – дифференциальный двигатель
analytical engine – аналитический двигатель

Answer the questions:

1. What was the astrolabe used for?
2. What is the first mechanical computer?
3. Why is the "castle clock" considered to be the earliest programmable analog computer?
4. What did the early versions of the abacus consist of?
5. When does the slide rule date to?
6. Why was the Jacquard loom an important step in the development of computers?
7. What kind of machine was the Difference Engine?
8. What is the difference between the Difference Engine and the Analytical Engine?
9. Charles Babbage is a computer Guru, isn't he?

Translate the following words and word combinations using the information from the text:

Полностью исключить человека; сводить в таблицу многочисленные функции; деление; предоставить машине необходимые данные; расположение; механическое вычислительное устройство; для того, чтобы; мате-

матические операции; корень; ввод данных; забросить проект; предсказание; умножение; последовательность; определение местного времени; перепрограммировать; прибавление; столкнуться с трудностями; удачно сказано; удовлетворять цели оператора; автоматически соединять замысловатые образцы; вычитание; триангуляция.

Use the information you learned from the reading to complete the chart below.

Times	Inventions/Developments	Inventors

Role-play the situation:

This is the beginning of the dialogue: «If there were no computers they had to be thought out». Continue the dialogue.

Topics for discussion:

1. In the beginning was the astrolabe.
2. "Beware of programmers who carry screwdrivers". (L. Brandwein)

Read Text 2 and invent the title to the text in English.

Text 2

Еще в первой половине XIX века английский математик Чарльз Бэббидж попытался построить универсальное вычислительное устройство, то есть компьютер (Бэббидж называл его Аналитической машиной). Именно Бэббидж впервые додумался до того, что компьютер должен содержать память и управляться с помощью программы. Бэббидж хотел построить свой компьютер как механическое устройство, а программы собирался задавать посредством перфокарт – карт из плотной бумаги с информацией, наносимой с помощью отверстий (они в то время уже широко употреблялись в ткацких станках). Однако довести до конца эту работу Бэббидж не смог – она оказалась слишком сложной для техники того времени.

Sum up the information of the text in the English language.

Topics for essays:

1. Preconditions of creating computers.
2. Charles Babbage as a prolific inventor.
3. Differences and similarities between the Analytical Engine and modern computing machinery.

UNIT 2

THE FIRST COMPUTERS

Think about and discuss the following questions:

1. What is the computer? Computers are now widespread (commonplace), aren't they?
2. Have you ever heard about the first computer models? Can you describe any of them?
3. How have computers changed since the first one was introduced in the early 1940s?

How long do you think it will take you to read through this text?

Read the text. Time yourself.

Text 1. SOME FIRST COMPUTER MODELS

The Mark I Computer (1937 – 1944). In 1944 in the United States, International Business Machines (IBM) built a machine in cooperation with scientists working at Harvard University under the direction of Prof. Aiken. The machine, called Mark I Automatic Sequence-Controlled Calculator, was built to perform calculations for the Manhattan Project, which led to the development of atomic bomb. It was the largest electromechanical calculator ever built. It used over 3000 electrically actuated switches to control its operations. Although its operations were not controlled electronically, Aiken's machine is often classified as a computer because its instructions, which were entered by means of a punched paper tape, could be altered. The computer could create ballistic tables used by naval artillery.

The relay computer had its problems. Since relays are electromechanical devices, the switching contacts operate by means of electromagnets and springs. They are slow, very noisy and consume a lot of power.

The ABC (1939-1942). The work on introducing electronics into the design of computers was going on.

The gadget that was the basis for the first computer revolution was the vacuum tube, an electronic device invented early in the twentieth century. The vacuum tube was ideal for use in computers. It had no mechanical moving parts. It switched flows of electrons off and on at rates far faster than possible with any mechanical device. It was relatively reliable, and operated hundreds of hours before failure. The first vacuum tube computer was built at Iowa University at about the same time as the Mark I. The computer, capable to perform thousands of related computations, was called ABC, the Atanasoff-Berry Computer, after

Dr. John Atanasoff, a professor of physics and his assistant, Clifford Berry. It used 45 vacuum tubes for internal logic and capacitors for storage. From the ABC a number of vacuum-tube digital computers developed.

Soon the British developed a computer with vacuum tubes and used it to decode German messages.

The ENIAC (1943-1946). The first all-electronic computer, the Electronic Numerical Integrator and Calculator (ENIAC) was developed at the Moore School of Electrical Engineering of the University of Pennsylvania. It was developed as a result of a military need. J. Presper Eckert and John Mauchly proposed the machine to solve the problem of calculating firing tables for new weapons.

The ENIAC weighed 90 tons, its 18.000 vacuum tubes demanded 140 kilowatts of electric power. Although it was fully electronic, the ENIAC had two major shortcomings: it could store and manipulate only a very limited amount of information, and its programs were wired on board. Since its programs were hardwired – that is, the programs operating the computer were established by physically changing the patterns of the wires interconnecting the vacuum tubes — the machine was not so flexible in operation. These limitations made it difficult to detect errors and to change the programs. And yet, the project was successful and the ENIAC was used for many years to solve ballistic problems.

The EDVAC (1946-1952). Although the idea of an automatic computing engine occurred first to Charles Babbage in 1832, it was more than a century later, in 1945, that John von Neumann set out the principles that fixed the pattern of computer design.

Dr.John von Neumann, professor of mathematics at the Prinston Institute of Advanced Study, together with P. Eckert, J.Mauchly and Goldstine became a project member of a new improved computer, the Electronic Discrete Variable Computer (EDVAC). Von Neumann was a major contributor to the project as he developed the concept of storing instructions as well as data in the memory of the computer. As a result it became possible to replace the writing board, which so seriously handicapped the operation of the ENIAC.

Von Neumann is also given a share of the credit for introducing the idea of storing both instructions and data in a binary code instead of decimal numbers or human-readable words.

The UNIVAC I (1951). P.Eckert and J.Mauchly left the EDVAC project to form their own company and built the UNIVAC I computer. UNIVAC stands for UNIVersalAutomatic Computer. The first UNIVAC was installed in the Census Bureau in 1951, and it was used continuously for 10 years. From the University laboratories the computer finally entered the wider world in 1951 with the invention of first UNIVAC I. It was the first digital computer which was not "one of a kind", it was produced in quantity.

In 1952 IBM (International Business Machine) introduced the 701 commercial computer. Although limited in storage capacity by modern standards, the

701 could add a column of 10-digit numbers as tall as the Empire State Building in one second. Very soon improved models of the UNIVAC I and other 701-series machines were introduced. In 1953 IBM produced the IBM 650 which used a magnetic drum for storage and was popular with business and science.

How long did it take you to read the passage?

Check your predictions about the first computer models. Were you correct?

Vocabulary list:

a digital computer – цифровой компьютер
an analog computer – аналоговый компьютер
sequence – последовательность
a spring – пружина
gadget – вспомогательное устройство; приспособление
storage/memory – запоминающее устройство, память; хранение
to perform computations – выполнять вычисления
a shortcoming – недостаток
to detect errors – находить, обнаруживать ошибки
to manipulate – обрабатывать, преобразовывать; управлять
binary code – двоичный код
to store data and instructions – запоминать информацию и команды
decimal numbers – десятичные числа
a magnetic drum – магнитный барабан

Choose the word to complete each of the following sentences:

1. British scientists invented a/an ... way of multiplying and dividing.
   a) mechanical;   b) electrical;   c) optical
2. A young American clerk invented a means of coding ... by punched cards.
   a) letters;   b) data;   c) numbers
3. Soon punched cards were replaced by ... terminals.
   a) printer;   b) scanner;   c) keyboard
4. Mark I was the first ... computer that could solve mathematical problems.
   a) analog;   b) digital;   c) mechanical
5. J. von Neumann simplified his computer by storing information in a ... code.
   a) analytical;   b) numerical;   c) binary
6. Vacuum tubes could control and ... electric signals.
   a) calculate;   b) amplify;   c) generate
7. The first generation computers were ... and often burned out.
   a) uncomfortable;   b) uncommunicative;   c) unreliable

Translate the following words and word combinations using the information from the text:

С высокой скоростью; вводить инструкции средствами; используемый; поглощать много энергии; в сотрудничестве; под руководством; механически двигающиеся части; относительно надежный; ограниченное количество информации; изменять программы; быть мобильным в действии; производить в некотором количестве; усовершенствованная модель компьютера; заменить записывающую плату; ставить в невыгодное положение; объем памяти.

