

*Куліш І.М., Розульська А.В.*

*ENGLISH*  
*FOR IT-STUDENTS*  
PART II



МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
ЧЕРКАСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ  
ІМЕНІ БОГДАНА ХМЕЛЬНИЦЬКОГО

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**Черкаси - 2015**

**УДК 811. 111 (075.8)**  
**ББК 81. 2Ан – 91**  
**К 90**

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**Куліш І.М., Рогульська А.В. Англійська мова для студентів ІТ-спеціальностей:** Навчальний посібник для студентів ІТ-спеціальностей. – Черкаси: Вид. від ЧНУ імені Богдана Хмельницького, 2015. – 109 с.

Навчальний посібник сформований у відповідності до програми з іноземної мови за професійним спрямуванням для студентів 3 та 4 курсу ІТ-спеціальностей.

Навчальний матеріал розташовано за тематичним принципом (за розділами). Робота за темою в межах одного розділу організовується на базі декількох основних текстів, зразків усного мовлення та завдань комунікативного характеру, текстів для додаткового читання, системи граматичних вправ репродуктивного та творчого характеру. Посібник вміщує індивідуальні творчі завдання для самостійної роботи студентів та вправи для контролю умінь та навичок студентів.

***Затверджено до друку на засіданні вченої ради  
Черкаського Національного університету  
імені Богдана Хмельницького  
протокол №3 від 14 грудня 2015 року***

ISBN 978-966-353-408-4

ЧНУ ім. Б.Хмельницького, 2015  
Куліш І.М., Рогульська А.В., 2015

**ПЕРЕДМОВА**

Навчальний посібник призначається для студентів 3 та 4 курсу ІТ-спеціальностей. Мета посібника – формувати у студентів навички читання та розуміння літератури фахової професійної тематики на основі активізації знань загальнонавчальної лексики та основ граматики. Поряд з цим у посібнику реалізується мета комплексного оволодіння студентами всіма видами мовленнєвої діяльності на основі комунікативного підходу до вивчення іноземної мови.

Навчальний матеріал посібника розподілено на чотири тематичних розділи, текстовий матеріал яких згруповано за темами професійного інтересу студентів, та розділ для додаткового читання, який містить зразок для анотації статті та автентичні матеріали і статті фахового спрямування для анотування.

Кожний розділ, в свою чергу, містить декілька основних текстів, які з різних сторін висвітлюють тему, та текстів, які несуть додаткову інформацію за певною тематикою.

Кожний цикл включає серію лексичних та граматичних вправ, призначених для формування мовленнєвих, лексичних, граматичних навичок та тренування вживання мовних явищ на різних етапах оволодіння англійською мовою. Вправи включають також ситуативні, рольові та ділові ігри, які виконують функцію створення ситуацій для вживання засвоєного лексичного та граматичного матеріалу. Дидактичні ігри мають різноплановий вплив на навчальний процес та стимулюють пізнавальний інтерес особистості студента.

Грамматичні вправи охоплюють основні програмні явища англійської мови, які необхідні для розуміння даного лексичного матеріалу, тобто, основну інформацію про частини мови, їх особливості та специфіку вживання. Грамматичні вправи спрямовані на засвоєння необхідного граматичного матеріалу, ефективне його повторення та практичне застосування отриманих знань.

Навчальний посібник включає граматичний довідник, призначений для самостійної роботи студентів з метою повторення раніше вивченого граматичного матеріалу.

## **Lesson 1**

## COMPUTER SCIENCE



Computer science is the science of how to treat information. There are many different areas in computer science. Some of the areas consider problems in a more abstract way. Some areas need special machines, called computers. A person who works with computers will often need mathematics, science, and logic in order to make and use computers.

Algorithms are ways to solve problems or do things. Think about playing cards, for example. A computer scientist wants to sort the cards. First he wants to sort them out by colour. Then he wants to order them by number (2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King, and Ace). The computer scientist may see different ways to sort the playing cards. He must now think about how he will do it. When he decides, he has created an algorithm. After making the algorithm, the scientist needs to test whether the algorithm always does what it should. Then, the scientist can see how well his program sorts the cards.

A simple but very slow algorithm could be: drop the cards, pick them up, and check whether they are sorted. If they are not, do it again. This method will work, but it will often take a very long time. The name of this sorting algorithm is Bogosort. A person may do this better by looking through all the cards, finding the first card (2 of diamonds), and putting it at the start. After this, he looks for the second card, and so on. This works much faster, and does not need much space. The name of this sorting algorithm is selection sort.

Computer science began during World War II and separated from the other sciences during the 1960's and 1970's. Now, computer science uses special methods of doing things, and has its own special words. It is related to electrical engineering, mathematics, and language science.

Computer science looks at the theoretical parts of computers. Computer engineering looks at the physical parts of computers (the parts that a person can touch), and software engineering looks at the use of computer programs and how to make them.

### **1. Find the English equivalents in the text:**

Поводитися з інформацією, класифікувати гральні карти, сортування Бого, сортування вибором, бути пов'язаним з, дивитися на.

### **2. Translate the following terms and terminological expressions:**

Computer science, to solve problems, computer scientist, to create an algorithm, to test an algorithm, sorting algorithm, Bogosort, selection sort, to be separated from the other sciences, to use special methods, electrical engineering, mathematics, language science, the theoretical parts of computers, the physical parts of computers, software engineering.

**3. Match the definitions with the notions and discuss them with your friends:**

Computer science	a step-by-step procedure for calculations
Electrical engineering	the application of engineering to software
Computer engineering	a discipline that integrates several fields of electrical engineering and computer science required to develop computer hardware and software
Software engineering	a field of engineering that generally deals with the study and application of electricity, electronics, and electromagnetism
An algorithm	the scientific and practical approach to computation and its applications

**4. Answer the following questions:**

- 1) What is computer science?
- 2) What will a person who works with computers need?
- 3) What is an algorithm?
- 4) What kinds of selecting algorithms are there?
- 5) What is computer science related to?
- 6) What is the difference between computer science and computer engineering?
- 7) What does software engineering look at?

**5. Read and translate the text.**

In computer science, **bogosort** is a particularly ineffective sorting algorithm based on the generate and test paradigm. It is not useful for sorting, but may be used for educational purposes, to contrast it with other more realistic algorithms; it has also been used as an example in logic programming.

In computer science, **selection sort** is a sorting algorithm, specifically an in-place comparison sort. It has  $O(n^2)$  time complexity, making it inefficient on large lists, and generally performs worse than the similar insertion sort. Selection sort is noted for its simplicity, and it has performance advantages over more complicated algorithms in certain situations, particularly where auxiliary memory is limited.

The algorithm divides the input list into two parts: the sublist of items already sorted, which is built up from left to right at the front (left) of the list, and the sublist of items remaining to be sorted that occupy the rest of the list. Initially, the sorted sublist is empty and the unsorted sublist is the entire input list. The algorithm proceeds by finding the smallest (or largest, depending on sorting order) element in the unsorted sublist, exchanging it with the leftmost unsorted element (putting it in sorted order), and moving the sublist boundaries one element to the right.

**6. Put six questions on it and ask your friend to answer them.**

**7. Explain to a schoolboy what computer science is.**

**8. Read how four people describe the effects of new technology on their**

**work. Guess their jobs and decide kind of comments (positive, negative or both).**

- 1) I can get patients' lab results – blood and biochemistry – through the Health Service intranet. No delays, no need to wait for paper copies. It's much faster.
- 2) My students can use the Internet to practise their German. They exchange emails with German students – half the time in English, half – in German. It's more realistic. And I can use the Web to get up-to-date material in German. I have a satellite receiver at home so I can watch German NV and record programs for use in class.
- 3) People pay with plastic. Now it's more cards than cash. It's safer because there's less money in the shop but I have to pay the card companies each time. And I don't get my money if someone uses a stolen card.
- 4) It's not good. My sales are much worse. Instead of buying CDs, people download individual tracks from the Internet.

## **GRAMMAR EXERCISES**

**9. State the forms and functions of the Infinitive and translate the following sentences into Ukrainian:**

1. Present day standards of experimental techniques make it possible to obtain antiparticles in laboratory conditions.
2. Scientists have set a centre for launching meteorological rockets in the Antarctic to cover an extensive programme of research into the upper layers of the Antarctic atmosphere.
3. People of all ages use the reading-room to prepare for exams, work on a thesis for a degree, keep up with the latest publications in their field or look at rare editions.
4. This experiment is too serious to be explained in a few words.
5. To irrigate deserts we build canals.
6. To use welding for joining metal parts means to obtain products which possess higher strength, better quality and lower cost.
7. M. Lomonosov was the first to find that heat, light and electricity are different forms of motion.

**10. Translate the following sentences into English and state the forms of the Infinitive:**

1. Я завжди радий поговорити з вами.
2. Дуже радий, що розмовляю зараз з вами.
3. Я радий, що поговорив з вами.
4. Я радий, що весь цей час розмовляю з вами.
5. Я завжди радий, коли зі мною розмовляють.
6. Я радий, що зі мною розмовляють.

**11. Transform the sentences using the Infinitive Complex:**

1. I have only a few minutes *in which I can explain these words to you.*
2. There was nothing *that he could do* except go home.
3. Don't forget that she has a babe *which she must take care of.*
4. Is there anybody *who will help you with your spelling?*

5. King Lear decided to have a hundred knights *who would serve him* after he had divided up his kingdom.
6. Here are some more facts *which will prove* that your theory is correct.
7. Here are some tablets *which will relieve your headache?*

**12. Remember the word-combinations with the Infinitive and translate the sentences:**

- **to cut a long story short** – коротше кажучи;
  - **to tell the truth** – правду кажучи;
  - **to say nothing of** – не говорячи вже про;
  - **to put it mildly** – м'яко кажучи;
  - **to say the least of it** – принаймні, щонайменше;
  - **to begin with** – почнемо з того, що;
  - **The book leaves much to be desired.** – Книга залишає бажати кращого.
  - **He is difficult to deal with.** – З ним важко мати справу.
  - **She is pleasant to look at.** – На неї приємно дивитися.
1. М'яко кажучи, він був не ввічливий.
  2. Ваша праця залишає бажати кращого.
  3. Вашій сестрі важко догодити.
  4. Почнемо з того, що я зайнятий.
  5. Всі аспіранти були дуже раді, не говорячи вже про їх керівника.
  6. Це дуже дивно, принаймні.
  7. Правду кажучи, ви мене здивували.
  8. На цих дітей приємно дивитися.
  9. Коротше кажучи, вони одружилися.

## Lesson 2

### COMPUTER ENGINEERING



Computer engineering is the science of making computers and their parts. Computer engineers are always trying to make new parts smaller and better.

As computers are electrical machines, computer engineering is related to electrical engineering and computer science. If you study computer engineering, you learn about the hardware and software of computers. You

will learn circuit theory and electronic circuits, too. As computer engineering is closely linked with electrical engineering, the fields are found in the same department at many universities.

Computer engineering is often compared to computer science. Computer engineering deals with computer hardware and some software. Computer science is about computer software only. Computer engineers study computer engineering, but software engineers study computer science.



Computer engineering is a difficult major in college, but computer engineers are needed. Software engineering companies, telecommunications firms, designers of digital hardware, and many other companies hire computer engineering majors right out of college and pay them well.

Computer engineering students learn about computers and computer related system design and development. The computer related systems are software systems, hardware systems and systems of software and hardware in combination. Students also need to learn fundamental science subjects and mathematics.

**1. Complete the following sentences:**

- 1) Computer engineering is the science of making computers and \_\_\_\_\_.
- 2) Computer engineering is related to electrical engineering and \_\_\_\_\_.
- 3) Computer engineering is often compared to \_\_\_\_\_.
- 4) Computer engineering deals with computer hardware and \_\_\_\_\_.
- 5) Computer engineers study computer engineering, but software engineers study \_\_\_\_\_.

**2. Restore the correct word-order:**

- 1) Computer engineers, new parts, are, better, always, smaller, trying, to make, and.
- 2) Computer engineering, study, if, you, software, learn, you, about, the hardware, and, of, computers.
- 3) Circuit theory, electronic circuits, learn, will, you, too, and.
- 4) Computer engineering, computers, learn, computer, development, and, design, system, students, related, and, about.

**3. Ask your friend to answer the following questions:**

- 1) What is computer engineering?
- 2) What is computer engineering related to?
- 3) What do you learn if you study computer engineering?
- 4) What does computer engineering deal with?
- 5) What do computer engineers and software engineers study?
- 6) What do computer engineering students learn?
- 7) What are the computer related systems?

**4. Read and translate the text.**



The first computer engineering degree program in the United States was established at Case Western Reserve University in 1972. As of October 2004, there were 170 ABET-accredited computer engineering programs in the US. In Europe, accreditation of computer engineering schools is done by a variety of agencies part of the EQANIE network. Due to increasing job requirements for engineers, who can concurrently design hardware, software, firmware, and manage all forms of computer systems used in industry, some tertiary institutions around the world offer a

bachelor's degree generally called computer engineering. Both computer engineering

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and electronic engineering programs include analog and digital circuit design in their curriculum. As with most engineering disciplines, having a sound knowledge of mathematics and science is necessary for computer engineers.

**5. Put five questions on it and ask your friend to answer them.**

**6. Say what you know about computer engineering.**

**7. Fill the gaps to compare computers now and ten years ago. Use the adjectives in brackets.**

✘

**Remember:**

- ⤴ We make comparisons with short adjectives like *fast* by adding *-er* – *faster*.
- ⤴ With long adjectives like *realistic*, we use *more* and *less* – *more/less realistic*.
- ⤴ Note the irregular forms: *good* – *better*, *bad* – *worse*.
- ⤴ Some adverbs are the same as adjectives, e.g. *early* – *earlier*, *fast* – *faster*, *high* – *higher*, *late* – *later*.
- ⤴ With adverbs ending in *-ly*, we use *more* and *less*. We can

add *much* to emphasize the comparison: *With a computer I can work **more efficiently** and **much faster**.*

- 1) Computers today are \_\_\_\_\_ (powerful).
- 2) They operate \_\_\_\_\_ (fast) and they have much \_\_\_\_\_ (large) memories.
- 3) Because they contain more electronics, the cases have become \_\_\_\_\_ (big) but the flat-screen monitors are \_\_\_\_\_ (heavy) and fit into a \_\_\_\_\_ (small) space on your desk.
- 4) Computers are also \_\_\_\_\_ (cheap).
- 5) The price is \_\_\_\_\_ (low) now than in the past.
- 6) The programs too are \_\_\_\_\_ (good).
- 7) They are \_\_\_\_\_ (sophisticated) and you can work much \_\_\_\_\_ (efficiently).

**GRAMMAR EXERCISES**

**8. Find the Objective Infinitive Construction and translate into Ukrainian:**

1. I consider them to be good specialists. 2. He heard them discuss their plan. 3. I heard him mention my name. 4. We expect writers to deal with the issues of the modern world. 5. They believed him to be honoured by the invitation to the international congress. 6. We assume these truths to be self-evident. 7. They find the experience of this conference to have been a remarkable one.

**9. Translate the sentences paying attention to the Objective Infinitive Construction:**

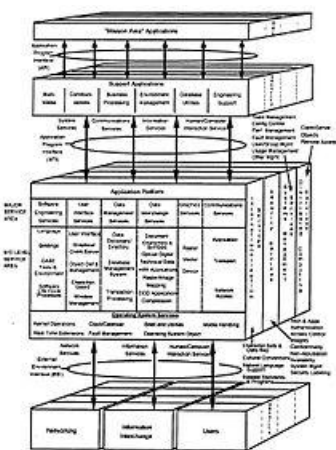
1. We know industrial electronic equipment to play a very significant role in the modern world. 2. We often watched the operator adjust the apparatus. 3. They wanted this device to be installed immediately. 4. Faraday expected electrochemistry to be widely used for peaceful construction. 5. We know electrochemistry to owe its birth to the discoveries of Volta.

**10. Transform the sentences using the Objective Infinitive Construction:**

1. I've never heard how he spoke about his life in India. 2. The two sides expect that negotiations will be long and difficult. 3. We expect that a scientist or a scholar will keep an open mind. 4. One can hardly expect that a true scientist will keep within the limits of one's narrow field. 5. They thought that he was an eminent scholar. 6. We expected that the partners would agree on a number of issues. 7. We assume that these errors are of no importance. 8. We suppose that his discovery is accidental. 9. We consider that he is a real genius. 10. They estimate that the number of casualties will be much higher.

**11. Translate the sentences paying attention to the Objective Infinitive Construction:**

1. Вона часто спостерігала, як він годинами працював над цим експериментом. 2. Члени наукового товариства вимагають, щоб цей пристрій було спочатку протестовано. 3. Дослідники вважатимуть цей регіон єдиним джерелом мінеральних ресурсів та енергії. 4. Він знав, що ці дані використовуються в їх дослідженнях. 5. Автор змусив їх переписати два розділи. 6. Ми б хотіли, щоб ви мали свою власну думку щодо цього експерименту. 7. Вчений вважає, що це явище досить рідкісне. 8. Вони очікували, що ця спроба виявиться вдалою.



**Lesson 3**

**SOFTWARE ENGINEERING**

Software engineering is a field of computer science, concerned with designing and writing programs for computers. A software engineer tries to change software so that it is of a better quality. Better quality software is easier

to understand, to maintain, or to extend. Becoming a software engineer is a higher education, done at the university level, usually. Software engineering can be very difficult work. Today it is mostly done in a team. Software engineering can broadly be split into the following:

- *Requirements* say what the software should do.
- *Software design* is usually done on paper. It says what the different components of the software are, and how they interact.
- When the design phase is done, the software is implemented, the different components are coded.
- At the end of the implementation, tests are done to see if the components meet the requirements. Note that the requirements can change over time.

A set of activities that leads to the production of a software product is known as software process. Although most of the software are custom build, the software engineering market is being gradually shifted towards component based. Computer-aided software engineering (CASE) tools are being used to support the software process activities. However, due to the vast diversity of software processes for different types of products, the effectiveness of CASE tools is limited. There is no ideal approach to software process that has yet been developed. Some fundamental activities, like software specification, design, validation and maintenance are common to all the process activities.

### **1. Find the English equivalents in the text:**

Розробка програм, змінити програмне забезпечення, бути розділеним, вимоги, взаємодіяти, відповідати вимогам, приводити до виробництва, бути виготовленим на замовлення, автоматизована розробка програм, широка різноманітність, ідеальний підхід, перевірка, технічне обслуговування.

### **2. Translate the following terms and terminological expressions:**

Software engineering, designing, design phase, software product, software process, component based, computer-aided software engineering, CASE tools, software specification, design, validation, maintenance.

### **3. Answer the following questions:**

- 1) What is software engineering?
- 2) What does a software engineer try to do?
- 3) What does better quality software mean?
- 4) What can software engineering be split into?
- 5) What is software process?
- 6) What is used to support the software process activities?
- 7) Is there an ideal approach to software process?
- 8) What activities are common to all the process activities?

### **4. Compare the work of computer software and hardware engineers, discuss it with your friend, make up a dialogue.**

Computer *software engineers* develop, design, and test software. Some software engineers design, construct, and maintain computer programs for

companies. Some set up networks such as "intranets" for companies. Others make or install new software or upgrade computer systems. Computer software engineers can also work in application design. This involves designing or coding new programs and applications to meet the needs of a business or individual.

Most computer *hardware engineers* research, develop, design, and test various



computer equipment. This can range from circuit boards and microprocessors to routers. Some update existing computer equipment to be more efficient and work with newer software. Most computer hardware engineers work in research laboratories and high-tech manufacturing firms. Some also work for the federal government. According to BLS, 95% of computer hardware engineers work in metropolitan areas. They generally work full-

time. Approximately 25% of their work requires more than 40 hours a week.

**5. Tell your friends about the work of computer software and hardware engineers.**

**6. Study the table and complete the sentences.**

Indicators	Airbus A380	Boeing 747
Length	73 m	70.7 m
Wingspan	79.8 m	64.4 m
Weight (empty)	275,000 kg	180,800 kg
Weight (maximum take-off)	548,000 kg	397,000 kg
Speed (maximum)	945 kph	1,127 kph
Range	15,000 km	14,200 km
Ceiling	13,100 m	13,500 m
Capacity (maximum)	840 (1-class)	550 (1-class)
Engines	4 turbofans	4 turbofans
Thrust	1,208 kN	1,096 kN
First introduced	2005	1989

1. The Airbus \_\_\_\_\_(long) than the Boeing.
2. The Boeing is a little \_\_\_\_\_(short) than the Airbus.
3. The Airbus can carry a \_\_\_\_\_(heavy) weight than the Boeing.
4. The Boeing is \_\_\_\_\_(fast) than the Airbus.
5. The Airbus can fly \_\_\_\_\_(far) than the Boeing.
6. The Boeing can fly \_\_\_\_\_(high) than the Airbus.

7. The Airbus engines are \_\_\_\_\_(powerful).
8. The Airbus was introduced \_\_\_\_\_(recently).

## GRAMMAR EXERCISES

### 7. Translate the sentences keeping in mind:

1) The verbs using with the Subjective Infinitive Construction in Passive form: a) *to believe, to consider, to hold, to think, to suppose* (вважати, думати); b) *to expect* (очікувати), *to estimate* (оцінювати), *to say* (говорити), *to report* (повідомляти).

2) The verbs using with the Subjective Infinitive Construction in Active form:

*to seem, to appear* (здаватися), *to prove, to turn out* (виявлятися), *to happen* (траплятися, виявлятися).

3) The expressions using with the Subjective Infinitive Construction: *to be likely* (ймовірно), *to be sure, to be certain* (напевно), *to be unlikely* (навряд).

1. Його знали як дуже чутливого до будь-якої критики. 2. Вважають, що атомна енергія стане головним джерелом постачання енергії. 3. Кажуть, що наша лабораторія отримала нові прилади. 4. Відомо, що напівпровідники знайдуть різноманітне застосування в майбутньому. 5. Вважається, що водень складає половину поверхні землі, води та повітря. 6. Очікується, що він поновить випробування на наступному тижні. 7. Ймовірно, ці вчені опублікують результати своїх досліджень. 8. Навряд чи він візьме участь у дискусії. 9. Напевно, він представить свою доповідь наприкінці конгресу. 10. Виявилось, що він усвідомлює всі наслідки експерименту.

### 8. Translate the following sentences into Ukrainian:

1. Leonardo da Vinci is considered to be a pioneer in physiology and botany. 2. The Earth is said to have been part of the Sun. 3. The delegation is reported to have arrived in the capital already. 4. Moral perfection is considered to be one of the ideals of mankind. 5. Leonardo da Vinci is known to have studied optics. 6. His painting and sculpture are supposed to have opened up few fields of enquiry. 7. He is known to have studied the structure of the bones and muscles of the human body.

### 9. Translate the following sentences into English:

1. Відомо, що наука значно змінила умови життя сучасної людини. 2. Вважається, що Леонардо да Вінчі сконструював перший ліфт. 3. Кажуть, що цей політичний діяч досяг великих успіхів. 4. Очікується, що протиріччя між цими країнами будуть залагоджені. 5. Відомо, що Леонардо да Вінчі створив проект реконструкції Мілана. 6. Кажуть, що він достатньо розумний, щоб правильно оцінити ситуацію. 7. Очікується, що вони поновлять випробування наступного тижня. 8. Повідомляють, що президент вже прибув до столиці.

## Lesson 4

### INFORMATION TECHNOLOGY



Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.

The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones.

Several industries are associated with information technology, such as computer hardware, software, electronics, semiconductors, internet, telecom equipment, ecommerce and computer

services.

In a business context, the Information Technology Association of America has defined information technology as "the study, design, development, application, implementation, support or management of computer-based information systems". The responsibilities of those working in the field include network administration, software development and installation, and the planning and management of an organisation's technology life cycle, by which hardware and software is maintained, upgraded, and replaced.

Humans have been storing, retrieving, manipulating and communicating information since the Sumerians in Mesopotamia developed writing in about 3000 BC, but the term "information technology" in its modern sense first appeared in a 1958 article published in the Harvard Business Review; authors Harold J. Leavitt and Thomas L. Whisler commented that "the new technology does not yet have a single established name. We shall call it information technology (IT)." Based on the storage and processing technologies employed, it is possible to distinguish four distinct phases of IT development: pre-mechanical (3000 BC – 1450 AD), mechanical (1450–1840), electromechanical (1840–1940) and electronic (1940–present).

#### **1. Find the English equivalents in the text:**

Застосування обладнання, зберігати дані, відновлювати дані, передавати дані, обробляти дані, охоплювати технології, визначати як, модернізуватися, виділяти чіткі фази.

#### **2. Translate the following terms and terminological expressions:**

Computers and telecommunications equipment, information distribution, semiconductors, implementation, computer-based information systems, technology life cycle, retrieving information, processing technologies.

### 3. Answer the following questions:

- 1) What is IT?
- 2) What industries are associated with information technology?
- 3) How is information technology defined in a business context?
- 4) What do the responsibilities of those working in the field include?
- 5) When did the term "information technology" in its modern sense first appear?
- 6) What phases are distinguished in IT development?

### 4. Read and translate the text.

Most digital data today is still stored magnetically on devices such as hard disk drives, or optically on media such as CD-ROMs

All database management systems consist of a number of components that together allow the data they store to be accessed simultaneously by many users while maintaining its integrity. A characteristic of all databases is that the structure of the data they contain is defined and stored separately from the data itself, in a database schema

The relational database model introduced a programming-language independent Structured Query Language (SQL), based on relational algebra

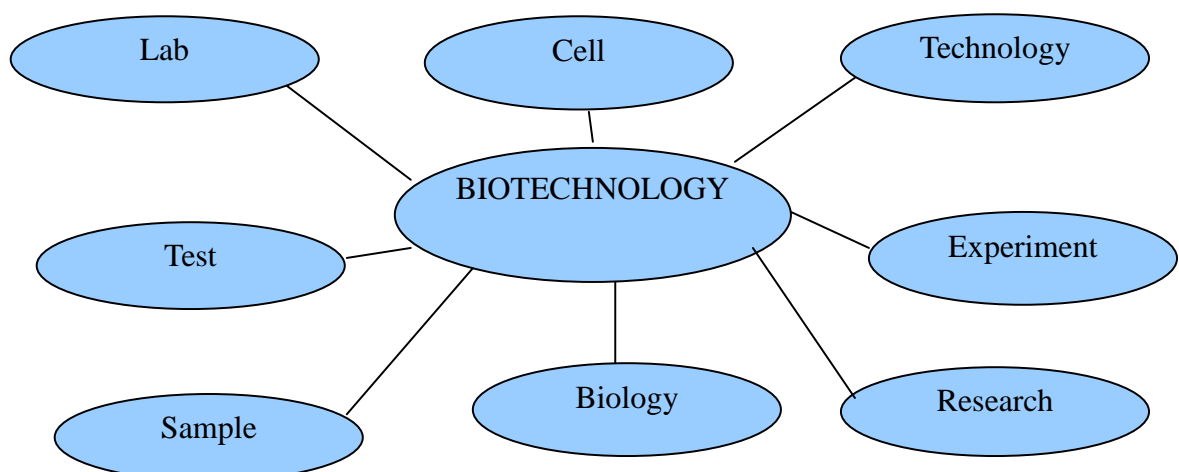
Data transmission has three aspects: transmission, propagation, and reception.

The business value of information technology lies in the automation of business processes, provision of information for decision making, connecting businesses with their customers, and the provision of productivity tools to increase efficiency.

