

CSc 360

Operating Systems

CPU Scheduling

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Review: process and thread

- Uniprogramming
- Multiprogramming
- Multitasking
- Multithreading
- How to handle many processes/threads?
 - state: ready, running, blocked
 - scheduling (PCB, TCB)

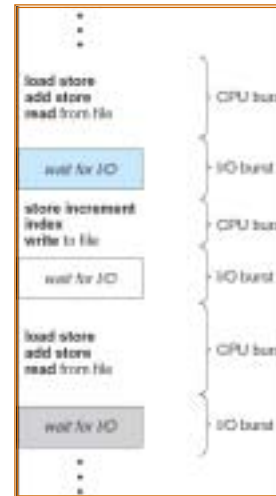
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CPU scheduling

- Goal
 - maximize resource utilization
 - CPU, memory, storage
 - improve system responsiveness
- Example
 - CPU burst
 - I/O burst



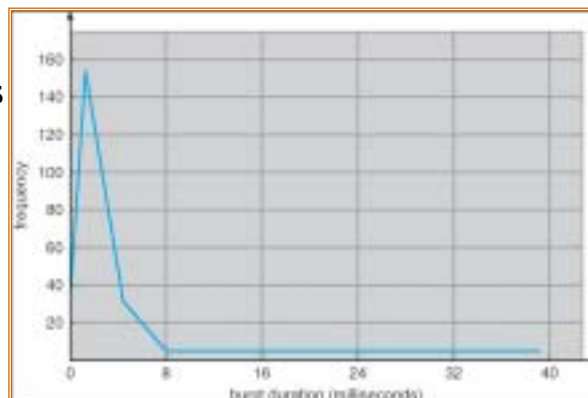
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CPU burst distribution

- Observation
 - many short bursts
 - a few long bursts
- Why is this important?



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CPU scheduler

- CPU scheduler
 - short-term scheduling
- CPU scheduling
 - switch from running to waiting (blocked)
 - switch from running to ready
 - switch from waiting to ready
 - terminate (i.e., leave the system)
- Preemptive vs non-preemptive

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CPU dispatcher

- Dispatcher
 - give control to the one selected by scheduler
- Procedures
 - context switching (save old, load new, etc)
 - mode switching (e.g., switch to user mode)
 - start to execute from newly loaded PC
- Performance measure
 - dispatch latency/overhead

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Scheduling criteria

- “Who’s next?”
 - CPU utilization: keep CPU as busy as possible
 - throughput: # of process done per unit time
 - turnaround time: from start to finish
 - waiting time: time spent in ready state
 - response time: interactive, request-reply
- Goal
 - $\max \{ \dots \}, \min \{ \dots \}$

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Scheduling algorithms

- First come, first serve (FCFS)
 - served by the order of arrival
- Example
 - P1(24), P2(3), P3(3)
 - schedule A
 - P1, P2, P3
 - schedule B
 - P2, P3, P1

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This lecture

- CPU scheduling
 - who's who
 - scheduler, dispatcher
 - who's next
 - FCFS (and many more)
- Explore further
 - what's the best way (data structure + algorithm) to implement an FCFS scheduler?

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Next lecture

- More scheduling algorithms to come
 - read OSC7 Chapter 5 (or OSC6 Chapter 6)

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