Use the information you learned from the reading to complete the chart below.

Inventions	Times	Main Characteristics

Invent a conversation:

In pairs, create a role play for the rest of the class. One of you should play the part of a scientist working at the production of the first computer models and the other should play the part of a student writing a report about the first computer models. Think about the questions the student would like to ask the scientist.

Retell the text to:

a pupil	a housewife	a professor

Survey Text 2. Read the first sentence and the last sentence. Do not read anything else. Make a prediction. What do you think this reading is going to be about?

Read the text and see, if your prediction was correct.

Text 2

В 40-х годах XX века сразу несколько групп исследователей повторили попытку Бэббиджа на основе техники XX века – электромеханических реле. Некоторые из этих исследователей ничего не знали о работах Бэббиджа и переоткрыли его идеи заново. Первым из них был немецкий инженер Конрад Цузе, который в 1941 году построил небольшой компьютер на основе нескольких электромеханических реле. Однако из-за войны работы Цузе не были опубликованы. А в 1943 году в США на одном из

предприятий фирмы IBM американец Говард Эйкен создал более мощный компьютер под названием «Марк-1». Он уже позволял проводить вычисления в сотни раз быстрее, чем вручную (с помощью арифмометра), и реально использовался для военных расчетов.

Однако электромеханические реле работали медленно и недостаточно надежно, поэтому начиная с 1943 года в США группа специалистов под руководством Джона Мочли и Преспера Экерта начала конструировать компьютер ENIAC на основе электронных ламп. Созданный ими компьютер работал в тысячу раз быстрее, чем Марк-1. Однако обнаружилось, что большую часть времени этот компьютер простаивал – для задания метода расчетов (программы) в этом компьютере приходилось в течение нескольких часов или даже нескольких дней подсоединять нужным образом провода. Сам же расчет мог занять лишь несколько минут или даже секунд.

Invent the title to the text in English.

Sum up the information of the text in the English language.

Topics for essays:
1. How has the world benefited from the invention of the PC? What problems have accompanied the computer revolution?
2. Of all advantages that the computer has brought to the modern world, which is the most beneficial?
3. Describe the invention that has had the greatest effect on the 20th century.

UNIT 3

THE PATRIARCHS

Think about and discuss the following questions:

1. What do you know about Pascal, Leibniz, and Jacquard?
2. What do you know about the first programmers?
3. When did the first software patriarchs live?
4. Are you a rule learner or a data gatherer?
5. Would you like to become a computer expert?
6. Who can be called a computer wizard? Do you attribute his/her success to hard work or talent?

Make a prediction. How long do you think it will take you to read through this text?

Read the text. Time yourself.

Text 1. ADA LOVELACE

Ada Lovelace, born 10 December 1815, was the only child of the poet Lord Byron and his wife, Anne Isabella "Annabella" Milbanke, who separated from Byron just a month after Ada was born. Four months later, Byron left England forever. Ada never met her father (who died in Greece in 1823) and was raised by her mother, Lady Byron. Her life was an apotheosis of struggle between emotion and reason, subjectivism and objectivism, poetics and mathematics, ill health and bursts of energy.

Lady Byron wished her daughter to be unlike her poetical father, and she wanted Ada to receive tutoring in mathematics and music, as disciplines to counter dangerous poetic tendencies. But Ada's complex inheritance became apparent as early as 1828, when she produced the design for a flying machine. It was mathematics that gave her life its wings.

On 8 July 1835 she married William King, 8th Baron King, later 1st Earl of Lovelace in 1838. Her full title for most of her married life was "The Right Honourable the Countess of Lovelace". They had three children.

Ada exhibited her mathematical talents early in life. One of her family's closest friends was Augustus De Morgan, the famous British Logician. She was well tutored, but always seemed to thirst for more knowledge than her tutors could provide. Ada actively sought the perfect mentor, whom she thought she found in a contemporary of her mother's – Charles Babbage.

The Difference Engine was a machine that performed mathematical computations such as number storage and simple arithmetic. Ada was so intrigued

by this loom-based construction that she translated works from French that discussed the machine. The Difference Engine was only a stepping stone to the greater Analytical Engine, which was never actually built due to lack of adequate funding. Charles Babbage had great difficulty in trying to explain exactly what it was, how it was different from the Difference Engine, and its significance. Ada made a great contribution by properly explaining this machine. She published Observations on Mr. Babbage's Analytical Engine in 1843. This paper explained that the machine used Operation Cards to perform arithmetic on numerical data and respond to symbols representing data. She emphasized the ability to program the machine. It is for this emphasis and development that she is known as the inventor of programming.

The level of impact of Lovelace on Babbage's engines is difficult to resolve due to Babbage's tendency not to acknowledge (either verbally or in writing) the influence of other people in his work. However Lovelace was certainly one of the few people who fully understood Babbage's ideas and created a program for the Analytical Engine. Her prose also acknowledged some possibilities of the machine which Babbage never published, such as speculation that "the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent".

Lovelace died at the age of thirty-six, on 27 November 1852, from uterine cancer and bloodletting by her physicians. She was survived by her three children. She was buried next to the father she never knew at the Church of St. Mary Magdalene in Hucknall, Nottingham.

Ada's accomplishments have been recognized by both her contemporaries, such as Michael Faraday and Charles Wheatstone, and modern computer scientists. In fact, the United States military developed a computer language that is named in her honor. ADA is an object-oriented programming language that is popular in Europe for communication purposes.

How long did it take you to read the passage?

Vocabulary List:

number storage – запоминание чисел
numerical data – числовые данные
an object-oriented programming language – объектно-ориентированный язык
программирования
to perform arithmetic – выполнять арифметические действия

Answer the questions:

1. What was Ada's husband?
2. What was Ada interested in?
3. What was Ada's influence on Babbage?

4. Was Babbage able to complete his long-dreamed-of Analytical Engine without Ada's support?

Scan the text to find the following words. Then, using the context, explain the meaning of each word. After you finish, you can check yourself in a dictionary.

To receive	a mentor
apparent	a contemporary
to exhibit	significance
to thirst	speculation
impact	to recognize
complexity	accomplishment

Translate the following words and word combinations using the information from the text:

Порывы энергии; тщательно, детально разработанный; признавать влияние; воспитываться матерью; назван в ее честь; сложная наследственность; финансирование; коммуникационные цели; апофеоз; противостоять опасным поэтическим тенденциям; простые арифметические действия; большой вклад; выполнять математические вычисления; трудно оценить.

Topics for discussion:

1. Ada as a software prophet.
2. Ada's biography.

Read Text 2:

Text 2. ALAN TURING

Alan Mathison Turing was born on 23 June 1912, the second and last child (after his brother John) of Julius Mathison and Ethel Sara Turing. The unusual name of Turing placed him in a distinctive family tree of English gentry, far from rich but determinedly upper-middle-class in the peculiar sense of the English class system.

Alan Mathison Turing appears now as a British mathematician, logician, cryptanalyst, the founder of computer science, the originator of the dominant technology of the late twentieth century.

Turing was a student of King's College Cambridge and was a graduate student at Princeton University from 1936 to 1938. While at Princeton Turing published "On Computable Numbers", a paper in which he conceived an abstract machine, now called a Turing Machine. In June 1938 he obtained his Ph.D. from Princeton; his dissertation introduced the notion of relative computing.

The concept of the Turing machine has become the foundation of the modern theory of computation and computability. Of his role in the modern computer, Time Magazine in naming Turing one of the 100 most influential people of the 20th century, states: "The fact remains that everyone who taps at a keyboard, opening a spreadsheet or a word-processing program, is working on an incarnation of a Turing machine." The Universal Turing Machine exploits what was later seen as the 'stored program' concept essential to the modern computer: it embodies the crucial twentieth-century insight that symbols representing instructions are no different in kind from symbols representing numbers. But computers, in this modern sense, did not exist in 1936. Turing created these concepts out of his mathematical imagination. Only nine years later would electronic technology be tried and tested sufficiently to make it practical to transfer the logic of his ideas into actual engineering. In the meanwhile the idea lived only in his mind.

Turing studied cryptology. During World War II, he worked in the British Foreign Office. He masterminded operations at Bletchley Park, UK which were highly successful in cracking the Nazis "Enigma" codes during World War II. He devised a number of techniques for breaking German ciphers, including the method of the bombe, an electromechanical machine that could find settings for the Enigma machine.

