

Name: Halimo Nur Ibrahim
ID: C122566
Class: CA223

Exercise 1 First-Come, First-Served without Arrival Time

Gantt Chart:

| P1 | P2 | P3 | P4 |

0 5 9 15 18

Step-by-step Calculation:

- WT: $BT(i-1) + WT(i-1)$ = P1 = 0 is default, P2 = 5 + 0 = 5, P3 = 4 + 5 = 9, P4 = 6 + 9 = 15
- TAT: $BT + WT$ = P1 = 5 + 0 = 5, P2 = 4 + 5 = 9, P3 = 6 + 9 = 15, P4 = 3 + 15 = 18
- AVG WT = $29 / 4 = 7.25$, AVG TAT = $47 / 4 = 11.75$

P	AT	BT	ST	CT	WT	TAT
1	0	5	0	5	0	5
2	0	4	5	9	5	9
3	0	6	9	15	9	15
4	0	3	15	18	15	18

Exercise 2 First-Come, First-Served without Arrival Time (Set 2)

Gantt Chart:

| P1 | P2 | P3 | P4 | P5 |

0 1 4 6 13 18

Step-by-step Calculation:

- WT: $BT(i-1) + WT(i-1)$ = P1 = 0, P2 = 1 + 0 = 1, P3 = 3 + 1 = 4, P4 = 2 + 4 = 6, P5 = 7 + 6 = 13
- TAT: $BT + WT$ = P1 = 1 + 0 = 1, P2 = 3 + 1 = 4, P3 = 2 + 4 = 6, P4 = 7 + 6 = 13, P5 = 5 + 13 = 18
- AVG WT = $24 / 5 = 4.8$, AVG TAT = $42 / 5 = 8.4$

P	AT	BT	ST	CT	WT	TAT
1	0	1	0	1	0	1
2	0	3	1	4	1	4
3	0	2	4	6	4	6
4	0	7	6	13	6	13
5	0	5	13	18	13	18

Exercise 3 FCFS With Arrival Time

Gantt Chart:

| P1 | P2 | P3 | P4 | P5 |

0 4 9 11 17 20

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 4 - 4 - 0 = 0$, $P2 = 9 - 5 - 1 = 3$, $P3 = 11 - 2 - 3 = 6$, $P4 = 17 - 6 - 5 = 6$, $P5 = 20 - 3 - 6 = 11$
- TAT: $CT - AT = P1 = 4 - 0 = 4$, $P2 = 9 - 1 = 8$, $P3 = 11 - 3 = 8$, $P4 = 17 - 5 = 12$, $P5 = 20 - 6 = 14$
- AVG WT = $26 / 5 = 5.2$, AVG TAT = $46 / 5 = 9.2$

P	AT	BT	ST	CT	WT	TAT
1	0	4	0	4	0	4
2	1	5	4	9	3	8
3	3	2	9	11	6	8
4	5	6	11	17	6	12
5	6	3	17	20	11	14

Exercise 4 FCFS With Arrival Time (Set 2)

Gantt Chart:

| P1 | P2 | P3 | P4 | P5 |
0 5 8 14 16 20

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 5 - 5 - 0 = 0$, $P2 = 8 - 3 - 2 = 3$, $P3 = 14 - 6 - 4 = 4$, $P4 = 16 - 2 - 6 = 8$, $P5 = 20 - 4 - 8 = 8$
- TAT: $CT - AT = P1 = 5 - 0 = 5$, $P2 = 8 - 2 = 6$, $P3 = 14 - 4 = 10$, $P4 = 16 - 6 = 10$, $P5 = 20 - 8 = 12$
- AVG WT = $23 / 5 = 4.6$, AVG TAT = $43 / 5 = 8.6$

P	AT	BT	ST	CT	WT	TAT
1	0	5	0	5	0	5
2	2	3	5	8	3	6
3	4	6	8	14	4	10
4	6	2	14	16	8	10
5	8	4	16	20	8	12

Exercise 5 SRTF Preemptive

Gantt Chart:

| P1 | P2 | P4 | P1 | P3 |
0 1 5 10 17 26

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 17 - 8 - 0 = 9$, $P2 = 5 - 4 - 1 = 0$, $P3 = 26 - 9 - 2 = 15$, $P4 = 10 - 5 - 4 = 1$
- TAT: $CT - AT = P1 = 17 - 0 = 17$, $P2 = 5 - 1 = 4$, $P3 = 26 - 2 = 24$, $P4 = 10 - 4 = 6$
- AVG WT = $25 / 4 = 6.25$, AVG TAT = $51 / 4 = 12.75$

