Round Robin

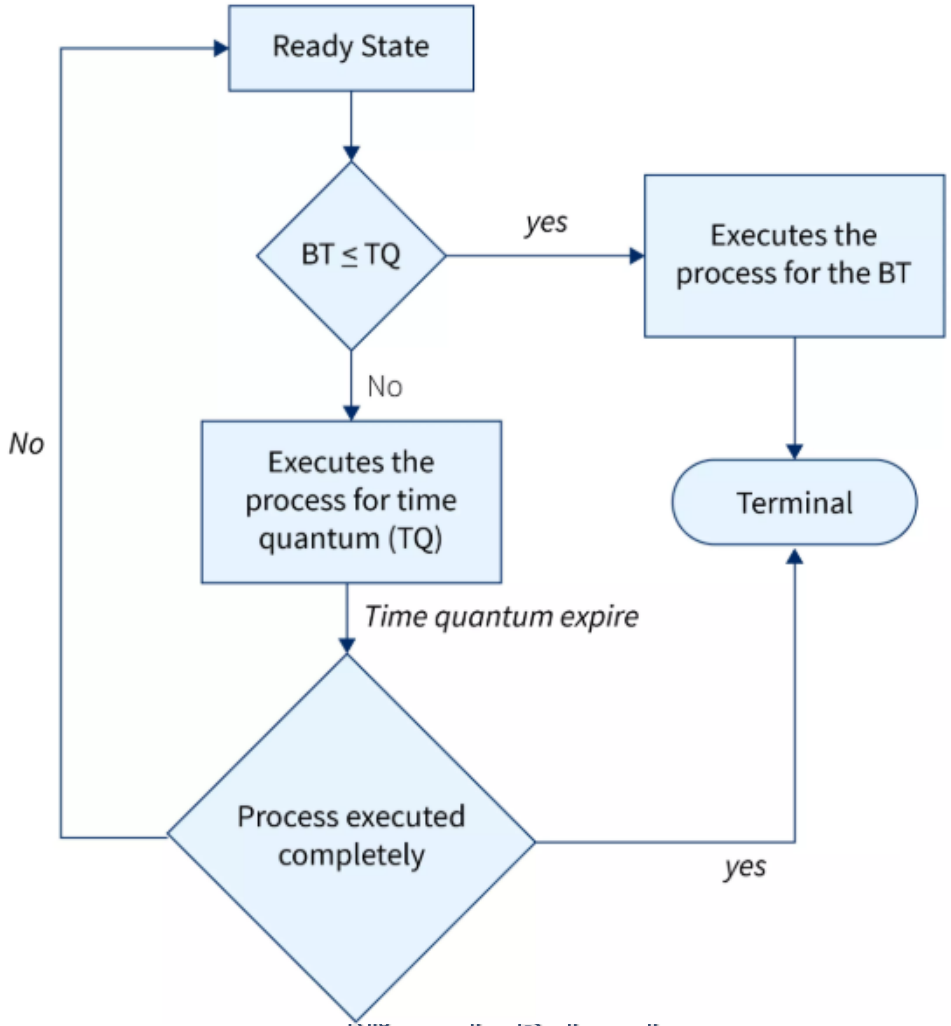
Nirmala Shinde Baloorkar
Assistant Professor
Department of Computer Engineering

SOMAIYA VIDYAVIHAR UNIVERSITY
K J Somaiya College of Engineering

Round Robin Scheduling

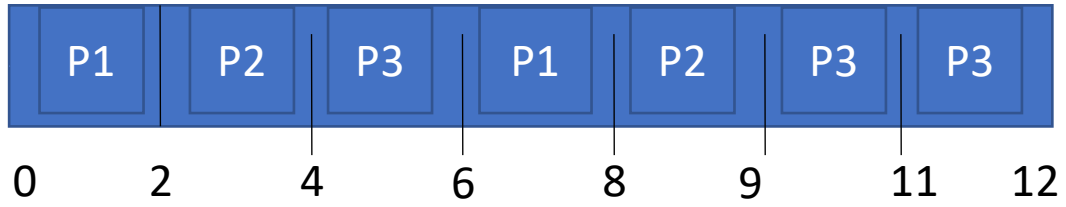
- **Time quantum / time slice** is defined as a small unit of time.
- Time quantum length is typically 10 to 100 milliseconds.
- This is a preemptive algorithm.
- After a fixed interval of time called a **time quantum**, the CPU is shifted to the next process.
- Processes that are pre-empted are added to the end of the queue.

