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CS520: Introduction to Operating Systems

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Report for The Simulation Programming Project

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The project is to implement a Process Scheduler Simulator which simulates 3 Process Scheduling Algorithms, namely, First Come First Serve (FCFS), Shortest Job First (SJF) and Round Robin (RR) algorithms.

There are total 7 files.

1. FCFS.java
2. RR.java
3. SJF.java
4. Output.java
5. Process.java
6. Sort.java
7. T.java

The FCFS.java implements the FCFS scheduling algorithm. It initializes 10 processes with diﬀerent burst times which are uniformly generated. And then adds the processes to the ready queue at the initialization.

The SJF.java file implements the SJF scheduling algorithm. It initializes 10 processes with diﬀerent burst times, but the processes are added in the ready queue based on the original burst times generated. The SJF algorithm implemented here is a non-preemptive SJF algorithm.

The RR.java implements the RR scheduling algorithm. The initial value of quantum is 100 and then, we decrease and go till 50 with a difference of 10 every time.

The values initially set for the variables are:

* No. of Processes = 10
* Base inter I/O Arrival Value = 30
* Increment inter I/O Arrival Value = 5
* Quantum Value = 100

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Log File Name | CPU Utilization | Quantum | Turnaround Time | Waiting Time | Throughput |
| RR\_Log\_File.txt | 74.72% | 100 | 28.75 | 5.12 | 0.26 |
| RR\_Log\_File2.txt | 75.93% | 90 | 28.56 | 5.07 | 0.27 |
| RR\_Log\_File3.txt | 74.62% | 80 | 28.9 | 4.97 | 0.26 |
| RR\_Log\_File4.txt | 74.53% | 70 | 28.97 | 4.98 | 0.26 |
| RR\_Log\_File5.txt | 73.99% | 60 | 28.99 | 4.86 | 0.27 |
| RR\_Log\_File6.txt | 75.15% | 50 | 29.05 | 4.80 | 0.27 |

RR\_Log\_File7.txt is set again at Quantum 100 for submitting the project.

The CPU Utilization is between 50 and 90 percent for all process schedulers with the above values and 10 processes have been considered in each case.

The average waiting time decreases with decreasing quantum time in Round Robin when the time taken to complete an I/O decrease. This is because the Processes finish the I/O fast and then must wait in the ready queue to occupy CPU thus the waiting time and the decreasing quantum causes them to occupy the CPU for less time and thus wait in the I/O Queue due to an I/O Interrupt. So, they are either waiting in the Ready queue due to decreasing quantum or in I/O queue due to decreasing I/O Time.

The Outputs for the FCFS algorithm, SJF Algorithm and RR Algorithm are in the output directory with the above-mentioned initial values.

For FCFS Algorithm, the output file is named “FCFS Output.txt”.

For SJF Algorithm, the output file is named “SJF output.txt”.

For RR Algorithm, the output file is named “RR Output.txt”.

To run the Process Schedulers, all the files need to be compiled together and the process scheduler selected needs to be run.

If there already exists a record for the file of the scheduler being run, the program will amend the data in the existing file.

If a log file for RR already exists another log file