

EOPSY Task 3 by Fernando Santana Falcón

Introduction:

1. Create a configuration file in which all processes run an average of 2000 milliseconds with a standard deviation of zero, and which are blocked for input or output every 500 milliseconds. Run the simulation for 10000 milliseconds with 2 processes. Examine the two output files. Try again for 5 processes. Try again for 10 processes. Explain what's happening.

→ 2 processes

```
// # of Process
numprocess 2

// mean deviation
meandev 2000

// standard deviation
standdev 0

// process # I/O blocking
process 500
process 500

// duration of the simulation in milliseconds
runtime 10000
```

Summary-Processes

```
Process: 0 registered... (2000 500 0 0)
Process: 0 I/O blocked... (2000 500 500 500)
Process: 1 registered... (2000 500 0 0)
Process: 1 I/O blocked... (2000 500 500 500)
Process: 0 registered... (2000 500 500 500)
Process: 0 I/O blocked... (2000 500 1000 1000)
Process: 1 registered... (2000 500 500 500)
Process: 1 I/O blocked... (2000 500 1000 1000)
Process: 0 registered... (2000 500 1000 1000)
Process: 0 I/O blocked... (2000 500 1500 1500)
Process: 1 registered... (2000 500 1000 1000)
Process: 1 I/O blocked... (2000 500 1500 1500)
Process: 0 registered... (2000 500 1500 1500)
Process: 0 completed... (2000 500 2000 2000)
Process: 1 registered... (2000 500 1500 1500)
Process: 1 completed... (2000 500 2000 2000)
```

Summary-Results

Scheduling Type: Batch (Nonpreemptive)

Scheduling Name: First-Come First-Served

Simulation Run Time: 4000

Mean: 2000

Standard Deviation: 0

Process #	CPU Time	IO Blocking	CPU Completed	CPU Blocked
0	2000 (ms)	500 (ms)	2000 (ms)	3 times
1	2000 (ms)	500 (ms)	2000 (ms)	3 times

➔ 5 processes

```
// # of Process
```

```
numprocess 5
```

```
// mean deviation
```

```
meandev 2000
```

```
// standard deviation
```

```
standdev 0
```

```
// process # I/O blocking
```

```
process 500
```

```
process 500
```

```
process 500
```

```
process 500
```

```
process 500
```

```
// duration of the simulation in milliseconds
```

```
runtime 10000
```

Summary-Processes

Process: 0 registered... (2000 500 0 0)

Process: 0 I/O blocked... (2000 500 500 500)

Process: 1 registered... (2000 500 0 0)

Process: 1 I/O blocked... (2000 500 500 500)

Process: 0 registered... (2000 500 500 500)

Process: 0 I/O blocked... (2000 500 1000 1000)

Process: 1 registered... (2000 500 500 500)

Process: 1 I/O blocked... (2000 500 1000 1000)

Process: 0 registered... (2000 500 1000 1000)

Process: 0 I/O blocked... (2000 500 1500 1500)

Process: 1 registered... (2000 500 1000 1000)

Process: 1 I/O blocked... (2000 500 1500 1500)

Process: 0 registered... (2000 500 1500 1500)

Process: 0 completed... (2000 500 2000 2000)

Process: 1 registered... (2000 500 1500 1500)
 Process: 1 completed... (2000 500 2000 2000)
 Process: 2 registered... (2000 500 0 0)
 Process: 2 I/O blocked... (2000 500 500 500)
 Process: 3 registered... (2000 500 0 0)
 Process: 3 I/O blocked... (2000 500 500 500)
 Process: 2 registered... (2000 500 500 500)
 Process: 2 I/O blocked... (2000 500 1000 1000)
 Process: 3 registered... (2000 500 500 500)
 Process: 3 I/O blocked... (2000 500 1000 1000)
 Process: 2 registered... (2000 500 1000 1000)
 Process: 2 I/O blocked... (2000 500 1500 1500)
 Process: 3 registered... (2000 500 1000 1000)
 Process: 3 I/O blocked... (2000 500 1500 1500)
 Process: 2 registered... (2000 500 1500 1500)
 Process: 2 completed... (2000 500 2000 2000)
 Process: 3 registered... (2000 500 1500 1500)
 Process: 3 completed... (2000 500 2000 2000)
 Process: 4 registered... (2000 500 0 0)
 Process: 4 I/O blocked... (2000 500 500 500)
 Process: 4 registered... (2000 500 500 500)
 Process: 4 I/O blocked... (2000 500 1000 1000)
 Process: 4 registered... (2000 500 1000 1000)
 Process: 4 I/O blocked... (2000 500 1500 1500)
 Process: 4 registered... (2000 500 1500 1500)

Summary-Results

Scheduling Type: Batch (Nonpreemptive)
 Scheduling Name: First-Come First-Served
 Simulation Run Time: 10000