Some of his early advances in computer design were inspired by the need to perform many repetitive symbolic manipulations quickly. Before the building of the Colossus computer this work was done by a room full of women.

In 1945 he joined the National Physical Laboratory in London and worked on the design and construction of a large computer, named Automatic Computing Engine (ACE). In 1948, he moved to the University of Manchester to work on the Manchester Mark 1, then emerging as one of the world's earliest true computers. In 1949 Turing became Deputy director of the Computing Laboratory at Manchester where the Manchester Automatic Digital Machine, the world's largest memory computer, was being built.

He also worked on theories of artificial intelligence, and on the application of mathematical theory to biological forms. In 1952 he published the first part of his theoretical study of morphogenesis, the development of pattern and form in living organisms.

Near the end of his life Turing became interested in chemistry. He wrote a paper on the chemical basis of morphogenesis and he predicted oscillating chemical reactions such as the Belousov–Zhabotinsky reaction, which were first observed in the 1960s.

Turing died under ambiguous circumstances on 7 June 1954.

Vocabulary List:

artificial intelligence – искусственный интеллект
a mathematician – математик

a logician – логик
a cryptanalyst – дешифровальщик
an abstract machine – абстрактная машина
relative computing – относительные вычисления
computation – вычисление
computability – вычислимость
a word-processing program – программа обработки текстов
a spreadsheet – крупноформатная таблица
a stored program – хранимая программа
cracking – взлом защиты

Answer the questions:

1. What is Alan Turing famous for?
2. What's a universal Turing machine?
3. Where did Turing study?
4. What sciences was Turing interested in?
5. What works did Turing publish?

Scan the text to find the following words. Then, using the context, explain the meaning of each word. After you finish, you can check yourself in a dictionary.

Distinctive	to appear
determinedly	a founder
to conceive	foundation
essential	to mastermind
to embody	to emerge

Translate the following words and word combinations using the information from the text:

Применение математической теории; получил степень доктора философии; взлом шифров; неясные обстоятельства; осциллирующие химические реакции; нетитулованное мелкопоместное дворянство; воплощение; математическое воображение; компьютер с самой большой в мире памятью; быстро выполнять вычисления.

Topics for discussion:

1. The essential idea of the machine doesn't change in the long run?
2. Turing's insights were a way to the invention of digital computers.
3. Turing as a mathematical prodigy.

Read Text 3:

Text 3. JOHN VON NEUMANN

John von Neumann (December 28, 1903 – February 8, 1957) was a Hungarian American mathematician who made major contributions to a vast range of fields, including set theory, functional analysis, quantum mechanics, ergodic theory, continuous geometry, economics and game theory, computer science, numerical analysis, hydrodynamics (of explosions), and statistics, as well as many other mathematical fields. He is generally regarded as one of the foremost mathematicians of the 20th century. The mathematician Jean Dieudonné called von Neumann "the last of the great mathematicians." Most notably, von Neumann was a pioneer of the application of operator theory to quantum mechanics, a principal member of the Manhattan Project and the Institute for Advanced Study in Princeton (as one of the few originally appointed), and a key figure in the development of game theory and the concepts of cellular automata and the universal constructor. Along with Edward Teller and Stanislaw Ulam, von Neumann worked out key steps in the nuclear physics involved in thermonuclear reactions and the hydrogen bomb.

Speaking about von Neumann's contribution to computer science it should be said that John von Neumann was the center of the group who created the "stored program" concept that made truly powerful computers possible, and he specified a design of almost all computers – the "von Neumann architecture" – the single-memory architecture. Von Neumann wrote an incomplete set of notes titled «The First Draft of a Report on the EDVAC». The paper, which was widely distributed, described a computer architecture in which data and program memory are mapped into the same address space. This architecture became the de facto standard and can be contrasted with a so-called Harvard architecture, which has a separate program and data memories on a separate bus. With very few exceptions, all present-day home computers, microcomputers, minicomputers and mainframe computers use this single-memory computer architecture.

Vocabulary List:

set theory – теория множеств
ergodic theory – эргодическая теория
numerical analysis – численный анализ
cellular automaton – ячеистый (клеточный) автомат
functional analysis – функциональный анализ
quantum mechanics – квантовая механика
continuous geometry – непрерывная геометрия
game theory – теория игр
nuclear physics – ядерная физика

a bus – шина

a mainframe computer – универсальная вычислительная машина

Answer the questions:

1. Who was John von Neumann?
2. What did John von Neumann create and specify?
3. What did John von Neumann create for computation?
4. What did the paper describe?

Scan the text to find the following words. Then, using the context, explain the meaning of each word. After you finish, you can check yourself in a dictionary.

Vast	to map
a pioneer	a key figure
foremost	to distribute
incomplete	

Topics for discussion:

1. John von Neumann's impact on computing.
2. John von Neumann is a versatile scientist.

Use the information you learned from the reading of three texts to complete the chart below.

Scientists	Sciences/Interests	Impact on Computing

Invent a conversation:

In pairs, create a role play for the rest of the class. One of you should play the part of a historian working in Houston Computer Museum and the other should play the part of a student writing a report about the first programmers. Think about the questions the student would like to ask the historian.

Topics for essays:

1. The beginning of the idea of computation.
2. Formal systems are the bridge between the abstractions of mathematics and the mysteries of human thought.
3. The Patriarchs and their impact on computing.

UNIT 4

FIVE GENERATIONS

Think about and discuss the following questions:

1. When did the first personal computer appear? How was it different from the computers that preceded it?
2. Where is the Silicon Valley? How is it related to the computer industry?
3. Who uses computers today? Give examples of the impact they have on our lives.

Look through the reading. Estimate how long it will take you to read it?

Read the text. Time yourself.

Text 1. FIVE GENERATIONS OF COMPUTERS

The history of computer development is often referred to different generations of computing devices. Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient and reliable devices.

First Generation – 1940-1956: Vacuum Tubes.

The first computers used vacuum tubes for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms. They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions.

First generation computers relied on machine language, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time. Input was based on punched cards and paper tape, and output was displayed on printouts.

The UNIVAC and ENIAC computers are examples of first-generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

Second Generation – 1956-1963: Transistors.

Transistors replaced vacuum tubes and ushered in the second generation of computers. The transistor was invented in 1947 but did not see widespread use in computers until the late 50s. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors. Though the transistor still generated a great deal of heat that subjected the computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for input and printouts for output.

Second-generation computers moved from cryptic binary machine language to symbolic, or assembly, languages, which allowed programmers to specify instructions in words. High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN. These were also the first computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

The first computers of this generation were developed for the atomic energy industry.

Third Generation – 1964-1971: Integrated Circuits.

The development of the integrated circuit was the hallmark of the third generation of computers. Transistors were miniaturized and placed on silicon chips, called semiconductors, which drastically increased the speed and efficiency of computers.

Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

Fourth Generation – 1971-Present: Microprocessors.

The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. What in the first generation filled an entire room could now fit in the palm of the hand. The Intel 4004 chip, developed in 1971, located all the components of the computer – from the central processing unit and memory to input/output controls – on a single chip.

In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh. Microprocessors also moved out of the realm of desktop computers and into many areas of life as more and more everyday products began to use microprocessors.

As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet. Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.

Fifth Generation – Present and Beyond: Artificial Intelligence.

Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today. The use of parallel processing and superconductors is helping to make artificial intelligence a reality. Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come. The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

How long did it take you to read the passage?

Vocabulary list:

A device – устройство,
a vacuum tube – электронная (вакуумная) трубка (лампа)
a printout – распечатка с принтера
symbolic (assembly) languages – символический язык
a high-level programming language – язык программирования высокого уровня
a magnetic drum – магнитный барабан
the integrated circuit – интеграционная схема
a semiconductor – полупроводник
a keyboard – клавиатура
to run an application – выполнять прикладную задачу
a handheld device – переносное устройство
a voice recognition system – система распознавания голоса
parallel processing – параллельная обработка

Answer the questions:

1. What were computers of the first generation based on?
2. What was the distinguishing feature of UNIVAC?
3. What advantages did the transistors have over the vacuum tube?
4. In what fields were the first computers used?
5. What was the essence of the integrated circuit?
6. What were the computers of the fourth generation based on?
7. What is the basis of nowadays generation?

