Contents

ВВЕДЕНИЕ

Данное учебно-методическое пособие разработано в соответствии с требованиями программы дисциплины «Иностранный язык» для бакалавров информационного направления.

В пособии представлен материал по 8 темам, которые соответствуют темам, отраженным в рабочей программе.

Каждая тема включает несколько разделов, раскрывающих основные особенности устной и письменной коммуникации на английском языке, а также содержит аутентичные тексты и систему упражнений, направленных на развитие иноязычной компетенции учащихся.

Материалы учебно-методического пособия могут быть использованы для организации как аудиторной и самостоятельной домашней работы обучающихся бакалавриата, так и для проведения мероприятий текущего контроля.

Unit 1. HISTORY OF MICROELECTRONICS

READING

Exercise 1. Answer the following questions.

1. What was your first computer?
2. How do you use computer?
3. What is your favorite device? Why?
4. How do computers impact on our daily lives?
5. Do you prefer using a laptop or a desktop computer? Why?
6. What was the most challenging computer problem you've ever faced? What did you do?
7. Why have you decided to become an IT professional?
8. What is your daily most-used software?
9. How have computers changed the way of communication? Do you like it?
10. If you could invent any device, what would it be and why?

Exercise 2. Explain the following words in English.

computer / laptop / informational technologies / processor / transistor / memory / voltage / development / AC outlet / current / digitalization

Exercise 3. Read the following quote. What does it mean?

"The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it".

Mark Weiser

Exercise 4. Read the text. Give your definition to the words in bold.

Microelectronics plays a very important role in the XXI century. Its idea of **miniaturization** has been a game changer in the industry. Due to it, electronic devices became not only smaller, but also faster and more **efficient**. Microelectronics engineers design electronic **circuits**, working on a microscopic **scale**, they build **intricate** systems. The main **components** of such systems are **diodes**, **transistors**, and **resistors**.

The cornerstone of modern electronics is the transistor. This device replaced **vacuum tubes** in the middle of the XX century. Vacuum tubes were **bulky** and unreliable. Transfer to transistors greatly affected the size of electronic **devices**. What is a transistor? It is a **semiconductor** device. It can be used in electronic circuits to **amplify** or **switch** electronic signals. The principle of its work was described at the beginning of the previous century. However, a working device was made only in 1947. It was developed by a group of physicists (William Shockley, John Bardeen, and Walter Brattain) who worked for Bell Laboratories. Later on, they got a Nobel prize for this achievement. Soon transistors became an integral part of different appliances. They could be found in radios and televisions as well as in early computers.

The next **leap** dealt with **integration** of several transistors onto a single **chip**. It occurred in the early 1960s. As it often happens in science, this concept was independently developed by two engineers. Jack Kilby forked for Texas Instruments, while Robert Noyce was an employee of Fairchild Semiconductor. I**ntegrated circuits**, containing lots of transistors, diodes and resistors, emerged. They were very small, fast, reliable, and needed little power. However, they easily overheated.

In 1971 Intel engineer Ted Hoff and his team designed the **microprocessor**. They suggested placing on a microchip all the components of a **CPU**. A **central processing unit** is responsible for input/output, logical and arithmetical operations. Creation of Intel 4004 contributed to availability of personal computers.

We can see that the history of microelectronics and the history of computer **evolution** go hand in hand. First computers appeared during World War II. Such machines were necessary to perform **accurate calculations** as fast as possible. The first electronic **digital** computer made at the University of Pennsylvania in 1946 was called ENIAC. It was designed by J. Presper Eckert and John Mauchly. ENIAC was a huge general-purpose machine. It could **execute** complex computations much faster than any earlier device.

The first mass produced and commercially successful computer was the UNIVAC I. It was introduced in 1951. The device **showcased** the growing practicality of electronic computing. That room-sized machine, developed by Eckert and Mauchly's company, Remington Rand, was employed for tasks such as weather **prediction**, **data processing**, and business applications.

Along with the development of microelectronics, the changes in computers were rushing ahead. **Mainframe computers** dominated the 1960s, followed by the introduction of minicomputers in the 1970s. They finally were replaced by personal computers in the 1980s and completely changed the way people **interacted** with technology.

The XXI century can be called the era of IT **innovations**. The number of available and useful devices is really mind-blowing. Take a look around: smartphones, smart watch, wireless headphones, tablets, laptops, smart rings, even smart houses. And all this has become possible only with the help of microelectronics development.

Exercise 5. Answer the follow-up questions.

1. What does microelectronics study?
2. What are the main components of electronic circuits?
3. How does the transistor work?
4. What were the tasks of the UNIVAC I?
5. What was the type of computers used in 1960s? 1970s? 1980s?

Exercise 6. Fill in the table and make sentences to tell about the events.

Date	***Name***	***Event***
1947	William Shockley	
1951		
		the first commercially available microprocessor
	Jack Kilby, Robert Noyce	
1946	J. Presper Eckert, John Mauchly	

VOCABULARY ELABORATION

Exercise 7. Match each word from column A to its synonym from the column B.

