* Stored - Program Concept :-

- The Stored Program Concept is one of the main features in modern Digital Computers.
- The Program and data were stored in separate memory using Stored Program Concept.

1. Von - Neumann Architecture :-

- Von- Neumann architectural model dervies from compiler architecture by a John von Neumann in 1945.
- Von Neumann architecture is based on the stored - program computer concept, where instruction data is are stored in the same memory.

It consisted of a Control unit, Arithmetic, and Logical memory Unit (ALU), Registers and Inputs / Outputs.

- The term "Stored-Program Concept" is generally used to mean a computer of this design.

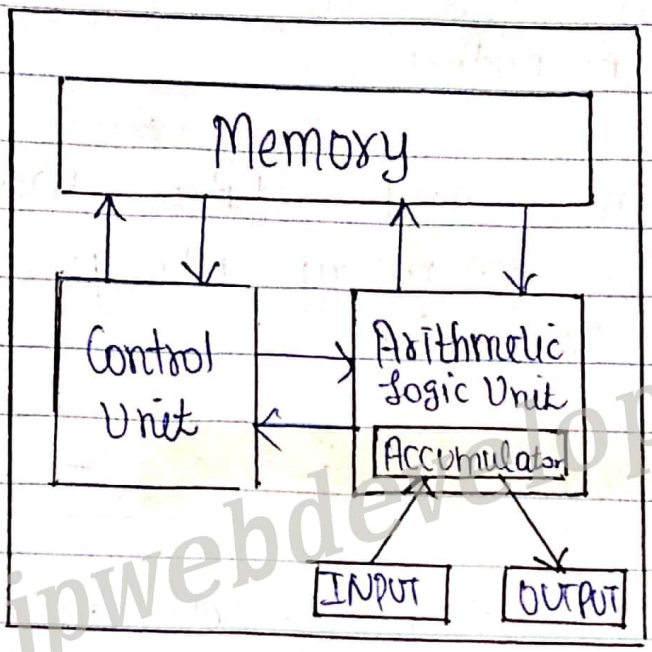

Fig:- Von-Neumann Architecture

Components:-

(1) **ALU**:- This unit performs the computer ~~computer~~ arithmetic and logical functions.

(2) **Memory**:- The computer's main or fast memory such as RAM used for storing both data and instructions.

3. Control Unit:- Control unit that directs other components of the computer to perform certain actions

4. Man-Machine Interfaces:- Man-machine Interfaces input and output devices such as a keyboard for Input and display monitor for output.

(2) Harvard Architecture:-

- Harvard Architecture is the Computer architecture that contains seprate storage and separate buses (Single path) for instruction and data.

- The main advantage of having separate buses for instruction and data is that CPU can access instructions and read/write data at the same time.

- It was basically developed to overcome the bottleneck of Von-Neumann Architecture