Translate the following words and word combinations using the information from the text:

Надежный; сохранять инструкции; отличительный признак; выполнять одну задачу за единицу времени; большое количество; причина неисправности; широкое использование; выполнять операции; соответствовать естественному языку; отображать; быть предназначенным для; история развития компьютерных технологий; развитие Интернета; предшественники; большой скачок; устанавливать инструкции; полагаться; увеличить скорость и эффективность работы компьютеров; быть доступным массовому пользователю; быть взаимосвязанным; огромный; существенный; handheld современные устройства; загадочный.

Use the information you learned from the reading to complete the chart below.

Generations	Times	Main Characteristics

Role-play the situation:

Imagine that now it is 2030. Present your computer. Discuss the computer applications you use both as a home user and a professional. What computer applications have you ever heard about?

Topics for discussion:

1. The evolution of computers in terms of generations.

Read Text 2 and invent the title to the text in English.

Text 2

Nobody knew an ordinary programmer called Norton in 1981. After being involved in programming since 1969, he bought one of PCs just appeared on the market. Just for fun. In 1982 at the age of thirty nine he left his job in the aerospace industry & founded his own firm "PETER NORTON COMPUTING", which began to supply utilities for IBM-compatible PC.

The stock of the company was $ 30 000. And the personnel consisted of one and the only man - P.N. himself. The main product at that time was THE NORTON UTILITIES BATCH which allowed the users to recreate lost data. Very soon Norton's name became known to millions and his products became a "brandname". Peter Norton is a bachelor of mathematics from the famous Berkeley University. At that time he became & still is the presiding genius in the PC industry. For more than 20 years Norton has been saving people from catastrophes with computers. He enables them to manipulate data easily, protects from viruses & provides data security. His BMW number - "Mr. IBM PC" - proves that.

Choose the proverbs that illustrate Norton's life best of all and prove your ideas:

a. Every man is the architect of his future.
b. Grasp a nettle hard, and it will not sting you.
c. Jack of all trades, master of none.
d. Constant dropping wears away a stone.
e. Forbidden fruit is the sweetest.

Sum up the information of the text.

Text 3

В 70-е годы появляются персональные компьютеры. Прежде всего, Apple. Компьютер пришел к человеку. И хотя мощность первых Apple была несравнимо меньше, чем у IBM, компьютер стал ближе и понятнее. Кстати, именно тогда были реализованы основные принципы многооконного интерфейса, которые позднее будут восприняты оболочкой Windows. Компьютер стал «думать» о человеке, о его удобствах, а не только о том, как бы быстрее посчитать. От последовательности, когда человек готовит задание, а компьютер задание выполняет, был совершен переход к параллельной работе человека и компьютера.

Фирма IBM, как и всякая огромная империя, оказалась очень неповоротлива: поначалу она даже не обратила внимания на персональный компьютер. Но когда объемы продаж Apple стали обвально нарастать, в IBM постепенно поняли, что упускают совершенно новый сегмент рынка. Последовал «огромный неуклюжий скрипучий поворот руля», и вместе с Microsoft IBM выбросила на рынок миллион (sic) компьютеров PC. Это произошло в 1981 году. Тогда и началась современная компьютерная эра. В этот некруглый год компьютер вошел в офисы и дома и расположился там, наверное, навсегда.

Это период резвого младенчества персональных компьютеров. Операционные системы возникают десятками. Чуть ли не каждая компания, производившая компьютеры, считала долгом чести создать свою. Основным языком программирования стал Бейсик – язык очень простой и доступный. Всякий человек, посвятивший пару месяцев его изучению, мог считать себя умудренным и многоопытным «гуру». Тогда же были созданы электронные таблицы и текстовые редакторы – весьма удобные, истинно персональные инструменты. Никакого общего стандарта не было, и еще не просвечивала сквозь каждое приложение лукавая улыбка Билла Гейтса.

Появились компьютерные игры, и самая знаменитая из них – «Тетрис». Однако, как только сделалось понятно, что персональный компьютер не только игрушка, что он может реально работать, потребовался стандарт и взаимная совместимость программ, процессоров, систем хранения информации, резко возросли требования к квалификации программиста и надежности «железа», многие фирмы разорились, другие ушли в тень мощных конкурентов. Ситуация стабилизировалась, и компьютерный мир приобрел вполне оформленные очертания.

Invent the title to the text in English.

Sum up the information of the text in the English language.

Topics for essays:

1. Computer – a God's gift or a Devil's toy?
2. Science fiction: serving the science

UNIT 5

FROM THE HISTORY OF THE INTERNET

Think about and discuss the following questions:

1. What do computers-biz futurists say?
2. You start with the computer and end with the media, don't you?
3. Are the humans manipulated by the media in the same way as by reading?
4. Will every cycle of processor power and every byte of memory be sucked by new, larger software programs (Gate's law).
5. The amount of info is said to be doubling every six to seven years. Can we keep up?
6. When and how do you spend your time on the Internet?

Survey the text "The Origins of the Internet". Read the title of the text, the first sentence and the last sentence. Do not read anything else. Make a prediction. What do you think this reading is going to be about? What details will be included in the text?

Make another prediction. How long do you think it will take you to read through this text?

Read the text. Time yourself.

Text 1. THE ORIGINS OF THE INTERNET

The Internet is an amorphous global network of thousands of linked computers that pass information back and forth. While the Internet has no government, no owners, no time, no place, no country, it definitely has a culture, which frequently approaches anarchy; and it has a language, which is more or less English. People who interact in an Internet environment know how addresses are formed, how to use e-mail, ftp, Usenet News, Telnet, and other software tools.

Like all new worlds, Cyberspace has its own lingo, for example: e-bahn, i-way, online, freenet, web page, freeware, browser, gopher, archie, gateway. There are words to describe people who roam the net: netters, e-surfers, internet surfers, netizens, spiders, geeks...The Internet has its own prerogatives: for example, the dismissive term lurker for the person who hangs around the net, reading what is there but not contributing anything. The term flaming refers to the public humiliation of another netter as punishment for a real or imagined transgression against net culture.

The Internet was the result of some visionary thinking by people in the early 1960s who saw great potential value in allowing computers to share information on research and development in scientific and military fields. J.C.R. Licklider of MIT, first proposed a global network of computers in 1962, and moved over to

the Defense Advanced Research Projects Agency (DARPA) in late 1962 to head the work to develop it. Leonard Kleinrock of MIT and later UCLA developed the theory of packet switching, which was to form the basis of Internet connections. Lawrence Roberts of MIT connected a Massachusetts computer with a California computer in 1965 over dial-up telephone lines. It showed the feasibility of wide area networking, but also showed that the telephone line's circuit switching was inadequate. Kleinrock's packet switching theory was confirmed. Roberts moved over to the Defense Advanced Research Projects Agency (DARPA) in 1966 and developed his plan for ARPANET. These visionaries and many more left unnamed here are the real founders of the Internet.

Large-scale use of computer-to-computer transfer of information was implemented by the US military in the late 60s and early 70s – part of the superpower competition of the cold war and the arms race. The US military used computers for handling the transfer of large amounts of sensitive data over long distances at incredible speed. Computer-to-computer virtual connections, using satellites and fiber optics, have distinct advantages over telephone or radio communications in the event of a nuclear attack.

Mathematicians and scientists (and their universities) have been linked and electronically exchanging information over the Internet since the mid-70s. Such universities as UCLA, Stanford Research Institute, UCSB, the University of Utah, MIT, Harvard, BBN, Systems Development Corp (SDC) in Santa Monica, Carnegie-Mellon, and Case-Western Reserve U were brought online as the first ones.

There was nothing friendly about the early Internet. There were no home or office personal computers in those days, and anyone who used it had to learn to use a very complex system.

E-mail was adapted by Ray Tomlinson of BBN in 1972. He picked the @ symbol from the available symbols on his teletype to link a username and an address. The same year the telnet protocol was published as a Request for Comments (RFC). The ftp protocol, enabling file transfers between Internet sites, was published as a RFC in 1973.

The World Wide Web, which is commonly known as the Web or simply as WWW was set off in 1989 and quickly gained great popularity among Internet users. The World-Wide Web is a product of the continuous search for innovative ways of sharing information resources. The WWW project is based on the principle of universal readership: "if information is available, then any person should be able to access it from anywhere in the world". One of the main features of the WWW documents is their hypertext structure. The possibilities for hypertext in the world-wide environment are endless.

The bulk of the system today is made up of private networking facilities in education and research institutions, business and in government organizations across the globe.

