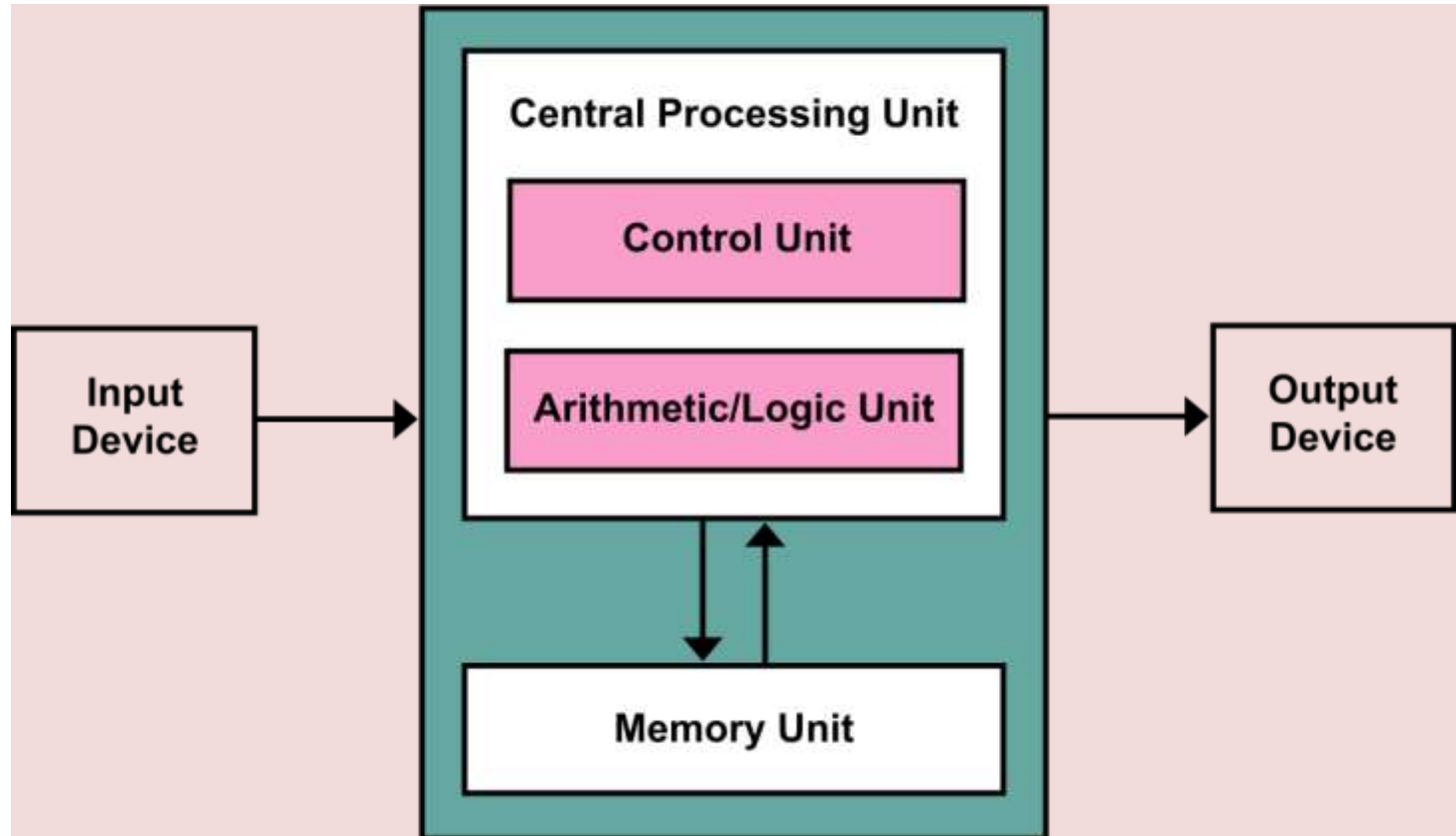


## Topic 1.2 Harvard and Von-Neumann architecture

### Types of Architectures

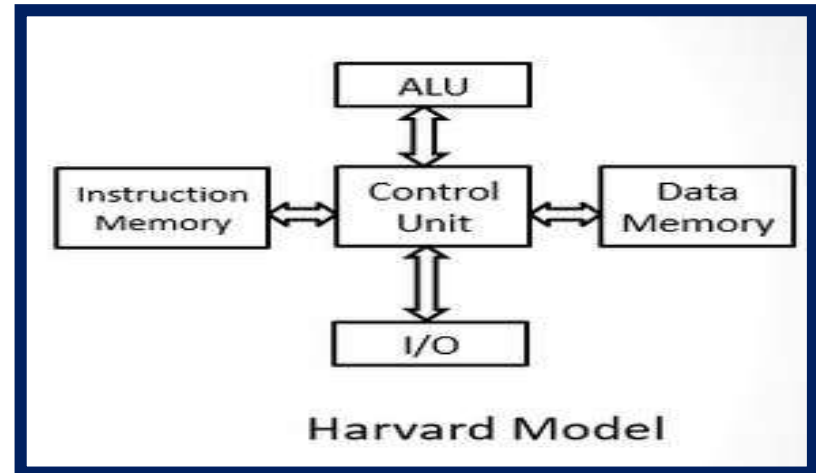
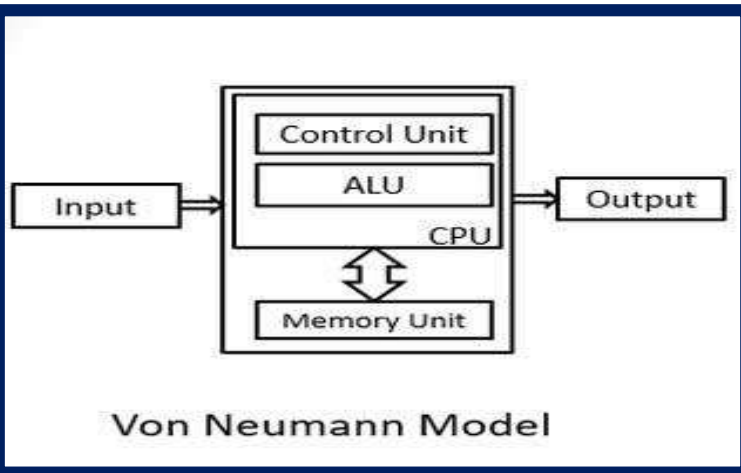
1. Von-Neumann
2. Harvard



## What is an Architecture of micro computer

Architecture of a micro computer or a micro controller refers to the arrangement of the CPU with respect of the RAM and ROM

Hence, the Von-Neuman and Harvard architecture are the two ways through which the micro controller can have its arrangement of the CPU with RAM and ROM.

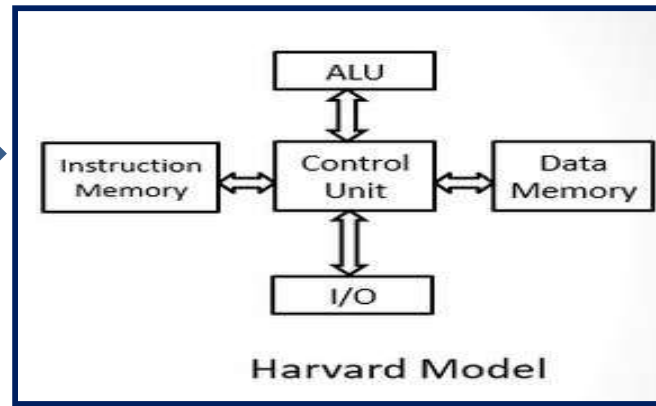


## Harvard Architecture :

In Harvard architecture, the CPU is connected with both the data memory (RAM) and program memory (ROM), separately.

Speed of execution is faster because the processor fetches data and instructions simultaneously

It requires more hardware since it will be requiring separate data and address bus for each memory. This requires more space.



It results in wastage of space since if the space is left in the data memory then the instructions memory cannot use the space of the data memory and vice-versa

Controlling becomes complex since data and instructions are to be fetched simultaneously.

