**Homework #2 Report**

**Group #4**

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### Abstract

This report has an objective to develop and analyze different processing algorithms. Those include First-Come First-Served (FCFS) [non-preemptive], Shortest job first (SJF) [non-preemptive], Shortest remaining time (SRT) [preemptive], Round Robin (RR) [preemptive] and Highest Priority First (HPF) [both non-preemptive and preemptive].The *arrival time* (0-99 measured in quanta), *expected total run time* (0.1-10 measured in quanta) and *priority* (1-4; priority 1 being the highest) were randomly generated. Specific analysis on each algorithm is discussed through this project report. Comparing the process schedule algorithms, based on the program execution findings, the team found the attributes for each:

* Shortest Remaining Time (SRT)-Lowest average response
* Shortest Job First (SJF) and Shortest Remaining Time (SRT) - Lowest averages for turnaround and waiting
* Round Robin (RR)-Lowest throughput

The findings to conclude on what is the best process schedule algorithm is described in the conclusion of this report.

### First-Come First-Served (FCFS) [non-primitive]

The FCFS (non-primitive) assigns processes to the CPU in the order they are requested. Pretty much functioning as a waiting line at the movie theatre to buy a movie ticket; people wait on the line to be served and get their ticked. After running our project, we noticed that the average turnaround and the average waiting were relatively close to each other on all of the tries executed. The average response is in between the average turnaround and the average waiting. Lastly, the throughput was the smallest number compared to the other three averages (turnaround, waiting and response).

### Shortest Job First (SJF) [non-preemptive]

In the SJF (non-preemptive) algorithm, the average throughput made the big difference when compare to our first analysed case the FCFS. The SJF is assuming the run times are known in advance, for which it would be very convenient to know. The results were very similar to our previous example; the average response was in between the average turn around and the average waiting, having the average turnaround bigger than the average waiting. The difference in the SJF, is that the average throughput number is very large. The average throughput is larger than the average of: turnaround, waiting, and response.

### Shortest Remaining Time (SRT) [preemptive]

The shortest remaining time contributed to the team findings, the team noticed the average response time was different than the previous examples. The SRT chooses the process whose remaining time is the shortest. Having said that, the team concluded that the average of: turnaround waiting and response were relatively close to those of SJF. However, the average response has lowered compared to the SJF. The throughput was about the same compared to the SJF.

Round Robin (RR) [preemptive]

In the RR process schedule algorithm, the team found out that the average of turnaround, waiting, and throughput were significantly unproportional and different. After running the RR, the team noticed that the average for turnaround and waiting were significantly larger than those of SJF and SRT. The average response was about the same of those two last mentioned. However, the throughput was discovered to be smaller than the previously described process schedule algorithms.

Highest Priority First (HPF) [both non-preemptive and preemptive]

During the execution of the HPF (non-preemptive), the team noticed that the averages for turnaround and waiting stayed about the same than SJF, SRT and RR; the throughput was very close to that of RR but the average response increased. The average response in this HPF (non-preemptive) increased in such a way that it is closer to the average of turnaround and waiting, but once again, the value of average response is still in between those two averages.

The HPF (preemptive) reported higher values for the averages of turnaround and waiting. The values for average response and throughput stayed relatively close to the one in HPF (non-preemptive). In fact, most values for the averages (turnaround, waiting, response and throughput) are close to those of HPF (non-preemptive), with the only difference that in some cases the throughput is, sometimes, very close to the average response.

Conclusion

In conclusion, the team concluded that the best process schedule algorithm is the one chosen for a particular scenario. As stipulated in the abstract, the team findings were:

* Shortest Remaining Time (SRT)-Lowest average response
* Shortest Job First (SJF) and Shortest Remaining Time (SRT) - Lowest averages for turnaround and waiting
* Round Robin (RR)-Lowest throughput

Therefore, when the lowest average response is the goal then the SRT should be used. This would allow the process to be fast responsive in a fast manner, not necessarily the most effective. Also, if the averages for turnaround and waiting need to be really small then the best choice would be the SJF and SRT. Finally, when a process is needed to stay for very little time on the CPU, the RR will handle that job.