

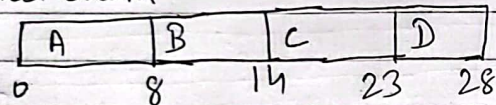
# Process Scheduling Assignment Solution

Q.1. Sol<sup>n</sup>:- Given

Process	A.T	B.T
A	0	8
B	2	6
C	4	9
D	7	5

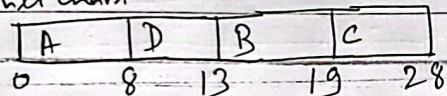
FCFS

Gantt chart



SJF

Gantt chart



At 8

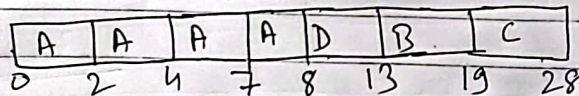
B.T

B 6

C 9

D 5 (Smallest)

SRTF Gantt chart



At 2

B.T

A 8-2=6

B 6

At 4

B.T

A 8-4=4

B 6

C 9

At 7

B.T

A 8-7=1

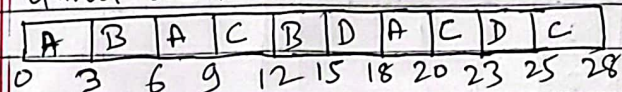
B 6

C 9

D 5

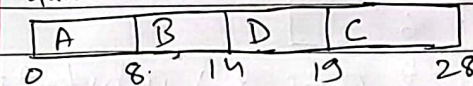
RR (quantum=3)

Gantt chart



HRRN

Gantt chart



At 8

$$R_p(B) = \frac{W.T + B.T}{B.T} = \frac{(8-2) + 6}{6} = \frac{12}{6} = 2 \text{ (highest)}$$

$$R_p(C) = \frac{(8-4) + 9}{9} = \frac{13}{9} = 1.44$$

$$R_p(D) = \frac{(8-7) + 5}{5} = \frac{6}{5} = 1.2$$

At 14

$$R_p(C) = \frac{(14-4) + 9}{9} = \frac{19}{9} = 2.11$$

$$R_p(D) = \frac{(14-7) + 5}{5} = \frac{12}{5} = 2.4$$

R.B

A

B

A

C

B

D

A

C

D

C



Q.2 Sol<sup>n</sup>: Given

Process	B.T	Priority
P <sub>1</sub>	18	4
P <sub>2</sub>	20	2
P <sub>3</sub>	6	1
P <sub>4</sub>	10	3
P <sub>5</sub>	12	5
P <sub>6</sub>	8	6

All process arrive at 0ms & 1 is highest priority

a) FCFS

$P_1$	$P_2$	$P_3$	$P_4$	$P_5$	$P_6$	
0	18	38	44	54	66	74

b) SJF

P <sub>3</sub>	P <sub>6</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>1</sub>	P <sub>2</sub>	
0	6	14	24	36	54	74

c) RR (Quantum = 6)

~~R.O P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> P<sub>4</sub> P<sub>5</sub> P<sub>6</sub> P<sub>1</sub> P<sub>2</sub> P<sub>4</sub> P<sub>5</sub> P<sub>6</sub> P<sub>1</sub> P<sub>2</sub> P<sub>2</sub>~~

Gantt chart

$P_1$	$P_2$	$P_3$	$P_4$	$P_5$	$P_6$	$P_1$	$P_2$	$P_4$	$P_5$	$P_6$	$P_1$	$P_2$	$P_2$
0	6	12	18	24	30	36	42	48	52	58	60	66	72

d) Priority

$P_3$	$P_2$	$P_4$	$P_1$	$P_5$	$P_6$	
0	6	26	36	54	66	74

f) SRTN: Here, gantt chart will be same as SJF.  
since all process arrive at 0ms

e) HRRN

At 0

$$R_r(P_1) = \frac{0+18}{18} = 1$$

$$R_r(P_2) = \frac{0+20}{20} = 1$$

$$R_r(P_3) = \frac{0+6}{6} = 1$$

$$R_r(P_4) = \frac{0+10}{10} = 1$$

$$R_r(P_5) = \frac{0+12}{12} = 1$$

$$R_r(P_6) = \frac{0+8}{8} = 1$$

Calculate Response ratio same way at 32 & 42.

