





Operating System Lecture 2



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Computer Startup







bootstrap program

- Is loaded at power-up or reboot
- Typically stored in ROM, generally known as firmware
- Initializes all aspects of system
- Loads operating system kernel and starts execution

Computer System Organization



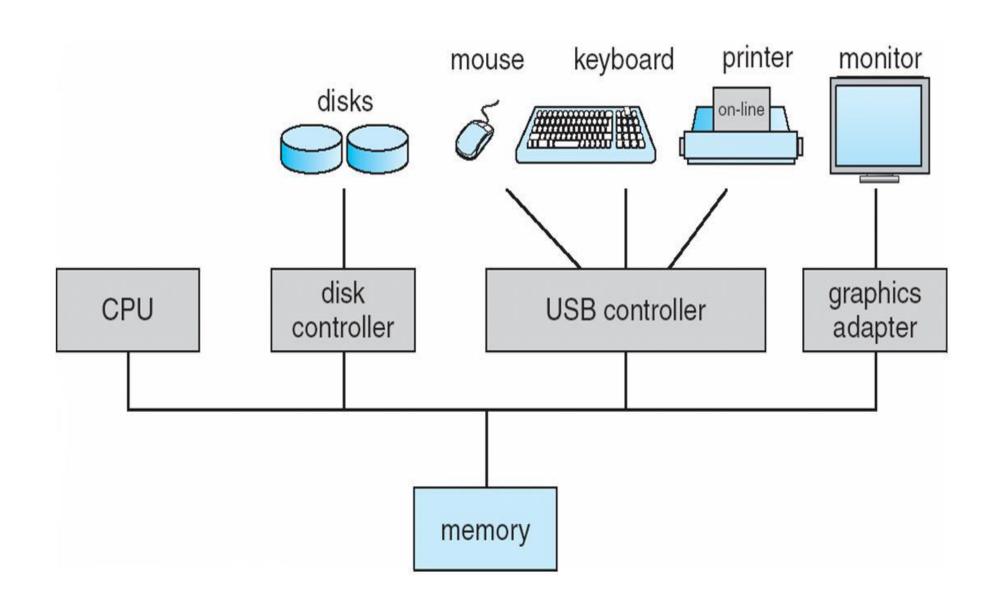




Computer-system operation

 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 Operation









Concurrent Execution

CPU and I/O devices operate simultaneously for efficiency.



Device Controllers

Each device controller is in charge of a particular device type



Local Buffers

Each device controller has a local buffer, which is temporary storage for data transfer between devices and the CPU.



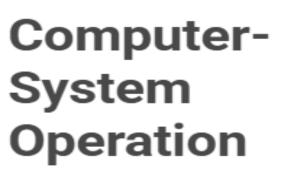
Data Transfer

CPU moves data between memory and local buffers.



Interrupts

The device controller informs CPU that it has finished its operation by causing an interrupt



