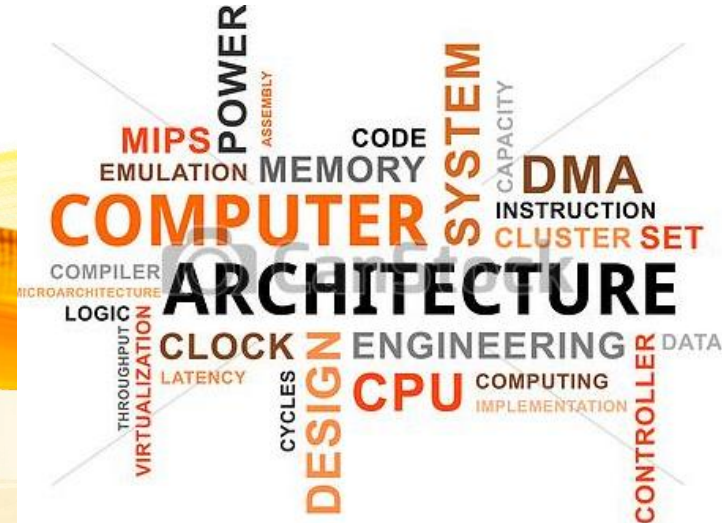


UNIT V

I/O ORGANIZATION AND PARALLELISM

Accessing I/O devices – Interrupts – Direct Memory Access - Buses–
Interface circuits - **Standard I/O Interfaces (PCI, SCSI, USB)**–Instruction
Level Parallelism : Concepts and Challenges – Introduction to multicore
processor Graphics Processing Unit.





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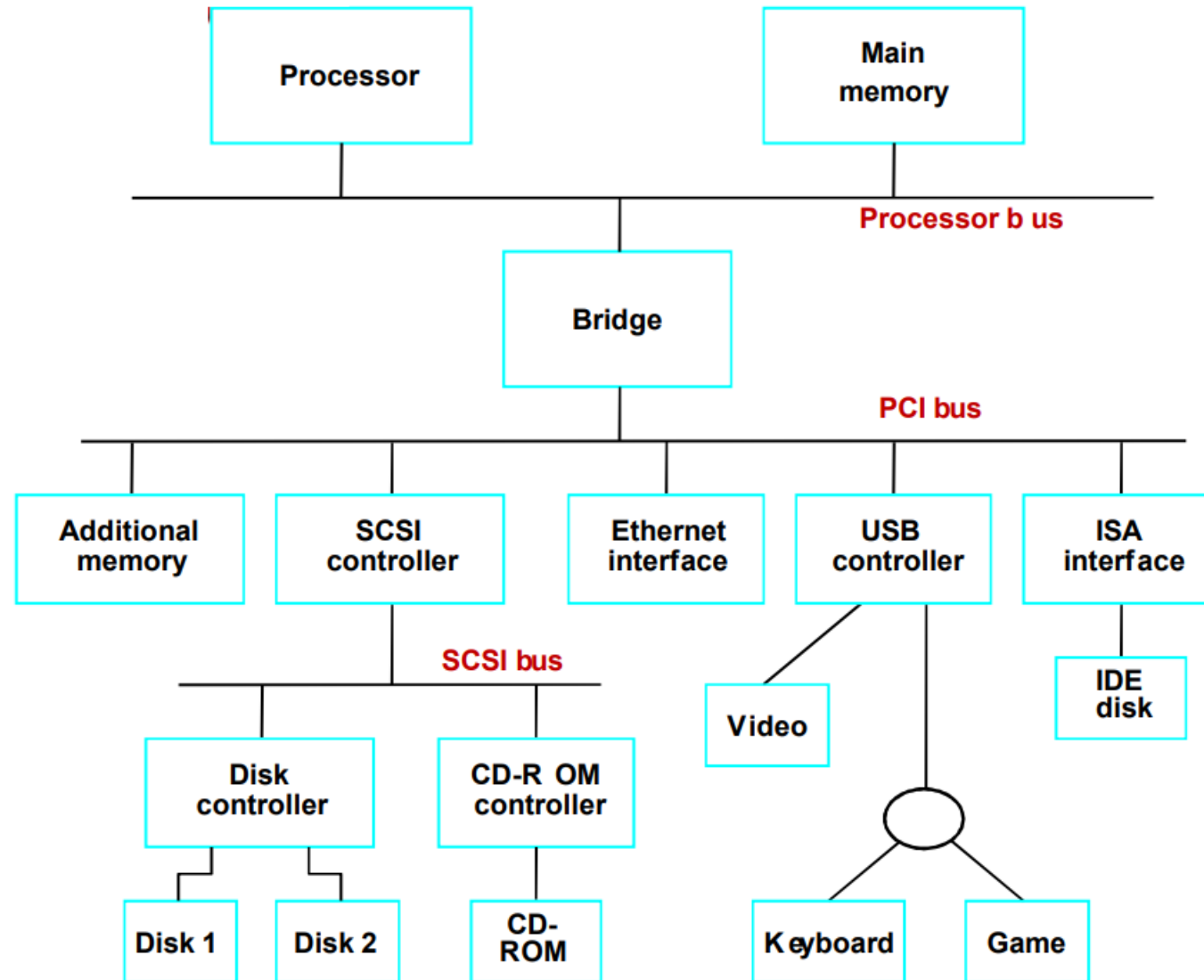
Recap the previous Class



