

Assignment – 2

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Objective: Make OS Process Scheduler Simulator

Simulator Parameters:

- Processes (Input at run-time)
 - Number of Processes (=5)
 - Mean Inter-arrival time (=3)
 - Mean Burst-time (=8)
- Scheduler (Defined in code)
 - RR Timeslice (=1)
 - MLFQ number of queues (=3)
 - MLFQ timeslice for each queue (= {1, 2, 3})
 - MLFQ reset time (=10)

FIFO

```
aby03@aby03-X550JX:~/Workspaces/MTL458/lab2/OS_Scheduler$ ./bin/simulator
Number of Processes: 5
Mean Time (Inter-arrival time): 3
5.28 1.11 2.31 10.17
Mean Time (Burst time): 8
2.23 4.33 13.43 8.84 6.80

*****FIFO*****

+-----+-----+-----+-----+-----+-----+
| PID | Burst Time | Response Time | Turn-Around Time | Arrival Time | Completion Time |
+-----+-----+-----+-----+-----+-----+
| 1 | 02.23 | 00.00 | 02.23 | 00.00 | 02.23 |
+-----+-----+-----+-----+-----+-----+
| 2 | 04.33 | 00.00 | 04.33 | 05.28 | 09.61 |
+-----+-----+-----+-----+-----+-----+
| 3 | 13.43 | 03.22 | 16.64 | 06.39 | 23.03 |
+-----+-----+-----+-----+-----+-----+
| 4 | 08.84 | 14.33 | 23.17 | 08.70 | 31.87 |
+-----+-----+-----+-----+-----+-----+
| 5 | 06.80 | 13.00 | 19.81 | 18.87 | 38.68 |
+-----+-----+-----+-----+-----+-----+

Total Response Time: 30.55
Average Response Time: 6.11
Total Turnaround Time: 66.18
Average Turnaround Time: 13.24

+-----+-----+-----+-----+-----+-----+
| P1 | NA | P2 | P3 | P4 | P5 |
+-----+-----+-----+-----+-----+-----+
0 2.23 5.28 9.61 23.03 31.87 38.68
*****
```

Conclusion: Processes are completed in the order of their arrival time

Round Robin

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*****RR*****
+-----+-----+-----+-----+-----+-----+
| PID | Burst Time | Response Time | Turn-Around Time | Arrival Time | Completion Time |
+-----+-----+-----+-----+-----+-----+
| 1 | 02.23 | 00.00 | 02.23 | 00.00 | 02.23 |
+-----+-----+-----+-----+-----+-----+
| 2 | 04.33 | 00.00 | 09.33 | 05.28 | 14.61 |
+-----+-----+-----+-----+-----+-----+
| 4 | 08.84 | 01.58 | 23.75 | 08.70 | 32.45 |
+-----+-----+-----+-----+-----+-----+
| 5 | 06.80 | 01.74 | 18.38 | 18.87 | 37.25 |
+-----+-----+-----+-----+-----+-----+
| 3 | 13.43 | 00.89 | 32.28 | 06.39 | 38.68 |
+-----+-----+-----+-----+-----+-----+

Total Response Time: 4.21
Average Response Time: 0.84
Total Turnaround Time: 85.97
Average Turnaround Time: 17.19
+-----+-----+-----+-----+-----+-----+
| P1 | P1 | P1 | NA | P2 | P2 | P3 | P2 | P3 | P4 |
+-----+-----+-----+-----+-----+-----+
0 1.0 2.0 2.2 5.28 6.3 7.3 8.3 9.3 10.3 11.3
+-----+-----+-----+-----+-----+-----+
| P2 | P3 | P4 | P2 | P3 | P4 | P3 | P4 | P3 | P4 |
+-----+-----+-----+-----+-----+-----+
12.3 13.3 14.3 14.6 15.6 16.6 17.6 18.6 19.6 20.6
+-----+-----+-----+-----+-----+-----+
| P5 | P3 | P4 | P5 | P3 | P4 | P5 | P3 | P4 | P5 |
+-----+-----+-----+-----+-----+-----+
21.6 22.6 23.6 24.6 25.6 26.6 27.6 28.6 29.6 30.6
+-----+-----+-----+-----+-----+-----+
| P3 | P4 | P5 | P3 | P5 | P3 | P5 | P3 | P3 |
+-----+-----+-----+-----+-----+-----+
31.6 32.4 33.4 34.4 35.4 36.4 37.3 38.3 38.7
*****
```

Conclusion: Round Robin has better response time as compared to FIFO but worse turnaround time

SJF