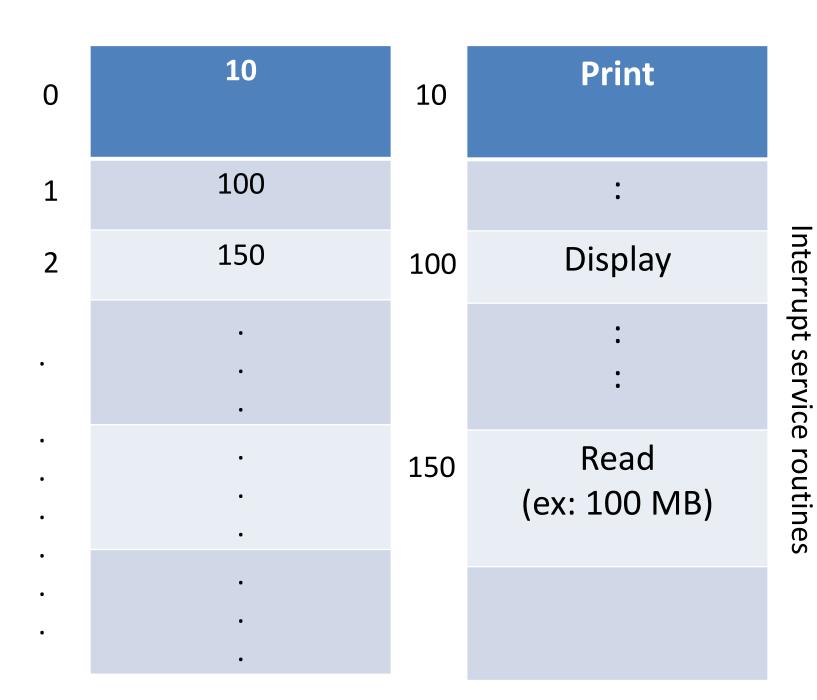
Common Functions of Interrupts







- 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 Vector

Memory

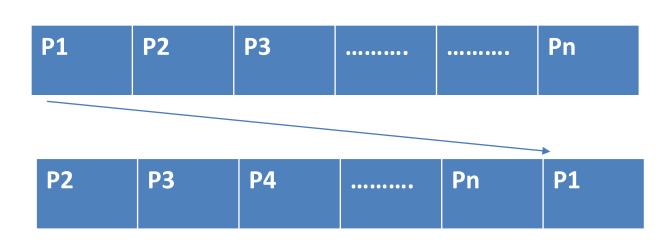
Interrupt Handling







- The operating system preserves the state of the CPU by storing registers and the program counter.
- Separate segments of code determine what action should be taken for each type of interrupt.

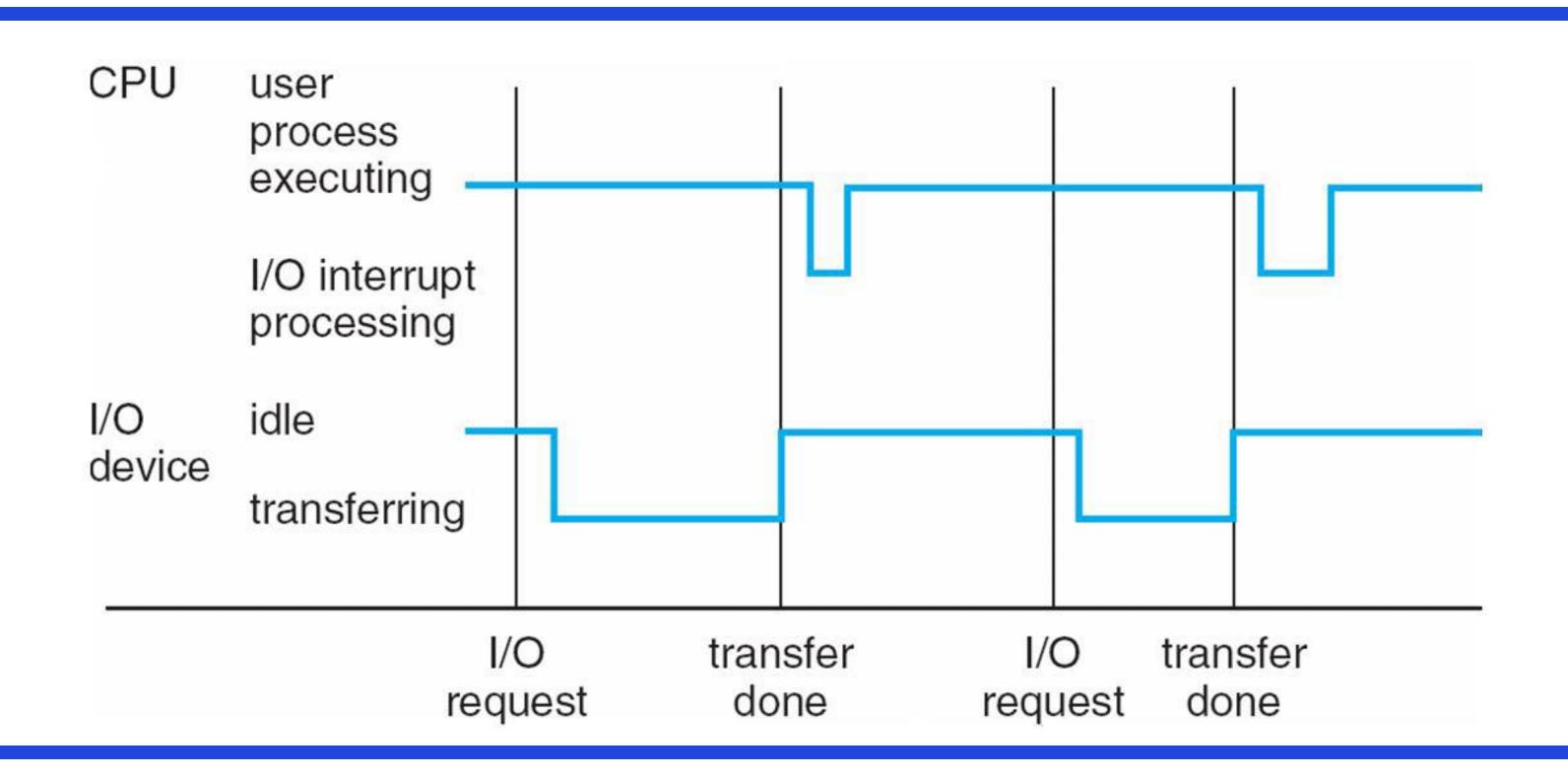


Interrupt Handling









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