

Year/2022

Course Code:1DV512

Assignment#:2

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Report

Random Scheduling

Part-1: Answers to given questions

- 1. Do the simulation results for the non-preemptive and preemptive versions of the scheduling algorithm differ with any observable patterns?**

Yes, the results differ. The total time taken by simulation and total waiting times of processes of pre-emptive are greater than that of non-preemptive.

- 2. Would the observable behaviour for non-preemptive vs preemptive versions be different, if the RNG seed was different? What if the number of simulations was increased to, e.g., 10000?**

Yes, the behaviour would be different because RNG seed will generate new pattern on which the processes would enter the processes queue according to their probability.

The code is generic and can run any possible number of simulations and would still result in different observable pattern for preemptive vs non-preemptive.

- 3. What are the advantages and disadvantages of such a random scheduling algorithm compared to the First Come First Served (FCFS) algorithm?**

FCFS uses simple logic, is easier to implement, every process will run hence starvation will not occur but in FCFS average waiting time is not optimal, it is non-preemptive in nature.

Random scheduling will allow every process to execute for a specific amount of time hence decreasing starvation in preemptive approach whereas the implementation is difficult and complex for this kind of scheduling. Random scheduling will decrease total execution time and allow random burst times for processes to execute.

Part-2: Implementation and output

The algorithm is implemented in native java programming language. ArrayList data structure is used to store a process that needs execution. Two ArrayLists are maintained, processes and **completed_processes**, first one. A variable named current_process holds reference of the process to be executed. Preemptive and non-preemptive, both approaches are implemented. After the completion of simulation, information regarding it is shown. Next page onwards are the screenshots of output.

Running non-preemptive simulation #0

Simulation results:

ID	Burst	Arrival	Total Waiting Time

0	4	7	7
5	7	11	11
6	4	13	18
3	10	10	22
8	9	14	32
9	2	15	41
2	3	9	43
4	9	11	46
7	2	13	55
1	9	8	57

Total simulation time : 66

Average Total Waiting Time : 33

Running non-preemptive simulation #1

Simulation results:

ID	Burst	Arrival	Total Waiting Time

0	2	0	0
1	7	1	2
5	4	5	9
6	7	6	13
3	4	4	20
7	3	7	24
4	2	5	27
8	4	8	29
2	2	3	33
9	3	8	35

Total simulation time : 38

Average Total Waiting Time : 19

Running non-preemptive simulation #2

Simulation results:

ID	Burst	Arrival	Total Waiting Time
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0	3	0	0
1	6	2	3
2	2	5	9
3	10	7	11
4	6	11	21
7	10	17	27
8	5	18	37
6	3	16	42
9	2	18	45
5	5	13	47

Total simulation time : 52

Average Total Waiting Time : 24

Running non-preemptive simulation #3

Simulation results:

ID	Burst	Arrival	Total Waiting Time
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0	3	0	0
1	5	6	6
2	8	9	11
3	8	12	19
9	9	25	27
6	4	16	36
7	3	18	40
5	9	16	43
8	3	20	52
4	4	15	55

Total simulation time : 59

Average Total Waiting Time : 28

Running non-preemptive simulation #4

Simulation results:

ID	Burst	Arrival	Total Waiting Time

0	5	0	0
1	7	6	6
2	5	8	13
5	8	16	18
8	6	20	26
3	10	14	32
4	6	15	42
6	4	17	48
9	6	23	52
7	9	18	58

Total simulation time : 67

Average Total Waiting Time : 29

Running preemptive simulation #0

Simulation results:

ID	Burst	Arrival	Total Waiting Time

0	3	0	0
2	4	5	7
4	7	11	11
1	3	3	16
6	6	19	25
3	9	7	33
8	8	23	36
5	8	15	42
7	8	23	50
9	7	25	56

Total simulation time : 64

Average Total Waiting Time : 27

Running preemptive simulation #1

Simulation results:

ID	Burst	Arrival	Total	Waiting Time
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0	8	0	0	
1	2	4	10	
2	10	8	10	
6	9	30	40	
9	5	40	49	
5	8	26	50	
8	3	38	56	
3	8	14	55	
4	5	22	61	
7	9	32	58	

Total simulation time : 68

Average Total Waiting Time : 38

Running preemptive simulation #2

Simulation results:

ID	Burst	Arrival	Total	Waiting Time
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0	5	0	2	
1	10	2	5	
3	9	19	25	
2	10	15	30	
6	9	31	38	
4	4	21	47	
7	2	34	63	
9	7	38	59	
5	10	27	62	
8	8	36	66	

Total simulation time : 75

Average Total Waiting Time : 39

Running preemptive simulation #3

Simulation results:

ID	Burst	Arrival	Total Waiting Time
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0	4	0	0
1	3	4	4
2	3	7	7
3	6	10	12
4	5	12	16
5	3	20	21
7	4	24	26
9	2	30	30
8	3	24	32
6	3	23	33

Total simulation time : 37

Average Total Waiting Time : 18

Running preemptive simulation #4

Simulation results:

ID	Burst	Arrival	Total Waiting Time
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0	4	0	6
6	2	10	12
5	2	10	14
2	8	2	10
8	3	18	20
4	5	6	29
1	4	0	32
9	10	20	40
3	9	4	44
7	10	14	47

Total simulation time : 58

Average Total Waiting Time : 25