Computer Organization and Architecture
(CS2600 and CS2610)

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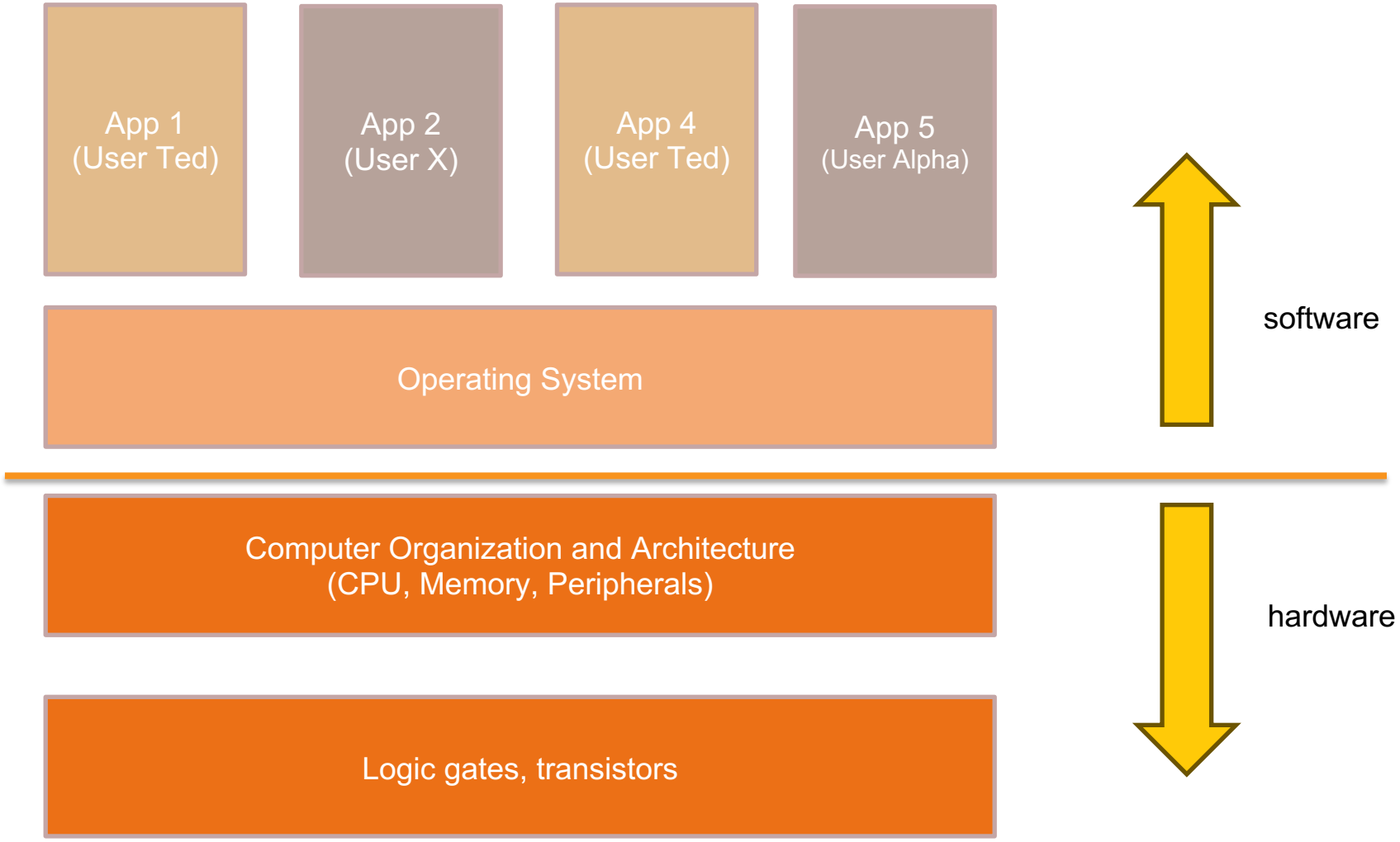
The Compute Stack



The Compute Stack

App 1
(User Ted)

App 2
(User X)