Column A	Column B
1. Scale	A. Progress
2. Interact	B. Rise
3. Leap	C. Competent
4. Execute	D. Size
5. Evolution	E. Collaborate
6. Prediction	F. Complete
7. Efficient	G. Forecast

Exercise 8. Fill in the correct word from the list below to fulfill the sentence.

diode / semiconductor / binary code / electronic circuit / amplify / device / mainframe computer

1. A _____ is a material that conducts electricity to power devices.
2. She adjusted the settings on the _____ for optimal performance.
3. She connected the _____ to control the flow of electricity.
4. Digital technology uses _____ to represent information.
5. The engineers designed the _____ for the new gadget.
6. The microphone helped her _____ her message to the audience.
7. Back then there was only the _____ that could process vast amounts of data.

Exercise 9. Form the words and fill in the gaps. Translate the sentences.

1. A _____ limits the flow of electric current in a circuit. **(resist)**
2. _____ are main components in modern electronics. **(conduct)**
3. _____ of new software can enhance the efficiency of a system. **(integrate)**
4. An _____ designed for scheduling tasks can boost daily operations. **(apply)**
5. _____ technologies have revolutionized how information is transmitted. **(digit)**
6. _____ models use data analysis to forecast future trends. **(predict)**
7. _____ of innovative technologies drives progress in various industries. **(develop)**

Exercise 10. Translate from Russian into English using active vocabulary for words in italics.

1. Сложная система *микропроцессора* объединяет миллионы *транзисторов* в одном *чипе*.
2. Для эффективного регулирования тока в *электронных схемах* используются такие компоненты, как *резисторы*.
3. *Электровакуумные лампы* когда-то были громоздкими предшественниками современных *интегральных схем*.
4. *Полупроводники*, как и *транзисторы*, могут и *усиливать*, и *переключать* электронные сигналы внутри *устройства*.
5. *Центральный процессор* обеспечивает бесперебойную работу сложных *взаимодействий* внутри *интегральной схемы*.

Exercise 11. Fill in the correct preposition. You can find all the phrases in the text from "Reading" section.

1. The innovative technology, often referred ___ ___ AI, is transforming various industries.
2. The latest software update represents a significant leap ___ performance and functionality.
3. Users can place the device ____ any flat surface for optimal charging.
4. This ancient artifact dates _____ __ the early civilizations of Mesopotamia.
5. Modern smartphones are capable ___ performing a multitude of functions beyond communication.
6. Smart assistants can handle tasks such ____ setting reminders and answering queries.
7. The invention of the internet paved the way ____ global information sharing.

Exercise 12. A. Fill in the words from the list.
B. Make sentences using the completed phrases.

artificial / technological / vacuum / data / accurate / quantum / electronic / computing

1. ……. tube
2. ……. calculation
3. ……. innovation
4. ……. computing
5. ……. intelligence
6. ……. processing
7. ……. power
8. ……. circuits

Exercise 13. Match the word with its definition.

1. Calculation	A. A semiconductor device with three connections, capable of amplification in addition to rectification, used in electronic circuits
2. Bulky	B. The gradual development of something, especially from a simple to a more complex form
3. Transistor	C. The action or process of innovating; a new method, idea, product, etc.
4. Resistor	D. The problem of mathematically estimating the value or number of something
5. Evolution	E. A statement of what someone thinks will happen in the future, based on information
6. Prediction	F. A device having a designed resistance to the passage of an electric current
7. Innovation	G. Taking up much space; large and unwieldy; of large size for its weight

LANGUAGE DEVELOPMENT

Exercise 14. Match each type of the computer with its definition.

1. Mainframe	A. Commonly used by individuals and small businesses for general computing tasks
2. Personal Computers (PCs)	B. Pioneered in the 1960s, these mid-sized computers were smaller and less powerful than mainframes but more capable than microcomputers
3. Supercomputer	C. Smaller, single-user computers that include desktops, laptops, tablets, and smartphones. They are prevalent in everyday use
4. Minicomputer	D. High-performance machines designed for intensive numerical calculations, used in scientific and engineering applications where massive computational power is needed
5. Workstation	E. Specialized computing systems designed to perform specific functions within a larger system, such as in consumer electronics, automobiles, industrial machines, and iot devices
6. Microcomputer	F. Large, powerful computers used primarily by large organizations for critical applications like bulk data processing
7. Embedded Computer	G. High-performance computers used for specialized applications such as engineering, graphics design, and scientific modeling

The computer of the future

A quantum computer is a type of computer that uses principles of quantum mechanics to store and process data. Unlike classical computers, which use bits as the **fundamental unit** of information (either 0 or 1), quantum computers use quantum bits, or **qubits**.

Qubits can exist in multiple states **simultaneously** due to a property called superposition. This allows quantum computers to perform certain calculations much more efficiently than classical computers for specific types of problems, such as factorization and optimization.

Quantum computers are still largely experimental and are not yet widespread due to the significant technical challenges in building and maintaining stable qubits.

Russia is actively engaged in quantum computing research and development. Several universities, **research** institutions, and companies in Russia are working on advancing quantum computing technology. For example, The Russian Quantum Center, based in Moscow, is a leading research institute in the field of quantum technologies, including quantum computing. They focus on developing quantum computers, quantum communication systems, and quantum **cryptography**.