Round Robin Scheduling (continued)



Example 1 RR (Round Robin) Scheduling (Continued)

Process	Burst time
P1	4
P2	3
P3	5



Arrival Time = 0 , Time Quantum = 2

Turnaround Time = Completion Time – Arrival Time

Waiting Time = Turnaround Time – Burst Time

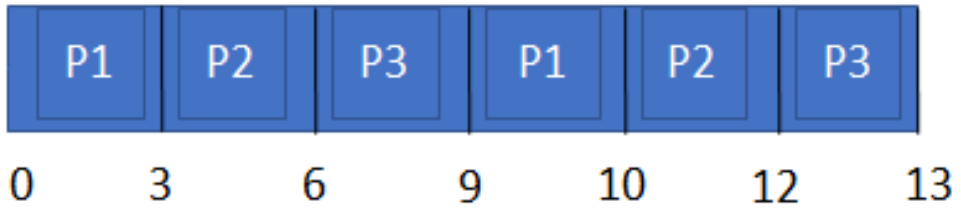
Turnaround Time p1=8, p2=9,p3=12

Waiting Time p1=4, p2=6,p3=7

Example 2 RR with arrival time

Process	Burst Time	Arrival time
P1	4	0
P2	5	1
P3	4	2

Time quantum: 3



Turnaround Time = Completion Time – Arrival Time

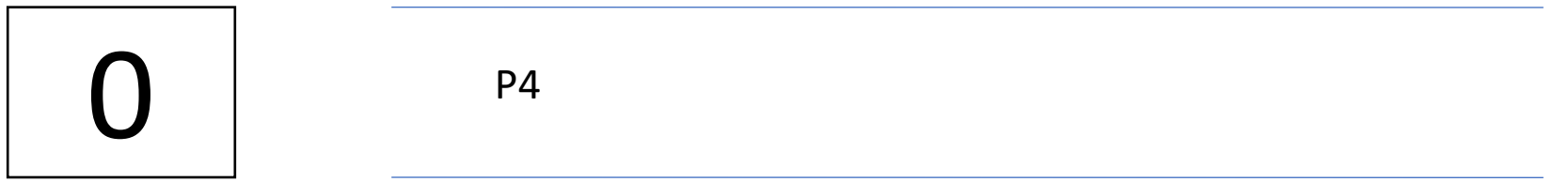
Waiting Time = Turnaround Time – Burst Time

Turnaround Time p1=10, p2=11,p3=11

Waiting Time p1=6, p2=6,p3=7

Example 3 - Time quantum = 2

process	Burst time	Arrival time
P1	6	2
P2	2	5
P3	8	1
P4	3	0
P5	4	4



Example 4 Practice

- Time Quantum given as 20

Process	Burst Time
P_1	53
P_2	17
P_3	68
P_4	24

Acts as FCFS with Preemption

Time quantum

Very less – Context switching

Huge - FCFS

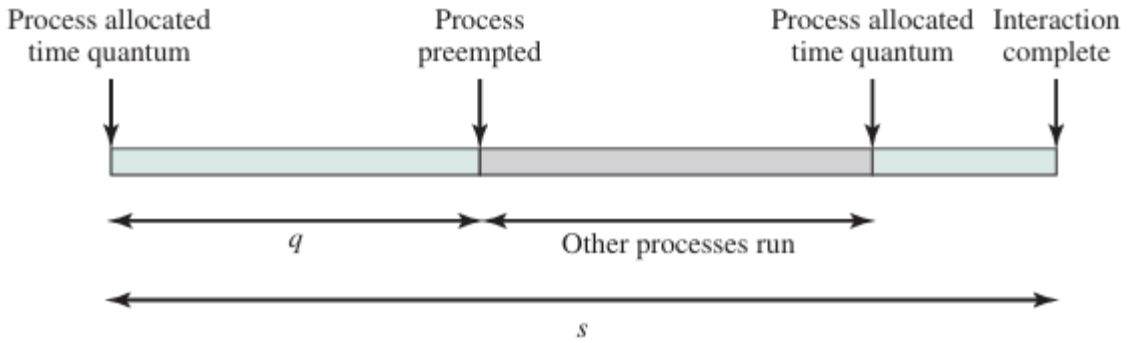
Round Robin: Limitations

Processor-bound processes tend to receive an unfair portion of processor time

- Results in:
  - poor performance for I/O-bound processes
  - inefficient use of I/O devices
  - increase in the variance of response time

Effect of time quanta

- With round robin, the principal design issue is the length of the time quantum, or slice, to be used.