### 5. Put five questions on it and ask your friend to answer them.

### 6. Tell your friends what you know about IT.

### 7. One effective way of recording key words used in technology is to group them into word sets. Study the example of how to group words related to *biotechnology*:





**Work in pairs. Make word sets for each of the branches of technology:**

- ▲ information technology
- ▲ telecommunications
- ▲ transport
- ▲ manufacturing

## GRAMMAR EXERCISES

### 8. Translate the sentences paying attention to the Object and Subjective Infinitive Constructions:

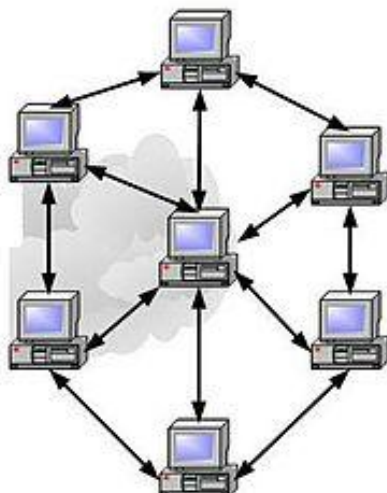
1. We consider radioactive atoms to be very valuable in all sorts of ways. 2. An atom is known has been proved to hold a tremendous force, hidden in its tiny body. 3. Everything around us is known to be composed of atoms. 4. The common articles in the laboratory are known to be made of plastics. 5. In general, plastics are known to be classified into groups according to their behaviour when they are heated. 6. The plastics have proved to be satisfactory alternatives to many other materials. 7. The 19<sup>th</sup> century is often considered to be the century of steam and electricity. 8. We know the molecules of substances to be in continual motion.

### 9. Translate the sentences paying attention to the Object and Subjective Infinitive Construction:

1. Відомо, що атомній енергії належить майбутнє. 2. Кажуть, що наша лабораторія отримала нові прилади. 3. Відомо, що розчин – це однорідна суміш двох або декількох речовин. 4. Ми виявили, що ці експерименти відповідали раніше прийнятим нормам. 5. Учні очікували, що магніт притягне цей предмет. 6. Відомо, що біля полюсів магніту магнітне поле сильніше.

## Lesson 5

### INFORMATION AND COMMUNICATIONS TECHNOLOGY



Information and Communications Technology or (ICT), is often used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

The phrase *ICT* had been used by academic researchers since the 1980s, but it became popular after it was used in a report to the UK government by Dennis Stevenson in 1997 and in the revised National Curriculum for England, Wales and Northern Ireland in 2000.

The term *ICT* is now also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the audio-visual, building management and telephone network with the computer network system using a single unified system of cabling, signal distribution and management.

The term Infocommunications is used in some cases as a shorter form of information and communication(s) technology. In fact Infocommunications is the expansion of telecommunications with information processing and content handling functions on a common digital technology base.

### 1. Find the English equivalents in the text:

Специфічний термін, наголошувати на ролі, підпрограмне забезпечення, передавати інформацію, використовуватися по відношенню до, величезна економія, усунення (ліквідація) телефонної мережі, єдина кабельна система, обробка інформації, функція обробки змісту.

### 2. Translate the following terms and terminological expressions:

Extended synonym, unified communications, the integration of telecommunications, telephone lines, wireless signals, enterprise software, middleware, storage, audio-visual systems, or link system, signal distribution and management, digital technology base.

### 3. Match the definitions with the notions and discuss them with your friends:

Software	the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise
Middleware	the activity of designing and constructing and maintaining communication systems
Information Technology	the natural expansion of telecommunications with <i>information processing</i> and <i>content handling</i> functions including all types of electronic communications (fixed and mobile telephony, data communications, media communications, broadcasting, etc.) on a common digital technology base, mainly through <i>Internet technology</i>
Communication Technology	computer software that provides services to software applications beyond those available from the operating system
Infocommunications	any set of machine-readable instructions (most often in the form of a computer program) that directs a computer's processor to perform specific operations

#### 4. Answer the following questions:

- 1) What is Information and Communications Technology?
- 2) When was this term become popular?
- 3) When is the term *ICT* also used?
- 4) When is the term Infocommunications used?
- 4) What is Infocommunications?

#### 5. Read and translate the text.



Cognitive infocommunications (CogInfoCom) investigates the link between the research areas of infocommunications and the cognitive sciences, as well as the various engineering applications which have emerged as the synergic combination of these sciences.

The primary goal of CogInfoCom is to provide a systematic view of how cognitive processes can co-evolve with infocommunications devices so that the capabilities of the human brain

may not only be extended through these devices, irrespective of geographical distance, but may also interact with the capabilities of any artificially cognitive system. This merging and extension of cognitive capabilities is targeted towards engineering applications in which artificial and/or natural cognitive systems are enabled to work together more effectively.

Two important dimensions of cognitive infocommunications are the mode of communication and the type of communication.

#### 6. Put five questions on it and ask your friend to answer them.

#### 7. Tell your friends what you know about ICT.

#### 8. Study the list of the ten most important technological innovations of the past 60 years. Work in groups and order them 1 to 10 (1-most important, 10-least important).

Innovation	Order
ABS brakes (Anti-lock braking system) (1971)	
Air bags (a vehicle safety device) (1951)	
Credit cards (a payment card) (1958)	
Digital camera (1975)	

DNA testing (genealogical) (1985)

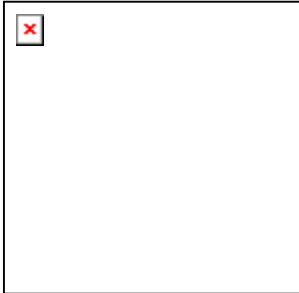
Laser eye surgery (1950s)

Long-life, low-energy light bulbs

Microwave oven

Mobile phone

Smoke detector (1969)



**Gadget Box:** *A smoke detector is a safety device to detect smoke in the air. There are two types: an optical detector which operates when smoke disturbs a beam of light, and an ionization detector which operates when very small particles of smoke interrupt an electric current.*

## GRAMMAR EXERCISES

### 9. Translate the sentences with Prepositional Infinitive Construction into Ukrainian:

1. It is desirable for you to know it. 1. He waited for the papers to be published. 3. There is only one thing for you to do. 4. For the experiment to be successful he had to do much work. 5. Have you got anything for me to read? 6. For the meeting to be a success much preliminary work must be done. 7. No efforts are large enough for the research to be completed. 8. We are waiting for the jury to announce their verdict. 9. It will take a number of years for the two sides to come to an agreement. 10. It will be expedient for them to postpone the visit. 11. It will be convenient for all of us to have the examination on Tuesday.

### 10. Complete the following sentences:

1. It is necessary for her ... 2. It is advisable for them ... 3. They waited for us ... 4. It was important for them ... 5. There was no reason for him ... 6. It will be dangerous for him ... 7. It was high time for them ... 8. It is better for her ... 9. The best thing for me was ... 10. She will wait for me ...

### 11. Make up sentences using “For ... to + Infinitive” construction:

Necessary	journalists	take a different view
Important	economists	take some interest in politics
Essential	politicians	confront reality / face facts
Impossible	philosophers	deny the progress of science

### 12. Translate the following sentences into English:

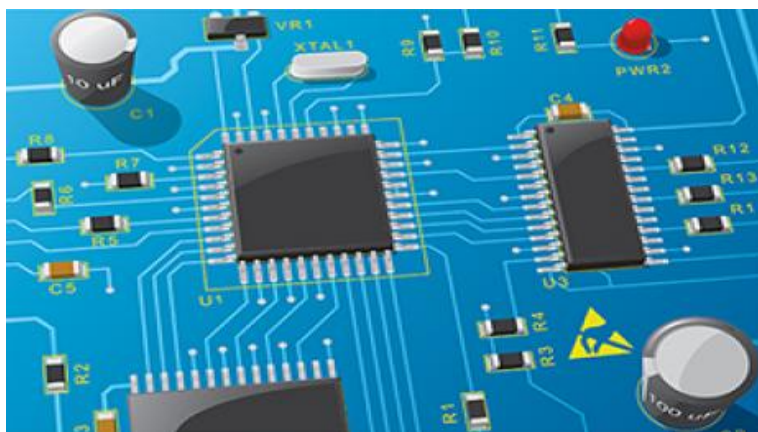
1. Не існує серйозних перешкод тому, щоб ці країни жили у мирі. 2. Він дав нам декілька статей, щоб ми використали його дані у нашому дослідженні.

3. Лектор говорив достатньо голосно, щоб всі могли чути його. 4. Вкрай важливо, щоб ви прочитали його біографію. 5. Всі ми повинні вчитися на власному досвіді. 6. Необхідно, щоб ця проблема була вирішена негайно.

## UNIT II

### Lesson 1

## COMPUTER ARCHITECTURE



In computer engineering, **computer architecture** is the conceptual design and fundamental operational structure of a computer system. It is the technical drawings and functional description of all design requirements (especially speeds and interconnections), it is how to design and implement various parts of a computer — focusing

largely on the way by which the central processing unit (CPU) operates internally and how it accesses addresses in memory.

It can be defined as the science and art of selecting and interconnecting hardware components to create computers that meet functional, performance and cost goals.

Computer architecture includes at least three main subcategories:

1. Instruction set architecture, or ISA, is the abstract model of a computing system that is seen by a machine language (or assembly language) programmer, including the instruction set, memory address modes, processor registers, and address and data formats.

2. Microarchitecture, also known as **Computer organization** is a lower level, a detailed description of the system that is sufficient for completely describing the operation of all parts of the computing system, and how they are inter-connected and inter-operate in order to implement the ISA. The size of a computer's cache for instance, is an organizational issue that generally has nothing to do with the ISA.

3. **System Design** which includes all of the other hardware components within a computing system such as:

- System interconnects such as computer buses and switches.
- Memory controllers and hierarchies.
- CPU off-load mechanisms such as direct memory access.
- Issues like multi-processing.

### 1. Find the English equivalents in the text:

Концептуальне проектування, технічні креслення, проектні вимоги, розробляти та застосовувати різні частини комп'ютера, визначатися як,

відповідати функціональним цілям, головні підкатегорії, архітектура набору програм, перемикач,

**2. Translate the following terms and terminological expressions:**

Fundamental operational structure, functional description, to operate internally, to access addresses in memory, hardware components, memory address modes, processor registers, computer's cache, computer buses, off-load mechanisms.

**3. Match the definitions with the notions and discuss them with your friends:**

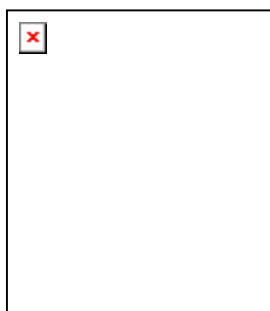
Instruction set	a component that transparently stores data so that future requests for that data can be served faster
Address mode	constraint placed upon the interpretation of data in a type system
Processor register	a small amount of storage available as part of a CPU or other digital processor
Data type	an aspect of the instruction set architecture in most central processing unit (CPU) designs
Cache	the part of the computer architecture related to programming, including the native data types, instructions, registers, addressing modes, memory architecture, interrupt and exception handling, and external I/O

**4. Ask your friend to answer the following questions:**

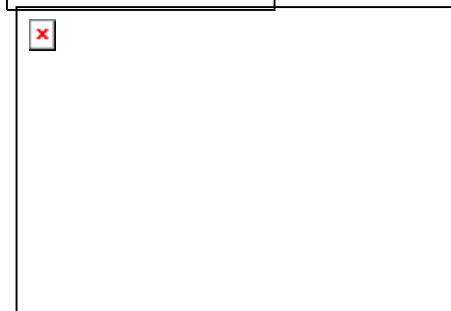
- 1) What is computer architecture in computer engineering?
- 2) How can it be defined?
- 3) What main subcategories does computer architecture include?
- 4) What is ISA?
- 5) What is microarchitecture?
- 6) What does system design include?

**5. Tell your friends about the main aspects of computer architecture.**

**6. Read the information and answer the question:**



**Gadget box:** Professor Negroponte of MIT (Massachusetts Institute of Technology) in the USA has developed a clockwork computer which will cost less than \$100. This low-cost laptop is intended for children in the developing world. It uses “open source” software and will connect to Wi-Fi networks. He hopes to produce 150 million a year. **Why does this computer use “open source” software and connect to Wi-Fi networks?**



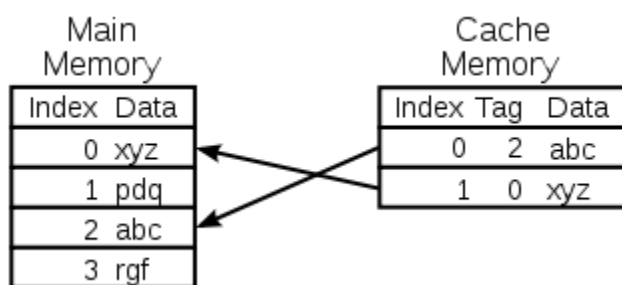
**Nicholas Negroponte** (born December 1, 1943) is a Greek American architect best known as the founder and Chairman Emeritus of Massachusetts Institute of

Technology's Media Lab, and also known as the founder of the One Laptop per Child Association (OLPC)

## 7. Read the article and put five questions to it.

### Cache

from Computer Architecture: A Quantitative Approach  
by John L. Hennessy; David A. Patterson (16 September 2011)



In computer science, a **cache** is a component that transparently stores data so that future requests for that data can be served faster. The data that is stored within a cache might be values that have been computed earlier or duplicates of original values that are

stored elsewhere. If requested data is contained in the cache (**cache hit**), this request can be served by simply reading the cache, which is comparatively faster. Otherwise (**cache miss**), the data has to be recomputed or fetched from its original storage location, which is comparatively slower. Hence, the greater the number of requests that can be served from the cache, the faster the overall system performance becomes.

To be cost efficient and to enable an efficient use of data, caches are relatively small. Nevertheless, caches have proven themselves in many areas of computing because access patterns in typical computer applications have locality of reference. References exhibit temporal locality if data is requested again that has been recently requested already. References exhibit spatial locality if data is requested that is physically stored close to data that has been requested already.

Hardware implements cache as a block of memory for temporary storage of data likely to be used again. CPUs and hard drives frequently use a cache, as do web browsers and web servers.

A cache is made up of a pool of entries. Each entry has a datum (piece of data) - a copy of the same datum in some **backing store**. Each entry also has a tag, which specifies the identity of the datum in the backing store of which the entry is a copy.

When the cache client (a CPU, web browser, operating system) needs to access a datum presumed to exist in the backing store, it first checks the cache. If an entry can be found with a tag matching that of the desired datum, the datum in the entry is used instead. This situation is known as a *cache hit*. So, for example, a web browser program might check its local cache on disk to see if it has a local copy of the contents of a web page at a particular URL. In this example, the URL is the tag, and the contents of the web page is the datum. The percentage of accesses that result in cache hits is known as the *hit rate* or *hit ratio* of the cache.

The alternative situation, when the cache is consulted and found not to contain a datum with the desired tag, has become known as a *cache miss*. The

previously uncached datum fetched from the backing store during miss handling is usually copied into the cache, ready for the next access.

During a cache miss, the CPU usually ejects some other entry in order to make room for the previously uncached datum. The heuristic used to select the entry to eject is known as the replacement policy. One popular replacement policy, "least recently used" (LRU), replaces the least recently used entry (see cache algorithm). More efficient caches compute use frequency against the size of the stored contents, as well as the latencies and throughputs for both the cache and the backing store. This works well for larger amounts of data, longer latencies and slower throughputs, such as experienced with a hard drive and the Internet, but is not efficient for use with a CPU cache.

### **8. Make an annotation of the article using the following sentences:**

#### **ANNOTATION**

1. I have read the article in ... ("Digest", "Art News").
2. It is ... (Ukrainian, British, American) ... (newspaper, magazine, journal).
3. The title of the article is ... .
4. The author of the article is ... .
5. The article considers the problem of ... .
6. It gives ... (facts, photos, diagrams, schemes).
7. The author points out that ... .
8. The article draws the readers' attention to the fact that ... .
9. The author stresses that ... .
10. The key problem of the article is ...
11. To my mind, ... .
12. The article is worth reading because the problem discussed in the article is of great interest (informative, of good use).

### **9. Answer these questions about yourself.**

1. What are you studying?
2. Where are you studying?
3. How long is your course?
4. Is it part-time or full-time?
5. What qualification do you get when you complete the course?
6. What are the main subjects?
7. Which subject do you find it difficult?
8. Why do you find it difficult?
9. Which subject do you enjoy most?
10. How many classes do you have each week?
11. When do your classes start each day?
12. When do they finish?
13. Do you have any self-study time?
14. What do you hope to do when you finish your course?



## GRAMMAR EXERCISES

### 10. Transform the following sentences using Participle phrases instead of the Subordinate Clauses:

1. The scientists *who will take part in the conference* must submit their abstracts. 2. A dialect is a form of language *that differs from the generally accepted standards of speech*. 3. The Queen opens the Parliament with a speech *that sets out the Government's programme for the future*. 4. The man *who is addressing the meeting* is the leader of the opposition. 5. Science fiction is fiction *that deals with imagined scientific discoveries and advances*. 6. Anybody *who will touch that wire* will get an electric shock.

### 11. Open the brackets using Participle 1 according to the model:

**Model:** (to be a good teacher) he could explain everything simply and clearly.  
– *Being a good teacher he could explain everything simply and clearly.*

1. (to be a man of flexible views) he appreciated the new theory. 2. (to be tired she went to her room). 3. (to be a foreigner) the man couldn't understand what we were talking about. 4. (not to know the answer) he decided not to say anything. 5. (to have his term paper to write) the students couldn't visit his parents.

### 12. Transform the sentences using Participle 1:

1. *As he was clever enough*, he realized his mistake at once. 2. He fell silent and *thus showed that the interview was over*. 3. *When he discussed his research with his colleagues*, he saw some of its weak points. 4. They applied his method to concrete problems and *thus provided a valuable test for it*. 5. *When you exchange opinions with other people*, you enrich your mind.

### 13. Translate the following sentences into Ukrainian:

1. When dreaming, one tends to believe in the reality of the dream world. 2. When giving advice to others, think whether you would follow it yourself. 3. When introducing a new method of research, you must consider its practicability. 4. Skimming is appropriate when trying to decide if careful reading would be desirable. 5. When speaking English, I often make mistakes.



## Lesson 2

## IMPLEMENTATION

Once both ISA and microarchitecture has been specified, the actual computing system needs to be designed into hardware. This design process is called *implementation*. Implementation is usually a hardware engineering design process.

Implementation can be further broken down into three but not fully separate pieces:

- **Logic Implementation:** Design of blocks defined in the microarchitecture, mainly, at the register-transfer and gate levels.
- **Circuit Implementation:** Transistor-level design of basic elements (gates, multiplexers, flip-flops, etc.) as well as of some larger blocks (ALUs, caches etc.) that may be implemented at this level, or even at a lower physical level, for performance reasons.
- **Physical Implementation:** Physical circuits are drawn out, the different circuit components are placed in a chip floor-plan or on a board and the wires connecting them are routed.

For CPUs, the entire implementation process is often called CPU design; it can also be a family of related CPU designs, such as RISC and CISC.

### 1. Find the English equivalents in the text:

Процес розробки, бути розділеним на, окрема частина, переважно, рівень регістрових передач, вентиль, компоненти схеми, розміщуватися, з'єднуючі дроти.

### 2. Translate the following terms and terminological expressions:

Implementation, logic implementation, the register-transfer and gate levels, circuit implementation, gates, multiplexers, flip-flops, physical circuits.

### 3. Match the definitions with the notions and discuss then with your friends:

Implementation	a computer where single instructions can execute several low-level operations (such as a load from memory, an arithmetic operation, and a memory store) and/or are capable of multi-step operations or addressing modes within single instructions
Arithmetic and logic unit (ALU)	a CPU design strategy based on the insight that simplified (as opposed to complex) instructions can provide higher performance if this simplicity enables much faster execution of each instruction
Logic gate	an idealized or physical device implementing a Boolean function, that is, it performs a logical operation on one or more logical inputs, and produces a single logical output
Reduced Instruction Set Computing, or RISC	a digital circuit that performs integer arithmetic and logical operations
Complex	a realization of a technical specification or algorithm as a

Instruction Set Computer (CISC)	program, software component, or other computer system through computer programming and deployment
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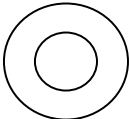
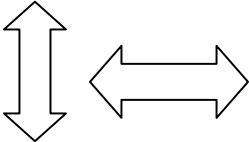
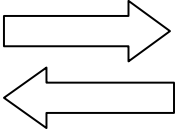
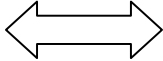


**4. Answer the following questions:**

- 1) What is implementation in computing terminology?
- 2) What separate pieces can implementation be broken?
- 3) What belongs to logic implementation?
- 4) What design does circuit implementation deal with?
- 5) How is the entire implementation process called?

**5. Tell your friends about the main aspects of implementation.**

**6. Match adjectives 1-6 with the diagrams and adverbs A-F.**

- 1) anticlockwise
- 2) clockwise
- 3) linear
- 4) oscillating
- 5) reciprocating
- 6) rotary

	Movement	Adjective	Adverb
A			-
B			up and down, backwards and forwards
C			in a straight line
D			from side to side
E			clockwise
F			anticlockwise

**7. Read the article and put five questions to it.**

## Implementation in the IT Industry

*from Management Information Systems: Managing the Digital Firm  
by K. Laudon*



In the IT Industry, implementation refers to post-sales process of guiding a client from purchase to use of the software or hardware that was purchased. This includes Requirements Analysis, Scope Analysis, Customizations, Systems Integrations, User Policies, User Training and Delivery. These steps are often overseen by a Project Manager using Project Management Methodologies set forth in the Project Management Body of Knowledge. Software Implementations involve several professionals that are relatively new to the knowledge based economy such as Business Analysts, Technical Analysts, Solutions Architect, and Project Managers.

To implement a system successfully, a large number of inter-related tasks need to be carried out in an appropriate sequence. Utilising a well-proven implementation methodology and enlisting professional advice can help but often it is the number of tasks, poor planning and inadequate resourcing that causes problems with an implementation project, rather than any of the tasks being particularly difficult. Similarly with the cultural issues it is often the lack of adequate consultation and two-way communication that inhibits achievement of the desired results.

System implementation generally benefits from high levels of user involvement and management support. User participation in the design and operation of information systems has several positive results. First, if users are heavily involved in systems design, they move opportunities to mold the system according to their priorities and business requirements, and more opportunities to control the outcome. Second, they are more likely to react positively to the change process. Incorporating user knowledge and expertise leads to better solutions.

The relationship between users and information systems specialists has traditionally been a problem area for information systems implementation efforts. Users and information systems specialists tend to have different backgrounds, interests, and priorities. This is referred to as the user-designer communications gap. These differences lead to divergent organizational loyalties, approaches to problem solving, and vocabularies.

### 8. Make an annotation of the article.

## GRAMMAR EXERCISES

### 9. Translate the sentences with Participle II:

*Model: 1. The report written by an expert was of great interest. – Доповідь, написана спеціалістом, представляла великий інтерес. 2. Written by an expert, the report could be trusted. – Оскільки доповідь була написана спеціалістом, їй*

можна було вірити. 3. *If confirmed, these facts can be of great value.* – Якщо ці факти підтвердяться, вони можуть виявитися дуже цінними. 4. *When offered help, they accepted it eagerly.* – Коли їм запропонували допомогу, вони прийняли її з готовністю.

1. Science is knowledge arrange in an orderly manner. 2. Experiment is a test carried out to gain new knowledge. 3. The number of electronic computers used in any given field of human activity is an indication of the degree of its modernity. 4. Thinking expresses itself in words spoken or written. 5. If asked to assess the chances of victory in a war, the computer will analyse facts quite differently from a military expert. 6. When asked about the latest development in this African country, the UN spokesman gave a full account of the situation. 7. Asked to justify his belief, the scientist said that science is becoming an essential part of our everyday life.

### 10. Combine two simple sentences into one, using Participle II.

*Model: The speaker refused to continue. He was infuriated by the interruptions. – Infuriated by the interruptions, the speaker refused to continue.*

1. He decided to have some rest. He was exhausted by hard work. 2. We decided to go home. We were depressed by the news. 3. Art students fail to understand the importance of science. They are inclined to regard science only as the power behind mass production. 4. We changed the lines of our research. We were disappointed by the results. 5. The subject of the research was presented historically. It seemed to be more interesting.

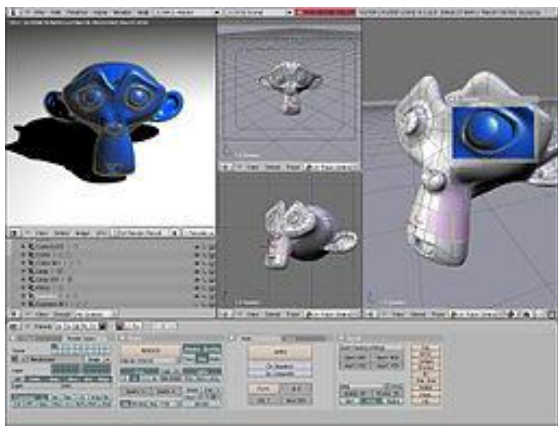
### 11. Transform the following sentences, using Participle II.

*Model: Though he was defeated, he remained a popular leader. – Though defeated, he remained a popular leader.*

1. Though he was offered a large reward, he would not disclose the truth. 2. Though he was well-educated, he lacked any coherent philosophical background. 3. Although these publications remained unconfirmed, they stirred considerable unrest. 4. Though the explorers were exhausted by heat and privations, they would not give in.

### 12. Use the verb in brackets in the form of Participle I or Participle II:

1. Scientists (to deal) with the problems of pollution insist on its being exactly assessed. 2. The problem of pollution in industrial areas (to deal) with in this paper is one of the most important for modern science. 3. People (to use) force when it is not necessary cannot be justified. 4. Electronics computers (to use) in the research, saved the scientists a lot of time. 5. (To carry out) numerous experiments and tests, the scientists tried to prove the original hypothesis. 6. The experiments (to carry out) by a team of young scientists led to sensational results.



## Lesson 3

## COMPUTER GRAPHICS

**Computer graphics** are visual representations of data displayed on a monitor made on a computer. Computer graphics can be a series of images (most often called video) or a single image.

Computer graphics are very useful. They are used for movie making, video game and computer program development, scientific modelling, and design for catalogs and other commercial things. Some people even make computer graphics as art.

Computer graphics can be 2D or 3D. Each subset has its own use, but is created in a different way. Different computer programs have to be used to make different types of graphics.

2D computer graphics are usually split into two categories: vector graphics and raster graphics.

Vector graphics use lines, shapes, and text to create a more complex image. If a vector graphic image is made very big on the monitor, it will still be as good as its regular size. This is one of the reasons vector graphics are liked so much. Vector graphics are made with programs like Adobe Illustrator and Inkscape, and were used for some older computer games. Today, they are often used for when computer graphics have to be printed out.

**1. Find the English equivalents in the text:**

Зйомка фільмів, розробка програм, наукове моделювання, підрозділ, мати своє власне використання, бути створеним по-різному, розпадатися на дві категорії, растрова графіка, створити складніший образ.

**2. Translate the following terms and terminological expressions:**

Visual representations, a series of images, vector graphics, raster graphics, lines, shapes, regular size, to be printed out.

