There are two fundamentally different types of computers: analog and digital. The former type solves problems by using continuously changing data such as voltage. In current usage, the term "computer" usually refers to high-speed digital computers. These computers are playing an increasing role in all branches of the economy.

Digital computers are based on manipulating discrete binary digits (1s and 0s). They are generally more effective than analog computers for four principal reasons: they are faster; they are not so susceptible to signal interference; they can transfer huge data bases more accurately; and their coded binary data are easier to store and retrieve than the analog signals.

For all their apparent complexity, digital computers are considered to be simple machines. Digital computers are able to recognize only two states in each of its millions of switches, "on" or "off", or high voltage or low voltage. By assigning binary numbers to their states, 1 for "on" and 0 for "off", and linking many switches together, a computer can represent any type of data from numbers to letters and musical notes. It is this process of recognizing signals that is known as digitization. The real power of a computer depends on the speed with which it checks switches per second. The more switches a computer checks in each cycle, the more data it can recognize at one time and the faster it can operate, each switch being called a binary digit or bit.

A digital computer is a complex system of four functionally different elements: 1) the central processing unit (CPU), 2) input devices, 3) memory-storage devices called disk drives, 4) output devices. These physical parts and all their physical components are called hardware.

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The power of computers greatly depends on the characteristics of memory-storage devices. Most digital computers store data both internally, in what is called main memory, and externally, on auxiliary storage units. As a computer processes data and instructions, it temporarily stores information internally on special memory microchips. Auxiliary storage units supplement the main memory when programmes are too large and they also offer a more reliable method for storing data. There exist different kinds of auxiliary storage devices, removable magnetic disks being the most widely used. They can store up to 100 megabytes of data on one disk, a byte being known as the basic unit of data storage.

Output devices let the user see the results of the computer's data processing. Being the most commonly used output device, the monitor accepts video signals from a computer and shows different kinds of information such as text, formulas and graphics on its screen. With the help of various printers information stored in one of the computer's memory systems can be easily printed on paper in a desired number of copies.

Programmes, also called software, are detailed sequences of instructions that direct the computer hardware to perform useful operations. Due to a computer's operating system hardware and software systems can work simultaneously. An operating system consists of a number of programmes coordinating operations, translating the data from different input and output devices, regulating data storage in memory, transferring tasks to different processors, and providing functions that help programmers to write software. In large corporations software is often written by groups of experienced programmers, each person focusing on a specific aspect of the total project. For this reason, scientific and industrial software sometimes costs much more than do the computers on which the programmes run.

Classes of computers

Supercomputer

Supercomputer is the fastest type of computer. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. Weather forecasting, animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration

require a supercomputer.

Mainframe

Mainframe is a very large and expensive computer capable of supporting hundreds, or even thousands, of connected users simultaneously. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster

than a mainframe.

Minicomputer

Minicomputer is a midsized computer. In size and power, minicomputers lie between workstations and mainframes. But in general, a minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.

Microcomputer

The term microcomputer is generally synonymous with personal computer (PC), or a computer that depends on a microprocessor. Microcomputers are designed to be used by individuals, whether in the form of PCs, workstations or notebook computers. A microcomputer contains a central processing unit (CPU)

on a microchip (the microprocessor), a memory system (typically read-only memory (ROM) and random access memory (RAM)), a bus system and I/O ports, typically housed in a motherboard.

Workstation

Workstation is a computer intended for individual use that is faster and more capable than a personal computer. It's intended for business or professional use (rather than home or recreational use). Workstations and applications designed for them are used by small engineering companies, architects, graphic

designers, and any organization, department, or individual that requires a faster microprocessor, a large amount of random access memory, and special features such as high-speed graphics adapters.

PDA

PDA is short for personal digital assistant, is a handheld device that combines computing, telephone/fax, Internet and networking features. A typical PDA can function as a cellular phone, fax sender, Web browser and personal organizer. PDAs may also be referred to as a palmtop, hand-held computer or pocket computer.

Unlike portable computers, most PDAs began as pen-based, using a stylus rather than a keyboard for input. This means that they also incorporated 24 handwriting recognition features. Some PDAs can also react to voice input by using voice recognition technologies. PDAs are available in either a stylus or keyboard version.

Apple Computer, which introduced the Newton MessagePad in 1993, was one of the first companies to offer PDAs. As technology changed the world of mobile devices, the PDA has become obsolete as devices like touch-screen smartphones and tablets grow in popularity.