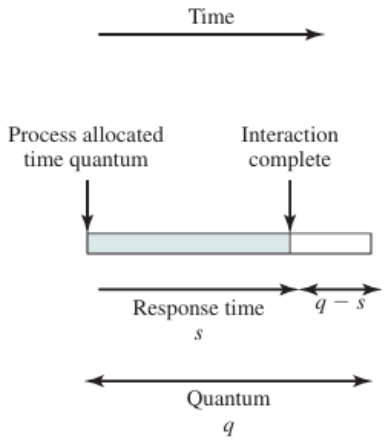


(b) Time quantum less than typical interaction

- If the quantum is very short, then short processes will move through the system relatively quickly.
- On the other hand, there is processing **over head** involved in handling the clock interrupt and performing the scheduling and dispatching function.
- Thus, very **short time quanta should be avoided**.

Effect of time quanta

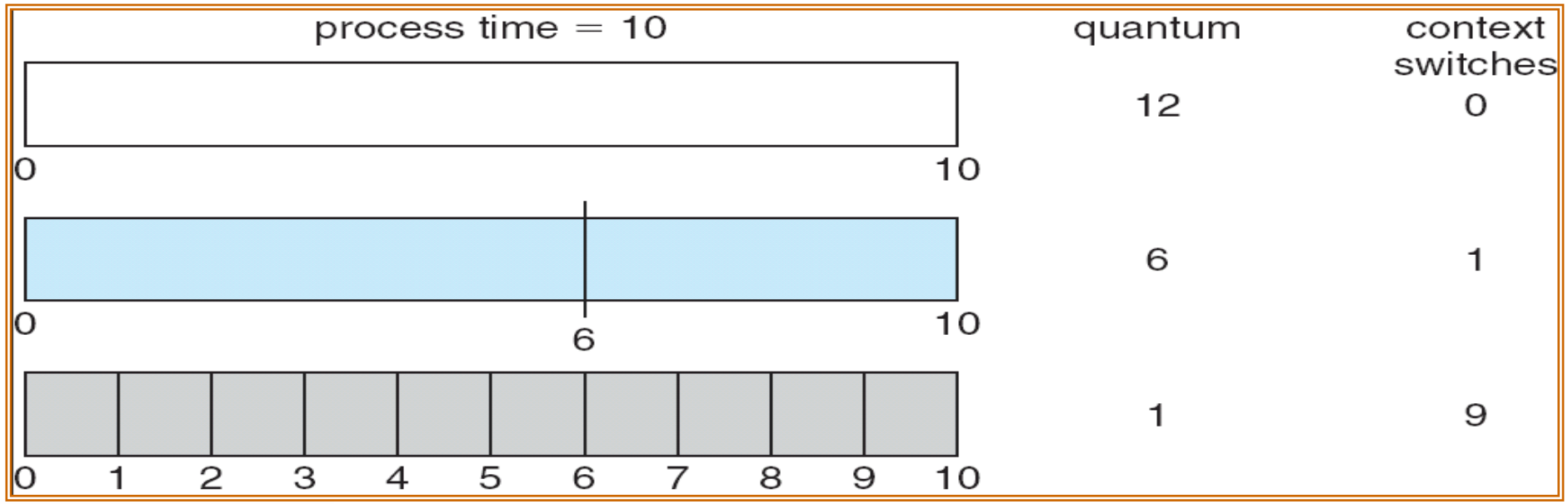
- When the time quantum is greater than the typical interaction time, it means that each process gets more time to execute before being switched out.
- This can lead to fewer context switches, which might improve efficiency for CPU-bound processes but could also increase response time for interactive processes.



(a) Time quantum greater than typical interaction

Choosing a Time Quantum

- The effect of quantum size on context-switching time must be carefully considered.
- The time quantum must be large with respect to the context-switch time
- Modern systems use quanta from 10 to 100 msec with context switch taking < 10 msec



Question ?