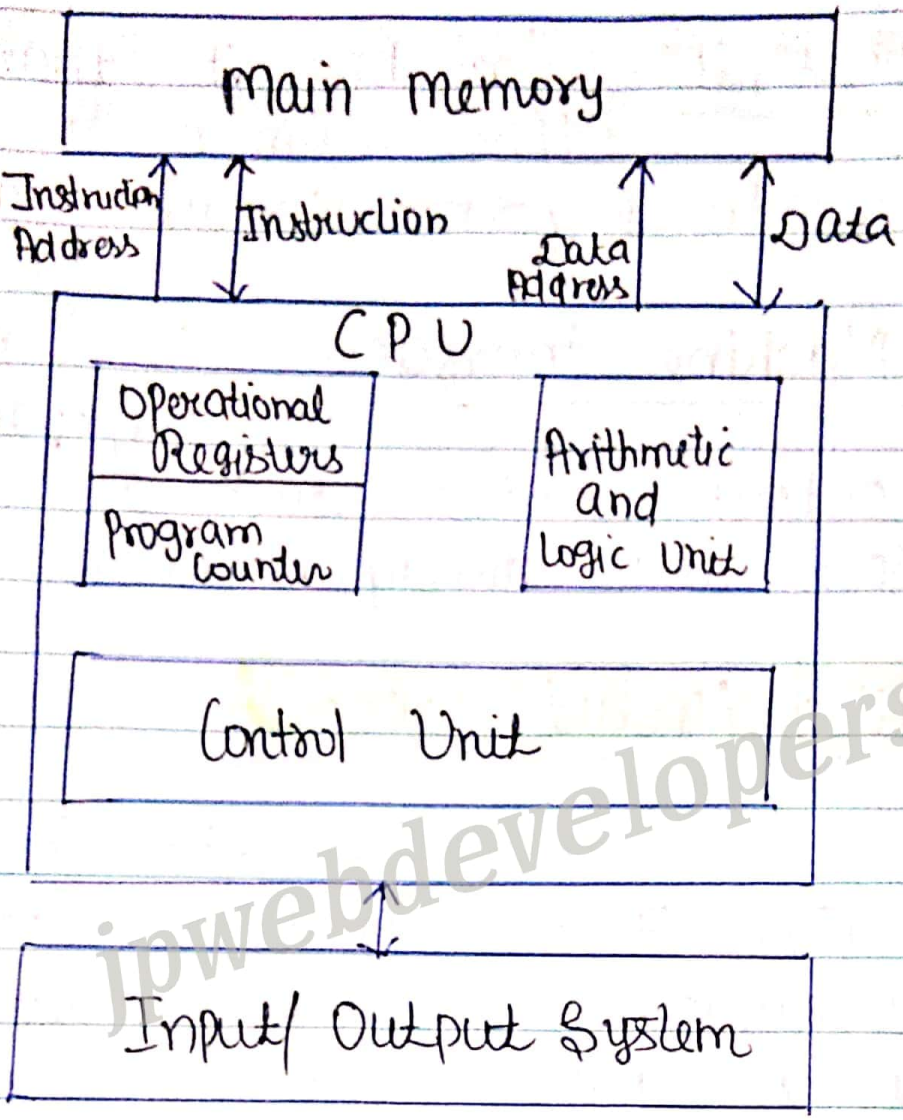

fig :- Harvard Architecture

- Buses :- Buses are used as signal pathways

In Harvard Architecture there are seprate buses for both instruction and data

(Types of Buses) :-

→ Data Bus :- It carries data among the main memory system, processor and I/O devices.

→ Data Address Bus :- It carries the address of data from Processor to main memory system.

→ Instruction Bus :- It carries instructions among the main memory system, Processor and I/O devices.

→ Instruction Address Bus :- It carries the address of instructions from Processor to main memory system.

• Operational Registers :- There are different types of registers involved in it which are used for storing address of different types of instructions.

for example :- Memory Address Register, Memory Data Registers.

Program Counters :- It has the location of the next instruction to be executed.

Arithmetic and logic Unit :- It is the Part of CPU. It perform

various arithmetic and logical operations

- **Control Unit:-** It Controls all the input and output devices and also control the movement of instructions and data within the system

- **Input/ Output System:-**

→ Input devices are used to read data into main memory.

→ The information from a computer as output are given through output devices.

(3) RISC and CISC :-

RISC:- Reduced Instruction Set Architecture. It is built to minimize the instruction execution time by the limiting the number of instructions.

CISC:- It stands for Complex Instruction Set Computer, developed by Intel.

It has a large collection of complex instructions.

- It emphasizes to build complex instructions directly in the hardware because the hardware is always ~~less~~ faster than software

* Difference Between RISC and CISC :-

RISC	CISC
1) focus on software.	Focus on hardware.
2) Go Reduced Instruction Set Computer.	Complex Instruction Set Compuler.
3) less number of Instructions	large Number of Instructions
4) Fixed length Instruction Format.	Variable lenegth Instructions format
5) less cost, less Powerful.	Cost is High, More Powerful
6) Single Cycle Instruction	Seveal Instruction Cycle.
Example:- ARM, MIPS	Example:- Mainframes, Intel 8080