

PRACTICE PROBLEMS

Consider the set of processes whose arrival time and burst time are given below:

Set 1

Process	Arrival Time	Burst Time
P ₁	3 (3)	4
P ₂	5 (5)	3
P ₃	0 (1)	2
P ₄	5 (6)	1
P ₅	4 (4)	3

Set 2

Process	Arrival Time	Burst Time
P ₁	0	2
P ₂	3	1
P ₃	5	6

Set 3

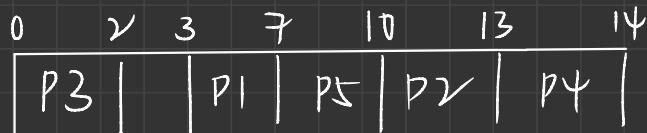
Process	Arrival Time	Burst Time
P ₁	0	3
P ₂	1	2
P ₃	2	1
P ₄	3	4
P ₅	4	5
P ₆	5	2

If the CPU scheduling policy is *First Come First Serve*, calculate the *Average Waiting Time* and *Average Turnaround Time*.

Set 1

Process	Arrival Time	Burst Time
P ₁	3 (3)	4
P ₂	5 (5)	3
P ₃	0 (1)	2
P ₄	5 (6)	1
P ₅	4 (4)	3

Grantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	7 - 3	4 - 4	0
P ₂	13 - 10	8 - 3	5
P ₃	2 - 0	2 - 2	0
P ₄	14 - 5	9 - 1	8
P ₅	10 - 4	6 - 3	3

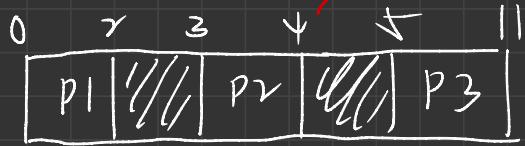
$$\text{Average Turnaround Time} = 29 \div 5 \\ = 5.8 \text{ units}$$

$$\text{Average Waiting Time} = 16 \div 5 \\ = 3.2 \text{ units}$$

Set 2

Process	Arrival Time	Burst Time
P ₁	0 (1)	2
P ₂	3 (2)	1
P ₃	5 (4)	6

Grantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	2 - 0	2 ~	0
P ₂	4 - 3	1 1	0
P ₃	11 ~	6 - 6	0

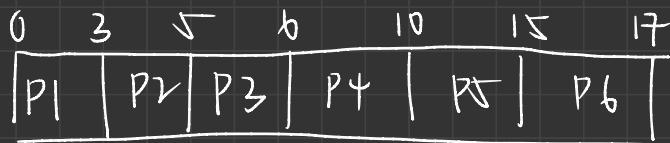
$$\text{Average Turnaround Time} = \frac{9}{3} = 3 \text{ units}$$

$$\text{Average Waiting Time} = \frac{0}{3} = 0 \text{ units}$$

Set 3

Process	Arrival Time	Burst Time
P ₁	0 (1)	3
P ₂	1 (2)	2
P ₃	2	1
P ₄	3	4
P ₅	4	5
P ₆	5	2

Gantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	3 - 0	3 - 3	0
P ₂	5 - 1	4 - 2	2
P ₃	6 - 2	4 - 1	3
P ₄	10 - 3	7 - 4	3
P ₅	15 - 4	11 - 5	6
P ₆	17 - 5	12 - 2	10

$$\text{Average TT} = \bar{t}_1 \div b \\ = 6.8 \text{ units}$$

$$\text{Average WT} = \bar{w}_1 \div b \\ = 4 \text{ units}$$

Consider the set of processes whose arrival time and burst time are given below:

Set 1

Process	Arrival Time	Burst Time
P ₁	0	8
P ₂	4	4
P ₃	1	1

Set 2

Process	Arrival Time	Burst Time
P ₁	0	4
P ₂	3	6
P ₃	2	5
P ₄	5	3
P ₅	7	10
P ₆	6	5

Set 3

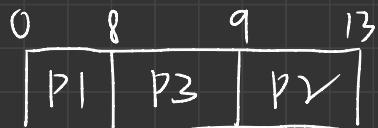
Process	Arrival Time	Burst Time
P ₁	5	8
P ₂	0	5
P ₃	4	9
P ₄	1	2

If the CPU scheduling policy is **Shortest-Job-First (SJF)**, calculate the *Average Waiting Time* and *Average Turnaround Time*.