**3. Match the definitions with the notions and discuss them with your friends:**

Computer graphics	an open source vector graphics editor
Vector graphics	a vector graphics editor developed and marketed by Adobe Systems
Raster graphics	a dot matrix data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium
Adobe Illustrator	the use of geometrical primitives such as points, lines, curves, and shapes or polygon(s), which are all based on mathematical expressions, to represent images in computer graphics
Inkscape	graphics created using computers and the representation of image data by a computer specifically with help from specialized graphic hardware and software

**4. Ask your friend to answer the following questions:**

- 1) What is computer graphics?
- 2) What are computer graphics used for?
- 3) What subsets are there in computer graphics?
- 4) What categories are 2D computer graphics split into?
- 5) What does vector graphics use?
- 6) What programs are vector graphics made with?
- 7) What is raster graphics?

**5. Tell your friends about the main aspects of computer graphics.**

**6. What's the best technical solution to the problem of protecting a large store from shoplifters (people who steal things from shops)? Work in small groups and study the solutions, then make your choice. Give reasons for your choice.**

## **CAMERAS**

### **CCTV (closed circuit television)**

*Advantages:*

- Visible deterrent (Thieves know they may be recorded)
- Not very expensive
- You can include some dummy cameras

*Disadvantages:*

- People forget to change tapes
- Image may not be very clear

**Digital CCTV cameras with online connections** (Recorded on hard disk which can store several months of recording)

*Advantages:*

- Can be viewed from any broadband connection
- *No tapes to change*

*Disadvantages:*

- *Expensive*

### **Concealed micro-cameras with RF connections**

*Advantages:*

- No expensive wiring
- Good way to catch thieves in action

*Disadvantages:*

- Not a visible deterrent

## **TAGS**

### **Large electronic security tags on things which are often stolen**

(Alarm is triggered by a 8.2 MHz signal when the tag is taken through a security gate at the shop entrance)

*Advantages:*

- Visible deterrent
- Tags are inexpensive

*Disadvantages:*

- Must be removed at tills
- Expensive system to install
- Professional thieves may remove them in the store

### **Concealed electronic security tags**

*Advantages:*

- Thieves may not see them and so can be caught more easily

*Disadvantages:*

- Must be deactivated at tills. Sales people may forget

**Ink tags on clothing** (they break if wrongly removed and spoil the item)

*Advantages:*

- Simple and expensive deterrent

*Disadvantages:*

- Professional thieves can remove them

**7. Read the information about short report and linking words:**

- In writing we often use linking words to make it clear to the reader how the ideas in our writing are connected. We can use **but** to link an advantage and a disadvantage. Example: *Use CCTV cameras and record onto video tapes. This is not very expensive but people forget to change the tapes.*
- We can also use **however** and **although** to link an advantage and a disadvantage? Usually at the start of a sentence. Examples: 1) *Use CCTV cameras and record onto video tapes. These cameras are a visible deterrent to thieves. However, the image may not be very clear.* 2) *Use CCTV cameras and record onto video tapes. Although these cameras are a visible deterrent to thieves, the image may not be very clear.*
- We can use **because**, **since** and **as** to link a recommendation with a reason. Examples: 1) *I advise you to install digital CCTV cameras because they are effective and not very expensive.* 2) *I recommend you to use large electronic security tags since they are a visible deterrent to most thieves.* 3) *Our advice is to use large electronic security tags as they are a visible deterrent to most thieves.*

**8. Write a short report on security for the owner of a large shop. Your report should have two sections:**

- 1) List the advantages and disadvantages of each solution.
- 2) Recommend the best solution. Give reasons to support your choice.

**9. Exchange your report with another student and decide if it can be understood easily. Mark any places where the report is not clear enough.**

**10. Read the article and put five questions to it.**

**History and Development**

*from Computer Graphics*

*by Francis S. Hill (2001)*

The phrase "Computer Graphics" was coined in 1960 by William Fetter, a graphic designer for Boeing.

The field of computer graphics developed with the emergence of computer graphics hardware. Early projects like the Whirlwind and SAGE Projects introduced the CRT as a viable display and interaction interface and introduced the light pen as an input device.





A programmer for the Whirlwind SAGE system performed a personal experiment in 1954 in which a small program he wrote captured the movement of his finger and displayed its vector (his traced name) on a display scope. The same individual, Douglas T. Ross, working at MIT on transforming mathematic statements into computer generated machine tool vectors in 1959 took the opportunity to create a display scope image of a Disney cartoon character.

Further advances in computing led to greater advancements in interactive computer graphics. In 1959, the TX-2 computer was developed at MIT's Lincoln Laboratory. The TX-2 integrated a number of new man-machine interfaces. A light pen could be used to draw sketches on the computer using Ivan Sutherland's revolutionary Sketchpad software. Using a light pen, Sketchpad allowed one to draw simple shapes on the computer screen, save them and even recall them later. The light pen itself had a small photoelectric cell in its tip. This cell emitted an electronic pulse whenever it was placed in front of a computer screen and the screen's electron gun fired directly at it. By simply timing the electronic pulse with the current location of the electron gun, it was easy to pinpoint exactly where the pen was on the screen at any given moment. Once that was determined, the computer could then draw a cursor at that location.

Sutherland seemed to find the perfect solution for many of the graphics problems he faced. Even today, many standards of computer graphics interfaces got their start with this early Sketchpad program. One example of this is in drawing constraints. If one wants to draw a square for example, they do not have to worry about drawing four lines perfectly to form the edges of the box. One can simply specify that they want to draw a box, and then specify the location and size of the box. The software will then construct a perfect box, with the right dimensions and at the right location. Another example is that Sutherland's software modeled objects - not just a picture of objects. In other words, with a model of a car, one could change the size of the tires without affecting the rest of the car. It could stretch the body of the car without deforming the tires.

## **11. Make an annotation of the article.**

### **GRAMMAR EXERCISES**

## **12. Translate the following sentences paying attention to the Objective Participial Construction.**

1. When we came back we found them still arguing. 2. He wanted his papers published as soon as possible. 3. He was pleased to hear his words quoted several times in the President's speech. 4. You could hear the loudness of the teacher's voice changing according to what he was talking about. 5. We watched the planes landing and taking off. 6. They heard the engine roaring and the plane started.

## **13. Translate the following sentences using the examples of the Objective Participial Construction after the verbs *to have* and *to get*:**

*They had new equipment installed in the library. – Їм встановили в бібліотеці нове обладнання. The administration had/(got) this scheme cancelled. – Адміністрація добилася скасування цієї програми або скасувала цю програму.*

1. They had all his speeches recorded.
2. A publisher in London had Dr. Brown's book translated into English.
3. We must have all the equipment packed by tomorrow.
4. When he had all his taxes paid, the amount left in the bank was hardly worth mentioning.
5. They got their children educated in the best British Universities.
6. She had her manuscript typed without a single typing error.

## Lesson 4

### COMPUTER NETWORK



A **computer network** is a group of computers connected to each other electronically. This means that the computers can "talk" to each other and that every computer in the network can send information to the others. Usually, this means that the speed of the connection is fast - faster than a normal connection to the Internet. Some basic types of computer networks include:

- A local area network (often called a LAN) connects two or more computers, and may be called a corporate network in an office or business setting.
- An "internetwork", sometimes called a Wide Area Network (because of the wide distance between networks) connects two or more smaller networks together. The largest internetwork is called the Internet.

Computers can be part of several different networks. Networks can also be parts of bigger networks. The *local area network* in a small business is usually connected to the *corporate network* of the larger company. Any connected machine at any level of the organization may be able to access the *Internet*, for example to demonstrate computers in the store, display its catalogue through a web server, or convert received orders into shipping instructions.

Microsoft Windows, Linux and most other operating systems use TCP/IP for networking. Apple Macintosh computers used Appletalk in the past, but it uses TCP/IP now.

To set up a network an appropriate media is required. This can be wired or wireless. Twisted-pair, co-axial or fiber-optic are examples of cable media; and infrared, blue-tooth, radio-wave, micro-wave etc. are wireless media used for networking. When you are working with a mere LAN, computers, media and peripherals are sufficient. But when you are working with a wider range you have to use some additional devices like bridge, gateway or router to connect different small or large networks. And obviously a protocol must be maintained.

To set up a network you have to select an appropriate topology to arrange the hardware devices using the media. Topologies generally used are bus-topology, ring-topology, star-topology, tree-topology, object-oriented topology etc. Among these star-topology and tree-topology are most popular nowadays.

### 1. Find the English equivalents in the text:

Бути з'єднаним один з одним, надсилати інформацію, означати, швидкість з'єднання, глобальна мережа, широка відстань, відповідні засоби, провідний засіб, бездротовий засіб, кабель "скручена пара", коаксіальний кабель, бути достатнім, підтримуватися (дотримуватися),

### 2. Translate the following terms and terminological expressions:

Local area network, corporate network, Wide Area Network, to access the Internet, web server; twisted-pair, co-axial or fiber-optic media; infra-red, blue-tooth, radio-wave, micro-wave media; bridge, gateway and router; to arrange the hardware devices using the media, bus-topology, ring-topology, star-topology, tree-topology, object-oriented topology.

### 3. Match the definitions with the notions and discuss them with your friends:

Local area network (LAN)	a flexible, transparent fiber made of high quality extruded glass (silica) or plastic, slightly thicker than a human hair
Wide Area Network (WAN)	the type of cable used for cable television (a type of cable that has an inner conductor surrounded by a tubular insulating layer, surrounded by a tubular conducting shield)
Twisted-pair wire	normal electrical wire (a type of wiring in which two conductors of a single circuit are twisted together for the purposes of canceling out electromagnetic interference (EMI) from external sources; for instance, electromagnetic radiation from unshielded twisted pair (UTP) cables, and crosstalk between neighboring pairs)
Coaxial cable	a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, or national boundaries) using private or public network transports
Fiber optic cable	a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media

### 4. Ask your friend to answer the following questions:

- 1) What is computer network?
- 2) What types do computer networks include?
- 3) What is LAN?
- 4) What does WAN connect?
- 5) What do most operating systems use for networking?
- 6) What is required to set up a network?
- 7) What are the examples of cable media?
- 8) What are the examples of wireless media used for networking?
- 9) What is sufficient when you are working with a mere LAN?

- 10) What additional devices have you to use when you are working with a wider range?
- 11) What have you to select to set up a network?
- 12) What are the most popular topologies nowadays?

**5. Tell your friends about the main aspects of computer network.**

**6. Read and translate the text.**

**ASVs**



Road traffic is increasing worldwide. This increase brings problems: road accidents, congestion, and pollution. However, engineers are working on Advanced safety vehicles (ASVs) which will be much safer for drivers, other road users such as cyclists, and for pedestrians. They are also working on new engines which

use cleaner fuels.

ASVs will be equipped with electronic sensors to prevent accidents and to make it safer for people when accidents do happen. One sensor will stop the driver falling asleep. Others will warn drivers when they are too close to other vehicles.

The car of the future might be electric. Electric motors are very efficient and produce no pollution, but they need heavy batteries and their range is limited with current technology. Hybrid cars have both a petrol engine and an electric motor. They save about 15% of fuel. They need batteries but they don't have to be charged overnight as the motor acts as a generator when the car brakes. Liquefied petroleum gas (LPG) is already used as a fuel. Cars can be converted easily but LPG only cuts down pollution a little. Hydrogen fuel cells may be the long-term answer. They provide clean power but each cell is very expensive.

**7. Answer the following questions:**

- 1) How is this car different from a typical car of today?
- 2) What does ASVs mean?
- 3) What are the aims of the designers of this car?
- 4) What further improvements could you make to this car?

**8. Read the last paragraph of the text again and note the advantages and disadvantages of the forms of power in the table.**

<b>Form of Power</b>	<b>Advantage</b>	<b>Disadvantage</b>
Electric		
Hybrid (petrol and electric)		
LPG		

# Hydrogen fuel cell

## Gadget Box



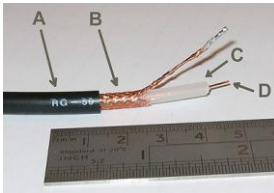
*The world's first hydrogen-powered motorbike can reach 80 kph in 12 seconds. It produces no pollution and is almost silent. However, the hydrogen fuel cell costs £ 15,000 and motorbike fans don't like the idea of a “noise-free” bike! How could you make this motorbike more attractive to bikers?*

### 9. Read the article and put five questions to it.



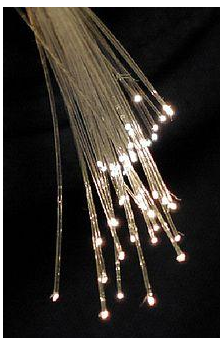
**Twisted pair** cabling was invented by Alexander Graham Bell.

**Coaxial cable** was invented by English engineer and mathematician Oliver Heaviside, who patented the design in 1880. Coaxial cable differs from other shielded cable used for carrying lower-frequency signals, such as audio signals, in that the dimensions of the cable are controlled to give a precise, constant conductor spacing, which is needed for it to function efficiently as a radio frequency transmission line.



**Optical fibers** are widely used in fiber-optic communications, which permits transmission over longer distances and at higher bandwidths (data rates) than other forms of communication.

Fibers are used instead of metal wires because signals travel along them with less loss and are also immune to electromagnetic interference.



Harold Hopkins and Narinder Singh Kapany at Imperial College in London achieved low-loss light transmission through a 75 cm long bundle which combined several thousand fibers. Their article titled "A flexible fibrescope, using static scanning" was published in the journal *Nature* in 1954. The first fiber optic semi-flexible gastroscope was patented by Basil Hirschowitz, C. Wilbur Peters, and Lawrence E. Curtiss, researchers at the University of Michigan, in 1956.

### 10. Make an annotation of the article.

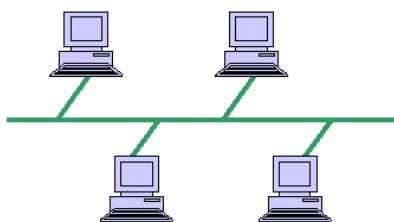
#### Computer Network Topologies

#### Bus, ring and star network topology diagrams

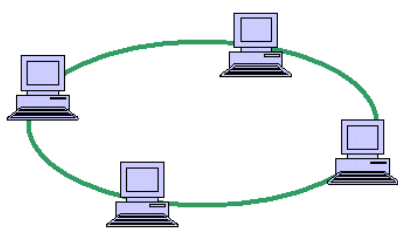
By Bradley Mitchell, *About.com Guide*

In computer networking, *topology* refers to the layout of connected devices.

A computer network topology is the physical communication scheme used by connected devices. These pages illustrate the common computer network topologies including bus, ring and star topology diagrams. More complex networks can be built as hybrids of two or more of these basic topologies.

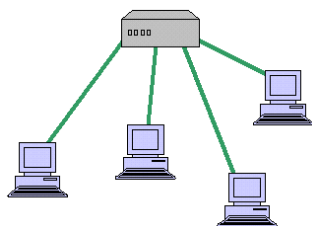


Bus networks (not to be confused with the system bus of a computer) use a common backbone to connect all devices. A single cable, the backbone functions as a shared communication medium that devices attach or tap into with an interface connector. A device wanting to communicate with another device on the network sends a broadcast message onto the wire that all other devices see, but only the intended recipient actually accepts and processes the message.



A *ring topology* such as FDDI or SONET sends messages clockwise or counterclockwise through the shared link. In a ring network, every device has exactly two neighbors for communication purposes. All messages travel through a ring in the same direction (either "clockwise" or "counterclockwise"). A failure in any cable or device breaks the loop and can take down

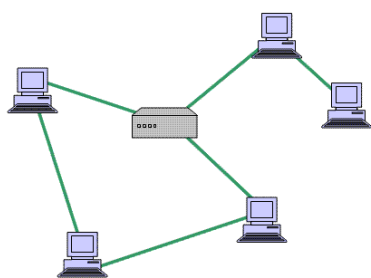
the entire network.



A *star topology* typically uses a network hub or switch and is common in home networks.

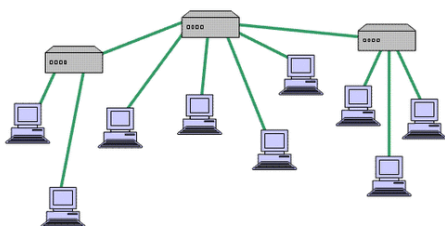
Compared to the bus topology, a star network generally requires more cable, but a failure in any star network cable will only take down one computer's network access and not the entire LAN. (If the hub fails, however, the entire network

also fails.)



A *mesh topology* provides redundant communication paths between some or all devices (partial or full mesh). Mesh topologies involve the concept of routes. Unlike each of the previous topologies, messages sent on a mesh network can take any of several possible paths from source to destination. (Recall that even in a ring, although two cable paths exist, messages can only travel in one direction.)

Some WANs, most notably the Internet, employ mesh routing. A mesh network in which every device connects to every other is called a full mesh. As shown in the illustration below, partial mesh networks also exist in which some devices connect only indirectly to others.



A *tree topology* integrates the star and bus topologies in a hybrid approach to improve network scalability.

Tree topologies integrate multiple star topologies together onto a bus. In its simplest form, only hub devices connect directly to the tree bus, and each hub functions as the root of a tree of devices. This bus/star

hybrid approach supports future expandability of the network much better than a bus (limited in the number of devices due to the broadcast traffic it generates) or a star (limited by the number of hub connection points) alone.

Think of a topology as a network's virtual shape or structure. This shape does not necessarily correspond to the actual physical layout of the devices on the network. For example, the computers on a home LAN may be arranged in a circle in a family room, but it would be highly unlikely to find a ring topology there.

Topologies remain an important part of network design theory. You can probably build a home or small business computer network without understanding the difference between a bus design and a star design, but becoming familiar with the standard topologies gives you a better understanding of important networking concepts like hubs, broadcasts, and routes.

## GRAMMAR EXERCISES

**11. Translate the following sentences into Ukrainian paying attention to the Absolute Participial Construction:**

*Model: His speech finished, the audience applauded. – Коли його промова була завершена, аудиторія зааплодувала. The speaker having finished, the audience applauded. – Коли оратор завершив промову, аудиторія зааплодувала. His speech being very interesting, the audience listened attentively. – Оскільки його промова була дуже цікавою, аудиторія слухала уважно. He continued speaking, his colleagues listening attentively. – Він продовжував говорити, а його колеги уважно його слухали.*

1. Her proposal having been accepted, she took her seat. 2. Nobody having anything more to say, the meeting was closed. 3. The crisis having passed, they could think about the future. 4. Her courage failing, the girl rushed back. 5. It being a scientific matter, we had to call in specialists. 6. The standard of living having improved after the First World War, the working class families could afford spending more money on foodstuffs.

**12. Translate the following sentences into English paying attention to the Absolute Participial Construction:**

1. Він не повернувся до цього дослідження знову, але його завдання було виконано. 2. Оскільки на його погляди не вплинула наука, він здійснив ряд серйозних помилок у своїх судженнях. 3. Оскільки припинення динаміки індустріального розвитку досить не реальне, нам слід повернути технологію на побудову здорового оточення. 4. І дослідники, і вчені проводять дослідження, але різниця між ними така, що перші займаються точними та природничими науками, в той час як останні працюють у сфері гуманітарних наук.

## Lesson 5

### COMPUTER SECURITY



**Computer security** is a branch of information technology known as information security which is intended to protect computers. Computer security has three main goals:

- Confidentiality: Making sure people cannot acquire information they should not (*keeping secrets*)
- Integrity: Making sure people cannot change information they should not (*protecting data*)
- Availability: Making sure people cannot stop the computer from doing its job.



Computer security involves telling computers what they are *not to do*. This makes computer security unique because most programming makes computers *do* things. Security takes much of a computer's power.

Basic computer security methods (in approximate order of strength) can be:

- Limit access to computers to "safe" users.
- Peripherals which block any "unsafe" activity.
- Firewall and antivirus software.

The aviation industry is especially important when analyzing computer security because the involved risks include human life, expensive equipment, cargo, and transportation infrastructure. Security can be compromised by hardware and software malpractice, human error, and faulty operating environments. Threats that exploit computer vulnerabilities can stem from sabotage, espionage, industrial competition, terrorist attack, mechanical malfunction, and human error.

The consequences of a successful deliberate or inadvertent misuse of a computer system in the aviation industry range from loss of confidentiality to loss of system integrity, which may lead to more serious concerns such as data theft or loss, network and air traffic control outages, which in turn can lead to airport closures, loss of aircraft, loss of passenger life. Military systems that control munitions can pose an even greater risk.

A proper attack does not need to be very high tech or well funded; for a power outage at an airport alone can cause repercussions worldwide. One of the easiest and, arguably, the most difficult to trace security vulnerabilities is achievable by transmitting unauthorized communications over specific radio frequencies. These transmissions may spoof air traffic controllers or simply disrupt communications altogether. These incidents are very common, having altered flight courses of commercial aircraft and caused panic and confusion in the past. Controlling aircraft over oceans is especially dangerous because radar surveillance only extends 175 to 225 miles offshore. Beyond the radar's sight controllers must rely on periodic radio communications with a third party.

### **1. Find the English equivalents in the text:**

Мати намір, головна мета, конфіденційність, цілісність, наявність (доступність), дороге обладнання, вантаж, людська помилка, комп'ютерна вразливість, шпигунство, механічна несправність, наслідки, навмисне неправопільне використання, відключення контролю (управління), контролювати боєприпаси, відключення електроенергії, викликати наслідки, вразливість безпеки, порушувати зв'язок, оглядовий радіолокатор,

### **2. Translate the following terms and terminological expressions:**



Limit access, firewall, antivirus software, hardware and software malpractice, faulty operating environments, inadvertent misuse, data theft, specific radio frequencies, to rely on periodic radio communications.

**3. Match the definitions with the notions and discuss them with your friends:**

Computer security	a rate of oscillation in the range of about 3 kHz to 300 GHz, which corresponds to the frequency of radio waves, and the alternating currents which carry radio signals
Firewall	instance of negligence or incompetence on the part of a professional
Antivirus	software used to prevent, detect and remove malware
Malpractice	a software or hardware-based network security system that controls the incoming and outgoing network traffic by analyzing the data packets and determining whether they should be allowed through or not, based on a rule set
Radio frequencies	information security as applied to computers and networks

**4. Answer the following questions:**

- 1) What is computer security?
- 2) What are the main goals of computer security?
- 3) What are the basic computer security methods?
- 4) What is especially important when analyzing computer security?
- 5) What can security be compromised by?
- 6) What do the consequences of a successful deliberate or inadvertent misuse of a computer system in the aviation industry range from?

**5. Tell your friends about the main aspects of computer security.**

**6. Read and translate the text about Jan Bronec, a Mechanical Engineer.**

**IT'S MY JOB**

I work for a Polish company which converts diesel engines to run on natural gas. They're used in forklifts and tractors, but mostly in buses. Diesel-engine buses can produce a lot of pollution. The air quality in city centres is often quite poor. Natural gas-fuelled engines are much cleaner than diesel. The work that we do is helping to improve the air quality in our cities.

In the past few years, we've started to build gas-powered generators. They produce up to 100 kilowatts. They run on bio-gas from sewage treatment plants. They produce all the power the plant needs, and more. When there's a power cut, people find it a bit strange that the sewage plant has all its lights on.

I travel quite a lot in my job. I help to install new generators all over the country and to provide support for bus companies who use our engines. We're

planning to export to other EU countries so I might have more opportunity to travel outside Poland and maybe use my English.

### **7. Answer the questions.**

- 1) What kind of transport is he concerned with?
- 2) How does his work improve life in cities?
- 3) What other products does his company make?
- 4) What kind of fuel does this product use?
- 5) Why might he have more opportunity to use English?

### **8. Read the article and put five questions to it.**

#### **Ross John Anderson**



**Ross John Anderson**, (born 1956) is a researcher, writer, and industry consultant in security engineering. He is Professor in Security Engineering at the University of Cambridge Computer Laboratory, where he is engaged in the Security Group

In 1978, Anderson graduated with a Bachelor of Arts in mathematics and natural science from Trinity College, Cambridge, and subsequently received a qualification in computer engineering. He worked in the avionics and banking industry before moving in 1992 back to the University of Cambridge, to work on his doctorate under the supervision of Roger Needham and start his career as an academic researcher. He received his PhD in 1995, and became a lecturer in the same year. He lives

near Sandy, Bedfordshire

Anderson's research interests are in computer security. In cryptography, he designed with Eli Biham the BEAR, LION and Tiger cryptographic primitives, and coauthored with Biham and Lars Knudsen the block cipher Serpent, one of the finalists in the AES competition. He has also discovered weaknesses in the FISH cipher and designed the stream cipher Pike.

In 1998, Anderson founded the Foundation for Information Policy Research, a think tank and lobbying group on information-technology policy.

Anderson is also a founder of the UK-Crypto mailing list and the economics of security research domain.

He is well-known among Cambridge academics as an outspoken defender of academic freedoms, intellectual property, and other matters of university politics. He is engaged in the Campaign for Cambridge Freedoms and has been an elected member of Cambridge University Council since 2002. In January 2004, the student newspaper Varsity declared Anderson to be Cambridge University's "most powerful person".

In 2002, he became an outspoken critic of trusted computing proposals, in particular Microsoft's Palladium operating system vision.

For years Anderson has been arguing that by their nature large databases will never be free of abuse by breaches of security. He has said that if a large system is designed for ease of access it becomes insecure; if made watertight it becomes impossible to use. This is sometimes known as Anderson's Rule.

Anderson is the author of *Security Engineering*, published by Wiley in 2001, ISBN 0-471-38922-6. He was the founder and editor of *Computer and Communications Security Reviews*.

## 9. Make an annotation of the article.

### Adobe Systems Inc.

*from Adobe Logo: Design and History*  
by Erik Larson



**Adobe Systems Inc.** is an American multinational computer software company headquartered in San Jose, California, United States. The company has historically focused upon the creation of multimedia and creativity software products, with a more-recent foray towards rich Internet application software development.

Adobe was founded in December 1982 by John Warnock and Charles Geschke, who established the company after leaving Xerox PARC in order to develop and sell the PostScript page description language. In 1985, Apple Computer licensed PostScript for use in its LaserWriter printers, which helped spark the desktop publishing revolution.

The company name *Adobe* comes from Adobe Creek in Los Altos, California, which ran behind the houses of both of the company's founders. Adobe acquired its former competitor, Macromedia, in December 2005, which added newer software products and platforms such as ColdFusion, Dreamweaver, Flash and Flex to its product portfolio.

As of 2010, Adobe Systems has 9,117 employees, about 40% of whom work in San Jose. Adobe also has major development operations in Orlando; Seattle; San Francisco; Lehi, Utah; Minneapolis; Waltham, Massachusetts; and San Luis Obispo, California in the United States; Ottawa, Canada; Hamburg, Germany; Noida and Bangalore, India; Bucharest, Romania; Basel, Switzerland; and Beijing, China.

Adobe's first products after PostScript were digital fonts, which they released in a proprietary format called Type 1. Apple subsequently developed a competing standard, TrueType, which provided full scalability and precise control of the pixelpattern created by the font's outlines, and licensed it to Microsoft.

In the mid-1980s, Adobe entered the consumer software market with Adobe Illustrator, a vector-based drawing program for the Apple Macintosh. Illustrator, which grew from the firm's in-house font-development software, helped popularize PostScript-enabled laser printers. Unlike MacDraw, the then standard Macintosh vector drawing program, Illustrator described shapes with more flexible Bézier

curves, providing unprecedented accuracy. Font rendering in Illustrator, however, was left to the Macintosh's QuickDraw libraries and would not be superseded by a PostScript-like approach until Adobe released Adobe Type Manager.