Mean: 2000

Standard Deviation: 0

Process #	CPU Time	IO Blocking	CPU Completed	CPU Blocked
0	2000 (ms)	500 (ms)	2000 (ms)	3 times
1	2000 (ms)	500 (ms)	2000 (ms)	3 times
2	2000 (ms)	500 (ms)	2000 (ms)	3 times
3	2000 (ms)	500 (ms)	2000 (ms)	3 times
4	2000 (ms)	500 (ms)	2000 (ms)	3 times

➔ 10 processes

// # of Process

numprocess 10

// mean deviation

meandev 2000

// standard deviation

standdev 0

```
// process  # I/O blocking
process 500
process 500
process 500
process 500
process 500
process 500
process 500
process 500
process 500
process 500
process 500
```

```
// duration of the simulation in milliseconds
runtime 10000
```

Summary-Processes

```
Process: 0 registered... (2000 500 0 0)
Process: 0 I/O blocked... (2000 500 500 500)
Process: 1 registered... (2000 500 0 0)
Process: 1 I/O blocked... (2000 500 500 500)
Process: 0 registered... (2000 500 500 500)
Process: 0 I/O blocked... (2000 500 1000 1000)
Process: 1 registered... (2000 500 500 500)
Process: 1 I/O blocked... (2000 500 1000 1000)
Process: 0 registered... (2000 500 1000 1000)
Process: 0 I/O blocked... (2000 500 1500 1500)
Process: 1 registered... (2000 500 1000 1000)
Process: 1 I/O blocked... (2000 500 1500 1500)
Process: 0 registered... (2000 500 1500 1500)
Process: 0 completed... (2000 500 2000 2000)
Process: 1 registered... (2000 500 1500 1500)
Process: 1 completed... (2000 500 2000 2000)
Process: 2 registered... (2000 500 0 0)
Process: 2 I/O blocked... (2000 500 500 500)
Process: 3 registered... (2000 500 0 0)
Process: 3 I/O blocked... (2000 500 500 500)
Process: 2 registered... (2000 500 500 500)
Process: 2 I/O blocked... (2000 500 1000 1000)
Process: 3 registered... (2000 500 500 500)
Process: 3 I/O blocked... (2000 500 1000 1000)
Process: 2 registered... (2000 500 1000 1000)
Process: 2 I/O blocked... (2000 500 1500 1500)
Process: 3 registered... (2000 500 1000 1000)
Process: 3 I/O blocked... (2000 500 1500 1500)
Process: 2 registered... (2000 500 1500 1500)
Process: 2 completed... (2000 500 2000 2000)
Process: 3 registered... (2000 500 1500 1500)
Process: 3 completed... (2000 500 2000 2000)
Process: 4 registered... (2000 500 0 0)
```

Process: 4 I/O blocked... (2000 500 500 500)
Process: 5 registered... (2000 500 0 0)
Process: 5 I/O blocked... (2000 500 500 500)
Process: 4 registered... (2000 500 500 500)
Process: 4 I/O blocked... (2000 500 1000 1000)
Process: 5 registered... (2000 500 500 500)

Summary-Results

Scheduling Type: Batch (Nonpreemptive)
Scheduling Name: First-Come First-Served
Simulation Run Time: 10000
Mean: 2000
Standard Deviation: 0

Process #	CPU Time	IO Blocking	CPU Completed	CPU Blocked
0	2000 (ms)	500 (ms)	2000 (ms)	3 times
1	2000 (ms)	500 (ms)	2000 (ms)	3 times
2	2000 (ms)	500 (ms)	2000 (ms)	3 times
3	2000 (ms)	500 (ms)	2000 (ms)	3 times
4	2000 (ms)	500 (ms)	1000 (ms)	2 times
5	2000 (ms)	500 (ms)	1000 (ms)	1 times
6	2000 (ms)	500 (ms)	0 (ms)	0 times
7	2000 (ms)	500 (ms)	0 (ms)	0 times
8	2000 (ms)	500 (ms)	0 (ms)	0 times
9	2000 (ms)	500 (ms)	0 (ms)	0 times

Conclusion:

We can observe that processes are completed in the created order because we are using First-Come First-Served scheduling technique. Due to nonpreemptive scheduling, other processes can not start execution until current process is completed or blocked. When one process is blocked, the following process starts to register and when this process is blocked the first process is unblocked and starts to register. CPU is busy all the time because our standard derivation is 0.

In the first simulation with 2 processes, processes change functions each 500ms as we configured. Is possible to verify that total runtime is 4000ms because we set up 2000ms per process. In this case the 10000ms configured runtime is useless because we need more processes or increase each process lifetime to reach 10000ms.

The second simulation using 5 processes has similar behaviour than the first one however the 4th process has not a pair for exchange functions. 5 processes with a lifetime of 20000ms are 10000ms of simulation runtime. The simulation period was equal than configured runtime.

In the last simulation we can observe that maximal runtime has been exceeded in process 5 execution. Time was not enough to execute all the processes. First 4 processes were executed, the following pair was not fully executed and the other processes did not start. Is important to highlight the different behaviour we can find in the process number 4 because in this case has a pair not like simulation number 2.

2. Implement a round-robin scheduling algorithm. (Hint: see the Run() method in SchedulingAlgorithm.java).

The modified algorithm folder is attached with this file.