Overview

- The needs for standardized interface signals and protocols.
- Motherboard
- Bridge: circuit to connect two buses
- Expansion bus • ISA, PCI, SCSI, USB,...

An example of a computer system using different interface standards





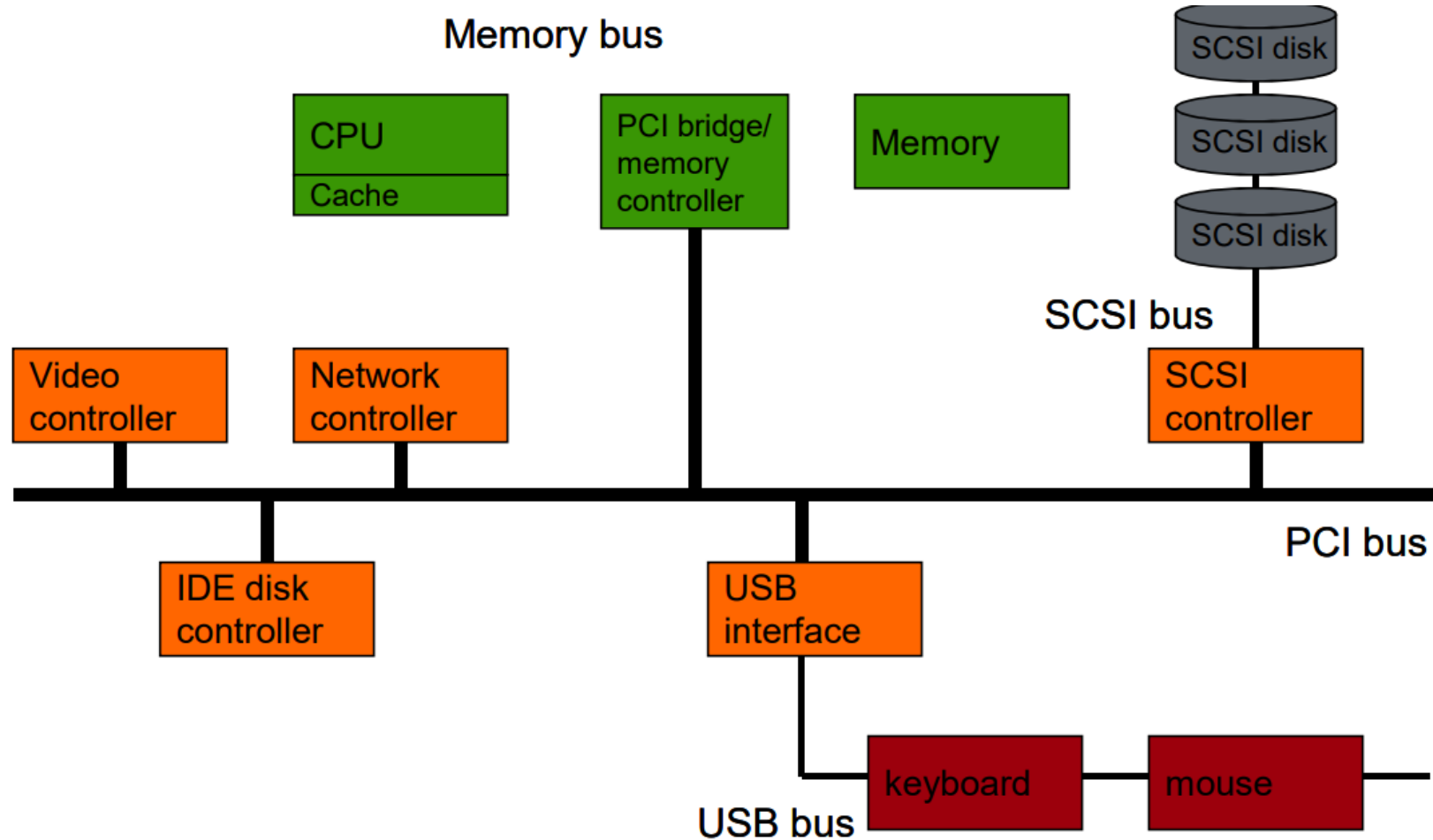
Hardware Environment

- Major components of a computer system: CPU, memories (primary/secondary), I/O system
- I/O devices:
- Block devices – store information in fixed-sized blocks; typical sizes: 128
- Character devices – delivers/accepts stream of characters (bytes)
- Device controllers:
- Connects physical device to system bus (Minicomputers, PCs)
- Mainframes use a more complex model: Multiple buses and specialized I/O computers (I/O channels)

Communication

- Memory-mapped I/O, controller registers
- Direct Memory Access - DMA

I/O Hardware - Multiple Buses



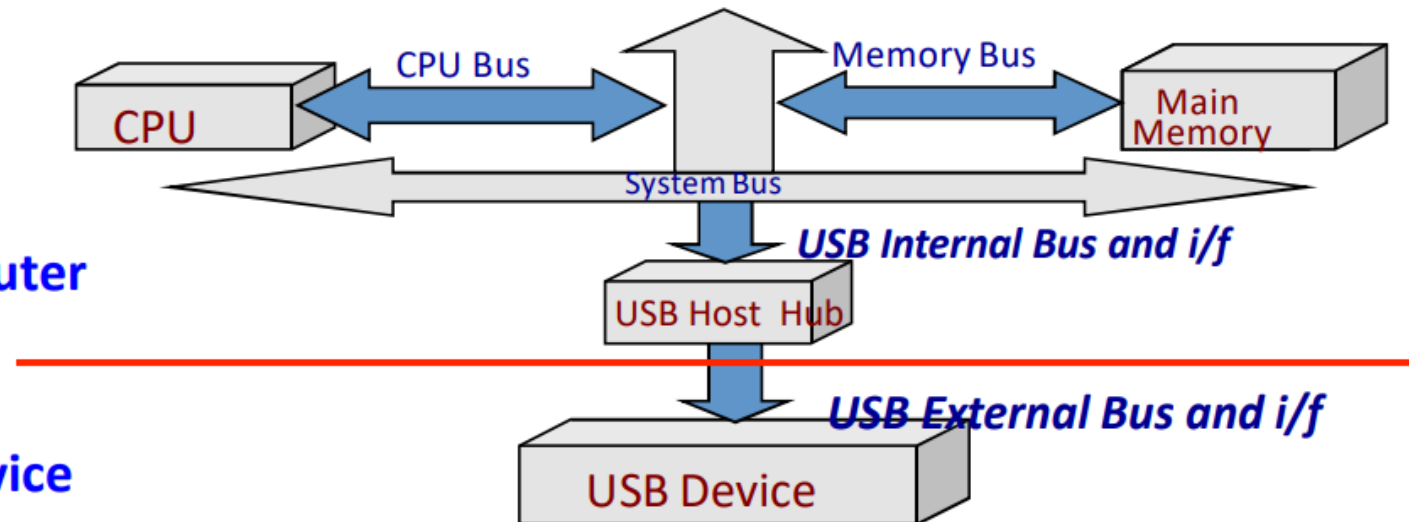
Universal Serial Bus (USB)

- USB is the most popular external bus standard in use today
 - Allows connection of almost all types of peripheral devices.
- Facilitates high-speed transfer of data.
- For connecting smaller devices like mobile phones and digital cameras, mini and
- micro USB connectors have also been developed.

Bus Hierarchy

Host Computer

External Device





TEXT BOOK

Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, McGraw-Hill, 6th Edition 2012.

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2. William Stallings, “Computer Organization and Architecture designing for Performance”, Pearson Education 8th Edition, 2010
3. John P.Hayes, “Computer Architecture and Organization”, McGraw Hill, 3rd Edition, 2002
4. M. Morris R. Mano “Computer System Architecture” 3rd Edition 2007
5. David A. Patterson “Computer Architecture: A Quantitative Approach”, Morgan Kaufmann; 5th edition 2011

THANK YOU