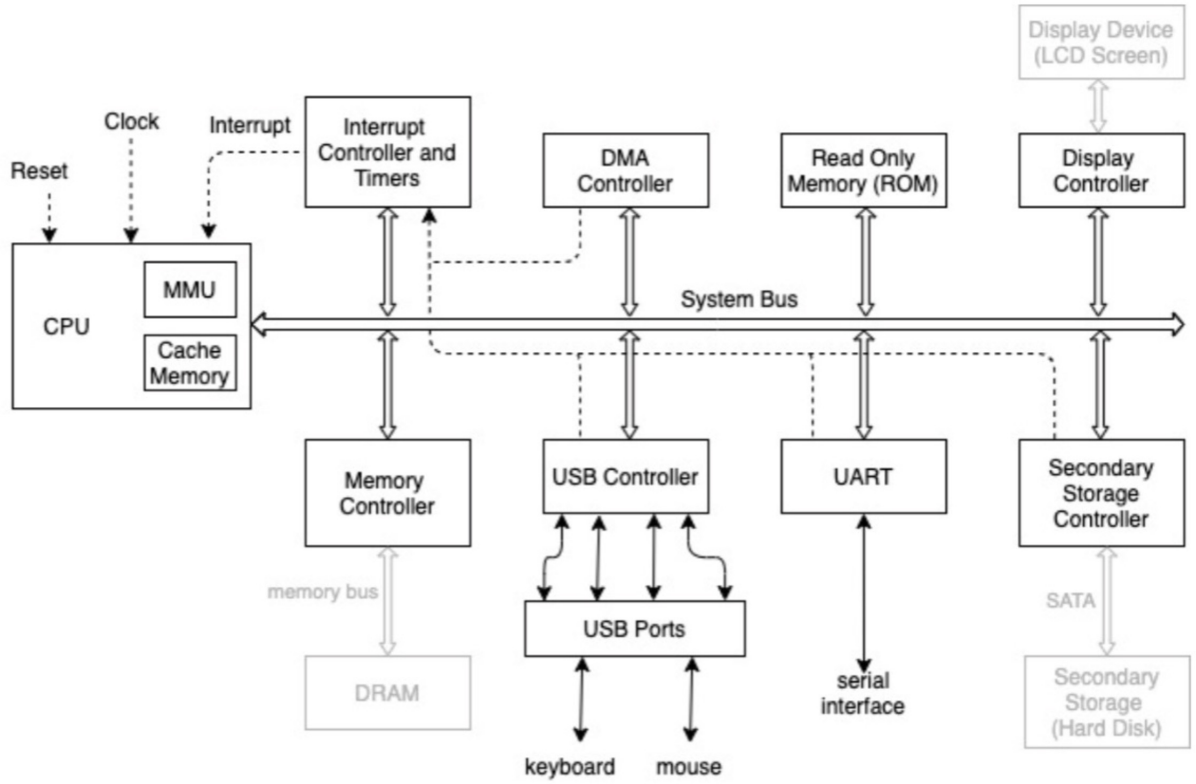
App 4
(User Ted)

App 5
(User Alpha)