In 1989, Adobe introduced what was to become its flagship product, a graphics editing program for the Macintosh called Photoshop. Stable and full-featured, Photoshop 1.0 was ably marketed by Adobe and soon dominated the market.

In 1993, Adobe introduced PDF, the Portable Document Format, and its Adobe Acrobat and Reader software. PDF is now an International Standard: ISO 32000-1:2008. The technology is adopted worldwide as a common medium for electronic documents.

## GRAMMAR EXERCISES

### 10. Analyse the table *Verb + to-Infinitive or Verb + ing-form*.

Some verbs take a to-infinitive and some take an ing-form. Some verbs take either a to-infinitive or an ing-form. Compare:

<b>VERB + TO INFINITIVE</b>	<b>VERB + ING FORM</b>	<b>BOTH</b>
Agree, guarantee, undertake ask, demand, beg attempt, seek can't afford can't wait choose, decide claim, pretend expect fail, omit, neglect, hesitate happen, turn out, prove hope, aim learn, train manage offer, promise, swear plan, arrange, prepare refuse seem, appear tend threaten wish, want	Admit, confess, deny appreciate avoid, save, escape, resist can't face can't help delay, postpone, put off dislike, detest, can't stand enjoy, fancy finish, quit, give up imagine, consider involve justify, excuse keep, keep on, carry on mention miss practice resent, mind risk suggest tolerate	Start, begin continue intend, propose bother love, like prefer hate

### 11. Put in the verbs. Use a to-infinitive or ing-form:

Elaine: Are we going to have a holiday this year?

Gary: I thought we'd decided (spend) our holidays on a Spanish beach somewhere.

Paula: Oh, good. I enjoy (lie) on the beach. I might manage (get) a suntan.

Elaine: But I dislike (stay) in one place all the time. I refuse (sit) on the beach all day.

Martin: I don't mind (tour) around in the car.

Elaine: You promised (go) to Scandinavia with me. We could take the car.

Gary: I'm not going to drive. I do too much driving. I can't face (drive) all holiday.

Martin: I wasn't planning (go) abroad. I can't afford (spend) too much money.

### 12. Put in the verbs. Use a to-infinitive or ing-form:

A: Where's your new hi-fi?

B: Oh, it went wrong. It kept (make) a funny noise. I took it back to the shop.

A: Did you get your money back?

B: Well, first they offered (repair) it, so I asked (see) the manager. In the end she agreed (give) me back the money.

A: And are you going to get another one?

B: I don't know. I want (think) about it. Can't help (wonder) if I really need a hi-fi after all. And I can't afford (buy) a very good one.

## UNIT III

### Lesson 1

### SYSTEM ADMINISTRATOR



A **system administrator**, **IT systems administrator**, **systems administrator**, or **sysadmin** is a person employed to maintain and operate a computer system and/or network.

The duties of a system administrator are wide-ranging, and vary widely from one organization to another. Sysadmins are usually charged with installing, supporting and maintaining servers or other computer systems, and planning for and responding to service outages and other problems. Other duties may include scripting or light programming, project management for systems-related projects, supervising or training computer operators, and being the consultant for computer problems beyond the knowledge of technical support staff. To perform his or her job well, a system administrator must demonstrate a blend of technical skills and responsibility.

Many organizations staff other jobs related to system administration. In a larger company, these may all be separate positions within a computer support or Information Services (IS) department. In a smaller group they may be shared by a few sysadmins, or even a single person.

- A database administrator (*DBA*) *maintains* a database system, and is responsible for the integrity of the data and the efficiency and performance of the system.
- A network administrator maintains network infrastructure such as switches and routers, and diagnoses problems with these or with the behaviour of network-attached computers.
- A security administrator is a specialist in computer and network security, including the administration of security devices such as firewalls, as well as consulting on general security measures.
- A web administrator maintains web server services (such as Apache or IIS) that allow for internal or external access to web sites. Tasks include managing multiple sites, administering security, and configuring necessary components and software. Responsibilities may also include software change management.
- Technical support staff responds to individual users' difficulties with computer systems, provides instructions and sometimes training, and diagnoses and solves common problems.
- A computer operator performs routine maintenance and upkeep, such as changing backup tapes or replacing failed drives in a RAID. Such tasks usually require physical presence in the room with the computer; and while less skilled than sysadmin tasks require a similar level of trust, since the operator has access to possibly sensitive data.
- A postmaster is the administrator of a mail server.

In some organizations, a person may begin as a member of technical support staff or a computer operator, then gain experience on the job to be promoted to a sysadmin position.

### **1. Find the English equivalents in the text:**

Бути зайнятим, широкі обов'язки, дуже відрізнятися, бути відповідальним за, перебіг у роботі, добре виконувати роботу, поєднання технічних навичок і відповідальності, укомплектовувати (штати), заходи безпеки, налаштування компонентів, персонал, відповідати за, вирішувати загальні проблеми, поточний ремонт та утримання, заміна резервних стрічок, набути досвіду.

### **2. Translate the following terms and terminological expressions:**

To maintain and operate a computer system and network; installing, supporting and maintaining servers; database administrator; network infrastructure; security devices; web server services; internal or external access; software change management; replacing failed drives.

### **3. Match the definitions with the notions and discuss them with your friends:**

Apache	the comprehensive process that leads from an original formulation of a computing problem to executable programs
IIS	a small program written for a command interpreter or another

	scripting language
RAID	redundant array of independent disks - a storage technology that combines multiple disk drive components into a logical unit
Script	Internet Information Services - a Microsoft web server software application and set of feature extension modules created by Microsoft for use with Microsoft Windows
Prgramming	a web server software program notable for playing a key role in the initial growth of the World Wide Web

#### 4. Answer the following questions:

- 1) What is a sytem administrator?
- 2) What are the duties of sysadmins?
- 3) What is a database administrator responsible for?
- 4) What does a network administrator maintain?
- 5) What specialist is a security administrator?
- 6) What does a web administrator maintain?
- 7) What does technical support staff respond to?
- 8) What does a computer operator perform?
- 9) What is a postmaster?

5. Tell your friends about the main responsibilities of a system administrator.

#### 6. Read, analyze and remember:

**Prediction: will, may, might**

▲ *Study these examples:*

Advanced safety vehicles (ASVs) **will** be much safer.

The car of the future **might** be electric.

Hydrogen fuel cells **may** be the long-term answer.

▲ *When we are talking about future developments, we use **will** for things which are certain. We use **may** and **might** for things which are possible. (there is a little difference between may and might in written English).*

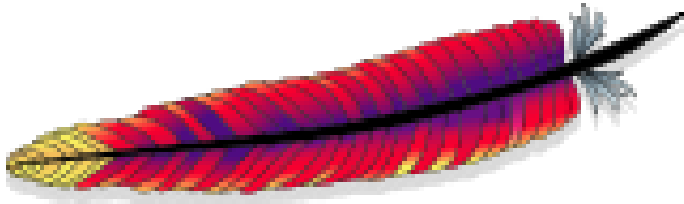
▲ *Note these short forms used in spoken English: **won't** = **will not**, **mighn't** = **might not** (there is no short form for **may not**).*

#### 7. Complete the sentences using **will, may / might** or their negative forms.

**The phrases in brackets will help.**

- 1) We \_\_\_\_\_ use petrol engines in the future. There are better alternatives. (I'm certain.)
- 2) Hydrogen fuel cells \_\_\_\_\_ get cheaper as technology improves. (I'm certain.)
- 3) A hybrid car \_\_\_\_\_ be the best choice. It doesn't produce much pollution. (It's possible.)
- 4) Solar-powered vehicles \_\_\_\_\_ be the answer to our transport problems. The cells are very inefficient. (It's very unlikely.)
- 5) Cars \_\_\_\_\_ become much safer with the addition of many sensors. (I'm certain.)
- 6) More people in Europe \_\_\_\_\_ travel to work by train than by car. (It's possible.)

## 8. Read the article and put five questions to it.



The Apache HTTP Server, commonly referred to as Apache is a web server software program notable for playing a key role in the initial growth of the World Wide Web. In

2009, it became the first web server software to surpass the 100 million website milestone. Apache was the first viable alternative to the Netscape Communications Corporation web server (currently named Oracle iPlanet Web Server). Typically Apache is run on a Unix-like operating system, and was developed for use on Linux.

Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation. The application is available for a wide variety of operating systems, including Unix, FreeBSD, Linux, Solaris, Novell NetWare, OS X, Microsoft Windows, OS/2, TPF, and eComStation. Released under the Apache License, Apache is open-source software.

Apache was originally based on NCSA HTTPd code. The NCSA code has since been removed from Apache, due to a rewrite.

Since April 1996 Apache has been the most popular HTTP server software in use. As of June 2013, Apache was estimated to serve 54.2% of all active websites and 53.3% of the top servers across all domains.

According to the FAQ in the Apache project website, the name Apache was chosen out of respect to the Native American tribe Apache and its superior skills in warfare and strategy.

## 9. Make an annotation of the article.



### **Brian Behlendorf**

"2003 Young Innovators Under 35". *Technology Review*. 2003.

*Retrieved August 15, 2011.*

Brian Behlendorf (born March 30, 1973) is a technologist, computer programmer, and an important figure in the open-source software movement. He was a primary developer

of the Apache Web server, the most popular web server software on the Internet, and a founding member of the Apache Group, which later became the Apache Software Foundation. Behlendorf served as President of the Foundation for three years. Behlendorf has served on the board of the Mozilla Foundation since 2003.

Behlendorf, raised in Southern California, became interested in the early development of the Internet while he was a student at the University of California, Berkeley in the early 1990s. One of his first projects was an electronic mailing list



and online music resource, SFRaves, which a friend persuaded him to start in 1992. Behlendorf was an early participant and the chief technology guru for the Burning Man festival, and also founded a large online resource devoted to electronic music and related subcultures.

In 1993, Behlendorf, Jonathan Nelson, Matthew Nelson and Cliff Skolnick co-founded Organic, Inc., the first business dedicated to building commercial web sites. While developing the first online, for-profit, media project — the HotWired web site for Wired Magazine — in 1994, they realized that the most commonly used web server software at the time (developed at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign) could not handle the user registration system that the company required. So, Behlendorf patched the open-source code to support HotWired's requirements.

It turned out that Behlendorf wasn't the only one busy patching the NCSA code at the time, so he and Cliff Skolnick put together an electronic mailing list to coordinate the work of the other programmers. By the end of February 1995, eight core contributors to the project started Apache as a fork of the NCSA codebase. Working loosely together, they eventually rewrote the entire original program as the Apache HTTP Server. In 1999, the project incorporated as the Apache Software Foundation.

Behlendorf is currently the CTO of the World Economic Forum and a Director of CollabNet, a company he co-founded with O'Reilly & Associates (now O'Reilly Media) in 1999 to develop tools for enabling collaborative, distributed software development. CollabNet used to be the primary corporate sponsor of the open source version control system Subversion, before it became a project of the Apache Software Foundation. He continues to be involved with electronic music community events such as Chillits, and speaks often at open source conferences worldwide.

In 2003, he was named to the MIT Technology Review TR100 as one of the top 100 innovators in the world under the age of 35.

## GRAMMAR EXERCISES

### **10. Translate the sentences into Ukrainian paying attention to the Gerund:**

1. It goes without *saying*. 2. There are two ways of *getting* sugar: one from beet and the other from sugarcane. 3. Jane Eyre was fond of *reading*. 4. It looks like *raining*. 5. My watch wants *repairing*. 6. Thank you for *coming*. 7. I had no hope of *getting* an answer before the end of the month.

### **11. Transform the sentences using the Gerund with the preposition of:**

**Model:** *She thought she would go to the country for the weekend. – She thought of going to the country for the weekend.*

1. I thought I would come and see you tomorrow. 2. She has always dreamt she will live in a small house by the sea. 3. He thought he would buy a new car after that terrible accident. 4. He dreams he will travel round the world. 5. He thought he would publish his article in the international journal.

## 12. Transform the sentences using the Gerund with the preposition *after*:

**Model:** *When she had bought everything she needed, she went home. – After buying everything she needed, she went home.*

1. When he had made a thorough study of the subject, he found that it was a great deal more important than he had thought at first. 2. After I had hesitated some minutes, I finally decided to support the first point of view. 3. When she had graduated from the university, she went to teach in her hometown. 4. When he had proved that his theory was correct, he started studying ways and means of improving the conditions of work in very deep coalmines.

## Lesson 2

### NETWORK ADMINISTRATOR



A Network administrator is an individual that is responsible for the maintenance of computer hardware and software systems that make up a computer network including the maintenance and monitoring of active data network or converged infrastructure and related network equipment.

Network administrators are generally mid-level support staff within an organization and don't typically get involved directly with users. Network administrators focus upon network components within a company's LAN/WAN infrastructure ensuring integrity. Depending on the company and its size, the network administrator may also design and deploy networks.

The actual role of the network administrator will vary from place to place, but will commonly include activities and tasks such as network address assignment, management and implementation of routing protocols such as RIPv2, HSRP, routing table configurations and certain implementations of authentication (e.g: challenge response, etc). It can also include maintenance of certain network servers: file servers, VPN gateways, intrusion detection systems, etc.

In smaller organisations, network administrators may also be technically involved in the maintenance and administration of servers, desktop computers, printers, routers, switches, firewalls, phones, IP Phones, personal digital assistants, smartphones, software deployment, security updates and patches as well as a vast array of additional technologies inclusive of both hardware and software.

The role of the network administrator can vary significantly depending on an organizations size, location and socio-economic considerations. Some organizations work on a user-to-technical support ratio, whilst others implement many other strategies.

Generally, in terms of reactive situations (i.e: unexpected disruptions to service, or service improvements), IT Support Incidents are raised through an Issue tracking system. Typically, these issues work their way through a Help desk and then

flow through to the relevant technology area for resolution. In the case of a network related issue, an issue will be directed towards a network administrator. If a network administrator is unable to resolve an issue, a ticket will be escalated to a more senior network engineer for restoration of service or a more appropriate skill group.

**1. Find the English equivalents in the text:**

Складати мережу, зосереджуватися на, проектувати та розгорнути мережі, широкий спектр додаткових технологій, співвідношення "користувач-технічна підтримка", реалізувати стратегії, несподівані сбої.

**2. Translate the following terms and terminological expressions:**

Converged infrastructure; network equipment; network address assignment; routing protocols; implementations of authentication; intrusion detection systems; software deployment; security updates and patches.

**3. Match the definitions with the notions:**

LAN	a virtual private network extends a private network across a public network, such as the Internet
WAN	hot Standby Router Protocol - a Cisco proprietary redundancy protocol for establishing a fault-tolerant default gateway
RIP	routing Information Protocol - a distance-vector routing protocol, which employs the hop count as a routing metric. RIP prevents routing loops by implementing a limit on the number of hops allowed in a path from the source to a destination
HSRP	a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, or national boundaries) using private or public network transports
VPN	a computer network that interconnects computers in a limited area such as a home, school, computer laboratory, or office building using network media

**4. Answer the following questions:**

- 1) What is a network administrator responsible for?
- 2) Do network administrators get involved directly with users?
- 3) What do they focus upon?
- 4) What activities and tasks will the actual role of the network administrator include?
- 5) What may network administrators be technically involved in smaller organisations?

**5. Tell your friends about the main tasks and activities of network administrators.**

**6. Read the article and put five questions to it.**

## Wi-Fi



Wi-Fi is a popular technology that allows an electronic device to exchange data wirelessly (using radio waves) over a computer network, including high-speed Internet connections. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers' (IEEE) 802.11 standards". However, since most modern WLANs are based on these standards, the term "Wi-Fi" is used in general English as a synonym for "WLAN". Only Wi-Fi products that complete Wi-Fi Alliance interoperability certification testing successfully may use the "Wi-Fi CERTIFIED" trademark.

A device that can use Wi-Fi (such as a personal computer, video-game console, smartphone, digital camera, tablet or digital audio player) can connect to a network resource such as the Internet via a wireless network access point. Such an access point (or hotspot) has a range of about 20 meters (65 feet) indoors and a greater range outdoors. Hotspot coverage can comprise an area as small as a single room with walls that block radio waves or as large as many square miles — this is achieved by using multiple overlapping access points.

Vic Hayes has been called the "father of Wi-Fi" by some, due to his involvement in negotiating the initial standards within the IEEE while chairing the workgroup.

The term *Wi-Fi*, commercially used at least as early as August 2000, was coined by a brand-consulting firm called Interbrand Corporation. The Wi-Fi Alliance had hired Interbrand to determine a name that was "a little catchier than 'IEEE 802.11b Direct Sequence'". Belanger also stated that Interbrand invented *Wi-Fi* as a play on words with Hi-Fi (high fidelity), and also created the Wi-Fi logo.

The key technologies behind Wi-Fi were developed by the radioastronomer John O'Sullivan as a by-product in a research project, "a failed experiment to detect exploding mini black holes the size of an atomic particle".

### 7. Make an annotation of the article.

#### Victor Hayes

##### *IEEE Computer Society Awards*



Victor "Vic" Hayes (born July 31, 1941 Surabaya, Dutch East Indies) is a Senior Research Fellow at the Delft University of Technology. His role in establishing and chairing the IEEE 802.11 Standards Working Group for Wireless Local Area Networks has led to him being referred to by some as the "Father of Wi-Fi"

Victor Hayes, nicknamed "the Father of Wi-Fi", was born in Surabaya, Netherlands-Indies at that time, on July 31, 1941. He repatriated with his family in 1950

to the Netherlands and received his B.E. degree from the “HTS Amsterdam” in Amsterdam, the Netherlands in 1961. After military service in the Dutch Air Force, he joined Friden Holland, later called Singer Business Machines, a company making Flexowriters (paper-tape oriented typewriters, often used as input/output machines for computers) and electro-mechanical billing and accounting machines. His first assignment was customer programmer for the latter. Eventually he played a key roll in engineering the first commercially available billing and accounting machine with integrated circuits.

In 1974 he joined Agere Systems, Utrecht, the Netherlands, when the group was still a part of NCR. He authored various NCR Corporate Engineering Standards on data communications, including HDLC and X.25 packet level protocols and represented the company in various standards bodies such as the Dutch Standards Institute NNI and the European Computer Manufacturers Association ECMA. As the Chair of the NNI JTC 1/SC 6 committee he often headed the Dutch delegation to the ISO/IEC JTC 1/SC6 committee. As the Chair of the LAN Task Group of the ECMA he was its delegate to the International Telecommunications Union.

## GRAMMAR EXERCISES

**8. a) Translate the examples with the different forms of the Gerund and compare them:**

*1) I like telling fantastic stories. (Indefinite Active) 2) He likes being told fantastic stories. (Indefinite Passive) 3) She is proud of having spoken with Nobel Prize winner. (Perfect Active) 4) He is proud of having been spoken to. (Perfect Passive).*

**b) Translate the sentences with different forms of the Gerund:**

1. Йй подобається, що її фотографують для цього журналу. 2. Він ненавидить, коли його ігнорують. 3. Я пишаюся тим, що навчався в цьому університеті. 4. Вона пишається тим, що їй пропонували роботу саме у цьому закладі. 5. Я просто люблю писати листи. 6. Вона насолоджується, коли отримує подарунки. 7. Його брат ненавидить, коли над ним сміються. 8. Я люблю плавати в басейні після роботи.

**9. Remember the verbs and expressions after which the Gerund is used:**

<b>to avoid</b>	<b>to excuse</b>	<b>to keep (on)</b>
<b>to burst out</b>	<b>to finish</b>	<b>to mind</b> (in interrogative and negative sentences)
<b>cannot help</b>	<b>to forgive</b>	<b>to postpone</b>
<b>to deny</b>	<b>to give up</b>	<b>to put off</b>
<b>to enjoy</b>	<b>to go on</b>	<b>to stop</b>

**Translate the sentences into Ukrainian paying attention to the Gerund:**

1. He keeps insisting on my going to the south. 2. Oh please do stop laughing at him. 3. Do you mind my asking you a difficult question? 4. I don't mind joining this group for discussion. 5. She could not help smiling. 6. I cannot put off doing this

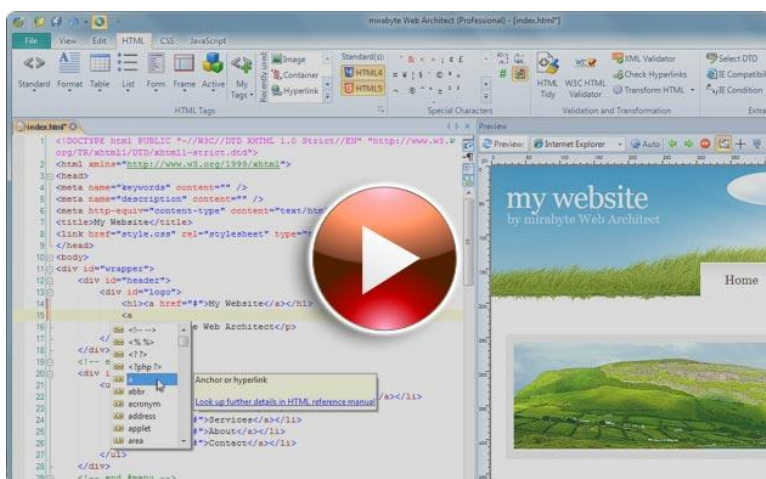
translation. 7. I avoided speaking to them about that matter. 8. She burst out crying. 9. He denied having been at the laboratory that evening. 10. He enjoyed talking of his future work. 11. Excuse my leaving you at such a moment. 12. Please forgive my interfering. 13. He gave up smoking a few years ago. 14. They went on talking. 15. He postponed going to the conference as he felt ill.

### 10. Translate the sentences into English:

1. Ми закінчили роботу над цією проблемою. 2. Він заперечує свою участь у злочині. 3. Я не могла не погодитись з ним. 4. У такому випадку ми відкладемо обговорення доповіді. 5. Я не заперечую, щоб залишитися дома і попрацювати над моїм перекладом. 6. Будь ласка, пробачте, що у мене поганий почерк. 7. Він не міг не думати, що його син зробить велику помилку. 8. Я отримала насолоду від перегляду цього запису знову. 9. Намагайся уникати обговорення цієї теми з учасниками проекту. 10. Продовжуйте працювати таким чином і ви припинити боятися за своє майбутнє.

## Lesson 3

### WEB ARCHITECT



A webmaster, also called a web architect, web developer, site author, or website administrator, is a person responsible for maintaining one or many websites. The duties of the webmaster may include ensuring that the web servers, hardware and software are operating correctly, designing the website, generating and revising web pages, A/B testing, replying to

user comments, and examining traffic through the site. As a general rule, professional webmasters "must also be well-versed in Web transaction software, payment-processing software, and security software." Due to the RFC 822 requirement for establishing a "postmaster" email address for the single point of contact for the email administrator of a domain, the "webmaster" address and title were unofficially adopted by analogy for the website administrator.

Webmasters may be generalists with HTML expertise who manage most or all aspects of Web operations. Depending on the nature of the websites they manage, webmasters typically know scripting languages such as JavaScript, PHP and Perl. They may also be required to know how to configure web servers such as Apache HTTP Server (Apache) or Internet Information Services(IIS) and be a server administrator. Further, webmasters may also act as website designers on smaller-scale sites.

Core responsibilities of the webmaster may include the regulation and management of access rights of different users of a website, the appearance and

setting up website navigation. Content placement can be part of a webmaster's numerous duties, though content creation may not be.

**1. Find the English equivalents in the text:**

Формування (розвиток) і перегляд веб-сторінки, відповіді на коментарі користувачів, бути прийнятим за аналогією, вимоги для встановлення, основні обов'язки.

**2. Translate the following terms and terminological expressions:**

Traffic through the site, Web transaction software, payment-processing software, security software, scripting languages, to configure web servers, content placement.

**3. Match the definitions with the notions:**

Software testing	a family of high-level, general-purpose, interpreted, dynamic programming languages
RFC	Personal Home Page Tools, Hypertext Preprocessor - a server-side scripting language designed for web development but also used as a general-purpose programming language
JS	JavaScript - an interpreted computer programming language
PHP	a Request for Comments - a publication of the Internet Engineering Task Force (IETF) and the Internet Society, the principal technical development and standards-setting bodies for the Internet
Perl	an investigation conducted to provide stakeholders with information about the quality of the product or service under test

**4. Answer the following questions:**

- 1) What is a webmaster?
- 2) What may the duties of the webmaster include?
- 3) What may the webmaster be required to know?
- 4) What is the core responsibilities of the webmaster?
- 5) Can content placement be part of a webmaster's numerous duties?

**5. Tell your friends about the main responsibilities of a web architect.**

**6. Read the article and put five questions to it.**

**JavaScript**



**JavaScript** (JS) is an interpreted computer programming language. It was originally implemented as part of web browsers so that client-side scripts could interact with the user, control the browser, communicate asynchronously, and alter the document content that was

displayed. More recently, however, it has become common in both game development and the creation of desktop applications.

JavaScript is a prototype-based scripting language that is dynamic, is type safe, and has first-class functions. Its syntax was influenced by the language C. JavaScript copies many names and naming conventions from Java, but the two languages are otherwise unrelated and have very different semantics. The key design principles within JavaScript are taken from the Self and Scheme programming languages. It is a multi-paradigm language, supporting object-oriented imperative, and functional programming styles.

JavaScript's use in applications outside of web pages—for example, in PDF documents, site-specific browsers, and desktop widgets—is also significant. Newer and faster JavaScript VMs and frameworks built upon them (notably Node.js) have also increased the popularity of JavaScript for server-side web applications.

JavaScript was formalized in the ECMAScript language standard and is primarily used as part of a web browser (client-side JavaScript). This enables programmatic access to computational objects within a host environment.

**Brendan Eich** (/ˈaɪk/; born 1961) is an American computer programmer and creator of the JavaScript scripting language. He is the chief technology officer at the Mozilla Corporation.



Eich started his career at Silicon Graphics, working for seven years on operating system and network code.

Eich is best known for his work on Netscape and Mozilla. He started work at Netscape Communications Corporation in April 1995, working on JavaScript (originally called Mocha, then called LiveScript) for the Netscape Navigator web browser.

He then helped found mozilla.org in early 1998, serving as chief architect. When AOL shut down the Netscape browser unit in July 2003, Eich helped spin out

the Mozilla Foundation.

In August 2005, after serving as Lead Technologist and as a member of the Board of Directors of the Mozilla Foundation, Eich became CTO of the newly founded Mozilla Corporation.

## 7. Make an annotation of the article.

### PHP

"History of PHP". *php.net*.



PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. PHP is now installed on more than 244 million websites and 2.1 million web servers. Originally created by Rasmus Lerdorf in 1995, the reference implementation of PHP is now produced by The PHP Group. While PHP originally stood for *Personal Home Page*, it now stands for *PHP: Hypertext Preprocessor*, a recursive acronym.



PHP code is interpreted by a web server with a PHP processor module which generates the resulting web page: PHP commands can be embedded directly into an HTML source document rather than calling an external file to process data. It has also evolved to include a command-line interface capability and can be used in standalone graphical applications.