P	AT	BT	ST	CT	WT	TAT
1	0	8	0	17	9	17
2	1	4	1	5	0	4

3	2	9	17	26	15	24
4	4	5	5	10	1	6

Exercise 6 SJF Non Preemptive

Gantt Chart:

| P1 | P3 | P4 | P2 |
0 6 10 13 23

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 6 - 6 - 0 = 0$, $P2 = 23 - 10 - 4 = 9$, $P3 = 10 - 4 - 4 = 2$, $P4 = 13 - 3 - 8 = 2$
- TAT: $CT - AT = P1 = 6 - 0 = 6$, $P2 = 23 - 4 = 19$, $P3 = 10 - 4 = 6$, $P4 = 13 - 8 = 5$
- AVG WT = $13 / 4 = 3.25$, AVG TAT = $36 / 4 = 9.00$

P	AT	BT	ST	CT	WT	TAT
1	0	6	0	6	0	6
2	4	10	13	23	9	19
3	4	4	6	10	2	6
4	8	3	10	13	2	5

Exercise 7 Priority Preemptive

Gantt Chart:

| P1 | P2 | P4 | P5 | P4 | P1 | P3 |
0 1 5 6 9 10 17 22

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 17 - 8 - 0 = 9$, $P2 = 5 - 4 - 1 = 0$, $P3 = 22 - 5 - 2 = 15$, $P4 = 10 - 2 - 4 = 4$, $P5 = 9 - 3 - 6 = 0$
- TAT: $CT - AT = P1 = 17 - 0 = 17$, $P2 = 5 - 1 = 4$, $P3 = 22 - 2 = 20$, $P4 = 10 - 4 = 6$, $P5 = 9 - 6 = 3$
- AVG WT = $28 / 5 = 5.6$, AVG TAT = $50 / 5 = 10.0$

P	AT	BT	Pri	ST	CT	WT	TAT
1	0	8	4	0	17	9	17
2	1	4	2	1	5	0	4
3	2	5	5	17	22	15	20
4	4	2	3	5	10	4	6
5	6	3	1	6	9	0	3

Exercise 8 RR TQ=5

Gantt Chart:

| P1 | P2 | P3 | P4 | P1 | P4 |
1 6 10 15 20 24 25

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 24 - 9 - 1 = 14$, $P2 = 10 - 4 - 2 = 4$, $P3 = 15 - 5 - 3 = 7$, $P4 = 25 - 6 - 3 = 16$
- TAT: $CT - AT = P1 = 24 - 1 = 23$, $P2 = 10 - 2 = 8$, $P3 = 15 - 3 = 12$, $P4 = 25 - 3 = 22$
- AVG WT = $41 / 4 = 10.25$, AVG TAT = $65 / 4 = 16.25$

P	AT	BT	TQ	ST	CT	WT	TAT
1	1	9	5	1	24	14	23
2	2	4	5	6	10	4	8
3	3	5	5	10	15	7	12
4	3	6	5	15	25	16	22

Exercise 9 RR TQ=3**Gantt Chart:**

| P1 | P2 | P3 | P4 | P1 | P5 | P2 | P3 | P4 | P2 | P3 |
 0 3 6 9 12 13 15 18 21 23 25 26

Step-by-step Calculation:

- WT: $CT - BT - AT = P1 = 13 - 4 - 0 = 9$, $P2 = 25 - 8 - 1 = 16$, $P3 = 26 - 7 - 2 = 17$, $P4 = 23 - 5 - 2 = 16$, $P5 = 15 - 2 - 4 = 9$
- TAT: $CT - AT = P1 = 13 - 0 = 13$, $P2 = 25 - 1 = 24$, $P3 = 26 - 2 = 24$, $P4 = 23 - 2 = 21$, $P5 = 15 - 4 = 11$
- AVG WT = $67 / 5 = 13.4$, AVG TAT = $93 / 5 = 18.6$

P	AT	BT	TQ	ST	CT	WT	TAT
1	0	4	3	0	13	9	13
2	1	8	3	3	25	16	24
3	2	7	3	6	26	17	24
4	2	5	3	9	23	16	21
5	4	2	3	13	15	9	11