Operating System

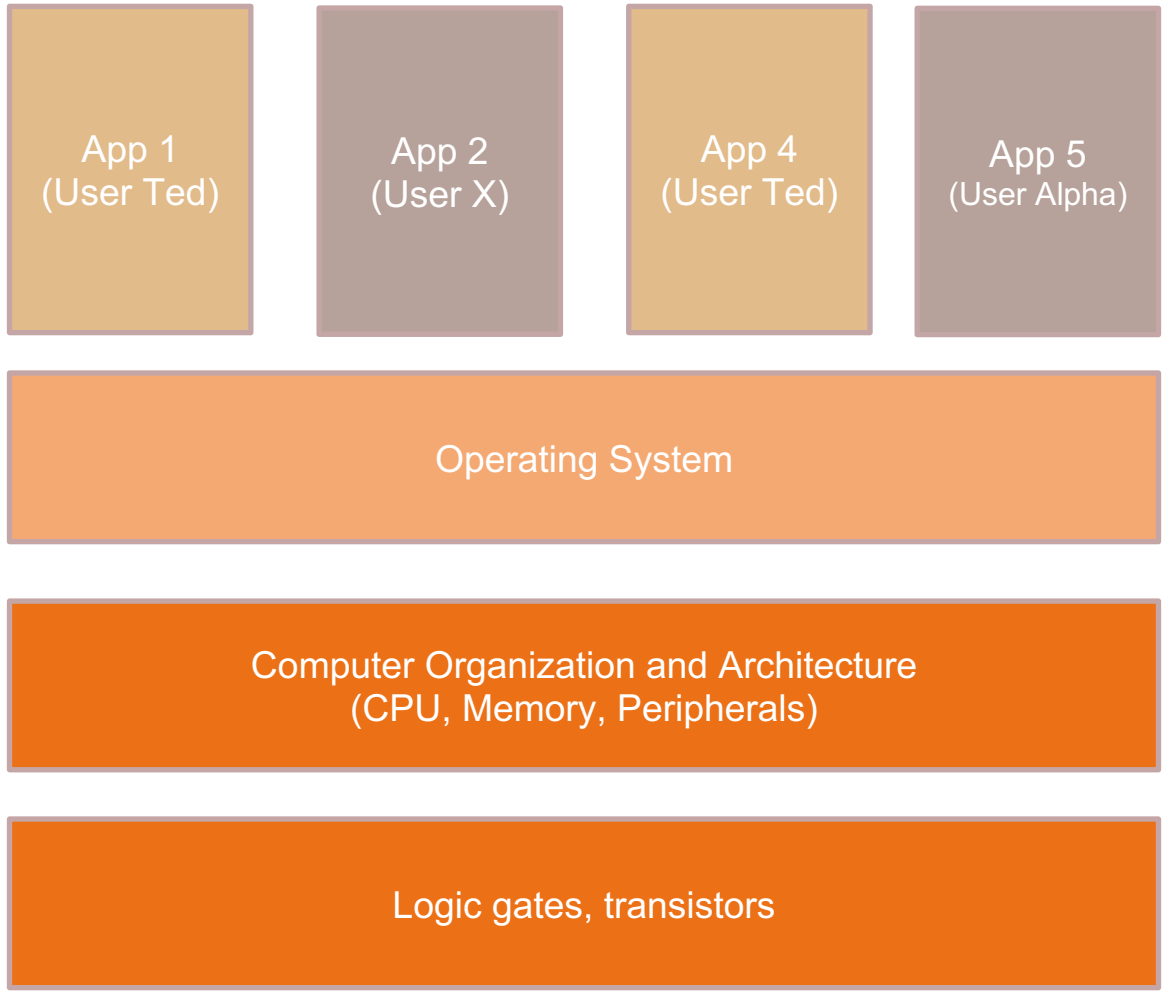
Computer Organization and Architecture
(CPU, Memory, Peripherals)