PHP is free software released under the PHP License, which is incompatible with the GNU General Public License (GPL) due to restrictions on the usage of the term *PHP*. PHP can be deployed on most web servers and also as a standalone shell on almost every operating system and platform, free of charge



PHP development began in 1994 when the developer Rasmus Lerdorf wrote a series of Common Gateway Interface (CGI) Perl scripts, which he used to maintain his personal homepage. The tools performed tasks such as displaying his résumé and recording his web traffic. He rewrote these scripts in C for performance reasons, extending them to add the ability to work with web forms and to communicate with databases and called this implementation "Personal Home Page/Forms Interpreter" or PHP/FI. PHP/FI could be used to build simple, dynamic web applications. Lerdorf initially announced the release of PHP/FI as "Personal Home Page Tools (PHP Tools) version 1.0" publicly to accelerate bug location and improve the code, on the comp.infosystems.www.authoring.cgi Usenet discussion group on June 8, 1995. This release already had the basic functionality that PHP has today. This included Perl-like variables, form handling, and the ability to embed HTML. The syntax was similar to Perl but was more limited and simpler, although less consistent. A development team began to form and, after months of work and beta testing, officially released PHP/FI 2 in November 1997.



Zeev Suraski and Andi Gutmans rewrote the parser in 1997 and formed the base of PHP 3, changing the language's name to the recursive acronym *PHP: Hypertext Preprocessor*. Afterward, public testing of PHP 3 began, and the official launch came in June 1998. Suraski and Gutmans then started a new rewrite of PHP's core, producing the Zend Engine in 1999. They also founded Zend Technologies in Ramat Gan, Israel.

## GRAMMAR EXERCISES

**8. Remember the verbs after which the Gerund with a definite preposition is used:**

to accuse of	to insist on
to agree to	to look forward to
to approve of	to object to
to be afraid of	to persist in
to congratulate on	to prevent from
to depend on	to succeed in
to dream of	to suspect of
to feel like	to thank for
to give up the idea of	to think of

**Translate the sentences into Ukrainian paying attention to the Gerund:**

1. My friend succeeded in translating this article. 2. We are looking forward to seeing you again. 3. He persisted on trying to solve that difficult problem. 4. Jane thought of leaving Lowood after Miss Temple's marriage. 5. He accused them of having written his private letters. 6. He never agreed to their joining this doubtful project. 7. The results of your research depends on using his methods during the experiment. 8. I don't feel like seeing him. 9. I insist on being told the truth. 10. I object to his applying the results of the investigation. 11. She congratulated herself on having thought of such a good idea.

**9. Translate the sentences into English:**

1. Я наполягаю на тому, щоб допомогти їй. 2. Я не схвалюю того, що ви витрачаєте так багато часу даремно. 3. Він заперечує проти того, щоб брати участь у цих зборах. 4. Він погоджується, щоб всі проблеми були обговорені спочатку у групі. 5. Він боявся проінформувати керівника про зміну методики. 6. Він мріяв про завершення експерименту та поїздки закордон. 7. Він з нетерпінням чекає участі у титульному бої за звання чемпіона світу. 8. Він відкидає ідею організації конгресу на даному етапі. 9. Комісія підозрювала його у поширенні фальшивої інформації. 10. Я була вдячна їм за допомогу у пошуку необхідних матеріалів для доведення нашої точки зору.

**Lesson 4**

**COMPUTER OPERATOR**



**Computer operators** oversee the running of computer systems, ensuring that the machines are running and physically secured and free of any bugs. The former role of a computer operator was to work with mainframe computers which required a great deal of management day-to-day, however nowadays they often work with a variety of different systems and applications. The computer operator normally works in a server room or a data centre, but can also work

remotely so that they can operate systems across multiple sites. Most of their duties are taught on the job, as their job description will vary according to the systems and set-up they help manage.

The role also includes maintaining records and logging events, listing e.g. each backup that is run, each machine malfunction and program abnormal termination. Operators assist system administrators and programmers in testing and debugging of new systems and programs prior to their becoming production environments.

Modern-day computing has led to a greater proliferation of personal computers, with a rapid change from older mainframe systems to newer self-managing systems. This is reflected in the operator's role. Tasks may include managing the backup systems, cycling tapes or other media, filling and maintaining printers. Overall the operator fills in as a lower level system administrator or operations analyst. Most operations departments will work 24x7.

A computer operator also has knowledge of disaster recovery and business continuity procedures. Formerly this would have meant sending physical data tapes offsite, but now the data is more than likely transmitted over computer networks. A computer operator can work inside the home on the network editing domains and nets or they can work on the road or part of a company.

### **1. Find the English equivalents in the text:**

Наглядати над функціонуванням комп'ютерних систем, забезпечувати (гарантувати), без будь-яких помилок, колишня роль, працювати дистанційно, ведення обліку, реєстрація подій, несправності машини, аварійне завершення програми, налагодження нових систем, виробниче середовище, поширення персональних комп'ютерів, відобразитися у, аварійне відновлення,

### **2. Translate the following terms and terminological expressions:**

Set-up, backup, to be run, the backup systems, disaster recovery, business continuity procedure, to be transmitted, the network editing domains.

### **3. Answer the following questions:**

- 1) What was the former role of a computer operator?
- 2) What does a computer operator work with nowadays?
- 3) Where does he work?
- 4) What does his role also include?
- 5) Whom do operators assist?
- 6) What knowledge does a computer operator also have?
- 7) Where can a computer operator work?

### **4. Tell your friends about the role of a computer operator.**

### **5. Read the article and put five questions to it.**



**Perl** is a family of high-level, general-purpose, interpreted, dynamic programming languages. The languages in this family include Perl 5 and Perl 6. Though Perl is not officially an acronym, there are various backronyms in use, such as: *Practical Extraction and Reporting Language*. Perl was originally developed by Larry Wall in 1987 as a general-purpose Unix scripting language to make report processing easier. Since then, it has undergone many changes and revisions. The latest major stable revision of Perl 5 is 5.18, released in May 2013. Perl 6, which began as a redesign of Perl 5 in 2000, eventually evolved into a separate language. Both languages continue to be developed independently by different development teams and liberally borrow ideas from one another.

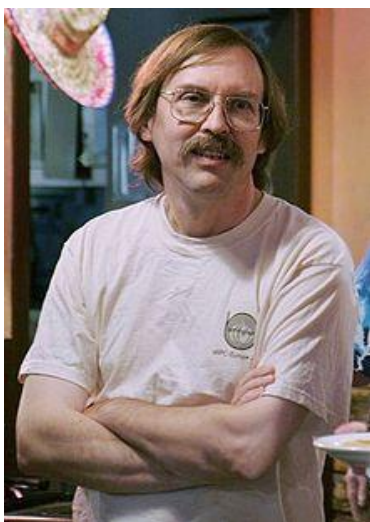
The Perl languages borrow features from other programming languages including C, shell scripting (sh), AWK, and sed. They provide powerful text processing facilities without the arbitrary data-length limits of many contemporary Unix tools, facilitating easy manipulation of text files. Perl 5 gained widespread popularity in the late 1990s as a CGI scripting language, in part due to its parsing abilities.

In addition to CGI, Perl 5 is used for graphics programming, system administration, network programming, finance, bioinformatics, and other applications. It's nicknamed "the Swiss Army chainsaw of scripting languages" because of its flexibility and power and possibly also because of its perceived "ugliness". In 1998, it was also referred to as the "duct tape that holds the Internet together", in reference to its ubiquity and perceived inelegance.

## 6. Make an annotation of the article.

### Larry Wall

*from Linux Journal*  
*by Marjorie Richardson*



**Larry Wall** (born September 27, 1954) is a computer programmer and author, most widely known for his creation of the Perl programming language in 1987.

Wall grew up in south Los Angeles and then Bremerton, Washington before starting higher education at Seattle Pacific University in 1976, majoring in chemistry and music and later Pre-med with a hiatus of several years working in the university's computing center before being graduated with a self-styled bachelor's degree in Natural and Artificial Languages.

While in graduate school at UC Berkeley, Wall and his wife were studying linguistics with the intention afterwards of finding an unwritten language, perhaps in Africa, and creating a writing system for it. They would then use this new writing system to translate various texts into the language, among them the Bible. Due to health reasons these plans were cancelled, and they remained in the U.S., where Larry instead joined the NASA Jet Propulsion Laboratory after he finished graduate school.

Wall developed the Perl interpreter and language while working for System Development Corporation, which later became part of Unisys. He is the co-author of Programming Perl (often referred to as the *Camel Book* and published by O'Reilly), which is the definitive resource for Perl programmers; and edited the Perl Cookbook. He then became employed full-time by O'Reilly Media to further develop Perl and write books on the subject.

Wall's training as a linguist is apparent in his books, interviews, and lectures. He often compares Perl to a natural language and explains his decisions in Perl's design with linguistic rationale. He also often uses linguistic terms for Perl language constructs, so instead of traditional terms such as "variable", "function", and "accessor" he sometimes says "noun", "verb", and "topicalizer".

Wall's Christian faith has influenced some of the terminology of Perl, such as the name itself, a biblical reference to the "pearl of great price" (Matthew 13:46). Similar references are the function name *bless*, and the organization of Perl 6 design documents with categories such as apocalypse and exegesis. Wall has also alluded to his faith when he has spoken at conferences, including a rather straightforward statement of his beliefs at the August 1997 Perl Conference and a discussion of Pilgrim's Progress at the YAPC (Yet Another Perl Conference) in June 2000

## GRAMMAR EXERCISES

### **7. Transform the following sentences using the necessary form of the past tense. Mind Sequence of Tenses.**

1. It is clear that he is right. 2. They claim that they are trying to reach an agreement on all the issues. 3. He says that the lecture is very interesting. 4. They complain that he has been rude to them. 5. The witness insists that he hasn't seen the man. 6. She says that she has been having strange dreams for a long time. 7. He insists that he is innocent. 8. Our correspondent reports that the rate of unemployment is rising in Britain.

### **8. Put the verbs in the appropriate tense:**

1. The author of the article wrote that until the 1970s the Americans (to supply) themselves with energy from their own sources. 2. Magellan finally proved conclusively that the Earth (to be) not flat. 3. The guide informed us that there (to be) no permanent residents on the island until 20<sup>th</sup> century. 4. Leonardo da Vinci discovered that the Moon (to shine) be reflected sunshine. 5. Already in the 50s there was some evidence that new discoveries in this field (to be made). 6. The scientist insisted that sleep (to be) just a waste of time. 7. He discovered his abilities as a hypnotist when he (to be) a schoolboy. 8. Socrates said that nothing (can) harm a good man. 9. The man explained that he (not to speak) English.

### **9. Transform the sentences with direct speech into indirect one:**

1. "I'm tired", she said. 2. The attendant said, "The exhibition finished last week". 3. A representative of the National Coal Board in Britain said, "Britain will have to return to the use of coal". 4. The chairperson said, "We shall put off the discussion of this issue till tomorrow". 5. She said, "We are leaving today". 6. The young scientist

said, "I won't support this idea". 7. He replied, "I have lived here since 1970". 8. Mr. Smith said, "I shall never change my mind". 9. The teacher said: "Don't worry. Correct all mistakes in your essay." 10. The scientific supervisor said to the postgraduate, "You must explain the meaning of this term".

## Lesson 5

### POSTMASTER



In computers and technology, **postmaster** is a term used to identify the administrator of a mail server. Nearly every domain will have the e-mail address `postmaster@example.com` where errors in e-mail processing are directed. Error e-mails automatically generated by mail servers' MTAs usually appear to have been sent to the postmaster address.

Every domain that supports the SMTP protocol for electronic mail is required by RFC 5321 and, as early as 1982, by RFC 822, to have the postmaster address. The `rfc-ignorant.org` website used to maintain a list of domains that do not comply with the RFC based on this requirement, but was shut down in November 2012.

Quoting from the RFC:

Any system that includes an SMTP server supporting mail relaying or delivery **MUST** support the reserved mailbox "postmaster" as a case-insensitive local name. This postmaster address is not strictly necessary if the server always returns 554 on connection opening. The requirement to accept mail for postmaster implies that RCPT commands which specify a mailbox for postmaster at any of the domains for which the SMTP server provides mail service, as well as the special case of "RCPT TO:<Postmaster>" (with no domain specification), **MUST** be supported.

SMTP systems are expected to make every reasonable effort to accept mail directed to Postmaster from any other system on the Internet. In extreme cases (such as to contain a denial of service attack or other breach of security) an SMTP server may block mail directed to Postmaster. However, such arrangements **SHOULD** be narrowly tailored so as to avoid blocking messages which are not part of such attacks. Since most domains have a postmaster address, it is commonly targeted by spamming operations. Even if not directly spammed, a postmaster address may be sent bounced spam from other servers that mistakenly trust fake return-paths commonly used in spam.

#### 1. Find the English equivalents in the text:

Помилки, бути спрямованим, виконуватися, посилання (цитування), ретрансляція або доставка, очікується, відмова, заходи, бути витриманим, бути спрямованим,

#### 2. Translate the following terms and terminological expressions:

To identify the administrator of a mail server, e-mail processing, postmaster address, reserved mailbox, breach of security, spamming operation

### 3. Match the definitions with the notions:

MTA	a method of exchanging digital messages from an author to one or more recipients
SMTP	the use of electronic messaging systems to send unsolicited bulk messages, especially advertising, indiscriminately
RFC	a Request for Comments - a publication of the Internet Engineering Task Force (IETF) and the Internet Society, the principal technical development and standards-setting bodies for the Internet
Spam	Simple Mail Transfer Protocol - an Internet standard for electronic mail (e-mail) transmission across Internet Protocol (IP) networks
e-mail	Message transfer agent or mail transfer agent, software that transfers e-mail between computers

### 4. Answer the following questions:

- 1) What meaning does a term postmaster have?
- 2) What is required by RFC 5321?
- 3) When is this postmaster address not strictly necessary?
- 4) What does the requirement to accept mail for postmaster imply?
- 5) What are SMTP systems expected to make?
- 6) What is a postmaster address commonly targeted by?

### 5. Tell your friends about the main aspects of postmaster.

### 6. Read the article and put five questions to it.

#### An Email Address



An email address identifies an email box to which email messages are delivered. This article covers modern internet email, but many earlier email systems used different address formats.

An email address such as *John.Smith@example.com* is made up of a local part, an @ sign, then a domain part. The domain part is not case-sensitive but local-parts normally are.

In practice, the mailsystem at *example.com* may chose to treat *John.Smith* as equivalent to *john.smith* or even *johnsmith*. Mailsystem often limit their users' choice of name to a subset of the technically valid characters, and may in some cases also limit which addresses it is possible to send mail to.

Ongoing internationalization efforts are underway to allow non-ASCII characters to be used in both the local and domain parts of an email address, allowing addresses such as: *Pelé@example.com* and *甲斐@黒川.日本* but these are still constrained by the current generation of email servers and clients.

The format of email addresses is local-part@domain where the local-part may be up to 64 characters long and the domain name may have a maximum of 255 characters – but the maximum 256 characters length of a forward or reverse path restricts the entire email address to be no more than 254 characters. The formal definitions are in RFC 5322 (sections 3.2.3 and 3.4.1) and RFC 5321 – with a more readable form given in the informational RFC 3696 and the associated errata.

## 7. Make an annotation of the article.

### John O'Sullivan

*The Australian Broadcasting Corporation (Melbourne). 1 April 2012.*



John O'Sullivan is an Australian electrical engineer whose work in the application of Fourier transforms to radio astronomy led to his invention with colleagues of a core technology that made wireless LAN fast and reliable. This technology was patented by CSIRO and forms part of the 802.11a, 802.11g and 802.11n Wi-Fi standards.

In 2009 O'Sullivan was awarded both the CSIRO Chairman's Medal and the Australian Prime Minister's Prize for Science.

He is currently working on the design of the Australian Square Kilometre Array Pathfinder telescope, a step towards the proposed Square Kilometre Array telescope.

In 1977 John O'Sullivan co-authored a paper in the Journal of the Optical Society of America titled "*Image sharpness, Fourier optics, and redundant-spacing interferometry*" with J. P. Hamaker, and J. E. Noordam. In this paper, they presented a technique for sharpening and improving picture clarity in radio astronomy pictures.

In 1999, IEEE ratified 802.11a standard. O'Sullivan was not a member of the working group and did not contribute to the standard.

In the early 1990s, O'Sullivan led a team at the CSIRO which patented in 1996 the use of a related technique for reducing multipath interference of radio signals transmitted for computer networking. This technology is a part of all recent WiFi implementations. As of April 2012, the CSIRO has earned over \$430 million in royalties and settlements arising from the use of this patent as part of the 802.11 standards with as much as a billion dollars expected after further lawsuits against other parties.

## GRAMMAR EXERCISES

### 8. Translate the sentences into English:

1. Він сказав, що ми змушені повернутися. 2. Голова зборів оголосив, що перерви між засіданнями не буде. 3. Вона пояснила нам, якими будуть умови роботи експедиції. 4. Лектор оголосив, що завтра заняття не буде. 5. Він сказав, що ніколи не повернеться сюди.



**9. Make up indirect questions, using the verbs *to ask, to want to know, to wonder* in the Simple Past tense:**

1. When will the performance begin? 2. Do you need my help? 3. How long will it take you to come over? 4. Who designed this palace? 4. When was the city founded? 5. Why did you live so early?

**10. Translate the following sentences into English:**

1. Я замислився про те, що чекає нас в майбутньому. 2. Ми запитали його, чому він запізнився на засідання. 3. Він не міг згадати, куди він поклав свій записник. 4. Студента запитали, хто побудував цю фортецю. 5. Я запитав її, коли вона здасть свій проект.

## UNIT IV

### Lesson 1

#### CENTRAL MATH

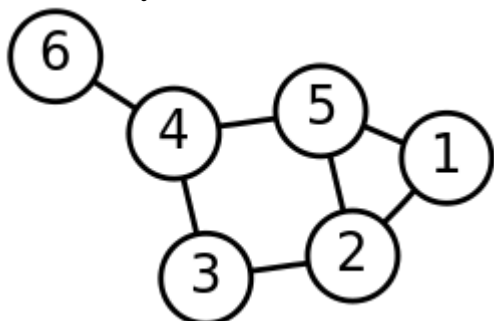
- Boolean algebra (when something can only be true or false)
- Computer numbering formats (how computers count)
- Discrete mathematics (math with numbers a person can count)
- Symbolic logic (clear ways of talking about math)

**Boolean algebra** is algebra for binary (0 meaning false, or 1 meaning true). It uses normal maths symbols, but it does not work in the same way. It is named after its creator George Boole.

**Computer numbering formats** are the ways that computers and calculators represent numbers. Most computers use a system of binary which is composed of ones and zeros.

Other systems in use are the octal (0,1-7) and the hexadecimal (0,1-9,A,B,C,D,E,F) systems.

Now we can use codes which the computer understands only, as well as other number systems.



**Discrete mathematics** is the study of mathematical structures that are discrete rather than continuous. In contrast to real numbers that varying "smoothly", discrete mathematics studies objects such as integers, graphs, and statements in logic. These objects do not vary smoothly, but have distinct, separated values. Discrete mathematics therefore excludes topics in "continuous mathematics" such as calculus and analysis. Discrete objects can often be counted using integers. Mathematicians say that this is the branch of mathematics dealing with countable sets (sets that have the same cardinality as subsets of the natural numbers, including rational numbers but not real numbers). However, there is no exact, universally agreed, definition of the term "discrete mathematics". Many

times, discrete mathematics is described less by what is included than by what is excluded: continuously varying quantities and related notions.

**1. Find the English equivalents in the text:**

Булева алгебра, представляти числа, двійкова система, вісімкова система числення, шістнадцяткова система числення, дискретні структури, цілі числа, злічена множина, безперервно змінні величини, пов'язані з ними поняття.

**2. Match the definitions with the notions:**

Octal numeral system	a set with the same cardinality (number of elements) as some subset of the set of natural numbers
Binary numeral system	a number that can be written without a fractional or decimal component
Hexadecimal numeral system	the study of mathematical structures that are fundamentally discrete rather than continuous
Discrete mathematics	a numeral system made up of 16 symbols (base 16)
Integer	represents numeric values using two symbols: 0 and 1
Countable set	the base-8 number system, and uses the digits 0 to 7

**3. Ask your friend to answer the following questions:**

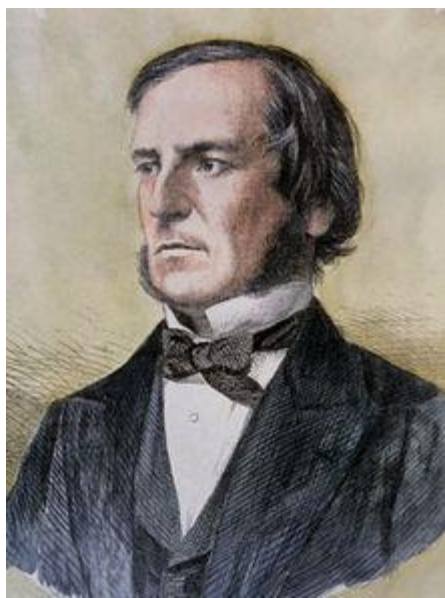
- 1) What does Boolean algebra use?
- 2) Why is this algebra named so?
- 3) What do most computers use?
- 4) What does discrete mathematics study?
- 5) Is there exact definition of the term "discrete mathematics"?

**4. Tell your friends about the main aspects of discrete mathematics.**

**5. Read the article and put five questions to it.**

**George Boole**

*from "Personalities in Mathematics"*  
*by John Witchwood*



**George Boole** (2 November 1815 – 8 December 1864) was an English mathematician, philosopher and logician. He worked in the fields of differential equations and algebraic logic, and is now best known as the author of *The Laws of Thought*. As the inventor of the prototype of what is now called Boolean logic, which became the basis of the modern digital computer, Boole is regarded in hindsight as a founder of the field of computer science.

George Boole's father, John Boole (1779–1848), was a tradesman in Lincoln and gave him lessons. He had an elementary school education, but little further formal and academic teaching. William Brooke, a bookseller in Lincoln, may have helped him with Latin; which he may also have learned at the school of Thomas Bainbridge. He was self-taught in modern languages. At age 16 Boole became the breadwinner for his parents and three younger siblings, taking up a junior teaching position in Doncaster, at Heigham's School. He taught briefly in Liverpool.

Boole participated in the local Mechanics Institute, the Lincoln Mechanics' Institution, which was founded in 1833. Edward Bromhead, who knew John Boole through the Institution, helped George Boole with mathematics books; and he was given the calculus text of Sylvestre François Lacroix by Rev. George Stevens Dickson, of St Swithin Lincoln. It took him many years to master calculus, however, without a teacher.

Boole's status as mathematician was recognised by his appointment in 1849 as the first professor of mathematics at Queen's College, Cork in Ireland. He met his future wife, Mary Everest, there in 1850 while she was visiting her uncle John Ryall who was Professor of Greek. They married some years later.[12] He maintained his ties with Lincoln, working there with E. R. Larken in a campaign to reduce prostitution.

## GRAMMAR EXERCISES

### 6. Read the information about conditional structures and translate the examples:

#### 1<sup>st</sup> conditional

If + Present tense, ... will/won't ...

- We use the first conditional to talk about things that we think might happen in the future:  
*If I **find** your watch, I'll tell you.*  
(You've lost your watch, and I'll look for it – perhaps I'll find it.)
- In the first conditionals, we use *if* + Present tense to talk about the future.

#### 2<sup>nd</sup> conditional

If + Past tense, ... would/wouldn't ...

- We use the second conditional to *imagine* things that we don't expect to happen:  
*If I **found** a watch in the street, I'd take it to the police.*  
(No-one has really lost a watch – I'm just imagining the situation.)
- We also use the second conditional to imagine things that can't be true:  
*If I **lived** in Hawaii, I'd go swimming every morning.*

(I don't live in Hawaii – I'm just imagining it.)

- In second conditionals Past tense does not refer to past time – it is used to show that the condition is unreal.
- In second conditionals, we can use *were* instead of *was*.

*If he were older, I'd take him swimming.*

*If I were you, I'd see a doctor.*

**7. Look at these two conditional sentences. What is the difference?**

1. If they offer me the job, I'll probably take it.
2. Of course, if someone offered me a better job, I'd probably take it.

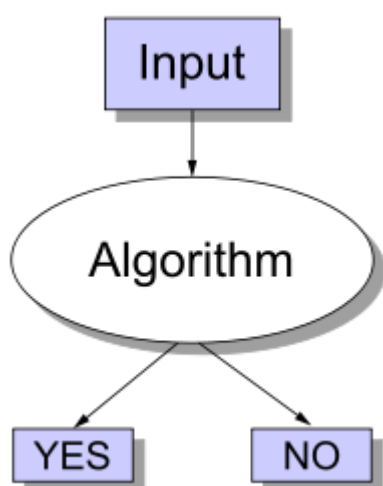
**Now complete these *If ...* sentences.**

1. ... I'll give you a lift to the station.
2. ... I'd hand it in to the police.
3. If you carry on working like this ...
4. ... no-one would need to learn English.
5. If they weren't so rude to everyone ...
6. If you don't apologise ...
7. ... I'll come round and see you.
8. ... you'd feel much better.

**8. On a piece of paper, write the first part of an *If ...* sentence, and give it to another student to complete.**

## Lesson 2

### ALGORITHMIC INFORMATION THEORY



**Algorithmic information theory** is a field of theoretical computer science. It is concerned with how information and computation are related. Most information can be represented as a string (or a sequence of characters). Algorithmic information theory studies the complexity of information represented that way (in other words, how difficult it is to get that information, or how long it takes). Unlike regular information theory, it uses Kolmogorov complexity to describe complexity, and not the measure of complexity developed by Claude Shannon and Warren Weaver. Kolmogorov complexity

was developed independently by Andrey Kolmogorov and Gregory Chaitin .

According to Claude Shannon the following two binary strings have the same content in information (this is only valid for the first-order entropy):

1000110111100101

1111111100000000

The first was generated with a random number generator, for example by throwing a coin. The second is easier to describe (eight times "1", then eight times "0"). For this reason, the first sequence has more algorithmic information, because it is harder to shorten ("compress") the description on how to generate it. Shortening the description may not be possible at all. The information value of a string is higher, if it is more difficult to shorten ("compress") its description. Random strings and white noise do not contain patterns that occur again. For this reason they cannot be compressed, and have a higher information value.

**1. Find the English equivalents in the text:**

Стосуватися, бути пов'язаним, ряд, послідовність символів, складність інформації, іншими словами, бути розробленим незалежно, послідовність, з цієї причини.

**2. Translate the following terms and terminological expressions:**

Regular information theory, to describe complexity, the measure of complexity, binary strings, the first-order entropy, a random number generator, algorithmic information, shortening the description, random strings, to contain patterns, information value.

**3. Match the definitions with the notions and discuss them with your friends:**

Information	having no definite aim or purpose; not sent or guided in a particular direction; made, done, occurring, etc., without method or conscious choice; haphazard
Computation	a step-by-step procedure for calculations
Information theory	a measure of the computational resources needed to specify the object
Kolmogorov complexity	a branch of applied mathematics, electrical engineering, bioinformatics, and computer science involving the quantification of information
Algorithm	any type of calculation or use of computing technology in information processing
Random	knowledge communicated or received concerning a particular fact or circumstance

**4. Answer the following questions:**

- 1) What is information theory?
- 2) How can most information be presented?
- 3) What does algorithmic information theory study?
- 4) What is Kolmogorov complexity?
- 5) When is the information value of a string higher?
- 6) Why can random strings not be compressed?

