

## HISTORY AND STAGES OF DEVELOPMENT OF COMPUTER TECHNIQUE

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**Annotation:** The article contains information about the history of the creation of computer technology, the theoretical foundations of the creation of universal computers with memory and software, the history of the development of computer technology from the time of its creation to the present, and the characteristics of each of them, characterized by certain characteristics, and the division into generations and stages according to these different periods and stages. At the same time, the information was carried out in a systematic, chronological way.

**Key words:** computer, generation, stage, emergence.

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### Introduction

"Computer", currently used as an international term, is an English word (joinputer) and means a calculator (in the sense of a machine). Before this word entered our language, it was replaced by "digital computing machine-RHM". The phrases "electronic computing machine - EHM" or "calculating machine - HM" were used. The history of computer technology begins with the creation of the first universal computer controlled by software (1946). Long before that, mechanical and electromechanical devices were created to perform calculations. For the first time, the famous French scientist Blaise Pascal developed an adding machine (1642). In 1673, Wilhelm Leibniz created a mechanical arithmetic meter that performed calculations. Starting from the 19th century, arithmetic meters began to be widely used. In 1830, the English mathematician Charles Babbage tried to create a computing machine (analytical machine) that works with a program, that is, performs calculations without human participation. The machine was supposed to enter the program from punched cards, and the data and results were to be stored in the "storage" (memory). However, the level of technology at that time did not allow me to create such a complex machine. Babić's ideas later laid the foundation for the creation of universal computers. The theoretical foundations of creating universal computers with memory and program control were developed in 1930 by A. Turing (England) and E. Post (USA). The basic principles of the creation of digital computing machines were given by American scientists John Von Neumann, G. Goldstein and A. Beris. The practical realization of these theoretical foundations was realized for the first time in 1946 in the United States with the creation of a universal computer called EMAK, built on elements with electronic lamps. Starting from this time, computer technology began to develop at a high speed.

### Discussion

The history of the development of computer technology from the time of its creation until now can be divided into stages (generations), each of which is characterized by certain characteristics. The first generation (1950-1959) computers were electronic and had low processing speed. The functional limitations of my input-output devices and external memory made it difficult to process my textual (character-type) information.

Therefore, the field of application of computers was limited. They were mainly used for solving mathematical problems. Examples of first-generation computers manufactured in the former USSR include "MESM", "BESM", "Strela", "M-3", "Minsk-P", "Ural-2", "M-20", etc. .

The element base of second generation (1960-1969) computers consisted mainly of semiconductors, the memory capacity, operating speed and reliability of the equipment were

relatively large. Input-output devices have been improved, large-capacity external memory (on magnetic tape) has been connected, and textual information processing has become possible. The issue of parallel operation of external devices and main devices has been partially solved. Using algorithmic languages makes programming much easier. The fields of application of computers have expanded considerably. Examples of II generation computers produced in the Soviet Union are "BESM-4", "BESM-6", "M-220", "Minsk-2", "Minsk-22", "Minsk-32", "Ural-14". etc. can be shown. The foundation for the creation of third-generation computers (1970-1985) was the creation of new elements - microelectronics and integrated circuits. As a result of their use, the overall dimensions of computers have decreased and the work reliability has increased. The principle of parallel operation of devices was further improved. As a result, it became possible to use an asynchronous switchable structure, and the execution of several programs at the same time (multiprogram mode) became possible. The organization of information exchange between main devices and external devices with a dynamic principle allowed connecting a number of different types of external devices to the computer. In addition to large storage capacity, magnetic disks with high read-write speed were used as external storage for the first time.