Set 1

Process	Arrival Time	Burst Time
P ₁	0 ①	8
P ₂	4	4 ②
P ₃	1	1 ③

Gantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	8	8	0
P ₂	13	9	5
P ₃	9	8	7

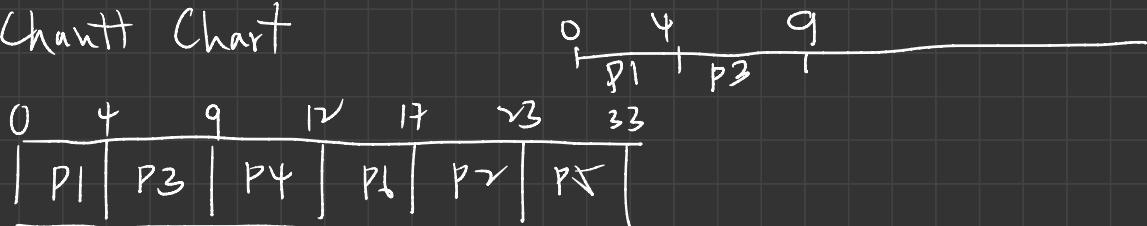
$$\text{Average TT} = \frac{25}{3} = 8.33 \text{ units}$$

$$\text{Average WT} = \frac{12}{3} = 4 \text{ units}$$

Set 2

Process	Arrival Time	Burst Time
P ₁	0	4
P ₂	3	6
P ₃	2	5
P ₄	5	3
P ₅	7	10
P ₆	6	5

Chatt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P1	4	4	0
P2	23	20	14
P3	9	7	2
P4	12	7	4
P5	33	26	16
P6	17	11	6

$$\text{Average TT} = 75 \div 6 \\ = 12.5 \text{ units}$$

$$\text{Average WT} = 42 \div 6 \\ = 7 \text{ units}$$

Set 3

Process	Arrival Time	Burst Time
P ₁	5	8 3
P ₂	0 	5
P ₃	4	9 4
P ₄	1	2 2

Chatt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	15 5	10 8	4
P ₂	5 0	5 5	0
P ₃	24 4	≥ 0 9	11
P ₄	7 1	6 2	4

$$\text{Average TT} = \frac{41}{4} = 10.25 \text{ units}$$

$$\text{Average WT} = \frac{17}{4} = 4.25 \text{ units}$$

Consider the set of processes whose arrival time and burst time are given below:

Set 1

Process	Arrival Time	Burst Time	Priority
P ₁	0	2	2
P ₂	0	1	1
P ₃	0	8	4
P ₄	0	4	2
P ₅	0	5	3

Set 2

Process	Arrival Time	Burst Time	Priority
P ₁	0	20	40
P ₂	25	25	30
P ₃	30	25	30
P ₄	60	15	35
P ₅	100	10	5
P ₆	105	10	10

Set 3

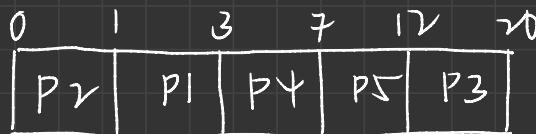
Process	Arrival Time	Burst Time	Priority
P ₁	0	5	22
P ₂	1	4	44
P ₃	2	2	11
P ₄	4	1	33

If the CPU scheduling policy is **Priority Based (Preemptive)**, calculate the *Average Waiting Time* and *Average Turnaround Time*.

Set 1

Process	Arrival Time	Burst Time	Priority
P ₁	0	2	2 ✓
P ₂	0	1	1 ✓
P ₃	0	8	4 ✗
P ₄	0	4	2 ✗
P ₅	0	5	3 ✗

Gantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	3	3	0
P ₂	1	1	0
P ₃	20	20	17
P ₄	7	7	3
P ₅	12	12	7

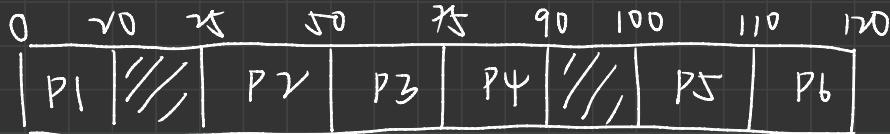
$$\text{Average TT} = \frac{43}{5} = 8.6 \text{ units}$$

$$\text{Average WT} = \frac{23}{5} = 4.6 \text{ units}$$

Set 2

Process	Arrival Time	Burst Time	Priority
P ₁	0	20	40
P ₂	25	25	30
P ₃	30	25	30
P ₄	60	15	35
P ₅	100	10	5
P ₆	105	10	10

Grantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P ₁	20	20	0
P ₂	50	25	0
P ₃	75	45	20
P ₄	90	30	15
P ₅	110	10	0
P ₆	120	15	5

