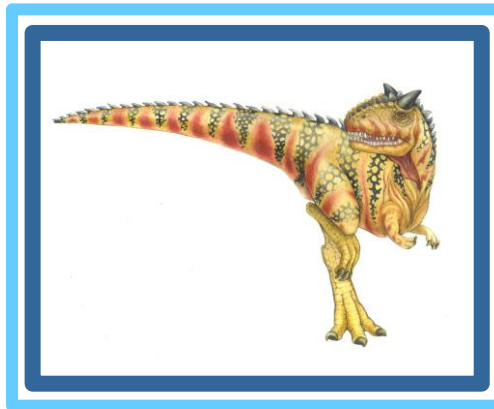


# Chapter 5: CPU Scheduling

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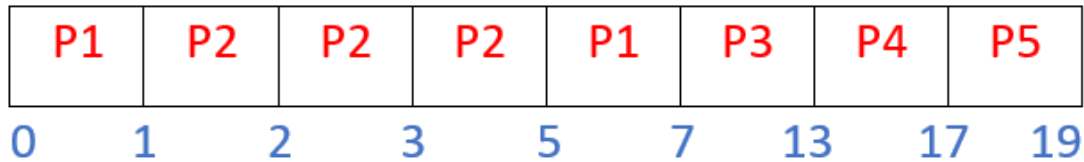


Apply preemptive priority scheduling and calculate the average waiting time.

| Process | Arrival Time | Priority | Burst Time |
|---------|--------------|----------|------------|
| P1      | 0            | 3        | 3          |
| P2      | 1            | 2        | 4          |
| P3      | 2            | 4        | 6          |
| P4      | 3            | 6        | 4          |
| P5      | 5            | 10       | 2          |



## Gantt Chart



$$\text{Total Waiting Time} = 4 + 0 + 5 + 10 + 12 = 31$$

$$\text{Average Waiting Time} = 31/5 = 6.20$$





# Algorithm Evaluation

- How to select CPU-scheduling algorithm for an OS?
- Determine criteria, then evaluate algorithms
- **Deterministic modeling**
  - Type of **analytic evaluation**
  - Takes a particular predetermined workload and defines the performance of each algorithm for that workload
- Consider 5 processes arriving at time 0:

| Process | Burst Time |
|---------|------------|
| $P_1$   | 10         |
| $P_2$   | 29         |
| $P_3$   | 3          |
| $P_4$   | 7          |
| $P_5$   | 12         |

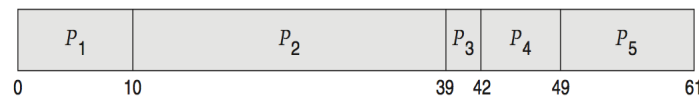
Apply FCFS, SJF and RR10



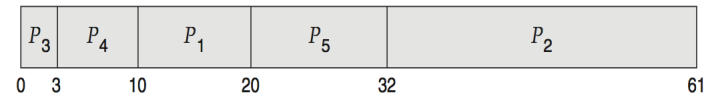


# Deterministic Evaluation

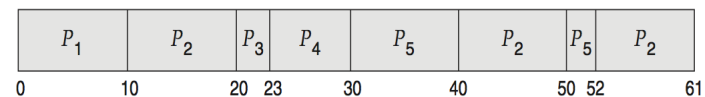
- For each algorithm, calculate minimum average waiting time
- Simple and fast, but requires exact numbers for input, applies only to those inputs
- FCS is 28ms:



- Non-preemptive SFJ is 13ms:



- RR is 23ms:





# Activity

- Consider P1, P2 and P3

Priority is P3 = 1, P2 = 2, P1 = 3

| Process ID | Arrival Time | Burst Time |
|------------|--------------|------------|
| P1         | 0            | 5          |
| P2         | 1            | 7          |
| P3         | 3            | 4          |

- What is the completion order of P1, P2 and P3 for FCFS, SJF, Priority queue and RR2.

Which algorithm would you prefer for this set of processes and why?