A secretariat has been created to manage the day-to-day function of the Internet Activities Board (IAB) and Internet Engineering Task Force (IETF).

IETF meets three times a year in plenary and in approximately 50 working groups convene at intermediate times by electronic mail, teleconferencing and at face-to-face meetings.

There are a number of Network Information Centers (NICs) located throughout the Internet to serve its users with documentation, guidance, advice and assistance. As the Internet continues to grow internationally, the need for high quality NIC functions increases. Although the initial community of users of the Internet were drawn from the ranks of computer science and engineering its users now comprise a wide range of disciplines in the sciences, arts, letters, business, military and government administration.

The cornerstones of an economy are land, labor, capital and entrepreneurial spirit. That traditional definition is now being challenged. Today you find a fifth key economic element: information dominant. As we evolve from an industrial to an information society, our jobs are changing from physical to mental labor. Just as people moved physically from farms to factories in the Industrial age, so today people are shifting muscle power to brain power in a new, computer-based, globally linked by the Internet society.

How long did it take you to read the text?

Vocabulary List:

The World-wide web – всемирная паутина
e-mail – электронная почта в сети Интернет
large-scale use – крупномасштабное использование
an Internet environment – среда Интернета
a hypertext structure – гипертекстовая структура
to be located throughout the Internet – находиться в Интернете
the telnet protocol – сетевой теледоступ (протокол виртуального терминала
                    в наборе интернет-протоколов)

Answer the questions:

1. What does the word «Internet» mean?
2. How does the Internet work?
3. What are the main features of the Internet?
4. Who are the founders of the Internet?
5. What were the first objects of using the net?
6. What are the most popular inventions of the Internet?
7. What principle is the WWW project based on?
8. Why does the need for high quality NIC functions increase?
9. What is the bulk of the system today?

Complete these sentences using the words below. Each word is only used once.

Multimedia, dominant, spider, netizen, flame, writing, foolproof, technostress, zoom.

1. Please, don't ... me if you disagree with this.
2. The person who develops a ... lock for computer data will make a fortune.
3. ... a person or computer program that searches the web for new links and link them to search engines.
4. ..., spends an excessive amount of time on the Internet.
5. Windows and Unix operating systems are going to be on the desktops and on servers in ... numbers (B. Gates).
6. Hit a video button and ... for a closer look.
7. ... brings together different types of visual devices: texts, pictures, sounds, animations, speech.
8. Each person handles ... differently.
9. Good ... on the Net tends to be clear, vigorous, witty and above all brief: short paragraphs, bulleted lists, one-liners – the units of thought.

Translate the following words and word combinations using the information from the text:

Наставление; включать большое разнообразие дисциплин; бесформенный, завоевать большую популярность; антрепренерский дух; частные сетевые услуги; передавать информацию, собираться; взаимодействовать; фундамент экономики, передача информации; содействие; невероятная скорость; публичное унижение; главные характеристики; гонка вооружений; наказание; большая часть; не отвечающий требованиям; осуществлять; выполнять повседневные функции; осуществимость; управление; явные преимущества.

Role-play the situation:

Imagine you are studying the historical background of the Internet. Now you are in the Computer Museum Network in Boston. You have a chance to get as much information as you want on your topic.

Topics for discussion:

1. How much has technology changed in just the last 20 years?
2. The founders of the Internet.

Survey Text 2. Read the first sentence and the last sentence. Do not read anything else. Make a prediction. What do you think this reading is going to be about? Read the text and see, if your prediction was correct.

Text 2

Все началось с того, что в 1948 году вышли книги К. Шеннона «Математическая теория связи» и Н. Винера «Кибернетика, или управление и связь в животном и машине». Они и определили новый вектор развития науки, в результате чего появился компьютер: вначале ламповый гигант, затем транзисторный и на интегральных схемах, на микропроцессорах. И вот в 1981 году появился персональный компьютер (IBM). В том же году вышла программа MS-DOS, а в 1990 – Windows – 3.0, а далее пошло стремительное совершенствование «железа» и программного обеспечения. К концу столетия человечество получило потрясающую миниатюризацию компьютерной техники, сокращение «расстояния» между компьютером и человеком, тотальное проникновение компьютерных технологий в бытовую сферу. 1986 год – рождение Интернета, глобальной сети, охватившей практически все страны мира, поставляющей каждому пользователю текущую информацию, открывающей доступ к книгам большинства крупных библиотек мира, позволяющей каждому жителю планеты поговорить с любым другим землянином. Кроме того, Интернет обеспечивает единую финансовую систему, покупки, бытовые услуги, службу знакомств.

Несколько слов об Интернете в России. В 1990 году к сети были подключены около тридцати организаций, главным образом научных центров. Но только через пять лет состоялось официальное распространение WWW-технологий. В 1998 году количество пользователей Интернета достигло одного миллиона, а к 2000 году – 5,4 млн. человек.

Компьютеризация и Интернет – столбовая дорога западной цивилизации в XXI веке. Хотим мы или нет – Россия много столетий тяготеет к европейскому пути развития. Поэтому и наше будущее связано не с сырьем, не с вооружением, а исключительно с широчайшей компьютеризацией школ и вузов, с выходом в мировую сеть Интернет, с поголовной компьютерной грамотностью молодежи. Другого пути нет, если мы не хотим остаться сырьевым придатком западного мира.

Invent the title to the text in English.

Sum up the information of the text in the English language.

Topics for essays:

1. The language of the e-mail. What major problems are there with the e-mail? Are they opinions or facts?
2. The ways to balance the use of technology and real-life conversation.
3. Next generation of the Internet.
4. On-line services in this country. What kind of facilities do online services provide?

COMPUTER AND CRIME

Get ready.

Take a few minutes to survey this unit. Look at the topic headings, sub-headings. Skim any text that looks interesting to you. Then answer the following questions.
1. How long do you think it will take you to work through this unit?
2. What topics will be addressed?
3. Which part of the unit looks most interesting to you?
4. What do you want to know about cyber crime? Think about three more things you would like to know?

Think about and discuss the following questions:

1. Where and when do you use passwords or codes in everyday life. (Make sure you don't tell anyone your passwords accidentally!)
2. Why is computer security important?
3. How could you use a computer to commit a crime?
4. What is the Russian for hacker?
5. Are hackers good or bad?

Read Text 1:

Text 1. THE FIRST HACKERS

The first "hackers" were students at the Massachusetts Institute of Technology (MIT) who belonged to the TMRC (Tech Model Railroad Club). Some of the members really built model trains. But many were interested in the wires and circuits underneath the track platform. Spending hours at TMRC creating better circuitry was called "a mere hack." Those members who were interested in creating innovative, stylistic, and technically clever circuits called themselves (with pride) hackers.

During the spring of 1959, a new course was offered at MIT, a freshman programming class. Soon the hackers of the railroad club were spending days, hours, and nights hacking away at their computer, an IBM 704. Instead of creating a better circuit, their hack became creating faster, more efficient program – with the least number of lines of code. Eventually they formed a group and created the first set of hacker's rules, called the Hacker's Ethic.

These rules made programming at MIT's Artificial Intelligence Laboratory a challenging, all encompassing endeavor. Just for the exhilaration of pro-

gramming, students in the AI Lab would write a new program to perform even the smallest tasks. The program would be made available to others who would try to perform the same task with fewer instructions. The act of making the computer work more elegantly was, to a bonafide hacker, awe-inspiring.

Hackers were given free reign on the computer by two AI Lab professors, "Uncle" John McCarthy and Marvin Minsky, who realized that hacking created new insights. Over the years, the AI Lab created many innovations: LIFE, a game about survival; LISP, a new kind of programming language; the first computer chess game; The CAVE, the first computer adventure; and SPACEWAR, the first video game.

Scan the text to find the following words. Then, using the context, explain the meaning of each word. After you finish, you can check yourself in a dictionary.

Creating	available
a freshman	a bonafide hacker
to perform tasks	reign

Decide which statements are true and which are false:

1. Those who can, do. Those who cannot, teach. Those who cannot teach, HACK
2. The first hackers were interested in railroad circuitry.
3. The first hackers studied at MIT.
4. The point of a hacker's work was to create a faster and smaller code.
5. Hackers had their own Ethic Code.
6. TMRC stands for Toy Machinery Railroad Car.
7. Hackers sabotaged the work of the AI Lab.
8. An elegant computer was, to a real hacker, awe-inspiring.
9. At AI Lab hackers wrote a computer program for every other task.
10. Hackers were quite prolific in innovations.
11. Hackers were given free reign on the two AI Lab professors.