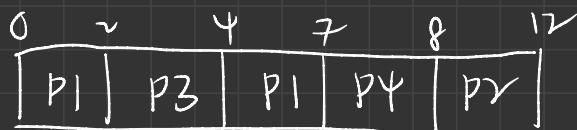
$$\text{Average TT} = \frac{145}{6} = 24.17 \text{ units}$$

$$\text{Average WT} = \frac{40}{6} = 6.67 \text{ units}$$

Set 3

Process	Arrival Time	Burst Time	Priority
P ₁	0 1	5	22 3
P ₂	1	4	44 5
P ₃	2	2	11 ✓
P ₄	4	1	33 4

Grantt Chart



Process ID	Completion Time	Turnaround Time	Waiting Time
P1	7	7	✓
P2	12	11	7
P3	9	✓	0
P4	8	4	3

$$\text{Average TT} = \frac{24}{4} = 6 \text{ units}$$

$$\text{Average WT} = \frac{12}{4} = 3 \text{ units}$$

Consider the set of processes whose arrival time and burst time are given below:

Set 1

Process	Arrival Time	Burst Time
P ₁	0	18
P ₂	1	4
P ₃	2	7
P ₄	3	2

Set 2

Process	Arrival Time	Burst Time
P ₁	0	8
P ₂	1	2
P ₃	4	3

Set 3

Process	Arrival Time	Burst Time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

If the CPU scheduling policy is *Shortest-Remaining-Time (SRT)*, calculate the *Average Waiting Time* and *Average Turnaround Time*.

Set 1

Process	Arrival Time	Burst Time
P ₁	0	18 ✓ 17
P ₂	1	4 ✓
P ₃	2	7
P ₄	3	2 ✓

Chaitin Chart



17.75
5

Set 2

Process	Arrival Time	Burst Time
P ₁	0	8 1✓ 7 1✓ 6✓
P ₂	1	2 ✓
P ₃	4	3 ✓

Chattt Chart



6
1.67

Set 3

Process	Arrival Time	Burst Time
P ₁	0	8 ✓, 7
P ₂	1	4 ✓, 3 ✓
P ₃	2	9 ✓, 8
P ₄	3	5 ✓

Chart Chart



13

6.5

Consider the set of processes whose arrival time and burst time are given below:

Set 1

Process	Arrival Time	Burst Time
P ₁	0	5
P ₂	1	7
P ₃	2	3
P ₄	3	4

If the CPU scheduling policy is *Round Robin* with *time quantum = 2*, calculate the *Average Turnaround Time* and *Average Waiting Time*.

Set 2

Process	Arrival Time	Burst Time
P ₁	0	4
P ₂	1	5
P ₃	2	2
P ₄	3	1
P ₅	4	6
P ₆	6	3

If the CPU scheduling policy is *Round Robin* with *time quantum = 3*, calculate the *Average Turnaround Time* and *Average Waiting Time*.

Set 3

Process	Arrival Time	Burst Time
P ₁	5	5
P ₂	4	6
P ₃	3	7
P ₄	1	9
P ₅	2	2
P ₆	6	3

If the CPU scheduling policy is *Round Robin* with *time quantum = 4*, calculate the *Average Turnaround Time* and *Average Waiting Time*.

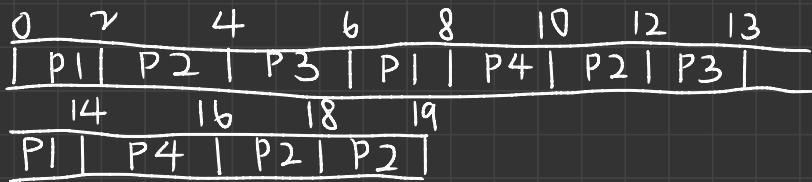
Consider the set of processes whose arrival time and burst time are given below.

Set 1

Process	Arrival Time	Burst Time
P ₁	0	6 X 1 0 ✓
P ₂	1	1 8 X 1 0 ✓
P ₃	2	3 X 0 ✓
P ₄	3	4 X 0 ✓

If the CPU scheduling policy is *Round Robin* with *time quantum = 2*, calculate the *Average Turnaround Time* and *Average Waiting Time*.

Grantt Chart



Waiting list

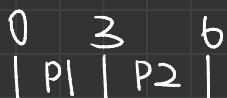
- P2
P3
P1
P4
P2
P3
P1
P4
P2
P2

Set 2

Process	Arrival Time	Burst Time
P ₁	0	4 1
P ₂	1	6 2
P ₃	2	2
P ₄	3	1
P ₅	4	6
P ₆	6	3

If the CPU scheduling policy is *Round Robin* with time quantum = 3, calculate the Average Turnaround Time and Average Waiting Time.

Grantt Chart



Waiting List
P1

