

Group 18 README File

Q1

1a)

batch1.txt

Non-Premptive FCFS:

Batch execution time: 12389

Average turn-around time: 12384

Average waiting time: 13520

Completion time: avg: 14759, max: 14766, min: 14753

CPU bursts: count: 61, avg: 203, max: 300, min: 1

batch1.txt

Premptive-RoundRobin (RR):

Batch execution time: 16557

Average turn-around time: 16417

Average waiting time: 15542

Completion time: avg: 17197, max: 17330, min: 16991

CPU bursts: count: 16550, avg: 1, max: 1, min: 1

Explanation:

The round robin involves more context switches BUT relieves us from the effect of convoy effect. Thus, we find that the turn-around time; batch execution time values; and average waiting time are approximately same. The completion time is lower for FCFS.

1b)

batch2.txt

Non-Premptive FCFS:

Batch execution time: 13051

Average turn-around time: 13046

Average waiting time: 12378

Completion time: avg: 13683, max: 13691, min: 13676

CPU bursts: count: 62, avg: 210, max: 269, min: 1

batch2.txt

Premptive RoundRobin (RR):

Batch execution time: 21756

Average turn-around time: 21450

Average waiting time: 19981

Completion time: avg: 22155, max: 22443, min: 21763

CPU bursts: count: 21746, avg: 1, max: 1, min: 1

Explanation:

The round robin has higher values of batch execution time and average turnaround time. This case has lower IO bursts thus the difference in values of batch execution time, turn-around time and waiting time is larger in this case.

1c)

batch7.txt

Non-Premptive FCFS:

Batch execution time: 16348

Average turn-around time: 9089

Average waiting time: 8189

Completion time: avg: 9824, max: 17086, min: 2525

CPU bursts: count: 12, avg: 1362, max: 1785, min: 1

batch7.txt
Preemptive RoundRobin (RR):
Batch execution time: 21165
Average turn-around time: 20993
Average waiting time: 21152
Completion time: avg: 23267, max: 23423, min: 23005
CPU bursts: count: 21155, avg: 1, max: 1, min: 1

Explanation:

The difference in FCFS and RR increases here. (the turn-around times and waiting times of RR are approximately double that of FCFS). Since we have only 2 IO bursts. However, due to lower IO bursts, the turnaround and waiting times in 1c is lowest of 1a, 1b and 1c; wrt Both FCFS and RR.

Q2

batch2.txt
NonPreemptive SJF:

Batch execution time: 10829
Average turn-around time: 9622
Average waiting time: 9495
Completion time: avg: 10578, max: 11788, min: 9367
CPU bursts: count: 59, avg: 183, max: 300, min: 1
CPU burst estimates: count: 59, avg: 148, max: 237, min: 101
CPU burst estimation error: count: 49, avg: 119

batch3.txt
NonPreemptive SJF:
Batch execution time: 44246
Average turn-around time: 34849
Average waiting time: 47472
Completion time: avg: 51896, max: 61295, min: 43458
CPU bursts: count: 210, avg: 210, max: 325, min: 1
CPU burst estimates: count: 210, avg: 200, max: 282, min: 98
CPU burst estimation error: count: 200, avg: 50

Explanation:

-Since outer loop limit is 4 times, we find that the average turn-around time, batch execution time, average waiting time and cpu burst count and cpu burst estimate count are all approximately 4 times. The average cpu burst and average cpu burst estimate are approximately the same.

- Since later on, we will get the true estimate no matter from where we start, we get lower average CPU burst estimation error. The time (or the required outer-limit) to get the average error below a particular threshold depends on the constants we used to calculate SJF.

The -ratio => (the average CPU burst estimation error per estimation instance)/(the average CPU burst length).

The ratio value decreases because we get more accurate estimation of CPU_burst. This value reaches closer to better estimation with more runs; though no. Of runs needed to reach the value depends on the constants.

Q3

batch4.txt
NonPreemptive FCFS
Batch execution time: 7587

Average turn-around time: 7584
Average waiting time: 7783
Completion time: avg: 8542, max: 8546, min: 8538
CPU bursts: count: 60, avg: 126, max: 268, min: 1

batch4.txt
NonPreemptive SJF
Batch execution time: 7917
Average turn-around time: 5824
Average waiting time: 5634
Completion time: avg: 6425, max: 8521, min: 4145
CPU bursts: count: 61, avg: 129, max: 281, min: 1
CPU burst estimates: count: 61, avg: 104, max: 237, min: 48
CPU burst estimation error: count: 51, avg: 93

Explanation:

- The turnaround time of SJF is the least of the two, which should be minimum.
- FCFS waiting time is more due to the convoy effect. i.e. the long job waits for IO to be completed without getting preempted.
- Since we are selecting the shortest job in SJF, we are getting a slightly higher batch execution time in SJF

Q4

4a)

batch5.txt
Preemptive RoundRobin (RR):
Batch execution time: 11314
Average turn-around time: 11288
Average waiting time: 11572
Completion time: avg: 12703, max: 12726, min: 12666
CPU bursts: count: 11310, avg: 1, max: 1, min: 1

batch5.txt
Preemptive Unix
Batch execution time: 9243
Average turn-around time: 924
Average waiting time: 19474
Completion time: avg: 2367, max: 23678, min: 23678

Explanation:

We have reduced turnaround time for Preemptive Unix Scheduler. This is because Unix Scheduler runs just as a Preemptive SJF with priorities set as per the burst used (cpu usage).

4b)

batch6.txt
Preemptive RoundRobin (RR):
Batch execution time: 10255
Average turn-around time: 10241
Average waiting time: 9928
Completion time: avg: 10953, max: 10967, min: 10936
CPU bursts: count: 10249, avg: 1, max: 1, min: 1

batch6.txt
Preemptive Unix
Batch execution time: 9529
Average turn-around time: 953

Average waiting time: 14337

Completion time: avg: 1844, max: 18448, min: 18448

Explanation:

We have reduced turnaround time for Preemptive Unix Scheduler. This is because Unix Scheduler runs just as a Preemptive SJF with priorities set as per the burst used (cpu usage).

The exact output files are attached in the zip