**5. Tell your friends about the main aspects of information theory.**

**6. Read about different branches of technology. Work in groups of three or four. Make a list of as many other branches of technology as you can. Try to explain them in English.**

- 1) *Electrical engineering* is about generating and supplying power.
- 2) Electronic engineering is about designing and making machines that use electric power.
- 3) Civil engineering is about designing building and looking after structures.
- 4) Marine engineering is applying engineering to take advantage of the sea.
- 5) Manufacturing engineering is about making useful things from raw materials.
- 6) Mechanical engineering is about designing and making all the parts of machines that move.
- 7) Chemical engineering is about using the processes which change materials in a chemical or physical way.
- 8) Information technology is about using computers for collecting, storing and sending information.

**7. Read the article and put five questions to it.**

**A. Kolmogorov**

*from "Personalities in Mathematics"*

*by Johnathan Wird*



**Andrey Nikolaevich Kolmogorov** (April 25, 1903 – October 20, 1987) was a Soviet mathematician and computer scientist. He made major advances in the fields of probability theory and topology. Born in a Russian family in Tambov, he worked early in his career on intuitionistic logic, and Fourier series. He also worked on turbulence, classical mechanics, and information theory; and was a founder of algorithmic complexity theory which is often referred to as simply Kolmogorov complexity theory.

In 1922, Kolmogorov gained international recognition for constructing a Fourier series that diverges almost everywhere. Around this time, he decided to devote his life to mathematics.

In 1925, Kolmogorov graduated from the Moscow State University and began to study under the supervision of Nikolai Luzin. He formed a lifelong friendship with Pavel Alexandrov. (Both were later involved in the political persecution of their common teacher Nikolai Luzin, in the so-called Luzin affair in 1936.) According to some researchers, Kolmogorov and Alexandrov were involved in a homosexual relationship, while others deny this and suppose that this rumor was spread in the 1950s in order to rehabilitate the participants of the Luzin affair. Kolmogorov (together with Aleksandr Khinchin) became interested in probability theory. Also in 1925, he published his famous work

in intuitionistic logic — *On the principle of the excluded middle*, in which he proved that under a certain interpretation, all statements of classical formal logic can be formulated as those of intuitionistic logic. In 1929, Kolmogorov earned his Doctor of Philosophy (Ph.D.) degree, from the Moscow State University.

In 1930, Kolmogorov went on his first long trip abroad, traveling to Göttingen and Munich, and then to Paris. His pioneering work, *About the Analytical Methods of Probability Theory*, was published (in German) in 1931. Also in 1931, he became a professor at the Moscow State University.

In 1933, Kolmogorov published his book, *Foundations of the Theory of Probability*, laying the modern axiomatic foundations of probability theory and establishing his reputation as the world's leading expert in this field. In 1935, Kolmogorov became the first chairman of the department of probability theory at the Moscow State University. Around the same years (1936) Kolmogorov contributed to the field of ecology and generalized the Lotka–Volterra model of predator-prey systems. In a 1938 paper, Kolmogorov "established the basic theorems for smoothing and predicting stationary stochastic processes"—a paper that would have major military applications during the Cold War. In 1939, he was elected a full member (academician) of the USSR Academy of Sciences.

In his study of stochastic processes (random processes), especially Markov processes, Kolmogorov and the British mathematician Sydney Chapman independently developed the pivotal set of equations in the field, which have been given the name of the Chapman–Kolmogorov equations.

## 8. Make an annotation of the article.

### GRAMMAR EXERCISES

#### 9. Read the information and translate the examples:

I wish	I had more money
	I could go home
	He'd stop shouting

- After *I wish*, we use Past tense or *could/would*.
- We use *I wish* + Past to talk about the present:  
*I wish I had a car.* (I don't have a car).
- We use *I wish* + *could/would* to talk about the things we want to do and things we want to happen:  
*I wish I could go out.* (I want to go out but I can't).  
*I wish they'd pay me more money.* (I want them to pay me more but they won't).

#### 10. Make sentences with *I wish ...* for each situation.

**Example:** *It's cloudy; the water's cold; you can't go swimming.*

I wish it wasn't so cloudy.

I wish the sun would come out.

I wish the water was warmer.

I wish we could go swimming.

a) You're so shy; you want to meet more people; no-one invites you out.

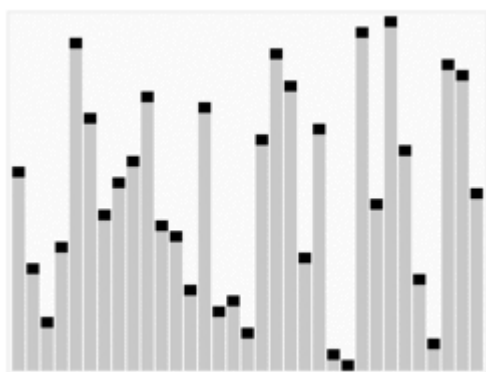
b) You live with your parents; you want to leave home; you haven't got much money.

c) Everything costs too much; you pay a lot of tax; you can't afford a holiday.

d) You're on a desert island; it's very hot; you haven't got any books with you; you want to escape.

### Lesson 3

## COMPUTATIONAL COMPLEXITY THEORY



**Computational complexity theory** is a part of computer science. It looks at algorithms, and tries to say how many steps or how much memory a certain algorithm takes for a computer to do. Very often, algorithms that use fewer steps use more memory (or the other way round: if there is less memory available, it takes more steps to do). Many interesting algorithms take a number of steps that is dependent on the size of the problem.

Complexity theory also looks at how a problem changes if it is done for more elements. Mowing the lawn can be thought of as a problem with linear complexity. Mowing an area that is double the size of the original takes twice as long.

Suppose you want to know which of your friends know each other. You have to ask each friend whether they know each other friend. If you have twice as many friends as someone else, you have to ask four times as many questions to figure out who everyone knows. Problems that take four times as long when the size of the problem doubles are said to have quadratic complexity.

#### 1. Find the English equivalents in the text:

Крок, навпаки, доступний (наявний), бути залежним від розміру, стрижка газону, вдвічі більше, з'ясувати.

#### 2. Translate the following terms and terminological expressions:

Complexity theory, linear complexity, to be double, twice as many, quadratic complexity.

#### 3. Complete the sentences:

- 1) Algorithms that use fewer steps use \_\_\_\_\_ memory.
- 2) If there is less memory available, it takes \_\_\_\_\_ steps to do.
- 3) Mowing the lawn can be thought of as a problem with \_\_\_\_\_ complexity.
- 4) Mowing an area that is double the size of the original takes \_\_\_\_\_.



5) If you have twice as many friends as someone else, you have to ask \_\_\_\_\_ times as many questions to figure out who everyone knows.

**4. Answer the following questions:**

- 1) What does computational complexity theory deal with?
- 2) What does a number of steps depend on?
- 3) What does complexity theory look at?
- 4) What is an example of problem with linear complexity?
- 5) What problems are said to have quadratic complexity?

**5. Tell your friends about the main aspects of computational complexity theory.**

**6. Ask information questions to get the answers.**

- 1) Where \_\_\_\_\_ ? (She works in London.)
- 2) When \_\_\_\_\_ ? (She moved there in 2006.)
- 3) What \_\_\_\_\_ ? (She designs mobile phones.)
- 4) Who \_\_\_\_\_ ? (I work with a team.)
- 5) Which material \_\_\_\_\_ ? (We use plastic.)
- 6) Why \_\_\_\_\_ ? (Because it's easy to mould.)
- 7) How \_\_\_\_\_ ? (This model weighs 120 grammes.)
- 8) How \_\_\_\_\_ ? (It costs \$400.)
- 9) How \_\_\_\_\_ ? (It has more than twenty functions.)
- 10) Where \_\_\_\_\_ ? (You can buy it anywhere.)

**7. Read the article and put five questions to it.**

**Claude Elwood Shannon**

*from Biographical Memoirs of Fellows of the Royal Society  
by Ioan James*



**Claude Elwood Shannon** (April 30, 1916 – February 24, 2001) was an American mathematician, electronic engineer, and cryptographer known as "the father of information theory".

Shannon is famous for having founded information theory with a landmark paper that he published in 1948. However, he is also credited with founding both digital computer and digital circuit design theory in 1937, when, as a 21-year-old master's degree student at the Massachusetts Institute of Technology (MIT), he wrote his thesis demonstrating that electrical applications of boolean algebra could construct and resolve any logical, numerical relationship. It has been claimed that this was the most important master's thesis of all time. Shannon

contributed to the field of cryptanalysis for national defense during World War II, including his basic work on codebreaking and secure telecommunications.

Shannon was born in Petoskey, Michigan. His father, Claude, Sr. (1862 – 1934), a descendant of early settlers of New Jersey, was a self-made businessman, and for a while, a Judge of Probate. Shannon's mother, Mabel Wolf Shannon (1890 – 1945), was a language teacher, and for a number of years she was the principal of Gaylord High School. Most of the first 16 years of Shannon's life were spent in Gaylord, Michigan, where he attended public school, graduating from Gaylord High School in 1932. Shannon showed an inclination towards mechanical and electrical things. His best subjects were science and mathematics, and at home he constructed such devices as models of planes, a radio-controlled model boat and a wireless telegraph system to a friend's house a half-mile away. While growing up, he also worked as a messenger for the Western Union company.

His childhood hero was Thomas Edison, whom he later learned was a distant cousin. Both were descendants of John Ogden, a colonial leader and an ancestor of many distinguished people.

## 8. Make an annotation of the article.

### GRAMMAR EXERCISES

#### 3d conditional

If + Past Perfect, ... would/wouldn't + have...

- Here we use the Past Perfect to talk about what didn't happen:  
*If we had won the match, we would have got through to the final. (But we lost.)*
- We do not use **would have** in an if-clause.
- We can use **could have** or **might have** in the main clause:  
*If I'd bought a ticket yesterday, I might have won a prize.*
- We can use **would** in the main clause if we are talking about the present:  
*If you had planned this properly, you wouldn't be in this mess now.*

#### 9. Transform the sentences as to the model:

**Model:** *I couldn't buy the book because I didn't have any money. – I could have bought the book if I had had some money.*

1. Gary couldn't play basketball because he was ill. 2. We couldn't meet because you didn't ring me up. 3. We couldn't work this out a lot quicker, because we had no calculator. 4. I couldn't sign the contract because we didn't discuss it. 5. I couldn't save a lot of time because I didn't take your advice.

#### 10. Transform the sentences as to the model:

**Model:** *Debbie didn't lock her bike and it got stolen. – If Debbie had locked her bike, it wouldn't have got stolen.*

1. Barbara went to bed late and so she overslept. 2. It wasn't warm enough, so we didn't sit outside. 3. You forgot the map, so we lost our way. 4. I noticed the mistake when I checked the figures. 5. Wayne was wearing a crash helmet, so I didn't recognize him. 6. No one watered the flowers, so they died.

### 11. Use the correct form of the verb in brackets:

1. I (to write) the composition long ago if you had not disturbed me. 2. If he (to work) hard, he would have achieved great progress. 3. If he (to come) to our house yesterday, he would have met his friend. 4. If she (not to help) me, I should have been in a very difficult situation. 5. Bob would have more free time if he (not to read) so many newspapers. 6. If only you had let me know, I (to go) there immediately. 7. If you had not put the cup on the edge of the table, it (not to get) broken.

### 12. Translate the following sentences:

1. Якби ви не перервали нас учора, ми б закінчили роботу вчасно. 2. Якби ви сказали їй про це минулої неділі, вона б мала час написати статтю. 3. Якби ви спостерігали за кішкою, вона б не з'їла всю рибу. 4. Якби ви мені зателефонували тоді, я б допоміг вам. 5. Якби ніч не була такою темною, ми б не заблукали.

## Lesson 4

### LOGARITHMIC COMPLEXITY



This is often the complexity for problems that involve looking things up, like finding a word in a dictionary. If the dictionary is twice as big, it contains twice as many words as the original to compare to. Looking something up will take only one step more. The algorithm to do lookups is simple. The word in the middle of the dictionary will be either before or after the term that needs to be looked up, if the words do not match. If it is before, the term needs to be in the second half of the dictionary. If it is after the word, it needs to be in the first half. That way, the problem space is halved with every step, until

the word or definition is found. This is generally known as logarithmic complexity.

There are problems that grow very fast. One such problem is known as the Travelling salesman problem. A salesman needs to take a tour of a certain number of cities. Each city should only be visited once, the distance (or cost) of the travelling should be minimal, and the salesman should end up where he started. This problem has exponential complexity. There are  $n$  factorial possibilities to consider. Adding one city (from  $n$  to  $n+1$ ) will multiply the number of possibilities by  $(n+1)$ . Most of the interesting problems have this complexity.

### 1. Find the English equivalents in the text:

Охоплювати речі, порівнювати слова, робити пошук, співпадати, зменшуватися вдвічі, з кожним кроком, визначення, комівояжер, враховувати.

## **2. Translate the following terms and terminological expressions:**

Logarithmic complexity certain number, exponential complexity, n factorial possibilities, adding, to multiply the number of possibilities by (n+1).

## **3. Complete the sentences:**

1) If the dictionary is twice as big, it contains \_\_\_\_\_ words as the original to compare to.

2) The word in the middle of the dictionary will be either \_\_\_\_\_ or \_\_\_\_\_ the term that needs to be looked up, if the words do not match.

3) When the problem space is halved with every step, until the word or definition is found, it is called \_\_\_\_\_ complexity.

4) In \_\_\_\_\_ complexity there are n factorial possibilities to consider.

5) Most of the interesting problems have \_\_\_\_\_ complexity.

## **4. Answer the following questions:**

1) What is the algorithm of finding a word in a dictionary?

2) Where will the word in the middle of the dictionary be if compared with the term that needs to be looked up?

3) Is the problem space halved with every step, until the word or definition is found?

4) What kind of complexity is it?

5) What complexity has the Travelling salesman problem?

## **5. Tell your friends about the main aspects of logarithmic complexity.**

## **6. Using non-specialist language. A computer specialist is trying to advise a non-specialist about which monitor to buy. Which parts of his explanation might be difficult for a non-specialist to understand?**

*“The monitor is an important part of the human interface with a computer. I advise this TFT XGA 19-inch flat panel. This model has 1024 by 768 pixels so you get a high-resolution display.”*

## **7. Compare this version. Has the specialist missed out anything important?**

*“When you work on a computer, the monitor is very important. It has to be the right size and give you a clear picture so it's comfortable to work with. The screen size is measured diagonally from one corner to another. You need at least a 19-inch screen. The picture is composed of tiny picture elements or “pixels”. The more pixels you have, the sharper the display. This model has a high number of pixels so you'll get a very good display.”*

## **8. Work in pairs. Prepare an explanation for a non-specialist:**

△ how printer works

△ which USB flash drive to buy



**Gadget box:** *This wall-mounted CD player was designed by Japanese designer Naoto Fukasawa just for fun in 1999. Now it is one of the top selling products at Muji.* Why do you think this design is so successful?

## 9. Read the article and put five questions to it.

### Sydney Chapman

*from MacTutor History of Mathematics Archive  
by John J O'Connor*



**Sydney Chapman** (29 January 1888 – 16 June 1970) was a British mathematician and geophysicist. His work on the kinetic theory of gases, solar-terrestrial physics, and the Earth's ozone layer has inspired a broad range of research over many decades.

Chapman was born in Eccles, near Salford in England and began his advanced studies at a technical institute, now the University of Salford, in 1902. In 1904 at age 16, Chapman entered the Victoria University of Manchester. He competed for a scholarship to the university offered by his home county, and was the last student selected. Chapman later reflected, "I sometimes wonder what would have happened if I'd hit one place lower." He initially studied engineering in the department headed by Osborne Reynolds. Chapman was taught mathematics by Horace Lamb, the Beyer professor of mathematics, and J.E. Littlewood, who came from Cambridge in Chapman's final year at Manchester. Although he graduated with an engineering degree, Chapman had become so enthusiastic for mathematics that he stayed for one further year to take a mathematics degree.

Following Lamb's suggestion, Chapman applied for a scholarship to Trinity College, Cambridge. He was at first awarded only a partial scholarship as a sizar (meaning that he obtained financial support by acting as a servant other students), but from his second year onwards he received a full scholarship. He graduated as a wrangler in 1910. He began his research in pure mathematics under G. H. Hardy, but later that year was asked by Sir Frank Dyson to be his chief assistant at the Royal Greenwich Observatory.

From 1914 to 1919 he returned to Cambridge as a lecturer in mathematics and a fellow of Trinity. He held the Beyer Chair of Applied Mathematics at Manchester from 1919 to 1924, the same position as had been held by Lamb, and

then moved to Imperial College London. During the Second World War he was Deputy Scientific Advisor to the Army Council.

In 1946, Chapman was elected to the Sedleian Chair of Natural Philosophy at Oxford, and was appointed fellow of Queen's College. In 1953, on his retirement from Oxford, Chapman took research and teaching opportunities all over the world, including at the University of Alaska and the University of Colorado, but also as far afield as Istanbul, Cairo, Prague, and Tokyo. As the Advisory Scientific Director of the University of Alaska Geophysical Institute from 1951 to 1970, he spent three months of the year in Alaska, usually during winter for research into aurora. Much of the remainder of the year he spent at the High Altitude Observatory in Boulder, Colorado.

The relationship of Chapman with some German geophysicists (e.g. Ertel, Bartels, and A. Schmidt) has been investigated by Wilfried Schröder. In 1970, Chapman died in Boulder, Colorado at the age of 82.

### 10. Make an annotation of the article.

## GRAMMAR EXERCISES

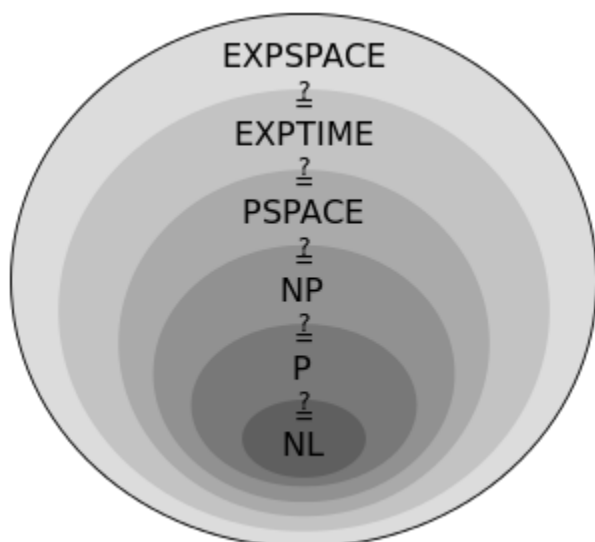
### 11. Read the information and translate the examples:

I wish	I had translated the article I had met you yesterday I had more practice in chess
--------	---

- We use *I wish* + Past Perfect to talk about the past:  
*I wish I had won a championship.* (I didn't win it).

### 12. Use the correct form of the verb in brackets:

1. I wish I (to pass) my driving test last Monday.
2. I wish I (not to forget) my friend's birthday yesterday.
3. I wish it (to be) sunny during our picnic last Saturday.
3. My friend wishes (not to do) it last night.
4. I wish I (to bring) my camera last summer.
5. They wish they (not to see) this horrible scene again.



The theory of computation is a branch of mathematics. Generally it is seen as belonging to computer science. The field of study of this subject is to see if a certain problem can be solved by a computer. If this is the case, then the question is to know if it can be solved in an efficient way.

There are two major branches in it. The first is computability theory. It looks to see if a certain problem can be solved by a computer. Since this is a theoretical field of study, no real computers are used. They are replaced by a system called the Turing machine.

Once it is known if such a solution exists, computer scientists want to know if it can be found, and perhaps how it can be improved. This field of study is covered by the complexity theory. That theory has developed concepts to compare different methods of solving a problem to one another. Such methods are usually called algorithms. This is similar to comparing cooking recipes and seeing which of two recipes is easier to do.

**1. Find the English equivalents in the text:**

Галузь математики, певна проблема (задача), бути вирішеним, ефективний спосіб, теорія обчислюваності, бути заміненним, бути знайденим, бути удосконаленим, кулінарні рецепти.

**2. Translate the following terms and terminological expressions:**

The theory of computation, computer science, computability theory, theoretical field of study, the Turing machine, the complexity theory, to develop concepts, to compare different methods.

**3. Match the definitions with the notions and discuss them with your friends:**

Computability theory	a series of steps, or collection of ways, taken to acquire knowledge
Complexity theory	the relation between human will and reality
Concept	a step-by-step procedure for calculations
Algorithm	a fundamental category of existence
Problem	a branch of the theory of computation in theoretical computer science and mathematics that focuses on classifying computational problems according to their inherent difficulty, and relating those classes to each other
Method	a branch of mathematical logic, of computer science, and of the

theory of computation that originated in the 1930s with the study of computable functions and Turing degrees
--

**4. Answer the following questions:**

- 1) What branch does the theory of computation belong to?
- 2) What is the field of its study?
- 3) What major branches are there in it?
- 4) What field is covered by the complexity theory?
- 5) What concepts has this theory developed?

**5. Tell your friends about the main aspects of computation.**

**6. Work in pairs. What do you know about the inventor of the “clockwork radio”? Read the first paragraph of the text and check your answers.**

### The Clockwork (Wind-up) Radio

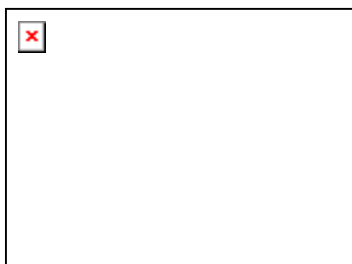


Trevor Baylis is an English inventor. In 1991, he heard about the problem of bringing health information to people in rural Africa. Radio was the best way but people had no electricity and couldn't pay for expensive batteries. So he invented a radio which doesn't need mains power or batteries. Instead, it consists of a spring, gears, and a small generator.

So how does his clockwork radio actually function? As you turn the handle on the side of the radio, you wind up a spring. It 's the same kind of steel spring used in car safety belts. It takes 60 turns to wind up the spring fully.

When the spring starts to unwind, the gears engage. There are three 1:10 step-up gears. The last step-up link is a pulley. Pulleys run more quietly than gears so this reduce noise. Each time the first gear turns, the generator turns one thousand times. As it turns, it generates electricity – a voltage of 3V at about 30 mA. The spring has enough power to run the radio for 30 minutes before you have to wind it up again.

More than two million clockwork radios are in use all over the world. Trevor Baylis has also invented an “electric shoe”. It charges batteries as you walk.



**7. Read the rest of the text and match parts a-e to the numbered components on the diagram.:**

- a) winding handle
- b) steel spring
- c) generator
- d) gears



e) pulley

**8. Scan the text. What do the following numbers and quantities refer to?**

- a) more than two million
- b) 60
- c) 3V
- d) 30 minutes
- e) 1991
- f) 30 mA

**9. Complete the sentences using information from the text.**

- 1) As you turn the handle on the side of the radio, ...
- 2) When the spring unwinds, ...
- 3) As the generator turns, ...
- 4) The spring has enough power to run the radio for 30 minutes before ...
- 5) The “electric shoe” charges batteries as ...

**10. Read the article and put five questions to it.**

**Warren Weaver**

*from Memoirs and Biographies of Pioneers*  
*by John Benjamins*



**Warren Weaver**, PhD (July 17, 1894 – November 24, 1978) was an American scientist, mathematician, and science administrator. He is widely recognized as one of the pioneers of machine translation, and as an important figure in creating support for science in the United States.

Weaver received three degrees from the University of Wisconsin–Madison; a Bachelor of Science in 1916, a Civil Engineering degree in 1917 and a PhD in 1921. He became an assistant professor of mathematics at Throop College (soon to be renamed the California Institute of Technology). He served as a second lieutenant in the Air Service during World War I. After the war, he returned to teach mathematics at Wisconsin (1920–32). Weaver married Mary Hemenway, one of his fellow students at the University of Wisconsin–Madison, a few years after their graduation. They had a son, Warren Jr., and a daughter, Helen.

He was director of the Division of Natural Sciences at the Rockefeller Foundation (1932–55), and was science consultant (1947–51), trustee (1954), and vice president (from 1958) at the Sloan-Kettering Institute for Cancer Research. Weaver's chief researches were in the problems of communication in science and in the mathematical theory of probability and statistics.

At the Rockefeller Foundation, he was responsible for approving grants for major projects in molecular engineering and genetics, in agriculture (particularly for developing new strains of wheat and rice), and in medical research. During World War II, he was seconded from the Foundation to head the Applied Mathematics Panel at the U.S. Office of Scientific Research and Development, directing the work of hundreds of mathematicians in operations research. He was therefore fully familiar with the development of electronic calculating machines and the successful application of mathematical and statistical techniques in cryptography.

He was co-author (together with Claude Shannon) of the landmark work on communication, *The Mathematical Theory of Communication* (1949, Urbana: University of Illinois Press). While Shannon focused more on the engineering aspects of the mathematical model, Weaver developed the philosophical implications of Shannon's much larger essay (which forms about 3/4 of the book).

With Max Mason he authored the book *The Electromagnetic Field* which was published by the University of Chicago Press in 1929.

## 11. Make an annotation of the article.

### UNIT V

#### Lesson 1

### IT SPECIALIST



An information technology specialist applies technical expertise to the implementation, monitoring, or maintenance of IT systems. Specialists typically focus on a specific computer network, database, or systems administration function. Specialty areas include network analysis, system administration, security and information assurance, IT audit, database administration, web administration, and more.

Education requirements vary depending on the IT specialty. While some IT specialists work their way up with professional certifications, most experts begin their careers with an information technology degree at the associate or bachelor level. IT certifications are useful for building specialist expertise and staying up to date on the latest advances in a specific area of information technology. Job outlook is excellent for IT specialist positions; network analysts, for example, can expect 53 percent job growth, making this the fastest-growing occupation in the U.S.

An information technology (IT) degree is a degree offered at the associate's, bachelor's, master's, and PhD levels. The degree focuses on the branch of engineering that pertains to the use of computers to collect, store, and share and protect information.

At the associate's degree level, typical courses include project-based information systems, Website database implementation, introduction to DHTML and Java Script, as well a mathematics based curriculum. The master's level of education in Information Technology typically spans two years and offers a more focused and advanced field study. Courses at this level range from principles of software engineering to advanced algorithms and program language. The PhD in IT is the highest degree level offered, and is often focused on research.

An Information technology degree differs from computer science in that one is expected to understand and explore management and information theory.

### 1. Find the English equivalents in the text:

Застосовувати технічні знання, зосереджуватися на функції, освітні вимоги, рівень бакалавра, перспективи роботи, посада спеціаліста з ІТ, рівень магістра, відноситися до використання комп'ютерів, навчальна програма на основі математики, охоплювати два роки, пропонувати навчання, зосереджуватися на науковому дослідженні.

### 2. Translate the following terms and terminological expressions:

Maintenance of IT systems, network analysis, system administration, security and information assurance, IT audit, database administration, web administration, network analyst, to protect information, project-based information system, Website database implementation.

### 3. Match the definitions with the notions:

DHTML	a postgraduate academic degree awarded by universities
IT	an academic degree granted to individuals who have undergone study demonstrating a mastery or high-order overview of a specific field of study or area of professional practice
Bachelor's degree	an academic degree earned for an undergraduate course of study or major that generally lasts four years
Master's degree	the study, design, development, application, implementation, support or management of computer-based information systems
PhD	an umbrella term for a collection of technologies used together to

create interactive and animated web sites by using a combination of a static markup language (such as HTML), a client-side scripting language (such as JavaScript), a presentation definition language (such as CSS), and the Document Object Model
---

**4. Ask your friends to answer the following questions:**

- 1) What does an information technology specialist apply technical expertise to?
- 2) What do specialists typically focus on?
- 3) What do specialty areas include?
- 4) What does information technology degree focus on?
- 5) What does the master's level of education offer?

