Experiment No. 1.
Scheduling Algorithms

Scheduling Criteria
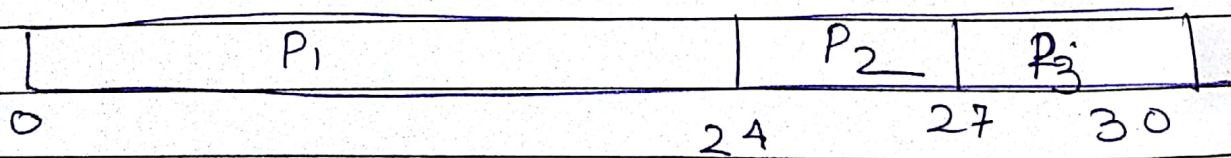- CPU utilization
- Throughput
- Turnaround - time
- Waiting Time
- Response Time
-

First Come First Serve

Process	Burst
P_1	24
P_2	3
P_3	3

If the processes arrive in the order P_1, P_2, P_3 and are served in FCFS order

GANTT chart

P_1	P_2	P_3

0   24   27   30

Waiting Time

$P_1 = 0$

$P_2 = 24$

$P_3 = 27$

Average Waiting Time

$$A.W.T. = \left(\frac{0 + 24 + 27}{3} \right)$$

* If there is a arrival time

Process	A.T.	B-T
P₁	0	24
P₂	1	3
P₃	2	3.

P₁	P₂	P₃

0   24   27   30.

Problem with FCFC

Convoy Effect
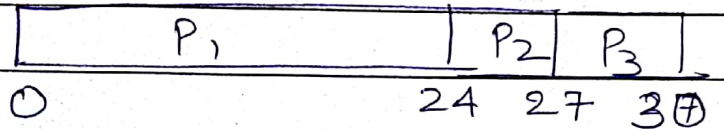
W-T.

$$P_1 = 0 - 0 = 0$$
$$P_2 = 24 - 1 = 23$$
$$P_3 = 27 - 3 = 24.$$

$$A-W-t = \frac{0 + 23 + 24}{3}$$

'— WT + BT

T.A.T.
Turn around Around Time.

Also find

Average T.A.T. =

Shortest Job First Scheduling → Preemptive
— Non Preempt
ive.

The real difficulty with SJF algorithm is knowing the length of the next CPU request. Users are motivated to estimate the process time limit accurately, since a lower value may mean faster response. SJF is frequently used in long term scheduling.

Nonpreemptive SJF.

Process	BT.
P₁	6
P₂	8
P₃	7
P₄.	3

P₄	P₁	P₃	P₂
0 3	9	16	22
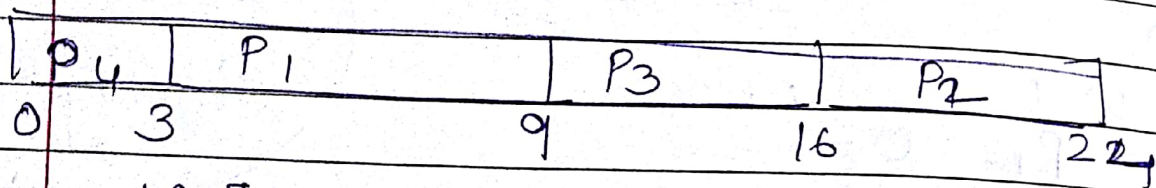
W.T

$P_1 : - 3$

$P_2 : - 16$

$P_3 : 9$

$P_4 : - 0$

$A \cdot W \cdot T : - 10 \cdot 25$

T.A.T: $WT + B.T$ Also find A.T $\widehat{A}T$.

Shortest Remaining Time first (or SRT) OR Preemptive SJF

Process	Arrival Time	Burst Time
P₁	0	8
P₂	1	4
P₃	2	9
P₄	3	5

Gantt Chart

P1	P2	P4	P1	P3
0 1	5	10	17	26
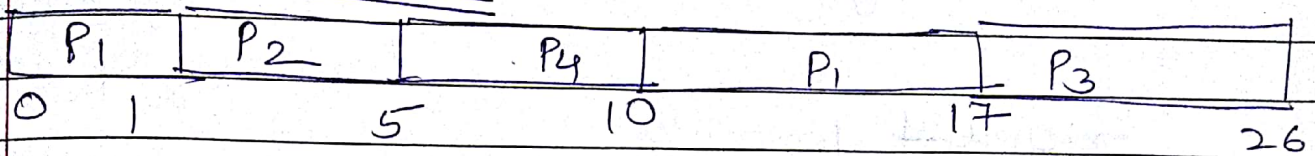
Average
W.T.
$(10-1) \rightarrow P_1$
$(1-1) \rightarrow P_2$
$(17-2) \rightarrow P_3$
$(5-3) \rightarrow P_4$

A.W.T. :- 6.5 ms

for non-preemptive :- 7.75 ms.

Priority Scheduling (special case) of

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

P2	P5	P1	P3	P4
0 1	6	16	18	19.
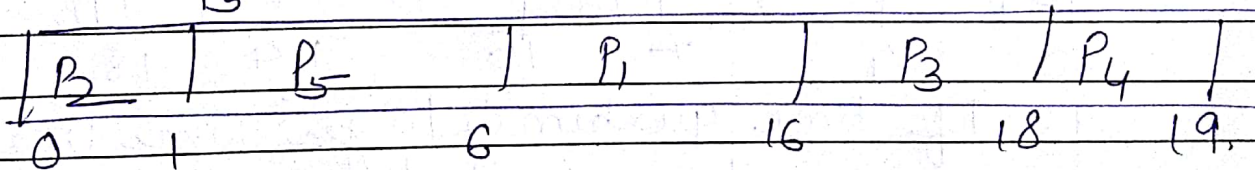
A.W.T. – 8.2 ms

SJF is special case of Priority scheduling. A priority is associated with each process and the CPU is allocated to the process with highest priority. Equal priority process are scheduled in FCFS order. SJF The longer the B.T is lower the priority.

Inturally defined priorities :- - time limits
memory requirements
the no of open files

External priorities
Importance of the process
the type and amount of funds
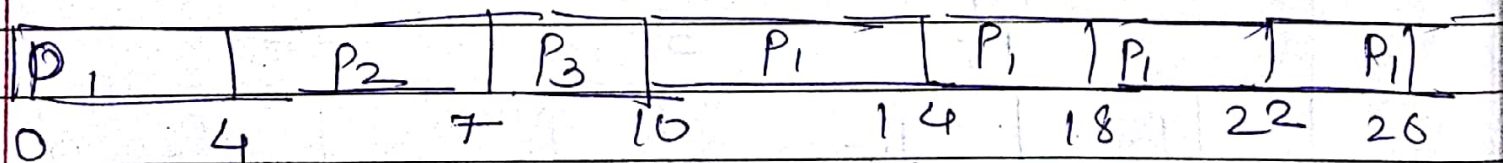Priority Scheduling can be preemptive or non preemptive
Disadvantage :- Starvation

Round Robin Scheduling (Preemptive)
Time slice or time quantum :- 10 to 100ms.

Process	Burst Time
P₁	24
P₂	3
P₃	3

Time quantum :- 4.

P₁		P₂	P₃		P₁		P₁	P₁		P₁
0	4		7	10		14		18	22	26

If time quantum is larger: Same like FCFS
" " " is less: processor Sharing.