OPERATING SYSTEMS

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HOMEWORK 5

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**Process Burst Time Priority**

***P*1 2 2**

***P*2 1 1**

***P*3 8 4**

***P*4 4 2**

***P*5 5 3**

**a.The Gnatt Chart of the four scheduling mechanisms w.r.t above mentioned time is as follows**

**1.FCFS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | P2 | P3 | P4 | P5 |

0 2 3 11 15 20

Waiting Time

|  |  |
| --- | --- |
| Waiting Time | Turnaround Time |
| P1 – 0 | P1=2+0=2 |
| P2 – 2 | P2=2+1=3 |
| P3 – 3 | P3=3+8=11 |
| P4 – 11 | P4=11+4=15 |
| P5 – 15 | P5=15+5=20 |

Average Waiting Time : 0+2+3+11+15/5 =6.2 secs

Average TurnAround Time= 2+3+11+15+20/5=10.2 secs

**2.SJF**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P2 | P1 | P4 | P5 | P3 |

0 1 3 7 12 20

Waiting Time

|  |  |
| --- | --- |
| Waiting Time | Turnaround Time |
| P1 – 1 | P1= 1+2=3 |
| P2 – 0 | P2=0+1=1 |
| P3 – 12 | P3= 12+8=20 |
| P4 – 3 | P4=3+4=7 |
| P5 – 7 | P5=7+5=12 |

Average Waiting Time : 1+0+12+3+7/5 = 4.6 secs

Average TurnAround Time= 3+1+20+7+12/5=8.6 secs

3.**Non Premptive Priority**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P3 | P5 | P1 | P4 | P2 |

0 8 13 15 19 20

|  |  |
| --- | --- |
| Waiting Time | Turnaround Time |
| P1 – 13 | P1= 13+2=15 |
| P2 – 19 | P2= 19+1=20 |
| P3 – 0 | P3= 0+8=8 |
| P4 – 15 | P4= 15+4=19 |
| P5 – 8 | P5= 8+5=13 |

Average Waiting Time: 13+19+0+15+9/5=11

Average Turnaround Time= 15+20+8+19+13=11.4

**4.Round Robin Time Quantum=2**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P1 | P2 | P3 | P4 | P5 | P3 | P4 | P5 | P3 | P5 | P3 |

0 2 3 5 7 9 11 13 15 17 18 20

Waiting Time of p1=0 Waiting Time of p2=2 Waiting Time of p3=3+4+4+1=12 Waiting Time of p4=5+4=9 Waiting Time of p5=7+4+2=13

Average Waiting Time=0+2+12+9+13/5=7.2

Average Turn Around Time

Turnaround Time of p1= 0+2 =2 Turnaround Time of p2= 2+1 =3 Turnaround Time of p3= 12 +8=20 Turnaround Time of p4= 9 +4=13 Turnaround Time of p5= 13 + 5=18

Average Turn Around Time:2+3+20+13+18=11.2

b.

Turnaround Time of FCFS = 10.2 secs Turnaround Time of SJF= 8.6 secs Turnaround Time of Non-Preemptive Priority = 11.4 secs Turnaround Time of = 11.2 secs

c.

Waiting Time of FCFS= 6.2 secs Waiting Time of SJF=4.6 secs Waiting Time of Non-Preemptive Priority =11 secs Waiting Time of = 7.2 secs

d. SJF Algorithm results in average minimum waiting time of 4.6 secs

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|  |  |  |  |
| --- | --- | --- | --- |
| Thread | Priority | Burst | Arrival |
| P1 | 40 | 20 | 0 |
| P2 | 30 | 25 | 25 |
| P3 | 30 | 25 | 30 |
| P4 | 35 | 15 | 60 |
| P5 | 5 | 10 | 100 |
| P6 | 10 | 10 | 105 |

a.Gannt Chart

The length of a time quantum is 10 units.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P1 | Pidle | P2 | P3 | P1 | P2 | P4 | P2 | P3 | P4 | P3 |

0 10 25 35 45 55 60 70 80 90 95 100

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FCFS: All jobs are executed in a sequence, therefore there won’t be any starvation

RR: All jobs are given equal amount of time slot for execution, therefore they wont be any starvation

SHORTEST JOB FIRST: may cause large jobs wait indefinitely for execution slot, this could lead to starvation,

PRIORITY BASED SCHEDULING: algorithms may cause low priority jobs to wait definitely for execution slot, this could result in starvation

**Therefore SJF and Priority based scheduling may lead to starvation.**

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