Logic gates, transistors

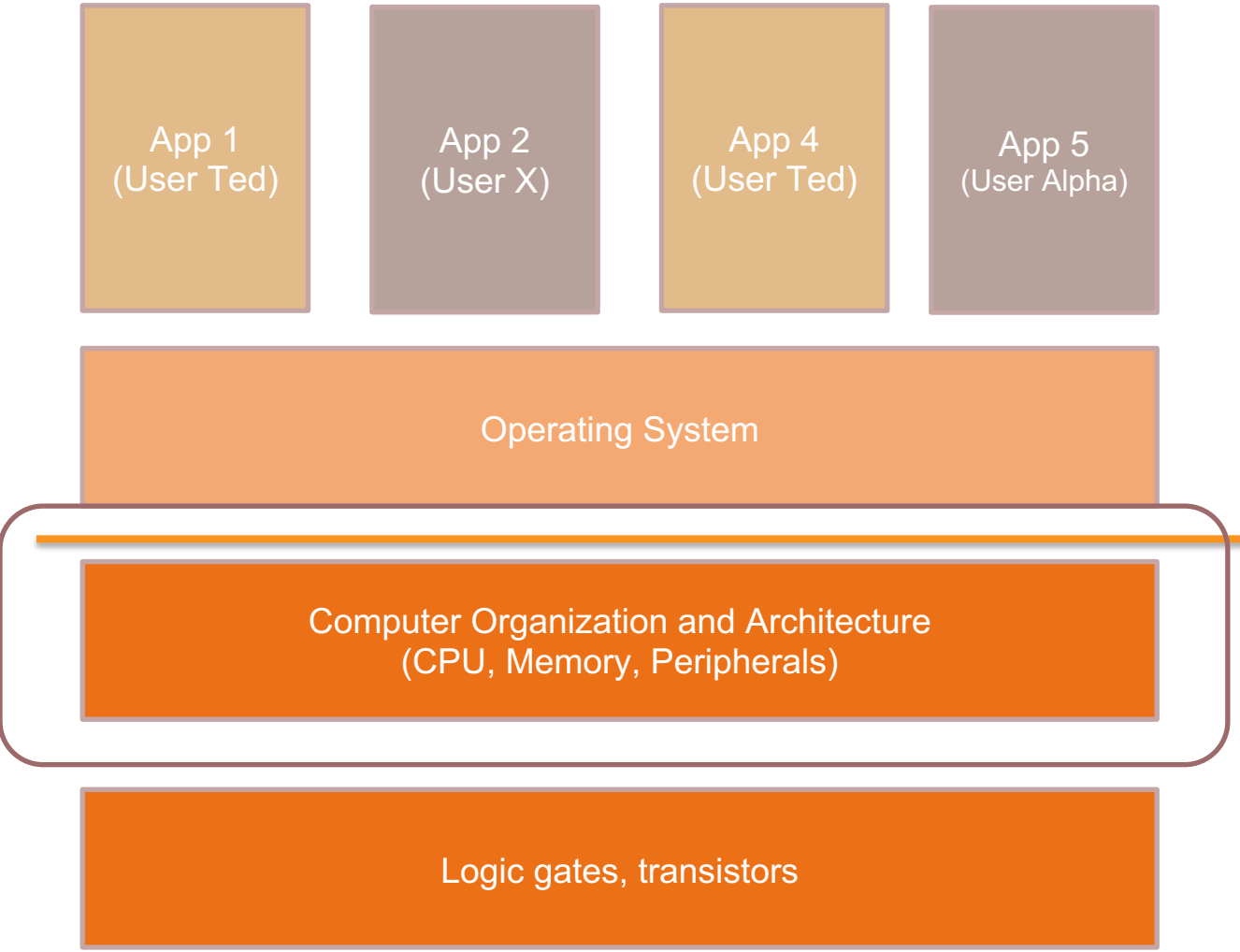


The Wish List

- Fast
- Energy Efficient
- Program support
- Security and Protection
- Multi-user systems

