# SNS COLLEGE OF TECHNOLOGY

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

COURSE NAME : **23CST202-OPERATING SYSTEMS**

II YEAR / IV SEMESTER

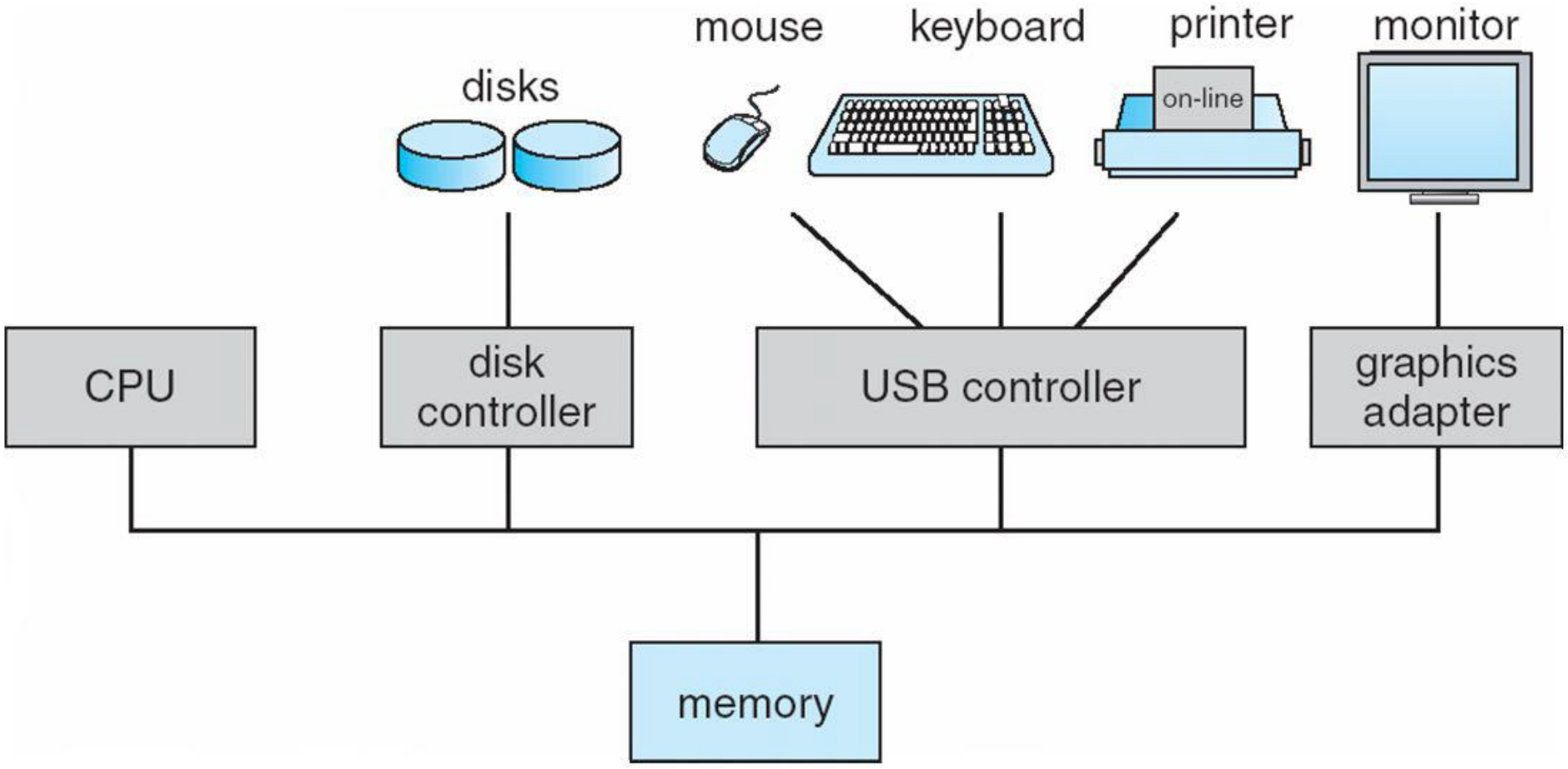
Unit 1-OVERVIEW AND PROCESS MANAGEMENT

Topic : Computer System Organization

# Computer System Organization

- One or more CPUs, device controllers connect through common bus providing access to shared memory
- Concurrent execution of CPUs and devices competing for memory cycles.

