# CAO: Lecture 8
Stored Program Concept

Topics Covered

- Stored program concept
- Design of the von Neumann architecture

Stored program concept

- Stored-program concept is designed by Hungarian mathematician John Von Neumann.
- The **von Neumann architecture** is a design model for a stored-program digital computer that uses a processing unit and a single separate storage structure to hold both instructions and data.
- A **stored-program** digital computer is one that keeps its programmed instructions, as well as its data, in read-write, random access memory (RAM).
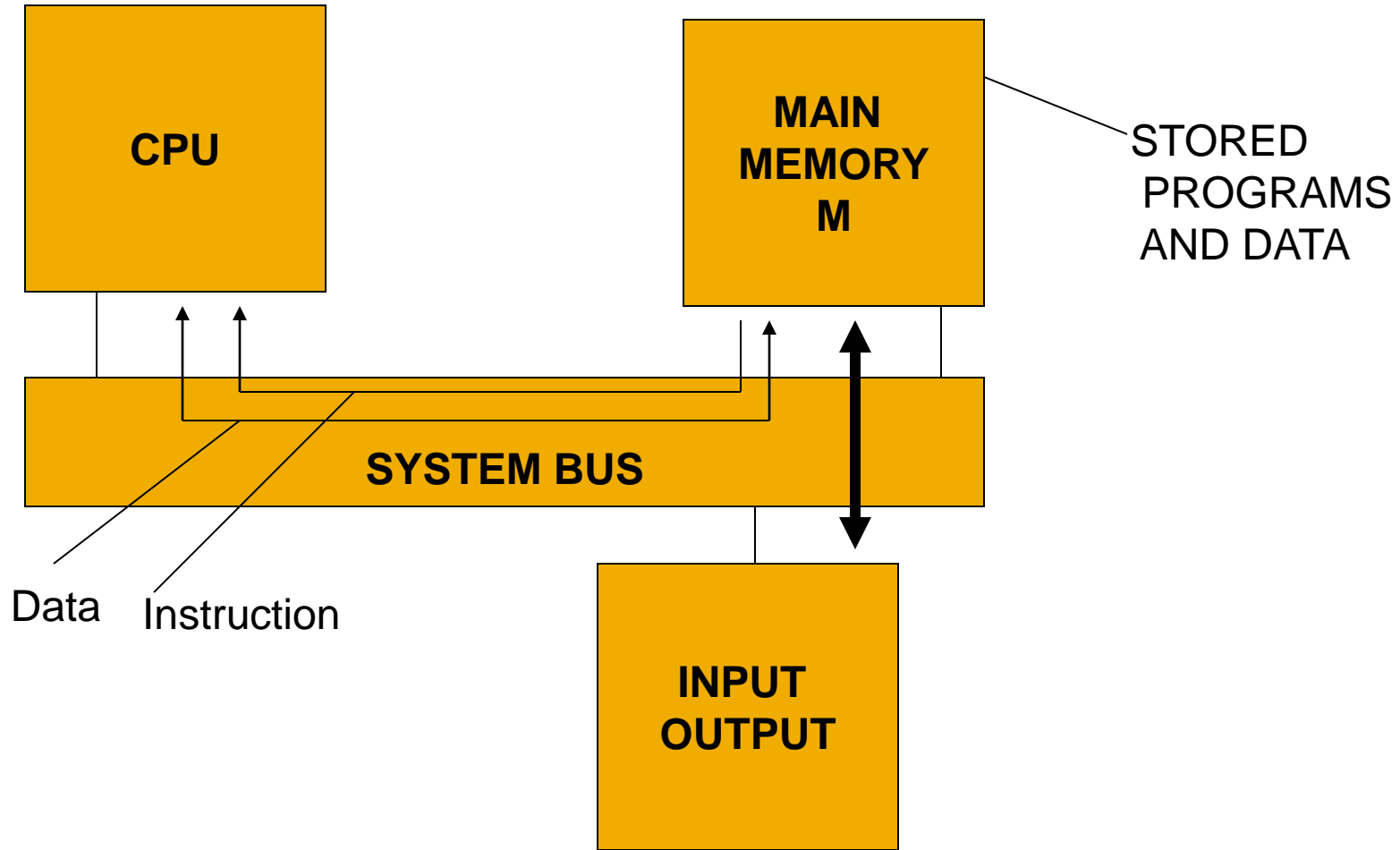
Design of the von Neumann architecture

- A von Neumann Architecture computer has five parts: an **arithmetic-logic unit**, a **control unit**, a **memory**, some form of **input/output** and a **system bus** that provides a data path between these parts.

- Role of computer's main memory M is to store programs and data as they are being processed by CPU.
- M is RAM
- RAM permits the CPU to read or change its contents via load or store instructions respectively.
- M is backed with secondary memory that is hard disk

- You store programs and data in a slow-to-access storage medium (such as a hard disk) and work on them in a fast-access, volatile storage medium (RAM).

- The idea behind stored-program concept was to design a computer that includes an [instruction set architecture](#) and can store in memory a set of instructions (a [program](#)) that details the [computation](#).

- A stored-program design also lets programs modify themselves while running

- An **instruction set** is a list of all the [instructions](), and all their variations, that a processor can execute.
- Instructions include:
- Arithmetic such as **add** and **subtract**
- Logic instructions such as **and**, **or**, and **not**
- Data instructions such as **move**, **input**, **output**, **load**, and **store**
- [Control flow]() instructions such as **goto**, **if … goto**, **call**, and **return**