

CSc 360 Operating Systems Process

Jianping Pan
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Processes

- Process: a program in execution
- Program: passive entity
 - static binary file on storage
 - e.g., `gcc -o hello hello.c; ll hello`
 - `-rwxrwxr-x 1 user group size date/time hello`
- Process: active entity; resource allocated!
 - `./hello`
 - text (code); data (static), stack, heap
 - process control block



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Process states

- E.g., one CPU
 - one running process at any time
 - maybe many ready/waiting processes



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Process control blocks

- PCB: keep track processes
 - state: ready/running, etc
 - CPU
 - PC, registers, priority, etc
 - memory
 - memory control information
 - I/O
 - e.g., opened files
 - accounting



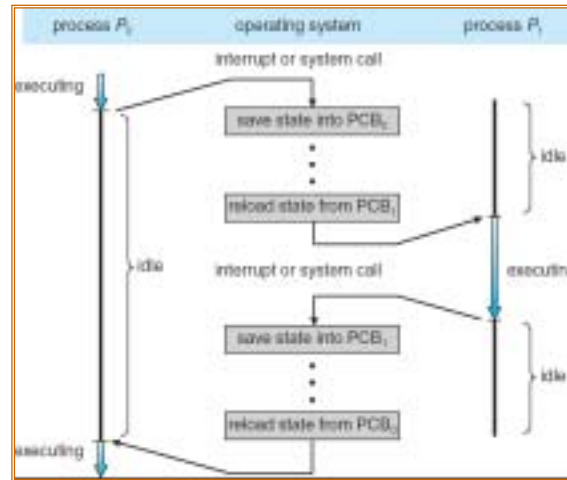
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Context switching

- Context switch
 - save states
 - restore states
- When
 - timer
 - I/O, memory
 - trap
 - system call



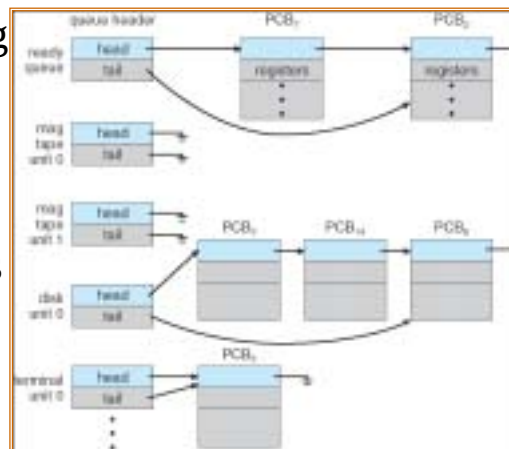
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Process scheduling

- Multiprogramming
 - utilization
- Timesharing
 - interactive
- Scheduling queues
 - linked list
 - ready queue
 - I/O queue

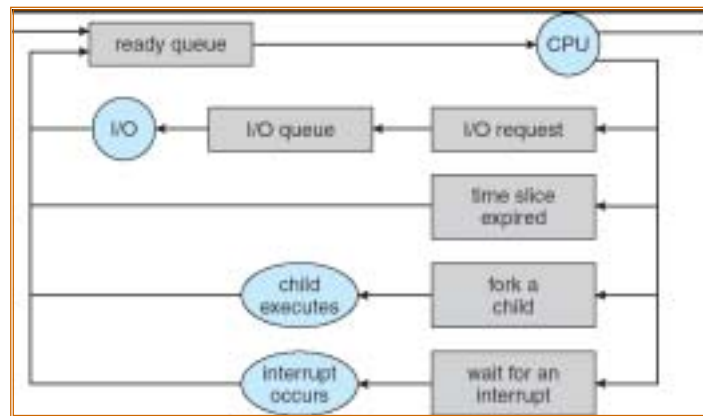


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Queuing system



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Queuing scheduler

- Who's the next?
- Long-term scheduler
 - job scheduler (spooling)
 - get to ready queue
 - CPU-intensive vs I/O intensive
- Short-term scheduler
 - CPU scheduler
 - frequency vs overhead

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More on scheduling

- Medium-term scheduler
 - who is NOT the next
 - reduce the degree of multiprogramming
 - swap-in/out
- Scheduling algorithms
 - first-come-first-server, shortest-job-first, priority, round-robin, fair and weighted fair, ...
 - more in Chapter 5

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This lecture

- Process and process scheduling
 - process vs program
 - process control block
 - context switch: what to save/restore
 - process scheduling
- Explore further
 - process status: `/bin/ps`
 - top CPU processes: `/usr/bin/top`

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Next lecture

- Process operations and IPC
 - read OSC7 Chapter 3 (or OSC6 Chapter 4)