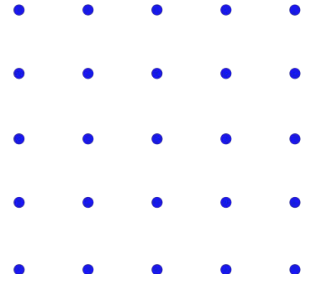


Introduction to computer architecture



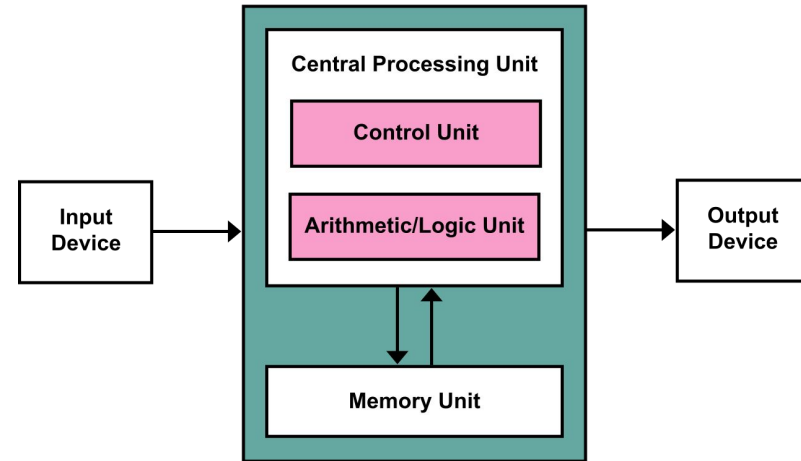
By: Yehia M. Abu Eita

Outlines

- **What is computer architecture?**
- **Instruction Set Architecture (ISA)**
- **Von Neumann architecture**
- **Harvard architecture**

What is computer architecture?

- It is a set of rules and methods that describe the **functionality, organization,** and **implementation** of computer systems.
- It is mainly concerned with **CPU, memory,** and **I/O devices interactions.**



Instruction Set Architecture (ISA)

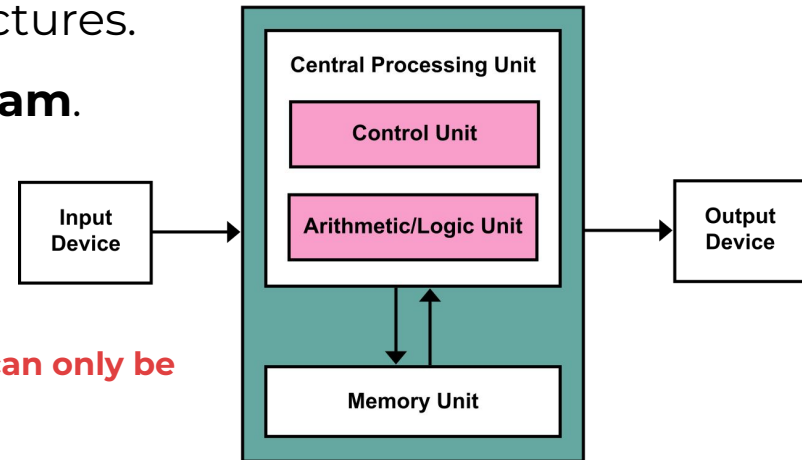
- It describes the **design of a Computer** in terms of the basic **operations** it must **support**.
- It defines the **types of instructions** to be supported by the processor.
 - **Arithmetic/Logic, Data Transfer, and Branch and Jump Instructions.**
- It defines the **maximum length** of each type of instruction.
- It defines the **Instruction Format** of each type of instruction.
- It is **classified** into:
 - **Complex Instruction Set Computing (CISC)**
 - **Reduced Instruction Set Computing (RISC)**

Von Neumann architecture

- It is one of the famous computer architectures.
- Only **one memory** holds **data and program**.

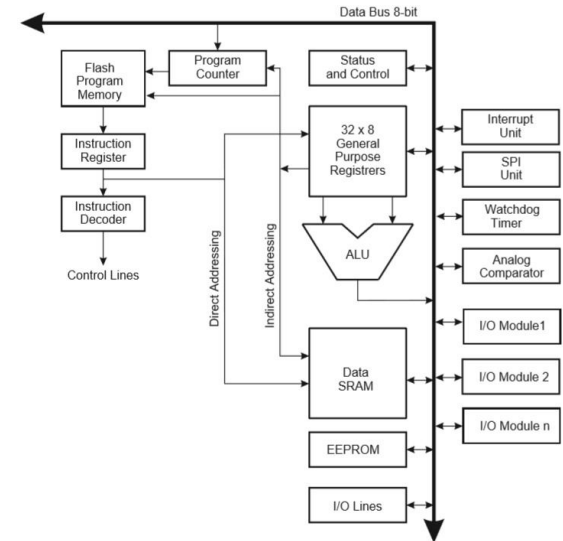
- **Von Neumann bottleneck:**

- Instructions can only be done one at a time and can only be carried out sequentially.
- Which will make enhancing performance is very hard.



Harvard architecture

- It is the computer architecture that contains **separate storage and separate buses** for **instructions and data**.
- It is mainly developed to **overcome Von Neumann bottleneck**.
- The main advantage that the CPU can access instructions and **read/write** data at the **same time**.



Summary

- You have learned what is computer architecture
- You have learned what are CISC and RISC ISA
- You can differentiate between Von Neumann and Harvard architectures