# Computer System Organization



# Computer System Organization

I/O devices and the CPU can execute concurrently

- Each device controller is in charge of a particular device type
- Each device controller has a local buffer
- CPU moves data from/to main memory to/from local buffers
- I/O is from the device to local buffer of controller
- Device controller informs CPU that it has finished its

operation by causing an interrupt

# Common Functions of Interrupts

- Interrupt transfers control to the interrupt service routine generally, through the **interrupt vector**, which contains the addresses of all the service routines
- Interrupt architecture must save the address of the interrupted instruction
- A **trap** or **exception** is a software-generated interrupt caused either by an error or a user request
- An operating system is **interrupt driven**

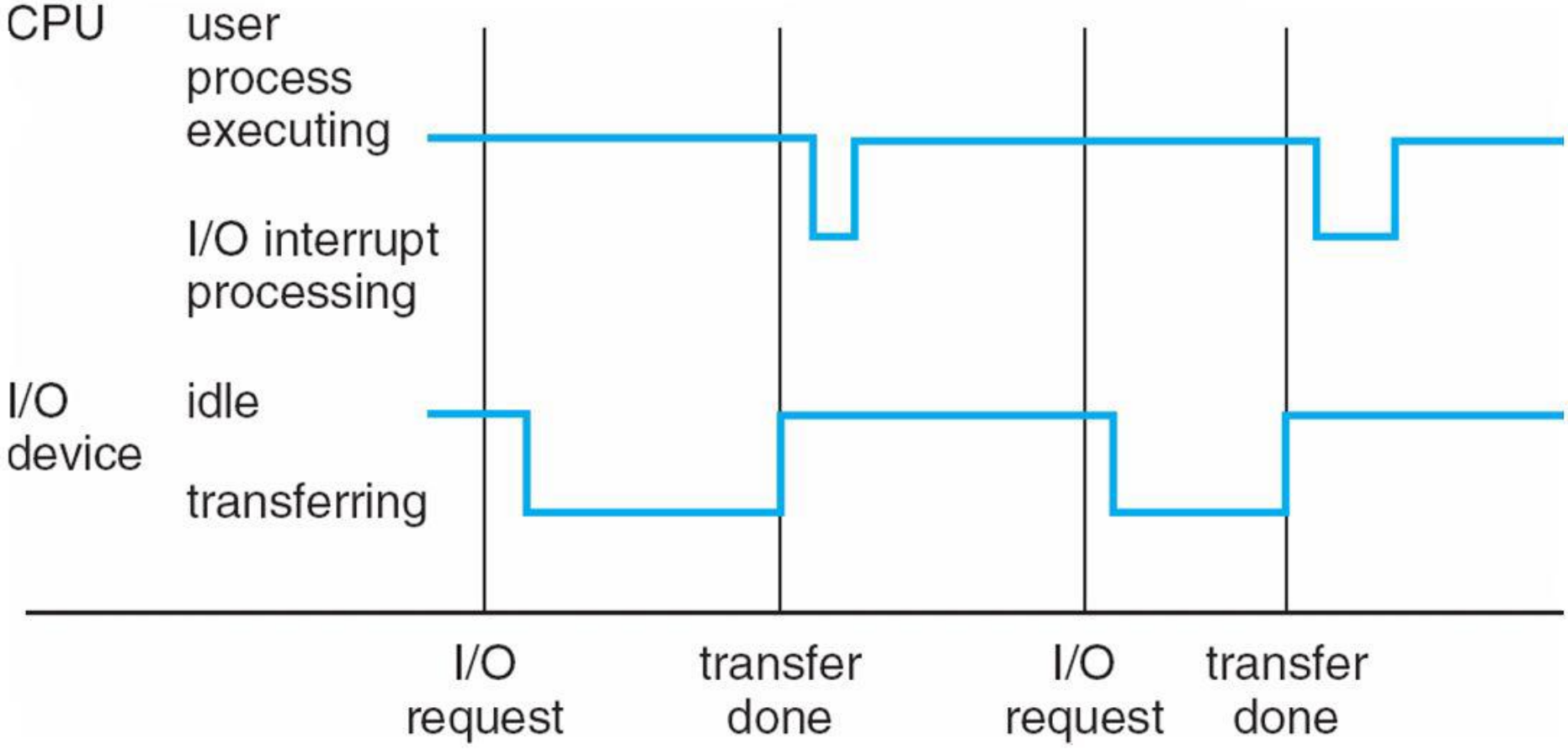
# Interrupt Handling

The operating system preserves the state of the CPU by storing registers and the program counter

- Determines which type of interrupt has occurred:
- **polling**
- **vectored** interrupt system

Separate segments of code determine what action should be taken for each type of interrupt

# Interrupt Timeline



# I/O Structure

After I/O starts, control returns to user program only upon I/O completion

- Wait instruction idles the CPU until the next interrupt
- Wait loop (contention for memory access)
- At most one I/O request is outstanding at a time, no simultaneous I/O processing
- After I/O starts, control returns to user program without waiting for I/O completion
- **System call** – request to the OS to allow user to wait for I/O completion
- **Device-status table** contains entry for each I/O device indicating its type, address, and state
- OS indexes into I/O device table to determine device status and to modify table entry to include interrupt

THANK YOU