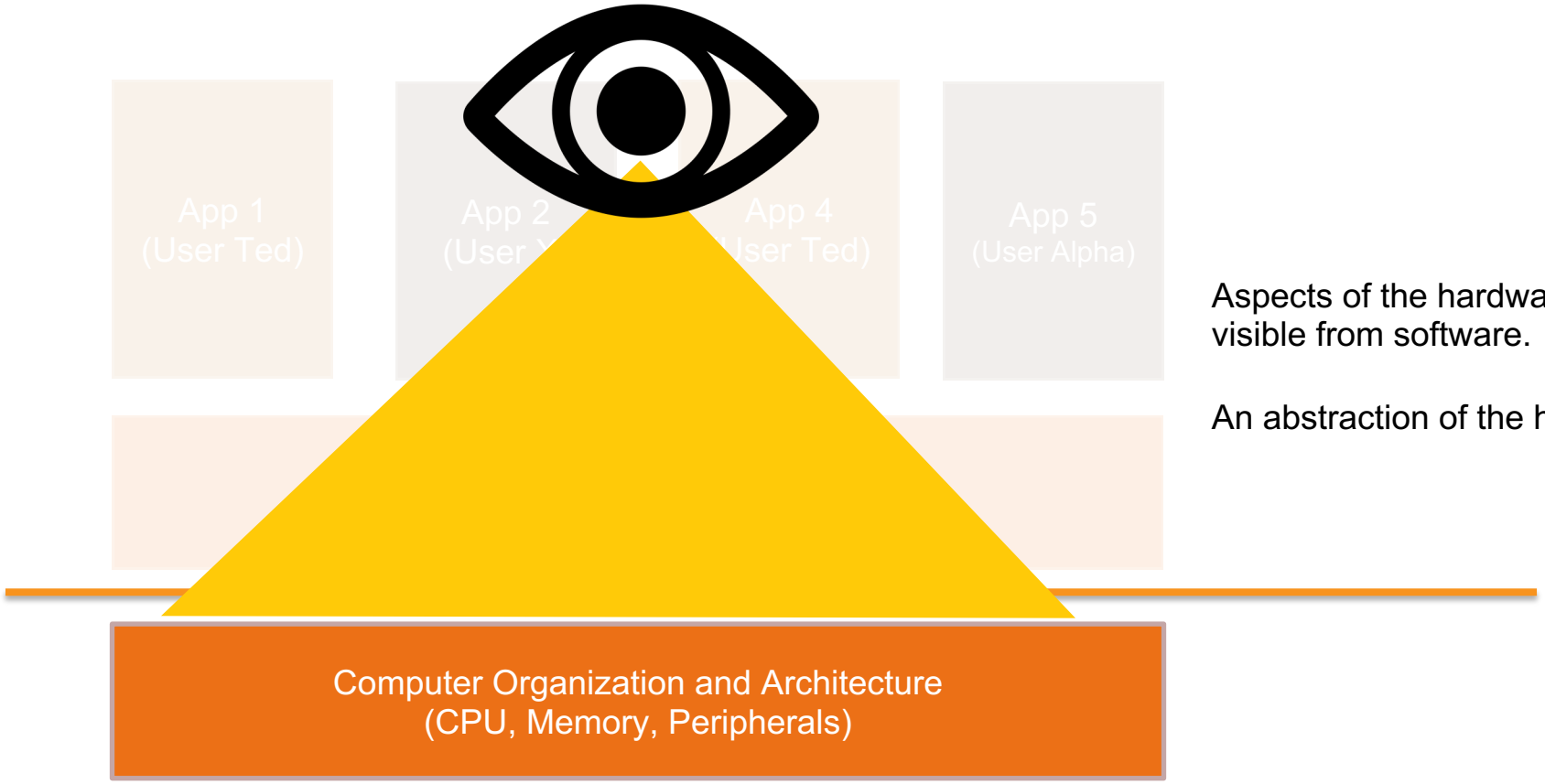


Where does COA fit in the Compute Stack



The layer which converts the logic gates into modules that can be usable by software to achieve the wishlist