## Harvard Architecture :

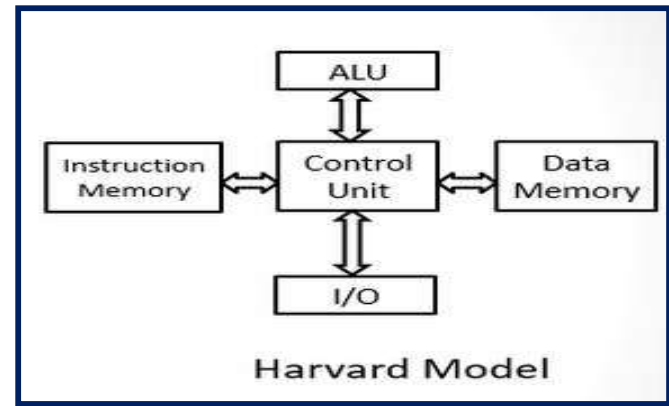


Harvard architecture require separate bus for instruction and data.

Processor can complete an instruction in one cycle .

Easier to pipeline, so high performance can be achieve

Comparatively high cost.



## Von-Neumann architecture

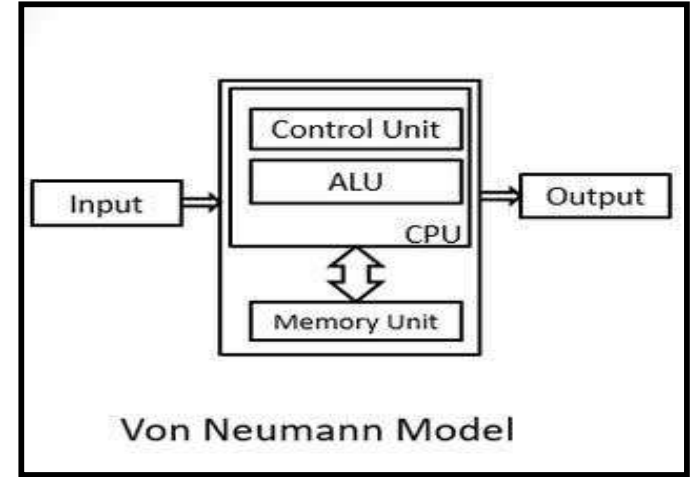


In Von-Neumann architecture, there is no separate data and program memory. Instead, a single memory connection is given to the CPU.

In contrast to the Harvard architecture, this requires less hardware since only a common memory needs to be reached.

Von-Neumann Architecture requires less space.

Speed of execution is slower since it cannot fetch the data and instructions at the same time.



Space is not wasted because the space of the data memory can be utilized by the instructions memory and vice-versa.

Controlling becomes simpler since either data or instructions are to be fetched at a time.

## Von-Neumann architecture

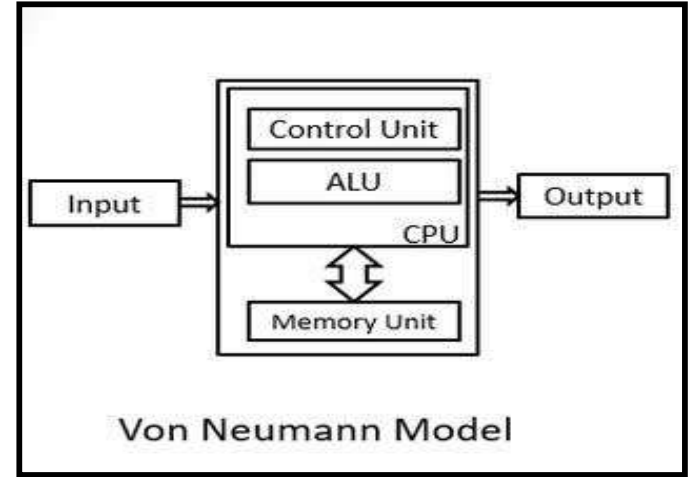


Von Neumann architecture require only one bus for instruction and data.

Processor needs two clock cycles to complete an instruction.

Low performance as compared to Harvard architecture

Comparatively low cost



ATTEMPT A QUIZZZZ