It was implemented on III generation computers. One of the main characteristics of third generation computers is the joint use of hardware and software tools in the organization of the computing process. Operating systems began to be used to simplify information processing and programming and increase efficiency. As a result, the role of software tools has increased significantly. The basis of the III generation computers is the IBM 360 and IBM 370 computers created by the US IBM firm. Based on these computers, computers of the type "EC GBM" (Edinaae Sistema Glektronnykh Vychislitelnykh Mashin) were later created in the USSR. Several models of this generation of computers have been created to meet the needs of computer users. It was possible to change the composition of each model as appropriate. Such a possibility was obtained on the basis of the construction of the III generation computers based on the modular principle. The essence of this principle is that the structurally and functionally diverse devices in the machine are connected to each other by universal external connections. Devices are made up of blocks. By changing the type and number of blocks, the technical characteristics of the device can be changed. With the joint participation of socialist countries, especially the USSR, the III generation "EC" computers were produced in two series: I series: EC-1010, EC-1020, EC-1030, EC-1040, EC-1050, EC-1060; Series II: EC-1015, EC-1025, EC-1035, EC-1045, EC-1055, EC-1065, EC-1066; These models differ from each other according to their productivity, technical characteristics and assembly. But at the level of machine codes, there is software compatibility between them. A representative of the third-generation computers are the PDP and VAX computers, which are included in the class of small (mini) machines and are produced by the American company DEC, and their analogues in the USSR "CM" machines: CM-1, CM-2, CM-3, CM-4, CM-1420, etc. These computers are mainly intended for application in control systems. IV generation includes computers created with large and very large integrated circuit (BIS, ЧБИС) technology from 1985 to now. In such integrated circuits, it is possible to place up to 1000 circuits in one semiconductor crystal. That is, one BIS can perform the functions performed by dozens and hundreds of ordinary circuits. Therefore, the overall dimensions of the computer are significantly reduced (10-100 times), and the work reliability increases. While in previous generation computers RAM is mainly built in magnetic cores, in IV generation computers RAM (static and dynamic memory) is built in integrated circuits. Therefore, the operating speed and capacity of the PC increases significantly. Micro- and mini-computers occupy a special place among IV generation machines. The most widespread type of micro-computers are personal computers (in English Personal Computer - PC). Personal computers (PC) are a separate class of IV generation computers. The creation, mass production and application of personal computers is considered a revolutionary achievement in computer technology. There are several reasons for this: - FK is much smaller in size (currently they have

desktop portable and pocket versions) and very cheap in price; - according to its technical indicators and capabilities, the III generation is not behind medium and small computers; - while old computers can be used mainly by specialists in this field (programmers, electronic engineers, operators), personal computers can be used by everyone as a mass tool (for example, television, tape recorder, etc.); - a personal computer is very reliable and it is very convenient to communicate with it in the form of a dialog. Currently, hundreds of millions of personal computers are used in science, production, education and household. Every year, personal computers and their software are improved, improved, and expanded in application. V and next generation - the computers of today and the future are assembled in more miniature elements with new electronic technology, in addition to having higher productivity and work reliability, they must qualitatively meet the following functional requirements: - to ensure working with knowledge bases and allow the organization of artificial intelligence systems based on it to create; - to provide communication with the user through speech and vision to further facilitate the application of the computer; - to simplify the process of creating software tools by automating the synthesis of programs.

### The result

In conclusion, we can note that intensive work is currently being done in the field of creating a new generation of computers both with the traditional Neyman architecture and with perspective architecture and schematic engineering. The basis of these architectures is, on the one hand, the parallel execution of computing operations (matrix and cellular processes, histological structures, neural networks, etc.), and on the other hand, data management of computing processes. In addition to new architectural and circuit-technical solutions, intensive work is being done in the field of improving the manufacturing technology of integrated circuits and creating an optoelectronic element base built on optical principles. Computer sizes are getting smaller every year. The size of FK has been reduced to the size of a regular pocket book. Currently, FK operates as a part of machines, devices, household items. In the field of creating a new architecture of computers, much attention is focused on the project of neurocomputers. A neurocomputer is based on the concept of a neural network (structures in formal neurons) that model the basic properties of real neurons. The creation of biological or optical neurocomputers is envisaged using bio- or opto-elements, respectively. Researchers believe that in the 21st century, neurocomputers will greatly surpass traditional computers in terms of their intellectual capabilities. Recent advances in microelectronics and the creation of an element base based on biotechnology make the realization of biocomputers possible.

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