Complete the sentences using the words below. Each word is only used once.

Programming, insights, innovation, ethic, instructions, exhilaration, endeavor, awe-inspiring, encompass, freshmen, authority, bogus, mistrust.

1. Decentralization results in ... to the chief.
2. Holding the door for a lady is the question of ...
3. This still life isn't Picasso's; it's a ...

4. The report you've presented doesn't ... some of the problems.
5. If you can survive both in the jungle and the desert, a ... Indian you are.
6. The ... in how hardware works is obligatory for a good programmer.
7. Each ... is another step to a new technological revolution.
8. In 1961 the Soviet Scientists' ... to conquer the space was a success.
9. ... without any reason proves one's carelessness.
10. Iron grip boss expects you to carry out all his ...
11. Annually MIT gains over 5000 ...
12. .., should cause ..., terror in your heart.

Topics for discussion:

1. Do we need hackers? (From the historical point of view)
2. Hacking for fun or running for life?

Skim Text 2. Which of the statements below summarizes the text? Decide this as quickly as you can.

Text 2. **FBI TEAMS UP WITH BUSINESS TO FIGHT CYBER CRIME**
By Andy Sullivan

1. The FBI is selling a computer program to businesses to help stop computer crime.
2. The FBI is giving away a computer program that it has made.
3. The FBI has just bought a computer program to sell to companies to help stop Internet crime.
4. The FBI is giving away a computer program that has been created by a computer company.
5. The FBI has created a computer program to give away to companies to help stop Internet crime.
6. The FBI has created a computer program that companies can use to find criminals.

Read the text again.

WASHINGTON January 5 (Reuters) - The FBI announced on Friday the completion of a program that seeks to combat cyber crime by encouraging companies to share information about Internet attacks they have experienced.

Participating companies and the FBI would use encrypted e-mail and a secure Web site to warn each other about new hacking attempts, computer viruses and other Internet-based criminal activity.

By encouraging communication among high-tech companies, the FBI hopes to reduce the impact of Internet crime, which according to one estimate takes a $1.6 trillion bite annually out of the global economy.

The FBI is currently investigating 1,200 cyber crime cases, up from 450 in early 1998, said Michael Vatis, head of the FBI's National Infrastructure Protection Center.

Attorney General Janet Reno said high-tech businesses and the FBI must cooperate to fight cyber crime, and that the InfraGard program was an important step.

"This will assist individual companies in providing a stronger, better-informed first line of defense against computer attacks," Reno said.

InfraGard started as a pilot project in Cleveland in 1996. Since then it has been expanded to all 56 regional FBI offices and has attracted the participation of 500 companies. Representatives of academic computer centers and high-tech firms such as IBM sit on the board.

Participation in the program is free, Vatis said, but companies must undergo a criminal background check before they are admitted. Participating companies can remain anonymous if they desire, and are not required to share confidential information.

"That is the key to all of this, that companies can share only as much information as they want," Vatis said.

In addition to using the national online communication system, InfraGard companies can organize local activities such as seminars and workshops to better educate themselves about Internet security.

Vatis said the InfraGard system was used last fall to alert companies to the existence of "zombies", or hostile computer programs, on their servers.

Zombies are used to launch denial-of-service attacks such as the one that swamped Yahoo! and other Web sites with massive amounts of data last February.

Decide which statements are true and which are false:

1. The FBI has developed the computer program InfraGard.
2. It is thought that computer thieves take approximately $1.6 trillion dollars out of the world economy every year.
3. The number of cyber crime cases has doubled since 1998.
4. Companies have to pay the FBI to use InfraGard.
5. Janet Reno believes that high-tech companies and the FBI have to work to-gether to help stop Internet crime.
6. If they use InfraGard companies have to share all their information with the public.
7. The program helps companies communicate with each other about Internet crime like computer viruses or computer hacking.

8. InfraGard did not begin as a trial project. Instead, it was used in all the FBI offices immediately.
9. InfraGard is a program that helps communication between companies by offering coded e-mail and a Web site that is meant to be secure from hackers and computer criminals
10. Last fall companies found out about unfriendly computer programs called 'zombies' because of the InfraGard system.
11. Several zombies stopped people receiving information service from Yahoo! by swamping it with huge amounts of data.

Complete the sentences using the words below. Each word is only used once.

Combat, attacks, impact, participate, anonymous, confidential, hostile, launch.

1. He told her that the news about the new system was still _____. She was not allowed to talk to reporters.
2. Everyone in the group is expected to _____ in the workshops.
3. He will _____ a new computer company tomorrow.
4. To _____ cyber crime he suggested the company tried the InfraGuard program.
5. He gave away half of the money he had made from designing the new computer program to the university but he remained _____ because he never told the university who he was.
6. _____ on computer systems can harm information stored in computers or even destroy it.
7. When the manager came to the factory, he was greeted by _____ workers because they hated him for his rude behavior.
8. Computers have had a huge _____ upon the worldwide economy.

Look at the words you have just used. What topic or topics, other than computers, would you associate with most of these words ?

Find and correct the grammatical mistakes in these sentences. Do not look at the article until you have completed this activity.

1. "That is the key to all of this, that companies can shared only as much information as they want," Vatis said.
2. Participation in the program is free, Vatis said, but companies must undergo a criminal background check before they is admitted.
3. The FBI is currently investigated 1,200 cyber crime case, up from 450 in early 1998, said Michael Vatis, head of the FBI's National Infrastructure Protection Center.

4. Vatis said the InfraGard system was use last fall to alerting companies to the existence of "zombies," or hostile computer programs, on their servers.
5. Participated companies can remains anonymous if they desires, and is not required to sharing confidential information.

Sum up the information on the text.

Read the title of Text 3. Make a prediction. What do you think this reading is going to be about?

Text 3. ХАКЕРЫ: ПЛОХИЕ ИЛИ ХОРОШИЕ?

Слово *хакер* совмещает в себе, по крайней мере, два значения (один дотошный хакер насчитал целых 69): одно – окрашенное негативно (*взломщик)*, другое – нейтральное или даже хвалебное (*ас, мастер*).

Английский глагол *to hack* применительно к компьютерам может означать две вещи – взломать систему или починить ее. В основе этих действий лежит общая основа: понимание того, как устроен компьютер, и программы, которые на нем работают.

В 1984 году Стивен Леви в своей знаменитой книге *Хакеры: Герои компьютерной революции* сформулировал принципы *хакерской этики:*

Доступ к компьютерам должен быть неограниченным и полным.

Вся информация должна быть бесплатной.

Не верь властям – борись за децентрализацию.

Ты можешь творить на компьютере искусство и красоту.

Компьютеры могут изменить твою жизнь к лучшему.

В своей книге Леви говорит о трех поколениях хакеров. Первое возникло в шестидесятых годах – начале семидесятых на отделениях компьютерных наук в университетах. Используя технику *разделения времени*, эти парни преобразовали *компьютеры общего пользования* (mainframes) в виртуальные персональные компьютеры.

В конце 70-х второе поколение делает следующий шаг – изобретение и производство персональных компьютеров. Эти неакадемические хакеры были яркими представителями контркультуры. Например, Стив Джобс, хиппи-битломан, бросивший колледж, или Стив Возняк, инженер в «Hewlett-Packard». Прежде чем преуспеть в «Apple», оба Стива занимались тем, что собирали и продавали так называемые *голубые коробки* – приспособления, позволяющие бесплатно звонить по телефону.

Руководясь той же *хакерской этикой*, что и предыдущие поколения, они противостоят коммерциализации Internet, создавая программы, которые тут же становятся доступны всякому, кто их пожелает, – так называемые *freeware* или *shareware.*

Третье поколение киберреволюционеров, хакеры начала 80-х, создало множество прикладных, учебных и игровых программ для персональных компьютеров. Типичная фигура – Мич Кейпор, бывший учитель трансцендентальной медитации, создавший программу «Lotus 1-2-3», которая весьма способствовала успеху компьютеров IBM.

За годы, прошедшие с выхода книги Леви, к власти пришло четвертое поколение революционеров. Именно они преобразовали милитаристскую Arpanet в *тотальную дигитальную эпидемию*, известную ныне как Internet.

Плохие хакеры – читают чужие письма, воруют чужие программы и всеми доступными способами вредят прогрессивному человечеству.