Computer Architecture

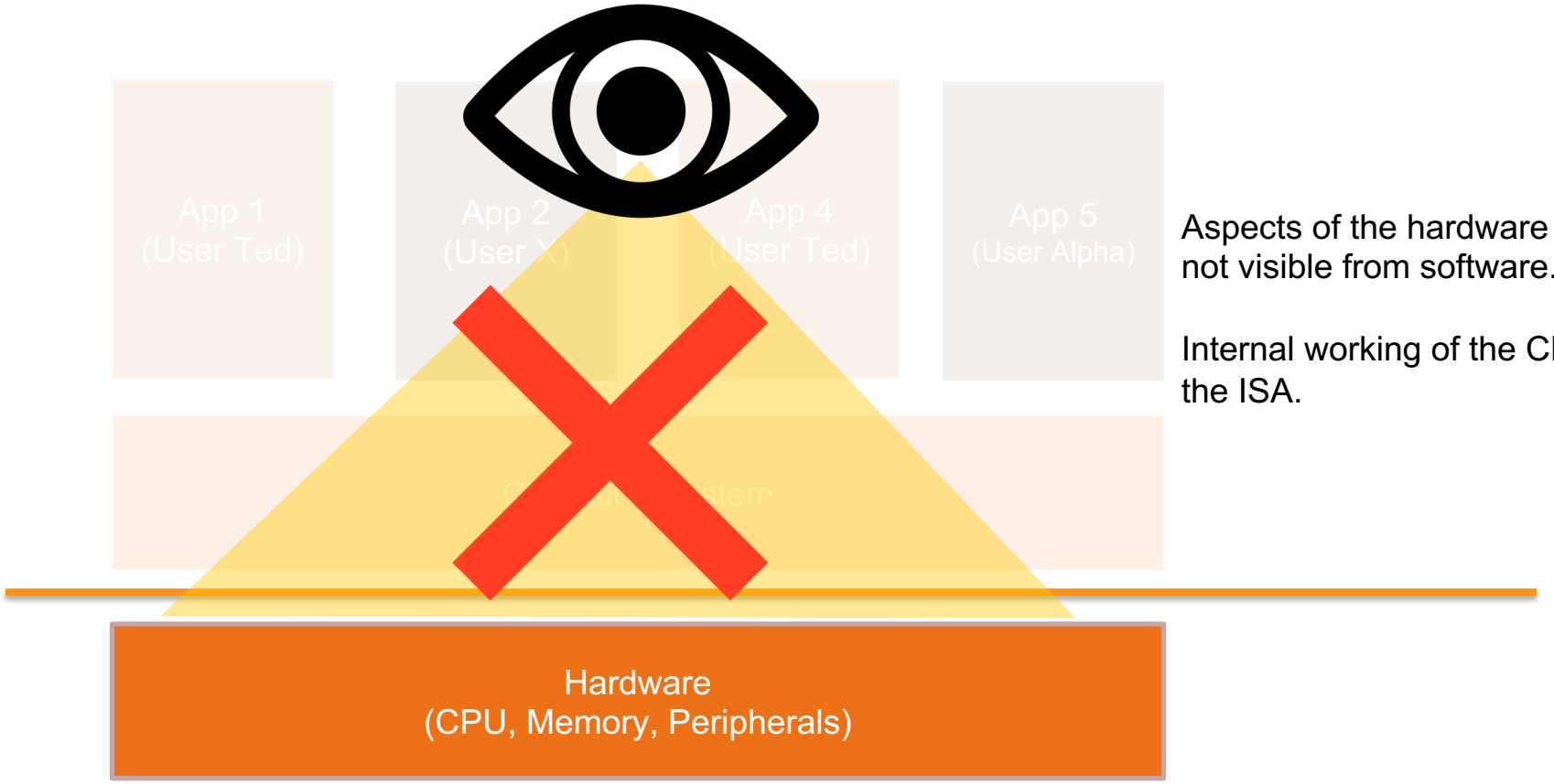


Aspects of the hardware visible from software.

An abstraction of the hardware

Instruction Set Architecture (ISA) + Operating System Interface

Computer Organization



Aspects of the hardware not visible from software.

Internal working of the CPU that realizes the ISA.

Two processors can have the same ISA but different implementations of the architecture, with varying cost and performance.