$P_1$	$P_3$	$P_6$	$P_4$	$P_5$	$P_2$	
0	18	24	32	42	54	74

At 18,

$$R_r(P_2) = \frac{(18-0)+20}{20} = \frac{38}{20} = 1.9$$

$$R_r(P_3) = \frac{(18-0)+6}{6} = \frac{24}{6} = 4 \checkmark$$

$$R_r(P_4) = \frac{(18-0)+10}{10} = \frac{28}{10} = 2.8$$

$$R_r(P_5) = \frac{(18-0)+12}{12} = \frac{30}{12} = 2.5$$

$$R_r(P_6) = \frac{(18-0)+8}{8} = \frac{26}{8} = 3.25$$

$$\text{At } 24, R_r(P_2) = \frac{(24-0)+20}{20} = \frac{44}{20} = 2.2$$

$$R_r(P_4) = \frac{(24-0)+10}{10} = \frac{34}{10} = 3.4$$

$$R_r(P_5) = \frac{24+12}{12} = \frac{36}{12} = 3$$

$$R_r(P_6) = \frac{24+8}{8} = \frac{32}{8} = 4 \checkmark$$



3. Given

Process	B.T	A.T	Priority
P <sub>1</sub>	10	0	2
P <sub>2</sub>	15	2	1
P <sub>3</sub>	22	3	4
P <sub>4</sub>	16	5	5
P <sub>5</sub>	5	6	3

FCFS

P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>
0	10	25	47	63
				68

SJF (non-preemptive)

P <sub>1</sub>	P <sub>5</sub>	P <sub>2</sub>	P <sub>4</sub>	P <sub>3</sub>
0	10	15	30	46
				68

At 10 B.T

P<sub>2</sub> 15

P<sub>3</sub> 22

P<sub>4</sub> 16

P<sub>5</sub> 5 ✓ (smaller)

SJF (Preemptive)

P <sub>1</sub>	P <sub>1</sub>	P <sub>1</sub>	P <sub>1</sub>	P <sub>1</sub>	P <sub>5</sub>	P <sub>2</sub>	P <sub>4</sub>	P <sub>3</sub>
0	2	3	5	6	10	15	30	46
								68

At 2	B.T	At 3	B.T	At 5	B.T	At 6	B.T
P <sub>1</sub>	10-2=8	P <sub>1</sub>	7	P <sub>1</sub>	5	P <sub>1</sub>	4
P <sub>2</sub>	15	P <sub>2</sub>	15	P <sub>2</sub>	15	P <sub>2</sub>	15
		P <sub>3</sub>	22	P <sub>3</sub>	22	P <sub>3</sub>	22
				P <sub>4</sub>	16	P <sub>4</sub>	16
						P <sub>5</sub>	5

Priority (Preemptive) : Assume 1 as highest priority

P <sub>1</sub>	P <sub>2</sub>	P <sub>2</sub>	P <sub>2</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>5</sub>	P <sub>3</sub>	P <sub>4</sub>
0	2	3	5	6	15	25	30	52
								68

At 2	Priority	At 3	Priority	At 5	Priority	At 6	Priority
P <sub>1</sub>	2	P <sub>1</sub>	2	P <sub>1</sub>	2	P <sub>1</sub>	2
P <sub>2</sub>	1 ✓	P <sub>2</sub>	1 ✓	P <sub>2</sub>	1 ✓	P <sub>2</sub>	1
		P <sub>3</sub>	4	P <sub>3</sub>	4	P <sub>3</sub>	4
				P <sub>4</sub>	5	P <sub>4</sub>	5
						P <sub>5</sub>	3

Priority (Non-Preemptive) : Assume 1 as highest priority

P <sub>1</sub>	P <sub>2</sub>	P <sub>5</sub>	P <sub>3</sub>	P <sub>4</sub>
0	10	25	30	52
				68

At 10 Priority

P<sub>2</sub> 1 ✓

P<sub>3</sub> 4

P<sub>4</sub> 5

P<sub>5</sub> 3

RR (Quantum = 4)

R.O P<sub>1</sub> P<sub>2</sub> P<sub>3</sub> P<sub>1</sub> P<sub>4</sub> P<sub>5</sub> P<sub>2</sub> P<sub>3</sub> P<sub>1</sub> P<sub>4</sub> P<sub>5</sub> P<sub>2</sub> P<sub>3</sub> P<sub>4</sub> P<sub>2</sub> P<sub>3</sub> P<sub>4</sub> P<sub>3</sub>

Gantt chart

P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>1</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>1</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>2</sub>	P <sub>3</sub>
0	4	8	12	16	20	24	28	32	36	38	39	43	47	51	54

P <sub>4</sub>	P <sub>3</sub>	P <sub>3</sub>
58	62	66
		68