CIS 452 - Operating Systems Concepts

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Images taken from Silberschatz book

Scheduling Algorithms -- Priority

Shortest job first (SJF) scheduling is a special case of **priority-scheduling** algorithm

With priority scheduling, some numeric importance (priority) is assigned to each process and the highest-priority process is scheduled

In case of a tie, first-come-first-served (FCFS) scheduling can be used

Priorities fall into some known range, such as 0 - 7

Always schedule "highest priority" process, but be careful: *lower numbers correspond to higher priority*

This is an arbitrary choice, but we must be consistent. (Some systems choose differently, so watch out!)

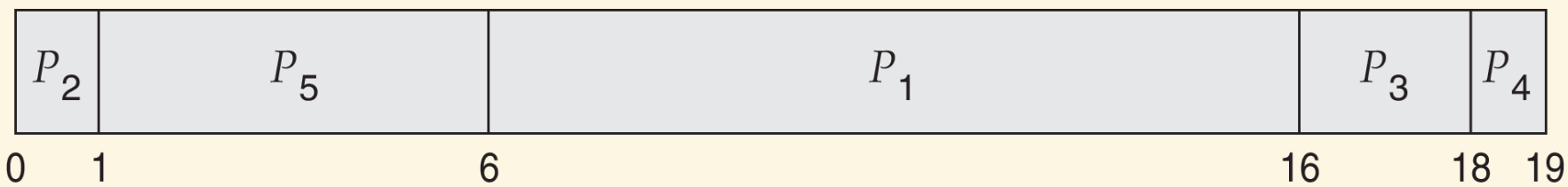Why is SJF a special case of priority scheduling?

Where is the "priority"?

Predicted burst time!

Shorter predicted burst time => higher priority => scheduled first

General example of priority scheduling (not SJF)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

(times are in milliseconds)

P_2	P_5	P_1	P_3	P_4
0 1	6	16	18	19

Average wait time: 8.2 ms

Cannot really say that priority scheduling is "good" or "bad" at minimizing average weight time (recall that SJF, a special case of priority scheduling, is optimal)

Priority scheduling implies that there are other considerations

Where do the priorities come from?

Can be internal to the system: expected CPU burst time, number of open files, memory requirement, etc.

Or external: importance of process, funds, sponsoring department, etc.

Priority scheduling can be preemptive or nonpreemptive

Priority scheduling can lead to **indefinite blocking** (also called **starvation**)

Low-priority processes are blocked while higher priority ones run

If there is an indefinite stream of high-priority processes, the low-priority process may never get the CPU

This can be solved by **aging**

Aging is when a process has its priority gradually increased as it waits

For example, could subtract 1 from priority value every 15 minutes a process waits, in which case it will eventually reach a low enough priority to run