```
*****SJF*****
+-----+-----+-----+-----+-----+-----+
| PID | Burst Time | Response Time | Turn-Around Time | Arrival Time | Completion Time |
+-----+-----+-----+-----+-----+-----+
| 1 | 02.23 | 00.00 | 02.23 | 00.00 | 02.23 |
+-----+-----+-----+-----+-----+-----+
| 2 | 04.33 | 00.00 | 04.33 | 05.28 | 09.61 |
+-----+-----+-----+-----+-----+-----+
| 4 | 08.84 | 00.91 | 09.75 | 08.70 | 18.45 |
+-----+-----+-----+-----+-----+-----+
| 3 | 13.43 | 12.05 | 25.48 | 06.39 | 31.87 |
+-----+-----+-----+-----+-----+-----+
| 5 | 06.80 | 13.00 | 19.81 | 18.87 | 38.68 |
+-----+-----+-----+-----+-----+-----+

Total Response Time: 25.96
Average Response Time: 5.19
Total Turnaround Time: 61.59
Average Turnaround Time: 12.32
+-----+-----+-----+-----+-----+-----+
| P1 | NA | P2 | P4 | P3 | P5 |
+-----+-----+-----+-----+-----+-----+
0 2.23 5.28 9.61 18.45 31.87 38.68
*****
```

Concusion: SJF has worse response time but better turnaround time

SRTF

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*****SRTF*****
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PID	Burst Time	Response Time	Turn-Around Time	Arrival Time	Completion Time
1	02.23	00.00	02.23	00.00	02.23
2	04.33	00.00	04.33	05.28	09.61
4	08.84	00.91	09.75	08.70	18.45
5	06.80	00.00	06.80	18.87	25.67
3	13.43	12.05	32.28	06.39	38.68

Total Response Time: 12.96
Average Response Time: 2.59
Total Turnaround Time: 55.39
Average Turnaround Time: 11.08

P1	NA	P2	P2	P2	P4	P3	P5	P3	
0	2.23	5.28	6.39	8.70	9.6	18.45	18.9	25.67	38.68

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Conclusion: SRTF has least completion and turn-around time for processes

MLFQ

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*****MLFQ*****
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PID	Burst Time	Response Time	Turn-Around Time	Arrival Time	Completion Time
1	02.23	00.00	02.23	00.00	02.23
2	04.33	00.00	08.33	05.28	13.61
5	06.80	00.00	14.80	18.87	33.67
4	08.84	00.00	27.81	08.70	36.51
3	13.43	00.00	32.28	06.39	38.68

Total Response Time: 0.00
Average Response Time: 0.00
Total Turnaround Time: 85.46
Average Turnaround Time: 17.09

P1	P1	NA	P2	P2	P3	P2	P4	P2	P2	
0	1.0	2.23	5.28	6.3	6.4	7.4	8.70	9.7	10.0	11.0
P3	P4	P2	P3	P4	P3	P5	P5	P5	P3	
12.0	13.0	13.6	15.61	17.61	18.87	19.9	20.0	21.0	22.0	
P4	P5	P3	P4	P5	P5	P3	P4	P5	P3	
23.0	25.00	27.00	29.00	30.0	31.0	32.0	33.0	33.7	35.67	
P4	P3									
36.5	38.68									

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Conclusion: MLFQ has the least response time amongst all

Final Conclusions

Average Response Time: MLFQ < RR < SRTF < SJF < FIFO

Average Turnaround Time: SRTF < SJF < FIFO < MLFQ < RR

Average Completion Time: SRTF < SJF < FIFO < MLFQ < RR