Sum up the information of the text in the English language.

Topics for essays:

1. Hackers of today.
2. What are computer viruses and how do they differ?
3. What sorts of crimes are committed using computers?
4. Cryptography.
5. Professional ethical behavior.

UNIT 7

HUMOR THE COMPUTER

Task 1

Invent the Computer Bible. This is the beginning of your story:

1. At the beginning there was the Word, and the Word had two Bytes and there was nothing else.
2. And God divided the ones from the zeros and He understood that it was good.
3. And God said, Let there be data: and there were data.
4. And God said, Let data be gathered together and He created floppies, hard drives and CD-ROMs.

Task 2

If you were to bury a time capsule to be opened in 2100 what would you put into it? Substantiate your ideas.

Task 3

Present a kitchen gadget that you think should be invented. What would it do? Who would buy it? How should it be marked?

Task 4

Look through the table:

PROCESSOR PERFORMANCE OVER TIME AND OTHER INTEL ARCHITECTURE KEY FEATURES

Intel Pro-ces-sor	Date of Prod-uct Intro-duc-tion	Perfor mance in MIPs 1	Max CPU Fre-quency at Intro-duction	Number of Tran-sistors in Die	Main CPU Reg-ister Size 2	Exter nal Data Bus Size 2	Max. Exter-nal Addr. Space	Cashes in CPU Package
8086	1978	0.8	8 MHz	29 K	16	16	1 MB	None
Intel 286	1982	2.7	12.5 MHz	134 K	16	16	16 MB	Note 3
Intel 386 DX	1985	6.0	20 MHz	275 K	32	32	4 GB	Note 3

Intel 486 DX	1989	20	25 MHz	1.2 M	32	32	4 GB	8 KB L1
Pen-tium	1993	100	60 MHz	3.1 M	32	64	4 GB	16 KB L1
Pen-tium Pro	1995	440	200 MHz	5.5 M	32	64	64 GB	16 KB L1; 256 KB or 512 KB L2
Pen-tium II	1997	466	266	7 M	32	64	64 GB	16 KB L1; 256 KB or 512 KB L2
Pen-tium III	1999	1000	500	8.2 M	32 GP 128 SIM D-FP	64	64 GB	32 KB L1; 512 KB L2

Describe the table using the words below:

Increase in performance – увеличивать свою производительность;
key features – ключевые характеристики;
MIPs – millions of instructions per second;
a benchmark – точка отсчета;
to correspond to – соответствовать;
large general-purpose cashes – большая кэш-память общего назначения;
to be listed in the table – быть представленным в таблице

Match each component in the first column with its translation in the second column:

1. убить сразу двух зайцев
2. открыть карты
3. вцепиться мертвой хваткой
4. идти на компромисс
5. проще простого
6. по крайней мере
7. знать толк в чем-либо
8. найти общий язык с
9. игра стоит свеч
10. стоять на своем
11. сбыть что-либо с рук
12. из первых рук

A. buy a pig in a poke
B. put cards on the table
C. split the difference
D. see eye to eye with
E. stand one's ground
F. make hay at smth
G. be in low water
H. cling like grim death
I. kill two birds with one stone
J. at first hand
K. like hell
L. pull somebody's leg

13. нагреть руки на чем-либо

14. как бы не так (черта с два)

15. сидеть на мели

16. морочить голову

17. купить кота в мешке

18. ставить точки над "I"

M. easy as ABC

N. cross a "t" and dot an "i"

O. have an eye for something

P. the game is worth the candle

Q. get smth off your hands

R. at all events

Which set expressions can be used to comment on the purchase?

Invent a conversation:

You are going to buy a computer. A shop-assistant is consulting you. Use the data from the table and the appropriate set expressions to invent a conversation.

Task 5

Match these smileys (or emoticons) to their meanings listed below:

1. %–)
2. (–:
3. I–I
4. :–Q
5. :–@

6. :–D
7. <:–I
8. :–)
9. ;–)
10. (☺
11. :–I
12. [:–)
13. *:O)

A. I'm a dunce.

B. I'm an egghead.

C. I'm left-handed.

D. I'm asleep.

E. I've been staring at this screen for too long.

F. I'm wearing a Walkman.

G. I'm happy.

H. I'm feeling like a buffoon.

I. I'm sticking my tongue out at you.

J. I'm laughing.

K. I'm flirting or being ironic.

L. I'm indifferent.

M. I'm screaming.

Do you know other smileys? Work in groups. Write down as many smileys as you can.

E-mailers keep their messages brief by abbreviating frequently used phrases. Complete these common phrases:

AAMOF	as a m... of f...
AFAIK	as f... as I k...
FYI	for your i...
FYA	f... y... am...
IMO	in my o...
IOW	in o... words
NRN	not r... necessary
TTYL	talk to y... l...
FAQ	f... a... question(s)
BTW	by t... w...
LOL	la... o... loud
KHYF	k... ho... y... fe...
IMHO	in my h... o...
WYSIWYG	what y... see is w... y... g...
RTFM	read the f... m...

Task 7

Write an e-mail message to your friend (on paper). Use an appropriate format and a chatty style. Try to use at least one smiley and some abbreviations.

Task 8

Study this page from the Google search engine (http://www.google.com). Which category is the best one to search in for this information?

a new treatment for cancer
new Hollywood movies
the Italian word for «computer»
the main news stories in the I IS
Tibetan Buddhism < Sunemployment statistics for Germany
the phone number of the While I louse
a video of a black hole developing
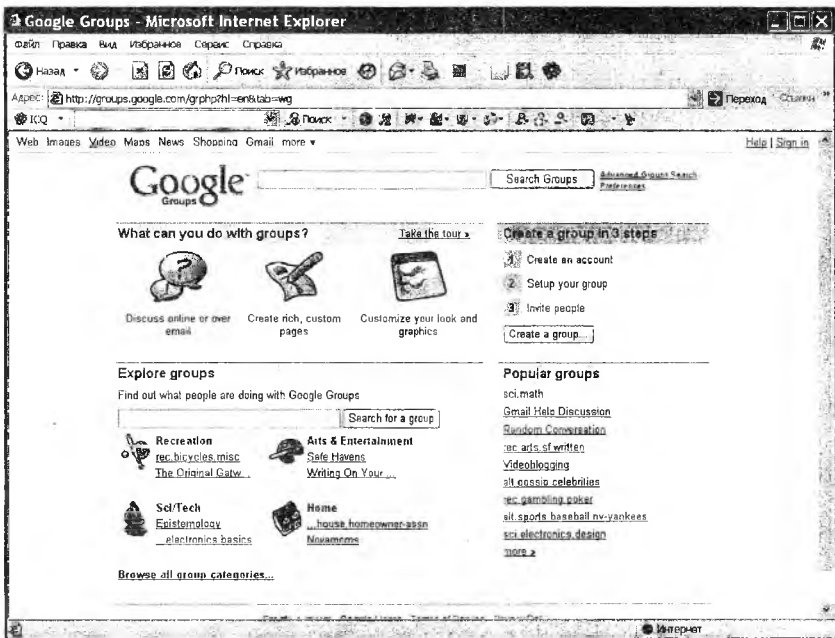
Task 9

Whose e-mail addresses are these? Match the addresses to the list of users:

1) redcrossyouth@algonet.se;
2) webmaster@fao.org.it;
3) today@bbc.co.uk;
4) jsmth@smith.senate.gov;
5) rossi@cantsoc.com.it;

6) sales@demon.net;
7) lunchx@swto 1.usace.army.mil;

8) s_larrieu@ly.ac.fr.

a) a UN organization based in Italy;
b) a US politician;
c) a Swedish charity;
d) a student at French university;
e) a news program on a public broadcasting service in the UK;
f) an Italian wine cooperative;
g) a military organization based in the US;
h) an ISP (Institute of Social Psychiatry).

Task 10

You can exchange views on almost any subject by joining an Internet newsgroup. Which of these groups would interest the following people?

1) alt.algebra.help;
2) alt.asian-movies;
3) alt.comics.bayman;
4) alt.education.disabled;
5) alt,.fashion;
6) alt.sport.soccer.european;
7) alt.tasteless-jokes;
8) rec.antiflues.bottles;
9) al.food.wine;
10) alt.music.world.

a) a football fan;
b) a student with math problems;
c) a bottle collector;
d) a fan of Indian cinema;
e) a comic book collector;
f) someone interested in clothes.

