

North East University Bangladesh
Department of CSE

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Assignment: Q 3

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① Elaborate on the difference between Von Neuman architecture and Harvard Architecture?

The difference between Von Neuman architecture & Harvard Architecture as follows:-

Von Neuman

① It uses a single physical address for accessing and storing both data and instruction.

② One common single path (bus) helps in the transfer of both instruction and data.

③ It requires two clock cycles for executing a single instruction.

Harvard

① It uses two separate physical addresses for storing and accessing both data & instruction.

② It uses separate buses for transferring both data and instruction.

③ It executes instruction using only one cycle.

The Von Neuman architecture is a type of digital computer architecture in which the design follows the concept of the computer with stored programs where both store the

data with the instruction data in the same memory.

The harvard architecture is a type of digital computer architecture in which the design follows a basic concept of having separate single bus and separate store for data & instruction.

② Explain how registers work?

In computer architecture, the registers are very bit computer memory which are used to execute programmes and operation efficiently.

A register is a group of flip-flops, each flip-flop capable of storing one bit of information. An n bit register has n flip-flop and is capable of storing binary information of n bits. The flip-flop can hold the binary information and gets control when and how new information is transfer into a register.

Consider the following arithmetic micro-operation:

$$R_3 \rightarrow R_1 + R_2$$

The above statement instructs the data or controls of register R_1 to be added to data of register R_2 and the sum transferred to register R_3 .

③ What is the function of ALU in a processor?

An arithmetic Logic Unit (ALU) is a digital circuit in a processor to perform arithmetic and logic operation. An ALU performs basic arithmetic operation are addition, subtraction, multiplication, and division. An ALU also can performs logic operation are NOT, AND, OR. An ALU represents the fundamental building block of the CPU of a computer. Modern CPUs contains very powerful and complex ALUs.

④ What are the bus system necessary for a microcomputer system?

The system bus is a pathway to carry data between computer microprocessor and the main memory. The bus provides a communication path for the data and control signals moving between the major components of the computer system. The system bus works by combining the function of the three main busses, namely, the data, address and control busses.

The data bus, which is a bidirectional path, which carries the actual data between the processor, memory and the peripherals.

The address bus is used to specify memory location for the data being transferred.

The control bus carries the control, timing, and co-ordinator signals to manage the various function across the system.