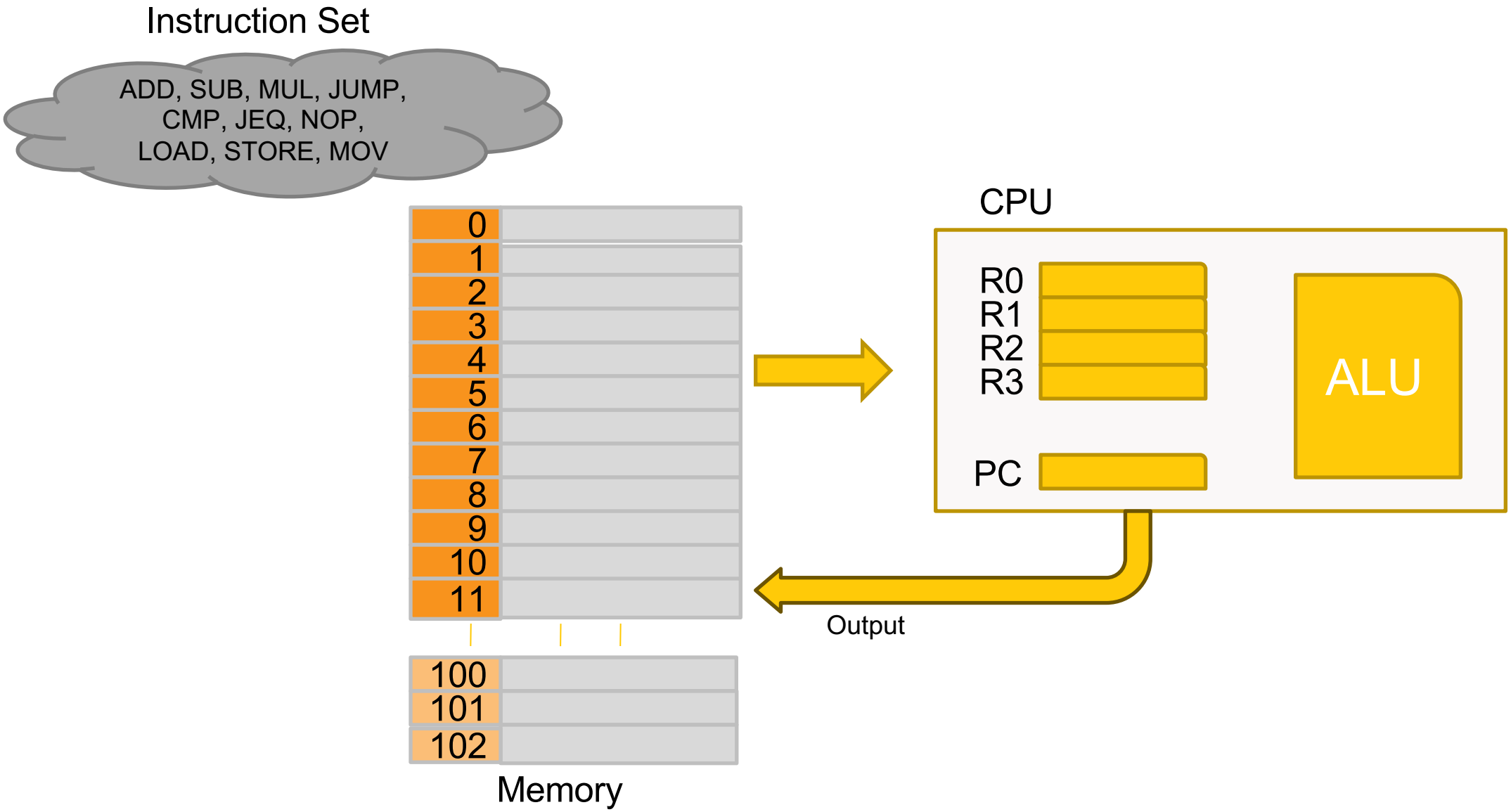
Microprocessors

General Purpose

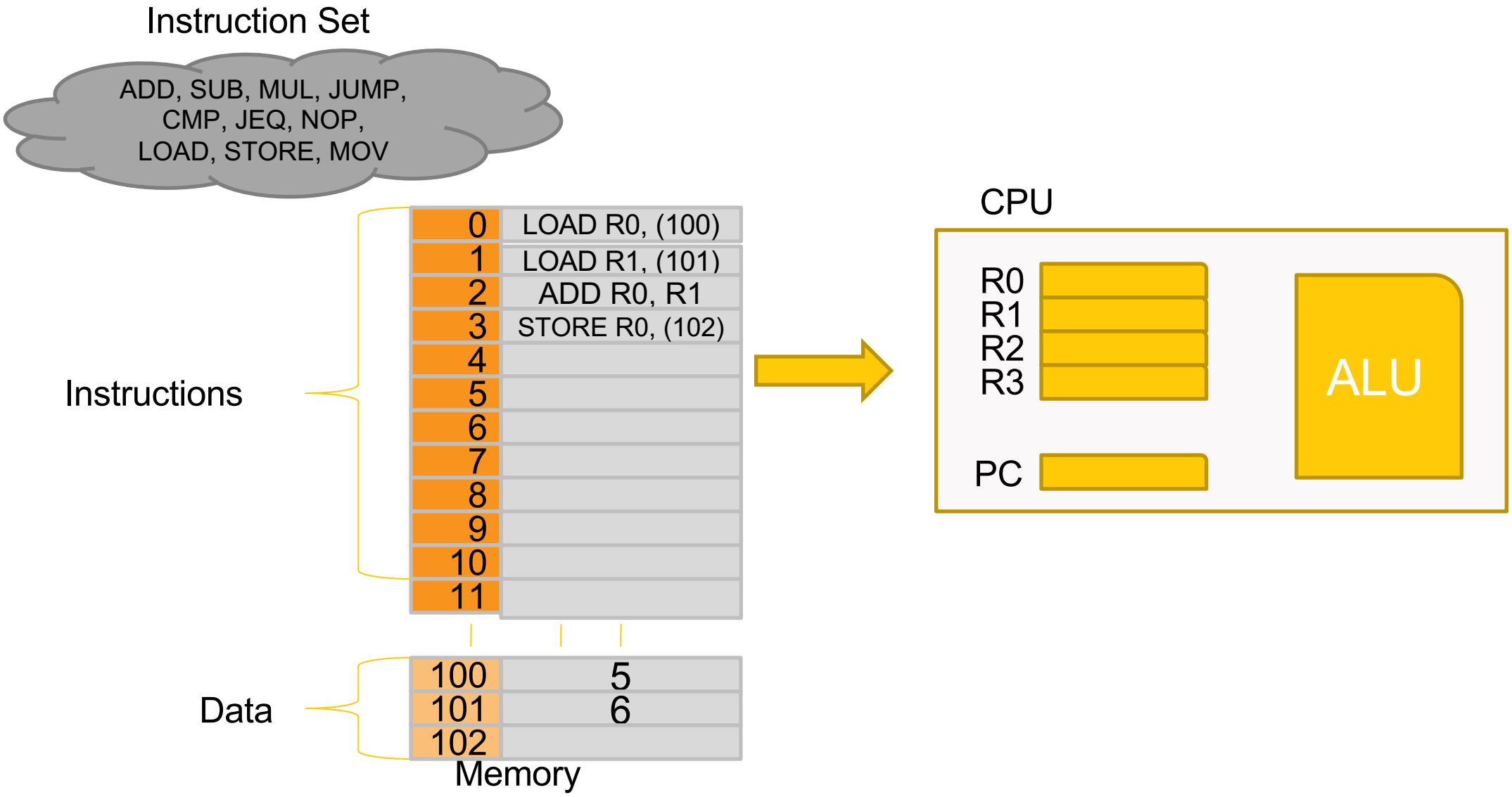
Application Specific

Many different processors, but underlying concept used is the same: Stored Program Concept

Stored Program Concept



Stored Program Concept



This Course (theory and Lab)

- How does the processor support programming languages?
- How does the processor support operating systems?
- How to design a processor to improve speed and performance?
- How to design a processor to support multiple users with limited resources?
- Lab: Assembly coding, processor design / analysis

RISC-V

Logistics and Grading

- Grading CS2600:
  - Quiz 1: 25 marks;
  - Quiz 2: 25 marks;
  - End Semester Exam: 40 marks
  - Tutorials: 10 marks
- Grading CS2610
  - Based on ~8 assignments

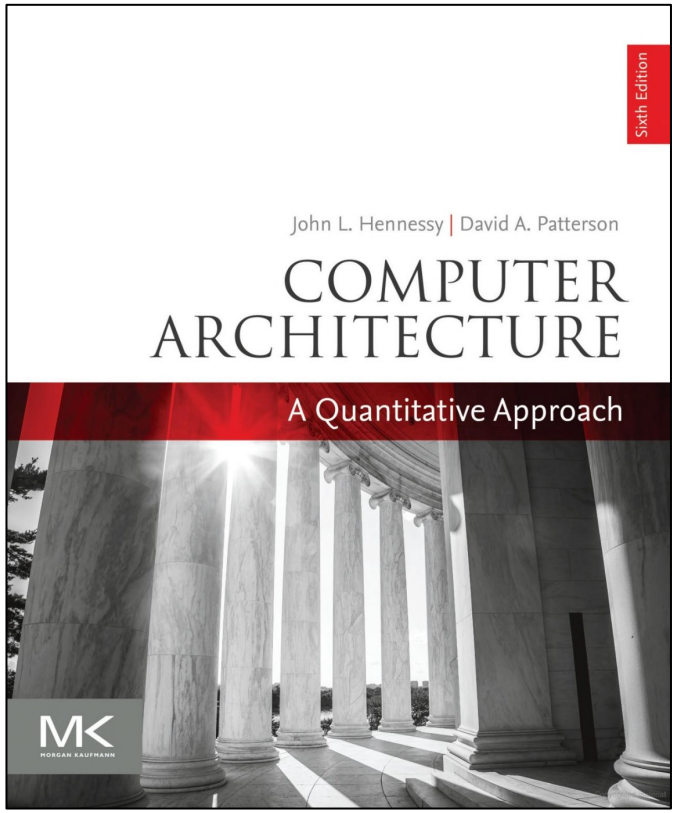
Website
https://sites.google.com/cse.iitm.ac.in/cs2600-2024/home

LOGISTICS

The slides and assignments will be shared through Microsoft Teams (work or school).

Please create an account with your smail ID and join this team.

Classes will be held from 17th Jan, 2024 in Slot C at CS15 (CSE, IITM). Labs will be in P slot

- Monday : 10:00 - 10:50 AM
- Tuesday : 9:00 - 9:50 AM
- Wednesday : 8:00 - 8:50 AM
- Friday: 1:00 - 1:50PM (Tutorials)
- Labs: Monday 2:00 - 4:00 PM

Reference Books