

Von Neumann Architecture

Filling gap

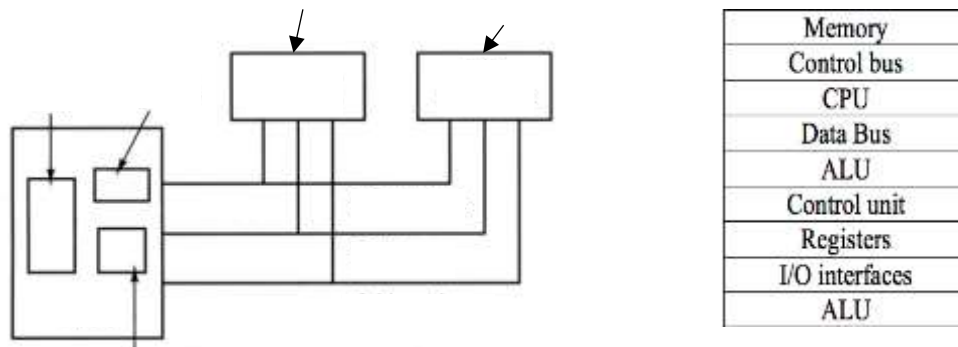
Name _____

ROM, executed and controls, a central processing unit (ALU/CU), von Neumann, memory, and input/output (I/O) interfaces, CPU, RAM (random-access memory), control unit (CU), registers, program instructions and data, arithmetic logic units (ALU), temporary storage, RAM, RAM, control signals, data, control unit, ALUs, different components, control bus, data bus, address bus, microprocessor, main memory, ROM (read-only memory), I/O interfaces, signals, bus

Computer architecture has undergone incredible changes in the past 20 years, from the number of circuits that can be integrated onto silicon wafers to the degree of sophistication with which different algorithms can be mapped directly to a computer's hardware. One element has remained constant throughout the years, however, and that is the _____ concept of computer design. Von Neumann architecture is composed of 5 distinct components _____ (or _____ sub-systems):

Figure 2.1 Basic Computer Components.

1. The _____, which can be considered the heart of the computing system, includes three main components: the _____ one or more _____, and various _____. The _____ determines the order in which instructions should be _____ the retrieval of the proper operands. It interprets the instructions of the machine. The execution of each instruction is determined by a sequence of _____ produced by the control unit. In other words, the control unit governs the flow of information through the system by issuing control signals to _____. Each operation caused by a control signal is called a microoperation (MO). _____ perform all mathematical and Boolean operations. The registers are _____ locations to quickly store and transfer the data and instructions being used. Because the registers are often on the same chip and directly connected to the CU, the registers have faster access time than _____. Therefore, using registers both as the source of operands and as the destination of results will improve the performance. A CPU that is implemented on a single chip is called a _____.
2. The computer's *memory* is used to store _____. Two of the commonly used type of memories are _____ and _____. _____ stores the data and general-purpose programs that the machine executes. _____ is temporary; that is, its contents can be changed at any time and it is erased when power to the computer is turned off. _____ is permanent and is used to store the initial boot up instructions of the machine.



3. The _____ allow the computer's memory to receive information and send data to output devices. Also, they allow the computer to communicate to the user and to secondary storage devices like disk and tape drives.

The preceding components are connected to each other through a collection of signal lines known as a _____. As shown in Figure 2.1, the main buses carrying information are the _____ and _____. Each bus contains several wires that allow for the parallel transmission of information between various hardware components. The address bus identifies either a memory location or an I/O device. The data bus, which is bidirectional, sends _____ to or from a component. The control bus consists of _____ that permit the CPU to communicate with the memory and I/O devices

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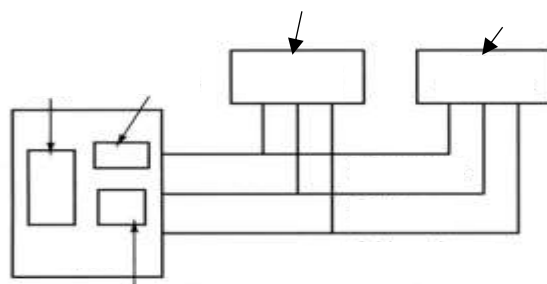
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Memory
Control bus
CPU
Data Bus
ALU
Control unit
Registers
I/O interfaces
ALU

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