EOPSY
LAB 3

Filip Korzeniewski 293070

In this laboratory, the non-preemptive, First come first served scheduling type is used. The non-preemptive scheduling type is the CPU's kind of scheduling that is used when a process terminates or switches from running to waiting state. Once resources are allocated to a process, the process holds the CPU till it get terminated or reaches a waiting state. Process running CPU is not interrupted in the middle of execution, but instead it waits until the process completed and then it allocates the CPU to another process.
First Come First Serve is the simplest scheduling algorithm. It works in this way, that the first process that requests CPU is allocated the CPU first. Generally, it is implemented using first in first out queue – when process enters the queue it goes to the tail of the queue.

2 processes:

Config:

```
// # of Process
numprocess 2

// mean deivation
meandev 2000

// standard deviation
standdev 0

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

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

Summary-processes output:

```
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 output:

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

Conclusion:

Maximal duration time for simulation time was 10000ms. There were 2 processes launched, each maximally 2000ms. It results in their maximum time equal to 4000ms. Therefore, there was no possibility to reach the maximum simulation time.

5 processes:

Config:

```
// # of Process
numprocess 5

// mean deivation
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 output:

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 output:
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

Conclusion:
Maximal duration time for simulation time was 10000ms. There were 5 processes launched, each maximally 2000ms. It results in their maximum time equal to 10000ms. However, one can see that last process was not completed in processes output (but in results output we can see that even the 5th process was blocked 3 times, respectively after 500, 1000 and 1500ms). The simulation ended faster than all 5 processes. We can also observe that processes are completed in pairs.

10 processes:

Config:

```
// # of Process
numprocess 10

// mean deivation
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

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

Summary-processes output:

```
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 output:

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:

Maximal duration time for simulation time was 10000ms. There were 10 processes launched, each maximally 2000ms. It results in their maximum time equal to 20000ms. Therefore, we can see that similarly to the previous case – 5^{th} process did not manage to be completed. Also, 6^{th} process was started but just like 5^{th} one – did not manage to be completed. 5^{th} process was blocked 2 times (after 500ms and 1000ms), while 6^{th} process was blocked just one time (after 500ms only). Processes 7^{th} to 10^{th} did not even manage to start due to lack of time.