Task 11

Use the key to work out what this number code means. Key: a=2, m=26, n=1

19,10,24,24/ 8,3,1,10.
25,3,15/ 16,2,17,10/ 6,9,2,6,22,10,8/ 13,16,18,
11/ 6,3,8,10.

Make up your own messages using this code and give them to your partner to solve.

Task 12

Make up your own coded messages using numbers, symbols or the alphabet. Remember to make a key so that other students can try cracking your codes.

Task 13

COMPUTER VIRUSES

Match these computer viruses with their definitions:

a) George Bush virus;   b) Disney virus;   c) Congressional virus;
d) Ellen Degeneres virus;   e) Mike Tyson virus;   f) Titanic virus;
g) Emelda Marcos virus;   h) X-files virus;   i) Saddam Hussein virus;
                                                          j) Ronald Reagan virus

1. Runs every program on the hard drive simultaneously, but doesn't allow the user to accomplish anything.

2. Sings you a song (slightly off key) on boot up, then subtracts money from your Quicken account and spends it all on expensive shoes it purchases through Prodigy.

3. It starts by boldly stating "Read my docs...No new files!" on the screen. It proceeds to fill up all the free space on your hard drive with new files, then blames it on the Congressional virus.

4. Your IBM suddenly claims it's a MAC.

5. Makes your whole computer go down.

6. Everything in the computer goes Goofy.

7. Quits after one byte.

8. Won't let you into any of your programs.

9. All your Icons start shape-shifting.

10. Saves your data, but forgets where it is stored.

Task 14

Read the title of the text. What will the text be about?

MOTHER SHOULD HAVE WARNED YOU!

If you can count on one person in this life, it's your mother. Particularly, you can rely on any mom anywhere to find the perils inherent in any situation. Indeed, no self-respecting mom ever missed an opportunity to caution her children about the dangers of everything from comic books to pool halls, to public restrooms.

Still, unless your mom was a real visionary, she probably didn't get much chance to warn you about PCs. Back when she was in peak nagging form, she probably hadn't even heard of the cursed things.

You may think that's just as well. We don't agree. The PC jungle is too scary to explore without knowing the answer to that comforting question, "What would mom say about this?"

So, after months of exhaustive polling of computer savvy moms around the country (there are more than you think), we've assembled the following list of five PC perils your mom should have warned you about, if she'd only known. Take them seriously. Mom knows what she is talking about.

1. **Playing too much Tetris will make you go blind.** Go outside, get some fresh air. Do you want to look like a ghost all your life?

2. **Never dial into strange bulletin board systems.** Who knows what kind of riff-raff you'll find there? Just last week, I saw a show about the kind of trash that hangs out on these systems. "Modem bums", they're called.

3. **If they're so interested in information, why don't they go to the library?**

4. Don't talk on the phone and debut spreadsheet macros at the same time. It's very rude, and frankly, I don't like your language when the macro doesn't work the way you think it should.

5. Clean up your hard disk. God forbid you should be in an accident and someone should see how sloppy your directions are.

Continue the list of PC perils (five as minimum) your mom should have warned you about.

Task 15

Can you guess the last line of this story?

TWO PROGRAMMERS ON A HIGHWAY

Two computer programmers are driving on a Highway. They switch on the radio and there is a warning: "Please note that a car is driving on highway 75 against the traffic". The programmer near the driver looks at him and says:

Task 16

Can you guess the last line of this story?

COMPUTERS VS. AUTO INDUSTRY

Bill Gates wanted to look good and impress everyone with his success. He decided to measure the accomplishments of Microsoft against General Motors. The comparison went like this: "If automotive technology had kept pace with computer technology over the past few decades, you would now be driving a V-32 instead of a V-8, and it would have a top speed of 10,000 miles per hour. Or you could have an economy car that weighs 30 pounds and gets a thousand miles to a gallon of gas. In either case the sticker price of a new car would be less than $50.

In response to all this goading, GM responds:

Task 17

Read the title. What will the sonnet be about? Do your best to translate the sonnet literally.

PROGRAMMER'S SONNET

Processing data is the only thing
Deserving to the mind, its aim and right.
The world, seen by the passionless sight,
Is nothing but the data it will bring.

Get information every day and night,
Process it byte by byte, translate and link.
What can be more insulting than the string,
The cruel, silly string "Access denied"!

Use sources which belong to every kind:
Unthinking matter and the other mind
Are things you can explore and explain...

Processing fails? Repeat until success.
And, when there is no data to process,
Disable interrupts and halt your brain.

<div align="right">Yuri Nesterenko 1995</div>

Task 18

Render into English:

1. Законы машинного программирования.
   a) Любая действующая программа устарела.
   b) Любая программа обходится дороже и требует больших затрат времени, чем предполагалось.
   c) Если программа полностью отлажена, ее нужно будет скорректировать.
   d) Любая программа стремится занять всю доступную память.
   e) Сложность программы растет до тех пор, пока не превысит способности программиста.
2. Третий закон Грида. Машинная программа выполняет то, что вы ей приказали делать, а не то, что вы бы хотели, чтобы она делала.
3. Первая компьютерная аксиома Лео Бейзера. Закладывая что-то в память ЭВМ, помните, куда вы это положили.
4. Руководство по системному программированию Штейнбаха. Никогда не выявляйте в программе ошибки, если вы не знаете, что с ними делать дальше.
5. Закон Брука. Увеличение числа участников при подготовке опаздывающей программы только замедляет процесс.

6. Законы мира ЭВМ по Голубу.
   a) Неточно спланированная программа требует в три раза больше времени, чем предполагалось; тщательно спланированная – только в два раза.
   b) Работающая над программой группа питает отвращение к еженедельной отчетности о достигнутых результатах, поскольку она слишком явно свидетельствует об отсутствии таковых.
7. Принцип Шоу. Создайте систему, которой сможет пользоваться даже дурак, и только дурак захочет ею пользоваться.
8. Закон Нейсера. Можно сделать защиту от дурака, но только не от изобретательного.

Unit 6. Computer and Crime

Skim Text 2. Which of the statements below summarizes the article? Decide this as quickly as you can.

Answer will be 5.

Decide which statements are true and which are false (Text 2).

1. True;

2. True;

. 3. False--They have almost tripled;

4. False--The FBI gives it away free;

5. True;

6. False--Companies only share what information they want to and they can remain anonymous;

7. True;

8. False--InfraGard began as a pilot (a trial) project in Cleveland before it was used in other FBI offices;

9. True;

10. True;

11. False--Only one zombie overloaded Yahoo! with data)

Complete the sentences using the words below. Each word is only used once (Text 2).

1. confidential;	5. anonymous;
2. participate;	6. attacks;
3. launch;	7. hostile;
4. combat;	8. impact

Find and correct the grammatical mistakes in these sentences. Do not look at the article until you have completed this activity.

Mistakes are shown in **bold** type.

1. "That is the key to all of this, that companies can **shared** only as much information as they want," Vatis said.

2. Participation in the program is free, Vatis said, but companies must undergo a criminal background check before they **is** admitted.

3. The FBI is currently **investigated** 1,200 cyber crime case, up from 450 in early 1998, said Michael Vatis, head of the FBI's National Infrastructure Protection Center.

4. Vatis said the InfraGard system was **use** last fall to **alerting** companies to the existence of "zombies," or hostile computer programs, on their servers.

5. **Participated** companies can **remains** anonymous if they **desires**, and **is** not required to **sharing** confidential information.

Unit 7. Humor the Computer

Task 4

Match each component in the first column with its translation in the second column.

1 – I; 2 – B; 3 – H; 4 – C; 5 – M; 6 – R; 7 – O; 8 – D; 9 – P; 10 – E; 11 – Q; 12 – J; 13 – F; 14 – K; 15 – G; 16 – L; 17 – A; 18 – N

Task 5

Match these smileys (or emoticons) to their meanings listed below.

1 – E; 2 –   ; 3 – D; 5 – M; 6 – J; 8 – G; 9 – K; 11 – L; 13 – H

Task 11

Use the key to work out what this number code means.

Well done. You have cracked this code.

Task 13

Match these computer viruses with their definitions.

1–c; 2–g; 3–a; 4–d; 5–f; 6–b; 7–e; 8–i; 9–h; 10–j

Task 15

Can you guess the last line of this story?

"One? There are hundreds of the"

Task 16

Can you guess the last line of this story?

"Yes, but would you really want to drive a car that crashes twice a day?"

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