

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.

```
// # 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-Results :

- 2 processes :

```
Scheduling Type: Batch (Nonpreemptive)
Scheduling Name: First-Come First-Served
Simulation Run Time: 4000
Mean: 2000
Standard Deviation: 0
```

| Process # | CPU Time | I/O 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 :

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

| Process # | CPU Time | I/O 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 :

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

| Process # | CPU Time | I/O 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 |

Summay-Processes :

| 2 processes | 5 processes | 10 processes |
|--|---|---|
| <pre> 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 1000 1000) 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) </pre> | <pre> 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) </pre> | <pre> 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) </pre> |

→ In the first case, even if the runtime parameter is 10000 in the configuration file, the simulation runtime is 4000 because we only call 2 processes and their runtime are 2000. So they can block 3 times for 500ms and leave.

In the second case, the 5 processes could work and each block 3 times.

In the third case, only 6 processes could work because the runtime simulation is defined to 10000 and we want to call 10 processes which run's each 2000ms. It would take twice as long to run 10 processes.