**5. Tell your friends about the main aspects of IT specialty.**

**6. Read the article and put five questions to it. Discuss it with your friends.**

The *business value* of information technology lies in the automation of business processes, provision of information for decision making, connecting businesses with their customers, and the provision of productivity tools to increase efficiency.

The field of *information ethics* was established by mathematician Norbert Wiener in the 1940s. Some of the ethical issues associated with the use of information technology include:

- Breaches of copyright by those downloading files stored without the permission of the copyright holders
- Employers monitoring their employees' emails and other Internet usage
- Unsolicited emails
- Hackers accessing online databases
- Web sites installing cookies or spyware to monitor a user's online activities

**7. Make an annotation of the article.**



Norbert Wiener (November 26, 1894 – March 18, 1964) was an American mathematician. He was Professor of Mathematics at MIT.

A famous child prodigy, Wiener later became an early researcher in stochastic and noise processes, contributing work relevant to electronic engineering, electronic communication, and control systems.

Wiener is considered the originator of cybernetics, a formalization of the notion of feedback, with many implications for engineering, systems control, computer science, biology, philosophy, and the organization of society.

Wiener was born in Columbia, Missouri, the first child of Leo Wiener and Bertha Kahn, Jews of Polish and German origin, respectively. Norbert Wiener became a famous child prodigy. Leo had educated Norbert at home until 1903, employing teaching methods of his own invention, except for a brief interlude when Norbert was 7 years of age. Earning his living teaching German and Slavic languages, Leo read widely and accumulated a personal library from which the young Norbert benefited greatly. Leo also had ample ability in mathematics, and tutored his son in the subject until he left home. In his autobiography, Norbert described his father as calm and patient, unless he (Norbert) failed to give a correct answer, at which his father would lose his temper.

After graduating 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, where upon he began graduate studies of zoology at Harvard. In 1910 he transferred to Cornell to study philosophy.

"Information is information, not matter or energy."

—Norbert Wiener, *Cybernetics: Or the Control and Communication in the Animal and the Machine*

Wiener is regarded as the originator of cybernetics, a formalization of the notion of feedback, with many implications for engineering, systems control, computer science, biology, philosophy, and the organization of society.

Wiener's work with cybernetics influenced Gregory Bateson and Margaret Mead, and through them, anthropology, sociology, and education.

## GRAMMAR EXERCISES

**Зверніть увагу на змішані випадки вживання часів в умовних реченнях II і III типу:**

*If he were not so short-sighted, he would have seen me in the theatre yesterday.*

**Умова стосується теперішнього часу (II тип), а наслідок – минулого (III тип).**

*If you had finished the work yesterday, you would be free now.*

**Умова стосується минулого часу (III тип), а наслідок – теперішнього (II тип).**

### **8. Make up conditional sentences:**

1. He is groaning with pain now because he did not go to the dentist to have his tooth filled. If ...
2. He went to Kyiv specially to hear this famous singer because he is fond of him. If ...
3. He is not a first-class sportsman now because he did not train hard last year. If ...
4. I am not acquainted with this famous professor, that's why I did not ring him up yesterday. If .
5. I am busy now because I did not translate the article yesterday. If ...

### **9. Use the correct form of the verb in brackets:**

1. If he had worked hard during the term, he (to be) the best student in his group.
2. If he (to be) more attentive, he would have understand the task.
3. If he had

prepared for the exam well, he (to get) better mark now. 4. If she were good at foreign languages, she (to enter) the foreign languages department. 5. If you (to read) the article yesterday, you would answer the question now.

**10. Translate the sentences into English:**

1. Якби я в школі вчила німецьку мову, я б навчалася в іншій групі зараз.  
 2. Якби вона була більш самовпевнена, вона б вчора сама вирішила цю проблему.  
 3. Якби ти проглядала ці статті раніше, ти б знала суть цього питання.  
 4. Якби він був більш відповідальним, він би прослідкував за роботою лабораторії минулого тижня.  
 5. Якби ти вчора повідомив всім про зустріч, ми б обговорили це питання зараз.

**11. Complete the sentences by matching a line from column A with a line from column B:**

<b>A</b>	<b>B</b>
If I were a Minister of the Environment	I'd ban the import of foreign cars.
If I were a Minister of Defence	I'd increase tax on people with very high incomes.
If I were a Minister of Trade	I'd stop factories letting harmful chemicals into the atmosphere.
If I were a Minister of the Home Office	I'd reduce the number of prisoners.
If I were a Minister of the Finance	I'd build up conventional weapons and get rid of nuclear weapons.

**What changes would you make if you were Ministers of various departments? What would be the results of these changes?**

**Lesson 2**

**SOFTWARE ARCHITECT**

Software architect is a computer programmer who makes high-level design choices and dictates technical standards, including software coding standards, tools, and platforms.

With the popularity of multi-tier application development, the choices of how an application can be built have also increased. Given that expansion, the risk that a software development project may inadvertently create a "new" end product that, in essence, already existed has grown markedly. A new 'software architect' role has become necessary during software development.

The software architect concept began to take hold when object-oriented programming (OOP) was coming into more widespread use (in the late 1990s and early years of the 21st century). OOP allowed ever-larger and more complex

applications to be built, which in turn required increased high-level application and system oversight.

The main responsibilities of a software architect include:

- Limiting choices available during development by
  - choosing a standard way of pursuing application development
  - creating, defining, or choosing an application framework for the application
- Recognizing potential reuse in the organization or in the application by
  - observing and understanding the broader system environment
  - creating the component design
  - having knowledge of other applications in the organization
- Subdivide a complex application, during the design phase, into smaller, more manageable pieces
- Grasp the functions of each component within the application
- Understand the interactions and dependencies among components
- Communicate these concepts to developers

In order to perform these responsibilities effectively, software architects often use tools or standardized model and symbol sets such as Unified Modeling Language and OOP to represent systems or develop artifacts. UML has become an important tool for software architects to use in communicating the overall system design to developers and other team members, comparable to the drawings made by building architects.

### **1. Find the English equivalents in the text:**

Вибір дизайну високого рівня, інструменти, підвищуватися, ненароком, по суті, помітно зрости, система контролю, головні обов'язки, проводити (здійснювати) розробку додатків, розуміти функції, взаємодія і залежність, ефективно виконувати обов'язки.

### **2. Translate the following terms and terminological expressions:**

Software coding standards, multi-tier application development, software architect, object-oriented programming, an application framework, system environment, Unified Modeling Language.

### **3. Match the definitions with the notions:**

OOP	activities through the application and development of novel concepts and techniques in computing
UML	all the computer software that causes a computer to perform useful tasks (compare with Computer viruses) beyond the running of the computer itself
Environment	the combination of hardware and software in a computer
Application	a standardized (ISO/IEC 19501:2005), general-purpose modeling language in the field of software engineering
Design	a programming paradigm that represents concepts as "objects" that have data fields (attributes that describe the object) and associated procedures known as methods

#### **4. Answer the following questions:**

- 1) What is software architect?
- 2) What did OOP allow?
- 3) What do software architects often use to perform their responsibilities effectively?
- 4) What has become an important tool for software architects?

#### **5. Tell your friends about the main responsibilities of software architects.**

#### **6. Read the article and put five questions to it. Discuss it with your friends.**

Programmers' Day is an international professional holiday, recognized in many technology companies and programming firms, that is celebrated on the 256th (hexadecimal 100th, or the 2<sup>8</sup>th) day of each year (September 13 during common years and on September 12 in leap years). It is also officially recognized in Russia and observed in several other countries, including Israel, Bangladesh, Chile, Brazil, Mexico, Austria, Germany, Canada, China, Croatia, France, Guatemala, India, Belgium, Australia, New Zealand, Poland, Slovenia, the United Kingdom, the United States and Uruguay.

The number 256 (2<sup>8</sup>) was chosen because it is the number of distinct values that can be represented with an eight-bit byte, a value well-known to programmers. 256 is the highest power of two that is less than 365, the number of days in a common year.

This particular day was proposed by Valentin Balt, an employee of Parallel Technologies a web design company. As early as 2002, he tried to gather signatures for a petition to the government of Russia to recognize the day as the official programmers' day.

On July 24, 2009, the Ministry of Communications and Mass Media (Russia) issued a draft of an executive order on a new professional holiday, Programmers' Day. On September 11, 2009, Prime Minister of Russia Dmitry Medvedev signed the decree.

#### **7. Make an annotation of the article.**



#### **Ada Lovelace**

*from Women in Computing*  
by A. Phillips

Augusta Ada King, Countess of Lovelace (10 December 1815 – 27 November 1852), born Augusta Ada Byron and now commonly known as Ada Lovelace, was an English mathematician and writer chiefly known for her work on Charles Babbage's early mechanical general-purpose computer, the Analytical Engine. Her notes on the engine include what is recognized as the first algorithm intended to



be processed by a machine. Because of this, she is often considered the world's first computer programmer.

She was born 10 December 1815 as the only legitimate child to the poet Lord Byron and his wife Anne Isabella Byron – all of his other children were born out of wedlock. Byron separated from his wife a month after Ada was born and left England forever four months later, eventually dying of disease in the Greek War of Independence when Ada was eight years old. Ada's mother remained bitter at Lord Byron and promoted Ada's interest in mathematics and logic in an effort to prevent her from developing what she saw as insanity in her father, but she remained interested in him despite this (and was, upon her eventual death, buried next to him at her request).

She referred to herself as a "poetical scientist" and "an analyst (& metaphysician)". As a young adult, her mathematical talents led her to an ongoing working relationship and friendship with fellow British mathematician Charles Babbage, and in particular Babbage's work on the analytical engine. Between 1842 and 1843, she translated an article by Italian military engineer Luigi Menabrea on the engine, which she supplemented with an elaborate set of notes of her own, simply called *Notes*. These notes contain what is considered the first computer program – that is, an algorithm encoded for processing by a machine. Lovelace's notes are important in the early history of computers. She also developed a vision on the capability of computers to go beyond mere calculating or number-crunching while others, including Babbage himself, focused only on those capabilities.

## GRAMMAR EXERCISES

### 8. Use the correct form of the verb in brackets:

1. If he were not such an outstanding scientist, he (not to have) so many pupils.
2. If you (to give) me your e-mail, I shall send you a message.
3. If she (not to be) so absent-minded, she would be a much better student.
4. If my sister doesn't go to the south, we (to spend) the summer in the Crimea.
5. If you were not so careless about your health, you (to consult) a doctor.
6. If he (to work) hard, he would have achieved great progress.
7. This student would not have missed so many lessons if he (not to hurt) his leg.

### 9. Translate the sentences into English:

1. Якби ти допоміг мені розв'язати цю задачу, я б переклав твою статтю.
2. Якби ви його зустріли, ви б його не впізнали.
3. Якби я був на вашому місці, я б порадився з науковим керівником.
4. Якби ви чули її твори, ви б знали її історію.
5. Якби він не дотримувався порад лікаря, він би не одужав так швидко.
6. Якщо вона почне грати зараз, вона буде видатним музикантом.
7. Якби ти попередив мене вчора, я б не зробив стільки помилок.
8. Якби вона не надіслала цього листа минулого тижня, ми б поїхали на конференцію.

Software testing takes place during software engineering. It is done before the release to the final audience.

Software testing is meant to see how the software works under different conditions. These conditions might be different depending on what the audience is. Testing is done to understand if it will work correctly, partially fail to work properly, or totally fail to work properly. Each test may be used to see how one, or many, parts of the software work at a point in its development.

Proper performance may be based on specific (written) requirements or standards (which might, for example, be usability). Bad performance, or poor quality, might cause an unhappy audience. This could cause more work needing to be done on the software and higher costs.

A review of the results of tests may show that some parts of the software system may need to be done again, or may work well. Some bad performances or software bugs may need to be fixed. After more work on the software, testing may be done again.

For larger software systems, tracking may take place checking completeness of the set of tests, test results, and how quickly any problems are fixed. All this information can be used for decision making about how ready the software is, and when it could be released to the final audience.

Software testing may be done with separate parts of the software, with a group of these parts, or with the entire software. Software testing may be done by allowing the software to be used by a small number of people who the software is meant for, under controlled settings. It is then tested with a larger group of people under less controlled settings (beta testing).

Some related terms are unit testing, white box testing, black box testing, regression testing, manual testing, automated testing, testing tools, test plan, test case, test data and test coverage.

### **1. Find the English equivalents in the text:**

Вихід до кінцевої аудиторії, за різних умов, працювати належним чином, у момент розробки, належне виконання, спеціальні вимоги, низька якість, вищі витрати, перевірити повноту (завершеність), призначатися, контрольовані параметри.

### **2. Translate the following terms and terminological expressions:**

Software testing usability, bad performances, software bugs, the set of tests, separate parts of the software, the entire software, unit testing, white box testing, black box testing, regression testing, manual testing, automated testing, testing tools, test plan, test case, test data and test coverage.

### **3. Match the definitions with the notions:**

Unit testing	any type of software testing that seeks to uncover new software bugs, or regressions, in existing functional and non-functional areas of a
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	system after changes
White box testing	the process of manually testing software for defects
Black box testing	a method of software testing that examines the functionality of an application (e.g. what the software does) without peering into its internal structures or workings
Manual testing	a method of testing software that tests internal structures or workings of an application, as opposed to its functionality
Regression testing	a method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine if they are fit for use

**4. Answer the following questions:**

- 1) When does software testing take place?
- 2) What is software testing meant to see?
- 3) What may a review of the test results show?
- 4) When may tracking take place for larger software systems?
- 5) Is software testing done with the entire software?
- 6) What is beta testing?

**5. Tell your friends about the main aspects of software testing.**

**6. Read the article and put five questions to it.**

**Smoke testing** refers to physical tests made to closed systems of pipes to detect cracks or breaks. By metaphorical extension, the term is also used for the first test made after assembly or repairs to a system, to provide some assurance that the system under test will not catastrophically fail. After a *smoke test* proves that "the pipes will not leak, the keys seal properly, the circuit will not burn, or the software will not crash outright," the system is ready for more robust testing.

The term *smoke testing* is used in several fields, including electronics, software development, plumbing, woodwind repair, infectious disease control, and the entertainment industry.

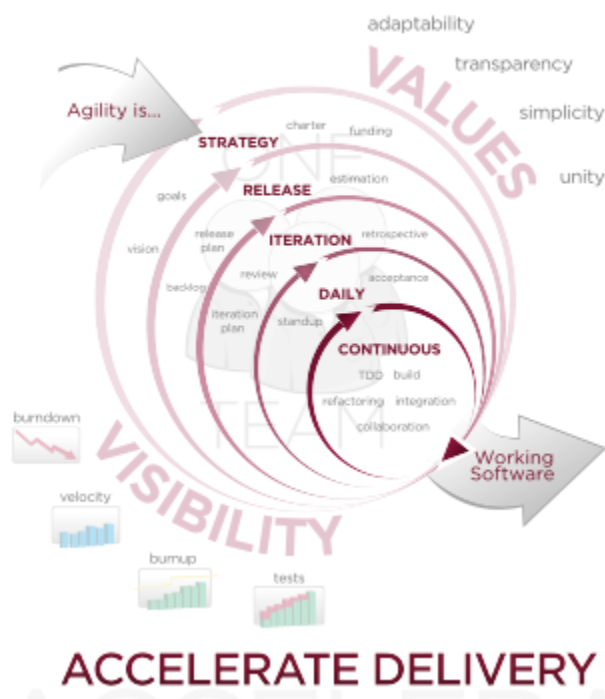
The plumbing industry started using the smoke test in 1875. Later this usage seems to have been forgotten, leading some to believe the term originated in the electronics industry: "The phrase *smoke test* comes from [electronic] hardware testing. You plug in a new board and turn on the power. If you see smoke coming from the board, turn off the power. You don't have to do any more testing."

**7. Make an annotation of the article.**

**Agile Software Development**

*from A Process for the Development of Software  
by E. A. Edmonds*

# AGILE DEVELOPMENT



**Agile software development** is a group of software development methods based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams. It promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change. It is a conceptual framework that promotes foreseen interactions throughout the development cycle. The *Agile Manifesto* introduced the term in 2001.

Incremental software development methods have been traced back to 1957. In 1974, a paper by E. A. Edmonds introduced an adaptive software development process. Concurrently and independently the same methods were developed and deployed by the New York Telephone Company's Systems Development Center under the direction of Dan Gielan. In the early 1970s, Tom Gilb started publishing the concepts of Evolutionary Project Management (EVO), which has evolved into Competitive Engineering. During the mid to late 1970s Gielan lectured extensively throughout the U.S. on this methodology, its practices, and its benefits.

So-called *lightweight* agile software development methods evolved in the mid-1990s as a reaction against the *heavyweight* waterfall-oriented methods, which were characterized by their critics as being heavily regulated, regimented, micromanaged and overly incremental approaches to development.

Proponents of lightweight agile methods contend that they are a return to development practices that were present early in the history of software development.

Early implementations of agile methods include Rational Unified Process (1994), Scrum (1995), Crystal Clear, Extreme Programming (1996), Adaptive Software Development, Feature Driven Development, and Dynamic Systems Development Method (DSDM) (1995). These are now collectively referred to as agile methodologies, after the Agile Manifesto was published in 2001.

There are many specific agile development methods. Most promote development, teamwork, collaboration, and process adaptability throughout the life-cycle of the project.

## GRAMMAR EXERCISES

**8. Use the correct form of the verb after *I wish*:**

1. I wish it (to be) warm and fine all the year round. 2. I wish I (not to lend) Nick my watch: he has broken it. 3. I wish I (not to have) to do my homework every day. 4. I wish I (to know) Spanish. 5. I wish I (not to drink) so much coffee in the evening: I couldn't sleep half the night. 6. I wish I (to be) at yesterday's party: it must have been very merry. 7. I wish we (to meet) again next summer.

### **9. Answer the following questions:**

What would you do

- if you found burglars in your flat?
- if you saw a ghost?
- if the weather had been fine last weekend?
- if you had more time?
- if you were the president of the country?
- if you had no homework tonight?
- if you won a million?
- if you could speak perfect French?

## **Lesson 4**

### **WEB DESIGN**

Web design encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardised code and proprietary software; user experience design; and search engine optimization. Often many individuals will work in teams covering different aspects of the design process, although some designers will cover them all. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating mark up then they are also expected to be up to date with web accessibility guidelines.

Web designers use a variety of different tools depending on what part of the production process they are involved in. These tools are updated over time by newer standards and software but the principles behind them remain the same. Web graphic designers use vector and raster graphics packages for creating web formatted imagery or design prototypes. Technologies used for creating websites include standardised mark-up, which could be hand-coded or generated by WYSIWYG editing software.

There is also proprietary software based on plug-ins that bypasses the client's browsers versions. These are often WYSIWYG but with the option of using the software's scripting language. Search engine optimisation tools may be used to check search engine ranking and suggest improvements.

Other tools web designers might use include mark up validators and other testing tools for usability and accessibility to ensure their web sites meet web accessibility guidelines.

### 1. Find the English equivalents in the text:

Різні навички, технічне обслуговування веб-сайтів, працювати у команді, частково охоплювати, у ширшій сфері, патентоване програмне забезпечення, пропонувати удосконалення.

### 2. Translate the following terms and terminological expressions:

Web design; web graphic design; interface design; authoring; user experience design; search engine optimization; web accessibility guidelines; vector and raster graphics packages; standardised mark-up; plug-in; to bypass the client's browsers versions.

### 3. Match the definitions with the notions:

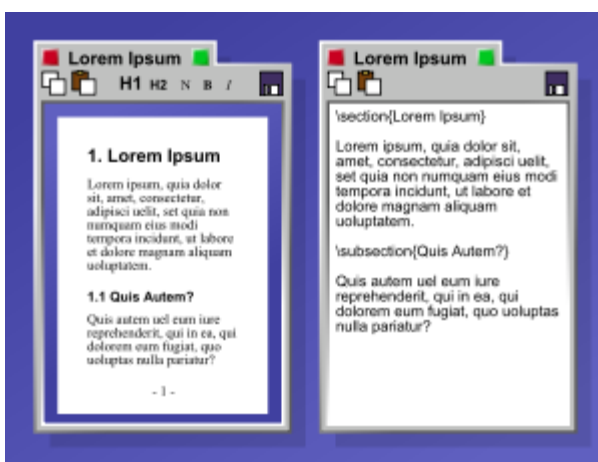
Markup language	an information retrieval system designed to help find information stored on a computer system
Plug-in	a system in which content (text and graphics) displayed onscreen during editing appears in a form closely corresponding to its appearance when printed or displayed as a finished product, which might be a printed document, web page, or slide presentation (an acronym for "What You See Is What You Get")
Computer system validation (CSV)	the documented process of assuring that a computer system does exactly what it is designed to do in a consistent and reproducible manner.
WYSIWYG editor	a software component that adds a specific feature to an existing software application
Search engine	a coding system, such as HTML and SGML, used to structure, index, and link text files.

### 4. Answer the following questions:

- 1) What does web design encompass?
- 2) What areas does web design include?
- 3) What is the term web design used for?
- 4) What do web designers use?
- 5) What do web graphic designers use?
- 6) What do technologies used for creating websites include?
- 7) What tools might web designers use?

5. Tell your friends about the main aspects of web design.

6. Read the article and put five questions to it.



WYSIWYG implies a user interface that allows the user to view something very similar to the end result while the document is being created. In general WYSIWYG implies the ability to directly manipulate the layout of a document without having to type or remember names of layout commands. The actual meaning depends on the user's perspective, e.g.

- In presentation programs, compound documents and web pages, WYSIWYG means the display precisely represents the appearance of the page displayed to the end-user, but does not necessarily reflect how the page will be printed unless the printer is specifically matched to the editing program, as it was with the Xerox Star and early versions of the Apple Macintosh.
- In word processing and desktop publishing applications, WYSIWYG means that the display simulates the appearance and represents the effect of fonts and line breaks on the final pagination using a specific printer configuration, so that, for example, a citation on page 1 of a 500-page document can accurately refer to a reference three hundred pages later.

## **7. Make an annotation of the article.**

### **Macintosh**



The Macintosh, marketed as Mac, is a line of personal computers (PCs) designed, developed, and marketed by Apple Inc. It is targeted mainly at the home, education, and creative professional markets.

The line includes the descendants of the first commercially successful personal computer that was sold without a programming language package and instead introduced a desktop publishing package, a mouse and a graphical user interface, all three novelties at the time.

It also includes descendants of the entry-level Mac mini desktop model, the Mac Pro tower graphics workstation, and the MacBook Air and MacBook Pro laptops. Its Xserve server was discontinued on January 31, 2011.

Apple Inc.'s then-chairman Steve Jobs introduced the first Macintosh on January 24, 1984. It became The Macintosh product line, and saw success through the end of the decade, though popularity dropped in the 1990s as the personal computer market shifted toward the "Wintel" platform: IBM PC compatible machines running MS-DOS and Microsoft Windows with an Intel processor. In 1998, Apple consolidated its multiple consumer-level desktop models into the all-in-one iMac, which proved to be a sales success and saw the brand revitalized.

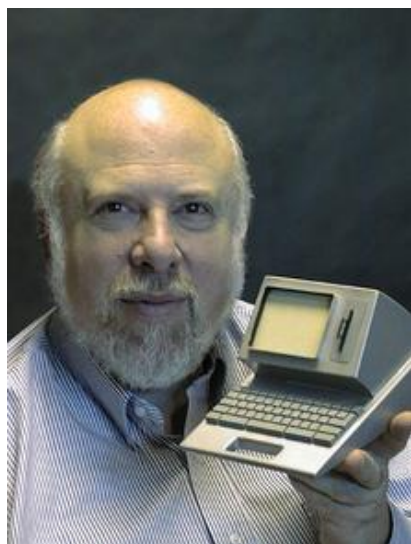
Production of the Mac is based on a vertical integration model. Apple facilitates all aspects of its hardware and creates its own operating system that is pre-installed on all Mac computers, unlike most IBM PC compatibles, where multiple sellers create and integrate hardware intended to run another company's operating software. Apple exclusively produces Mac hardware, choosing internal systems,

designs, and prices. Apple uses third party components, however, such as graphics subsystems from Nvidia, Intel, and AMD. Current Mac CPUs use Intel's X86-64 architecture. The earliest models (1984–1994) used Motorola's 68k, and models from 1994 until 2006 used the AIM alliance's PowerPC. Apple also develops the operating system for the Mac, OS X, currently on version 10.8 "Mountain Lion". The modern Mac, like other personal computers, is capable of running alternative operating systems such as Linux, OpenBSD, and, in the case of Intel-based Macs, Microsoft Windows. However, Apple does not license OS X for use on non-Apple computers.

## 8. Make an annotation of the article.

### Jef Raskin

The Little Engine That Could  
*The New York Times*



Jef Raskin (March 9, 1943 – February 26, 2005) was an American human–computer interface expert best known for starting the Macintosh project for Apple in the late 1970s.

Raskin was born in New York City to a secular Jewish family. He received a BA in mathematics and a BS in physics with minors in philosophy and music from the State University of New York at Stony Brook. In 1967, he received a master's degree in computer science (after switching from mathematical logic due to differences of opinion with his advisor) from Pennsylvania State University. Even though he had completed work for his PhD, the university was not accredited for a PhD in computer science. His first computer program, a music program, was part of his master's thesis.

Raskin later enrolled in a graduate music program at the University of California, San Diego, but stopped to teach art, photography and computer science there, working as an assistant professor in the Visual Arts dept from 1968 until 1974. He was awarded a National Science Foundation grant to establish a Computer and Humanities center which used a 16 bit Data General Nova computer and graphic display terminals rather than the teletypes which were in use at that time.

Along with his undergraduate student Jonathan Collins, Jef developed the Flow Programming Language for use in teaching programming to the art and humanities students. The language was first used at the Humanities Summer Training Institute held in 1970 at the University of Kansas in Lawrence, Kansas. The language had only 6 instructions (get it, print it, print "text", jump to, if it is ' ' then & stop) and could not manipulate numbers. The language utilized "typing amplification" in which only the first letter was typed and the computer provided the balance of the instruction eliminating typing errors. It was also the basis for programming classes taught by Jef and Jon in the UCSD Visual Arts Dept.



He curated several art shows including one featuring his collection of unusual toys. It was during this period that Jef changed the spelling of his name from Jeff to Jef after meeting Jon and liking the lack of extraneous letters.

He occasionally wrote for computer publications, such as Dr. Dobb's Journal.

## GRAMMAR EXERCISES

### 9. Respond to the following statements using “*must* + Perfect Infinitive” and keep the conversation going.

*Model:*

*A: My watch ran out during the night.*

*B: You were so very tired yesterday. You must have forgotten to wind it.*

1) Stop being funny, Peter. Why is the child wet to the skin? 2) I say, where is Fred? He’s kept us waiting for more than half an hour. 3) Oh, bother! The cake is still in the oven. 4) Don’t be silly and stop banging the door. I’m having a wash. 5) I wanted to do some shopping in the afternoon but couldn’t find my purse. 6) I think I smell something cooking. 7) Jane took Spot for a walk and he disappeared. I’m sure he’s been run over. 8) You look a bit tired. Have you been doing the rooms all day? 9) Is John likely to play chess at his father’s tonight? I didn’t find him in though he promised not to leave till seven. 10) What’s wrong? Why does your sister look so worried?

### 10. Respond to the following statements using “*should* + Perfect Infinitive” or “*ought* + Perfect Infinitive” and keep the conversation going.

