Operating system

Assignment 2

Part E

1. Consider the following processes with arrival times and burst times:

| **Process** | **Arrival Time** | **Burst Time** |

|---------|--------------|------------|

| **P1** | **0** | **5** |

| **P2** | **1** | **3** |

| **P3** | **2** | **6** |

Calculate the average waiting time using First-Come, First-Served (FCFS) scheduling.

Answer:

Process	Arrival Time	Burst Time	Waiting time	Completion time	Turnaround time
P1	0	5	0	5	5
P2	1	3	4	8	7
P3	2	6	6	14	12
Avg times-			3.3		8

Gantt chart

P1	P2	P3

0 5 8 14

Calculations:

Average waiting time = sum of all process waiting time / no of process

= 0+4+6/3

= 3.3

Average turnaround time = sum of all process turnaround time / no of process

= 5+7+12/3

= 8

2. Consider the following processes with arrival times and burst times:

| Process | Arrival Time | Burst Time |

|---------|--------------|------------|

| P1 | 0 | 3 |

| P2 | 1 | 5 |

| P3 | 2 | 1 |

| P4 | 3 | 4 |

Calculate the average turnaround time using Shortest Job First (SJF) scheduling.

Answers:

Process	Arrival Time	Burst Time	Waiting time	Completion time	Turnaround time
P1	0	3	0	3	3
P2	1	5	7	13	12
P3	2	1	1	4	2
P4	3	4	1	8	5
			2.25		5.5

Gantt Chart

P1	P3	P4	P2

0 3 4 8 13

Calculations:

Average waiting time = sum of all process waiting time / no of process

= 0+7+1+1/4

= 2.25

Average turnaround time = sum of all process turnaround time / no of process

= 3+12+2+5/4

= 5.5

3. Consider the following processes with arrival times, burst times, and priorities (lower number indicates higher priority):

| Process | Arrival Time | Burst Time | Priority |

|---------|--------------|------------|----------|

| P1 | 0 | 6 | 3 |

| P2 | 1 | 4 | 1 |

| P3 | 2 | 7 | 4 |

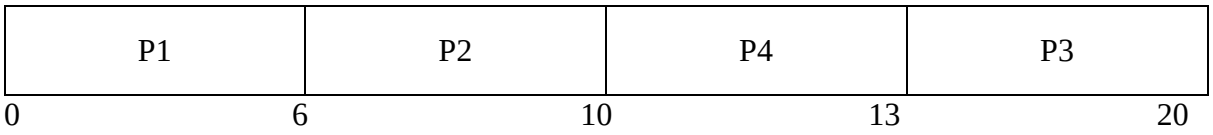
| P4 | 3 | 2 | 2 |

Calculate the average waiting time using Priority Scheduling.

Answers:

Process	Arrival Time	Burst Time	Priority	Waiting time	Completion time	Turnaround time
P1	0	6	3	0	6	6
P2	1	4	1	5	10	9
P3	2	7	4	11	20	18
P4	3	2	2	7	13	10
average				5.75		10.75

Gantt Chart:



Average waiting time = sum of all process waiting time / no of process

= 0+5+11+7/4

= 5.75

Average turnaround time = sum of all process turnaround time / no of process

= 6+9+18+10/4

= 10.75

4. Consider the following processes with arrival times and burst times, and the time quantum for Round Robin scheduling is 2 units:

| Process | Arrival Time | Burst Time |

|---------|--------------|------------|

| P1 | 0 | 4 |

| P2 | 1 | 5 |

| P3 | 2 | 2 |

| P4 | 3 | 3 |

Calculate the average turnaround time using Round Robin scheduling.

Answer:

Process	Arrival Time	Burst Time	Waiting time	Completion time	Turnaround time
P1	0	4	6	10	10
P2	1	5	8	14	13
P3	2	2	2	6	4
P4	3	3	7	13	10
Average			5.75		9.25

Gantt Chart:

P1	P2	P3	P4	P1	P2	P4	P2

0 2 4 6 8 10 12 13 14

calculations

Average waiting time = sum of all process waiting time / no of process

= 6+8+2+7/4

= 5.75

Average turnaround time = sum of all process turnaround time / no of process

= 10+13+4+10/4

= 9.25

5. Consider a program that uses the fork() system call to create a child process. Initially, the parent process has a variable x with a value of 5. After forking, both the parent and child processes increment the value of x by 1. What will be the final values of x in the parent and child processes after the fork() call?

Value of x will be 6