CIS 452 - Operating Systems Concepts

Nathan Bowman

Images taken from Silberschatz book

Scheduling Algorithms -- FCFS

First-come, first-served is the simplest CPU-scheduling algorithm

Whichever process requests CPU first is given CPU first

Ready queue is simply a FIFO queue

This is a non-preemptive algorithm

Code for FCFS scheduling is simple

However, tends to lead to long waiting times

We will study scheduler behavior with examples

Simplifying assumption: each process consists of just one CPU burst

CPU bursts are of varying lengths
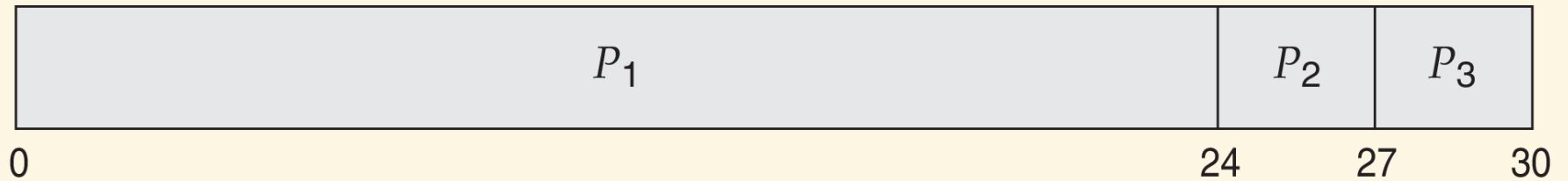
Completely unrealistic, but simplifies analysis

Three processes arrive at time 0 as follows

Process	Burst Time
P1	24
P2	3
P3	3

(times are in milliseconds)

We can examine process scheduling with a **Gantt chart**
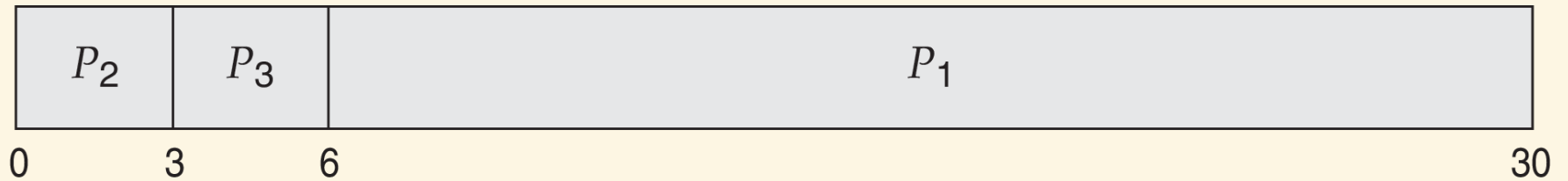
Assuming processes arrive in the order P1, P2, P3

P_1		P_2	P_3
0	24	27	30

Resulting waiting times are

Process	Waiting Time
P1	0
P2	24
P3	27

Average waiting time: 17 ms

Order matters a lot in FCFS scheduling

Assuming processes arrive in the order P2, P3, P1

P_2	P_3	P_1

0   3   6   30

Resulting waiting times are

Process	Waiting Time
P1	6
P2	0
P3	3

Average waiting time: 3 ms

When CPU burst times vary greatly, as in previous example, average waiting time can also vary substantially

Average waiting time varied from 3 ms to 17 ms for *exact same processes*

More principled approach can remove some of the random nature of the scheduling