*Model:*

*A: It’s no use talking, Nancy. You’ll have to stay baby-sitting.*

*B: You should (ought to) have mentioned it yesterday. It would have saved a lot of trouble.*

1) Here is a letter from Jane. She wants to come and stay for a week from tomorrow. That will be nice, won’t it? 2) I’m expecting two of my school-fellows. They are coming over for the day. Will you give them some supper, Mother? 3) Oh, I’ve put salt instead of sugar into my tea. 4) I believe the milk has turned sour. 5) You are being interested in collecting stamps! Why haven’t you ever told me anything about it? 6) Jack cut himself while he was shaving. 7) Though you have driven in some more nails, I’m afraid the shelf will not hold the weight of all those books.

## Lesson 5

### TECHNICAL SUPPORT



Technical support or tech support refers to a range of services by which enterprises provide assistance to users of technology products such as mobile phones, televisions, computers, software products or other electronic or mechanical goods. In general, technical support services attempt to help the user solve specific problems with a product—rather

than providing training, customization, or other support services.

Most companies offer technical support for the products they sell, either freely available or for a fee. Technical support may be delivered over the telephone or online by e-mail or a website or a tool where users can log a call/incident.

Larger organizations frequently have internal technical support available to their staff for computer related problems. The internet is also a good source for freely available tech support, where experienced users may provide advice and assistance with problems. In addition, some fee-based service companies charge for premium technical support services.

Technical support may be delivered by different technologies depending on the situation. For example, direct questions can be addressed using telephone calls, SMS, Online chat, Support Forums, E-mail or Fax; basic software problems can be addressed over the telephone or, increasingly, by using remote access repair services; while more complicated problems with hardware may need to be dealt with in person.

**1. Find the English equivalents in the text:**

Набір послуг, забезпечувати (надавати) допомогу, намагатися допомогти, безкоштовно, за плату, доставляти (передавати), надавати пораду (консультацію), стягувати плату.

**2. Translate the following terms and terminological expressions:**

Providing training, customization and support services; internal technical support; remote access repair services.

**3. Match the definitions with the notions:**

SMS	the place to share your experience with experts and with other users, report bugs and generally join in discussions.
Online chat	the telephonic transmission of scanned printed material (both text and images), normally to a telephone number connected to a printer or other output device
E-mail	a method of exchanging digital messages from an author to one or more recipients
Fax	any kind of communication over the Internet that offers a real-time transmission of text messages from sender to receiver
Forum	a text messaging service component of phone, web, or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices (Short Message Service)

**4. Answer the following questions:**

1) What does technical support refer to?

- 2) Do companies offer technical support for the products freely?
- 3) How may technical support be delivered?
- 4) What do larger organizations have?
- 5) What is a good source for freely available tech support?
- 6) How can direct questions be addressed?

**5. Tell your friends about the main aspects of technical support.**

**6. Read the article and put five questions to it.**



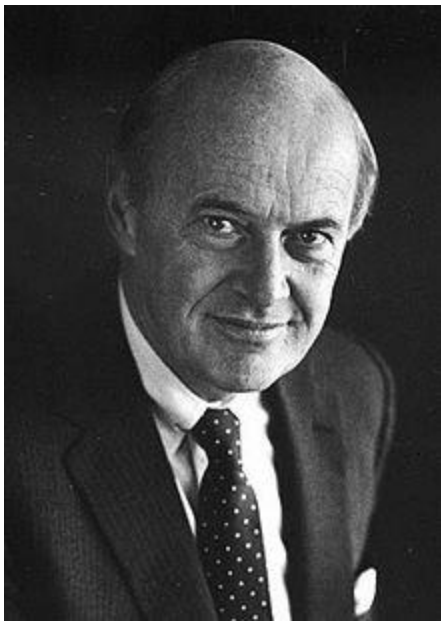
Xerox Corporation /'ziəɹɒks/ is an American multinational document management corporation that produces and sells a range of color and black-and-white printers, multifunction systems, photo copiers, digital production printing presses, and related consulting services and supplies. Xerox is headquartered in Norwalk, Connecticut (moved from Stamford, Connecticut in October 2007), though its largest population of employees is based around Rochester, New York, the area in which the company was founded. On September 28, 2009, Xerox announced the intended acquisition of Affiliated Computer Services for \$6.4 billion. The deal closed on February 8, 2010. Xerox holds a Royal Warrant from Queen Elizabeth II and the Prince of Wales.

Researchers at Xerox and its Palo Alto Research Center invented several important elements of personal computing, such as the desktop metaphor GUI, the computer mouse and desktop computing. These features were frowned upon by the then board of directors, who ordered the Xerox engineers to share them with Apple technicians. The features were taken on by Apple and, later, Microsoft. Partly thanks to these features, these two firms would then go on to duopolize the personal computing world

**7. Make an annotation of the article.**

**Charles Peter McColough**

*from Fumbling the Future  
by Smith, Douglas K.; Alexander, Robert C.*



Charles Peter Philip Paul McColough (August 1, 1922 – December 13, 2006) was one of the joint creators and founders of the Xerox Corporation (along with Joseph C. Wilson), and was a former Chief Executive Officer and Chairman of the Board at Xerox. He retired in the late 1980s, after serving over fourteen years as CEO. Aside from building Xerox to the corporate empire it is today, McColough was treasurer of the Democratic National Committee between 1974 and 1976, was Chairman of United Way of America, and served on the Board of Trustees at the Council on

Foreign Relations, New York Stock Exchange, Bank of New York, Wachovia, Citigroup, Knight Ridder, and Union Carbide Corporation.

C. Peter McColough is also the namesake of the C. Peter McColough Roundtable Series on International Economics, part of the Council on Foreign Relations. This program was enacted and funded by the Council on Foreign Relations upon McColough's retirement as a Director on the Council's Board for nine years. McColough also served as Treasurer between 1985-87, Chairman of the Finance and Budget Committee between 1981-87, and served as Chairman of the Campaign for the Council between 1983-85.

He resided with his wife, Mary Virginia White McColough, in Greenwich, Connecticut, and Palm Beach, Florida.

McColough worked initially for Lehigh Navigation Coal Sales Company in the USA before making the switch in 1954 to Xerox, then a little known manufacturer of industrial photocopiers and still known as the Haloid Company. Five years after that career move, his new firm introduced its first office photocopier. As one of the first companies to step into the lucrative arena and potential growth market, Xerox's annual revenues soared from \$40 million in 1960 to almost \$3 billion in the early 1970s.

After taking over the presidency of the firm in 1966, McColough significantly changed and altered the direction and goals of Xerox Corporation. By 1979, McColough had built up Xerox revenues to \$7 billion a year and its annual earnings to \$563 million. The company's chief scientist told Forbes Magazine in 1980 that "in the late 1960s, Peter McColough redefined our company." From 1970 through to the mid-1980s he has held several directorships and in 1970, was honoured by his former alma mater, Dalhousie University, with an Honorary Doctorate.

## **8. Make an annotation of the article.**

### **Ursula Burns**

*from "An Historic Succession At Xerox". Business Week  
by Byrnes, Nanette; Crockett, Roger O*



Ursula M. Burns (born September 20, 1958) serves as Madam Chairman and CEO of Xerox. She is the first African-American woman CEO to head a Fortune 500 company. She is also the first woman to succeed another woman as head of a Fortune 500 company. In 2009, Forbes rated her the 14th most powerful woman in the world.

Burns was raised by a single mother in the Baruch Houses, a New York city housing project. Both of her parents were Panamanian immigrants. She attended Cathedral High School, a Catholic all-girls school on East 56th Street in New York. She went on to obtain a bachelor of science degree in Mechanical Engineering from Polytechnic Institute of NYU in 1980 and a master of science in Mechanical Engineering from Columbia University a year later.

In 1980, Burns first worked for Xerox as a summer intern, permanently joining a year later, in 1981, after completing her master's degree. She worked in various roles in product development and planning in the remainder of the 1980s throughout her 20s.

In January 1990, her career took an unexpected turn when Wayland Hicks, then a senior executive, offered Burns a job as his executive assistant. She accepted and worked for him for roughly nine months when she was ready to go back home because she was about to be married Lloyd Bean. ranks. In June 1991, she became executive assistant to then chairman and chief executive Paul Allaire. In 1999, she was named vice president for global manufacturing.

In 2000, Burns was named a senior vice president and began working closely with soon to be CEO Anne Mulcahy, in what both women have described as a true partnership. Nine years later, in July 2009, she was named CEO, succeeding Mulcahy, who remained as chairwoman until May 2010.

Burns has served on numerous professional and community boards, including Exxon Mobil Corporation, American Express, Boston Scientific, FIRST, National Association of Manufacturers, University of Rochester, the MIT Corporation, the Rochester Business Alliance, and the RUMP Group. She will serve as Vice Chairman of the Executive Committee of The Business Council in 2013 and 2014. She was the Commencement speaker at MIT's 2011 Commencement, which was also the conclusion of MIT's 150th anniversary celebration. She delivered the 2011 Commencement address at the University of Rochester. She was the 2012 Commencement speaker for Xavier University of Louisiana's May 12 Commencement ceremony, where she also received an honorary degree, one of the institution's highest honors.

## GRAMMAR EXERCISES

### 9. Change the sentences according to the model:

a) *She reads too much.* > *She shouldn't read so much.*

b) *She doesn't work hard.* > *She should (ought to) work hard.*

1. You don't do it properly. 2. She doesn't use new information on the problem. 3. The student doesn't remember the conditions of the experiment. 4. The book is not published yet. 5. People do not always express their ideas clearly. 6. They are discussing the project too long. 7. The supervisor makes the postgraduate work too much.

### 10. Choose the necessary modal verb and translate into Ukrainian:

1. The talker (can, must) remember that conversation (must, should) serve a purpose. 2. We frequently (may, have to) use reference books and encyclopaedias where we (must, can) find information we need at the moment. We (cannot, need not), of course, read reference boors from cover to cover. 3. Writers do not always express things directly so that you (to have to, may) think carefully to see what they mean. 4. Reading a book (need, should) be a conversation between you and the author. 5. To achieve progress in any subject we (may, must) discuss things. 6. It (can, must, may) be born in mind that some people are afraid of having time to think, so they go to the movies, watch television, because they (should, can) think of

nothing better to do. 7. When we are introduced to new people we (should, need) try to appear friendly.

## ГРАМАТИЧНИЙ ДОВІДНИК

### §1. The Infinitive

<b>Infinitive forms</b>	<b>Active Voice</b>	<b>Passive Voice</b>
Indefinite	to offer	to be offered
Continuous	to be offering	-----
Perfect	to have offered	to have been offered
Perfect Continuous	to have been offering	-----

1. The **Indefinite Infinitive** refers to the present or future: *I'd like **to go** for a walk.*
2. The **Continuous Infinitive** is used with *appear, claim, seem, pretend, must, can't, happen, should, would etc* to describe an action happening now: *He must **be working** in the garden now.*
3. The **Perfect Infinitive** is used with *appear, happen, pretend, seem etc* to show that the action of the infinitive happened before the action of the verb: *He **claims to have met** the Queen.*
4. The **Perfect Continuous Infinitive** with *appear, seem, pretend etc* to put emphasis on the duration of the action of the infinitive, which happened before the action of the verb: *She **seems to have been working** all morning.*

#### **The to-infinitive is used:**

1. to express purpose: *She went out **to buy** some milk.*
2. after certain verbs (*advise, agree, appear, decide, expect, hope, promise, refuse etc*):  
*He **promised to be** back at 10 o'clock.*
3. after certain adjectives (*angry, happy, glad etc*): *She was glad **to see** him.*
4. after question words (*where, how, what, who, which, but not after why*): *Has she told you where **to meet** them? But: I don't know why he left so early?*
5. after *would like/would love/would prefer* to express specific preference): *I'd love **to go** for a walk.*
6. after nouns: *It's a pleasure **to work** with you.*
7. after *too/enough* constructions: *He's too short **to reach** the top shelf. He isn't tall enough **to reach** the top shelf.*

8. with *it + be + adj ( + of + object)*: *It was nice of him **to remember** my birthday.*
9. with *only* to express unsatisfactory result: *He called me **only to say** that he would be late.*

### **The infinitive without *to* is used:**

1. after modal verbs (*must, can, may, will etc*): *You **must be** back at 12 o'clock.*
2. after *had better/would rather*: *I'd rather **had stayed** in last night.*
3. after *make/let/see/hear/feel + object*: *Mum let me **watch** TV. I made him **apologise**.*

But: in the passive form: *be made/be heard/be seen + to-infinitive*: *He was made **to apologise**.*

Note: *help* is followed by a *to*-infinitive or an infinitive without *to*: *She helped me **(to) wash** the dress.*

## **§2. The Objective Infinitive Complex**

The Objective Infinitive Complex consists of a noun in the Common Case or a personal pronoun in the Objective Case and the infinitive. The nominal part of the complex denotes the subject or the object of the action expressed by the infinitive.

In the sentence this complex has the function of a complex object.

The Objective Infinitive Complex is used:

- a) after the verbs denoting perceptions of senses (*to see, to hear, to feel, to watch, to observe, to notice*); infinitive without *to* is used after these verbs, e.g.: *They all watched **him walk** up the hill.*
- b) after the verbs denoting wish, intention, emotions (*to want, to wish, to desire, to like, to dislike, to hate, to intend, should/would like*), e.g.: *He intended **me to go** with him to the theatre.*
- c) after the verbs denoting mental activity (*to consider, to believe, to think, to find, to know, to expect, to suppose*), e.g.: *We consider **him to be** an interesting person.*
- d) after the verbs denoting request, permission, advice, compulsion (*to order, to ask, to request, to allow, to permit, to advise, to recommend, to cause, to force, to make, to let*); infinitive without *to* is used after *to make* and *to let*, e.g.: *We made **George work**.*

## **§3. The Subjective Infinitive Complex**

The Subjective Infinitive Complex consists of a noun in the Common Case or a personal pronoun in the Nominative Case and the infinitive.

The nominal part of the complex may denote both the subject and the object of the action expressed by the infinitive.

The Subjective Infinitive Complex is used:

- α) with the verbs *to say* and *to report* (in the Passive Voice), e.g.: *The delegation is reported to have arrived in Geneva.*
- β) with the verbs (in the Passive Voice) denoting mental activity (*to consider, to believe, to think, to know, to expect, to suppose*), e.g.: *The meeting is expected to begin this morning.*
- χ) with the verbs (in the Passive Voice) denoting sense perceptions (*to see, to hear, to feel, to watch, to observe, to notice*), e.g.: *He was seen to enter the house.*
- δ) with the verbs (in the Passive Voice) denoting request, permission, advice, compulsion (*to order, to ask, to request, to allow, to permit, to advise, to recommend, to cause, to force, to make, to let*); e.g.: *They were ordered to leave the hall.*
- ε) with the verbs *to seem, to appear, to happen, to chance, to turn out, to prove*, e.g.: *She seemed not to listen to him.*
- φ) with the expressions *to be sure, to be certain, to be likely, to be unlikely*, e.g.: *He is certain to be sleeping.*

#### §4. The Prepositional Infinitive Complex

The infinitive complex preceded by the preposition *for* is called the Prepositional Infinitive Complex. It may be used in the functions of a subject, predicative, object, attribute and adverbial modifier of result and purpose.

*It is time for us to go. He waited for her to speak. There's nobody here for him to play with. It was too dark for her to see him.*

#### §5. The Participle

There are two participles in English: **Present Participle** (or **Participle I**) and **Past Participle** (or **Participle II**). Present Participle is formed by adding the ending *-ing* to the infinitive without the particle *to*. Past Participle is formed by adding the ending *-ed* for regular verbs and we use the *III form* for irregular verbs, e.g.:

Participle I	Participle II
to read – reading	to love – loved
to write – writing	to study – studied
to sit – sitting	to cry – cried
to begin – beginning	to stop – stopped
to look – looking	to permit – permitted
to prefer – preferring	to prefer – preferred
to compel – compelling	to occur – occurred
to travel – traveling	to travel – traveled
to lie – lying	to fulfil – fulfilled
to tie – tying	<i>to write – written</i>
to die – dying	<i>to bring – brought</i>
to study – studying	<i>to shut – shut</i>
to try – trying	<i>to show – shown</i>



## Participle Forms

Participle forms	Active voice	Passive Voice
Present Participle	asking	being asked
Past Participle		asked
Perfect Participle	having asked	having been asked

**Present Participle Indefinite** may express an action:

- a) simultaneous with that expressed by the finite verb, e.g.: *Reading English books I write out new books;*
- b) referring to the present irrespective of the time of the action expressed by the finite verb, e.g.: *The students **working** in our village came from Kyiv.*
- c) having no reference to any particular time, e.g.: *The bisector is a straight line **dividing** an angle into two equal parts.*
- d) preceding that expressed by the finite verb if these actions closely follow each other, e.g.: ***Entering** his room, he went quickly to the other door.*

**Perfect Participle** is used to express an action preceding that expressed by the finite verb, e.g.: ***Having given** her word, she ought to keep it.*

**Present Participle Active** is used when the noun or pronoun it refers to denotes the subject of the action expressed by the participle, e.g.: ***Having opened** my window, I went downstairs.*

**Present Participle Passive** is used when the noun or pronoun it refers to denotes the object of the action expressed by the participle, e.g.: ***Being invited** to an evening-party she couldn't go to the theatre.*

**Past Participle** has only one form which is passive in meaning, e.g.: *We looked at the **destroyed** bridge. A central angle is an angle **formed** by two radii.*

### §6. The Objective Participle Complex

The Objective Participial Complex consists of a noun in the Common Case or personal pronoun in the Objective case and a participle. The first part of the complex (the noun or pronoun) denotes the subject or the object of the action expressed by the participle.

The Objective Participial Complex is used:

- a) with verbs denoting sense perceptions (after these verbs both Present Participle and Past Participle can be used), e.g.: *I saw **him walking** in the garden. I saw **the window broken**.*
- b) with verbs denoting wish and mental activity (only Past Participle is used in this case), e.g.: *I want **him changed**. Margaret considered **herself deceived**.*
- c) with the verbs **to have** and **to get** (after these verbs only Past Participle is used), e.g.: *She had **her hair done**. I must have my watch **repaired**.*

### §7. The Subjective Participle Complex

The Subjective Participial Complex consists of a noun in the Common Case or personal pronoun in the Subjective case and a participle (mostly Present Participle) which stands in predicate relation to the noun or pronoun.

The Subjective Participial Complex is used:

- a) with verbs denoting sense perceptions in Passive Voice (in the function of predicate in a sentence), e.g.: *A **plane** was heard **flying** high in the sky.*
- b) with verbs *to consider, to believe, to find*, (sometimes with Past Participle), e.g.: ***The work** was considered **finished**.*

## §8. The Absolute Participle Complex

The Absolute Participial Complex is a construction in which a participle has its own subject expressed by a noun in the Common Case or a personal pronoun in the Nominative Case. All the forms of the Participle are used here. The complex is used in the function of adverbial modifier of time, cause, manner or attending circumstances and condition. It may be introduced by the preposition *with*. In this case it is used in the function of adverbial modifier of manner or attending circumstances, e.g.:

***The rain having stopped** we went home.*

***The day being very fine**, we went for a walk.*

***Weather permitting**; we'll spend our day off in the forest.*

Незалежний дієприкметниковий комплекс перекладається на українську мову:

а) підрядним обставинним реченням:

***The letter being written**, I went to post it. - Коли лист був написаний, я пішла відправити його.*

б) простим реченням, що входить до складносурядного:

*They went quickly out of the house, **Jude accompanying her to the station**. - Вони швидко вийшли з дому, і Джуд провів її до вокзалу.*

в) дієприслівниковим зворотом:

***Her face smiling**, she came into the room. - Усміхаючись, вона увійшла в кімнату.*

г) головним реченням в складнопідрядному:

*She sat down at the table, **her hands beginning to tremble**. – Коли вона сідала за стіл, її руки починали тремтіти.*

д) вставним реченням:

*The evening was so dark, (**the moon not having yet risen**), that he could see no one twenty yards off. – Вечір був такий темний (місяць ще не зійшов), що за двадцять ярдів він нікого не міг бачити.*

е) іменником з прийменником:

*He came into the room, his face smiling. – Він увійшов до кімнату з усміхненим обличчям.*

## §9. The Gerund

The gerund is a non-finite form of the verb which has noun and verb characteristics.

## Gerund Forms

	Active	Passive
Indefinite	<i>writing</i>	<i>being written</i>
Perfect	<i>having written</i>	<i>having been written</i>

The **Indefinite Gerund** is used:

- a) if the action expressed by the gerund is simultaneous with that expressed by the finite verb, e.g.: *Nobody thought of **going** to bed.*
- b) if the action expressed by the gerund does not refer to any particular time, e.g.: *She is fond of **painting**.*

The **Perfect Gerund** expresses an action prior to that denoted by the finite verb, e.g.: *He has no right to come without **having been invited**.*

The gerund is the only form of the verb which can be preceded by a preposition that refers to it; so the gerund is used after verbs, adjectives and expressions which require a prepositional object, e.g.:

*Thank you **for telling** me. – Дякую, що ви сказали мені.*

*She could not keep **from crying**. – Вона не могла стриматися, щоб не заплакати.*

*I am fond of **reading**. – Я люблю читати.*

Gerund is used after such verbs, prepositions and expressions:

*I think of **going** to Minsk next week.*

*After **finishing** school he worked at a plant.*

*She insisted on **going** to the library.*

*She insisted on **being sent** to the library.*

*I am looking forward to **getting** a letter from you.*

*I enjoyed **seeing** this performance.*

*It is no use **learning** rules without examples.*

*Excuse me for **troubling** you.*

*I'm sorry for **not telling** you about it.*

*I am proud of **being** his pupil.*

*I am proud of **having been** his pupil.*

*I am proud of **being** often invited there.*

*I am proud of **having been** invited there.*

*They went home **without waiting** for me.*

***Instead of taking** a taxi, I went there by bus.*

*Mother is **busy cooking** dinner.*

*This radio set is **worth buying**.*

**The –ing form is used:**

**1. as a noun**

***Eating** vegetables is good for your health.*

**2. after certain verbs** (*admit to, avoid, consider, continue, delay, deny, enjoy, escape, excuse, fancy, finish, forgive, imagine, involve, keep=continue, look*

*forward to, mention, mind, miss, object to, postpone, practise, prevent, report, resist, risk, save, stand, suggest, understand etc)*

*He admitted (to) stealing the painting.*

3. **after love, like, dislike, hate, enjoy, prefer (to express general preference)**  
*He likes cooking* (in general)  
*I like to eat a healthy breakfast* (it's useful, it's a good idea, specific preference)
4. **after I'm busy, it's no use, it's (no) good, it's (not) worth, what's the use of, can't help, there's no point (in), can't stand, be/get used to, be/get accustomed to, have difficulty (in)**  
*It's no use complaining.*
5. **after go for physical activities**  
*They go skiing every winter.*
6. **after spend/waste time**  
*He wasted his time playing videogames.*
7. **after prepositions**  
*He entered without knocking at the door.*
8. **after see, hear, listen, watch to express an incomplete action, the action in progress or a long action**  
*I saw Kate painting the kitchen* (I saw Kate in the middle of painting. I saw part of the action in progress. I didn't wait until she had finished).  
*I watched Kate paint the kitchen* (I saw the whole action from beginning to end).

## §10. Conditionals

### Three Types of Conditional Sentences

Type	English	Ukrainian	Use
<b>I</b>	If he <b>leaves</b> early, he <b>will be</b> on time for the meeting. If the morning <b>is</b> fine, they <b>will compete</b> outdoors.	Якщо він вийде рано, він буде вчасно на зборах. Якщо ранок буде гарним, вони змагатимуться на відкритому повітрі.	Real – likely to happen in the present or future
<b>II</b>	If he <b>left</b> early, he <b>would be</b> on time for the meeting. If the morning <b>were</b> fine, they <b>would compete</b> outdoors.	Якби він вийшов раніше (сьогодні, завтра), він був би вчасно на зборах. Якби ранок був гарним (сьогодні, завтра), вони б змагалися на відкритому повітрі.	Unreal – unlikely to happen in the present or future; also used to give advice
<b>III</b>	If he <b>had left</b> early, he <b>would have been</b> on time for the meeting. If the morning <b>had been</b> fine, they <b>would</b>	Якби він вийшов раніше (вчора), він був би вчасно на зборах. Якби ранок був гарним (вчора), вони б змагалися на	Unreal situations in the past; also used to express regrets and criticism

<b>have</b> outdoors.	<b>competed</b>	ВІДКРИТОМУ ПОВІТРІ.	
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- When the *if*-clause is before the main clause, the two clauses are separated with a comma; e.g.:  
*If you **come early**, we **can go** for a walk.*  
**But:** *We **can go** for a walk if you **come early**.*
- After *if*, *were* can be used instead of *was* in all persons; e.g.:  
If I **was/were** you, I **would try** harder.
- *Unless* means *if not*; e.g.:  
*Unless she **studies**, she **won't pass** her test.*  
*(If she doesn't study, she won't pass her test)*

### §11. Sequence of Tenses

The sequence of tenses is a dependence of the tense of the verb in a subordinate clause on that of the verb in the principle clause.

If the verb in the principle clause expresses a past action, a past tense or future-in-the-past is used in the object clause, e.g.:

*I thought you **were** his friend. I knew that you **would understand** me.*

If the action of the object clause refers to the same period of time as the past action of the principle clause, the Past Indefinite or the Past Continuous is used in the object clause, e.g.:

*They knew what they **were fighting** for.*

If the action of the object clause precedes the past action of the principle clause, the Past Perfect is used in the object clause, e.g.:

*I thought you **had left** England.*

The sequence of tenses is usually not observed if the object clause expresses a well-known fact, e.g.:

*He knew that metals **conduct** electricity.*

Table 1

Заміна часів у підрядному додатковому реченні при головному реченні у минулому часі		
Present Simple > Past Simple Present Continuous > Past Continuous	Дія підрядного речення відбувається одночасно з дією головного	<i>I thought that he <b>lived</b> in New York.</i> <i>I knew that mother <b>was sleeping</b>.</i>
Present Perfect > Past Perfect Past Simple > Past Perfect	Дія підрядного речення передуює дії головного	<i>I was told he <b>had returned</b> from London.</i> <i>I heard he <b>had bought</b> a new car.</i>

Future > Future-in-the-Past	Дія підрядного відбувається пізніше, ніж дія ГОЛОВНОГО	<i>I supposed that he <b>would send</b> us a letter.</i>
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Table 2

Direct Speech	Indirect Speech
today	that day
yesterday	the day before
tomorrow	the next day
... ago	... before
this ...	that ...
these...	those ...
here	there
last year	the year before
last month	the month before
last ...	the ... before
next ...	the following

Table 3

Direct Speech	Indirect Speech
Commands	
<i>Keep quiet! Don't make noise!</i>	<i>He told me <b>to keep</b> quiet and not <b>to make</b> noise.</i>
Special Questions	
<i>What are you doing? Where does he work? When did you come yesterday?</i>	<i>He asked me what I <b>was doing</b>. He asked me where he <b>worked</b>. He asked me when I had come home the day before.</i>
General Questions	
<i>Does she go to the University? Will you see your friend tomorrow?</i>	<i>He asked me whether (if) she <b>went</b> to the University. He asked me whether (if) I <b>should see</b> my friend the next day.</i>
Some constructions	
<i>Let's play chess. All right. Oh, no.</i>	<i>He suggested <b>playing</b> chess. He agreed. He refused.</i>

