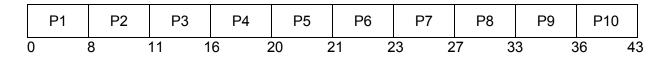Assignment #2 – Results Sheet

Record the statistics from your trial runs here. Use them to justify your answers to the lab questions. Refer to the Assignment #2 summary for more information about these statistics (20 pts)

Trial	Avg. Turnaround	Avg. Wait Time	Avg. Response Time	# Context Switches
FCFS Trial 1	23.8	19.5	19.5	10
FCFS Trial 2	203.2	166	166	10
FCFS Trial 3	135	114.25	114.25	10
FCFS Trial 4	299.5	278.75	278.75	20
RR(Q=10) Trial 1	23.8	19.5	19.5	10
RR(Q=10) Trial 2	268	230.8	45	42
RR(Q=4) Trial 3	26.5	22.2	14.8	14
RR(Q=4) Trial 4	174.8	154.05	32.9	109
RR(Q=4) Trial 5	194	174.05	36.4	109

Lab Questions
☐ Using FCFS Trial 1, verify your implementation of FCFS by drawing a Gantt chart and manually calculating the average turnaround time, the average wait time, average response time, and the number of context switches. Show all your work. (15 pts)

In order:

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10

0   8   11   16   20   21   23   27   33   36   43

Average Turnaround Time = $\dfrac{8 + 11 + 16 + 20 + 21 + 23 + 27 + 33 + 36 + 43}{10}$ = 23.8

Average Wait Time = $\dfrac{0 + 8 + 11 + 16 + 20 + 21 + 23 + 27 + 33 + 36}{10}$ = 19.5

Average Response Time = $\dfrac{0 + 8 + 11 + 16 + 20 + 21 + 23 + 27 + 33 + 36}{10}$ = 19.5

Context switches =
P1->P2->P3->P4->P5->P6->P7->P8->P9->P10 = 10

☐ Using RR Trial 3, verify your implementation of RR by drawing a Gantt chart and manually calculating the average turnaround time, the average wait time, the average response time, and the number of context switches. Show all your work. (15 pts)

In order:

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P1	P3	P8	P10

0   4   7   11   15   16   18   22   26   29   33   37   38   40   43

Average Turnaround time = $\dfrac{(37) + 7 + (38) + 15 + 16 + 18 + 22 + (40) + 29 + (43)}{10}$ = 26.5

Average wait time = $\dfrac{(0 + (33 - 4)) + 4 + (7 + (37 - 11)) + 11 + 15 + 16 + 18 + (22 + (38 - 26)) + 26 + (29 + (40 - 33))}{10}$ = 22.2

Average Response Time = $\dfrac{0 + 4 + 7 + 11 + 15 + 16 + 18 + 22 + 26 + 29}{10}$ = 14.8

Context switches =
P1->P2->P3->P4->P5->P6->P7->P8->P9->P10->P1->P3
->P8->P10 = 14

☐ A system's workload is known to consist of processes that behave similarly to the ones simulated in FCFS Trial 1. If the system is intended to be an user interactive system, is FCFS a reasonable choice? Explain your reasoning. (5 pts)

I do not believe that FCFS is a reasonable choice to implement a user interactive system. The average response time on the first trial is 19.5 seconds, which is a really long time by any standard to wait for a processor to respond by the system. If processors have this as the typical response time, I would argue that round robin should almost always be the response to implement a UI system, since the quantum would allow us to define the time a processor would be kicked out.

☐   This time assume that the processes on the interactive system will resemble the ones simulated in FCFS Trial 2. Is FCFS a reasonable choice in this scenario? Explain your reasoning. (5 pts)

For this trial it would be a horrible choice in this scenario because the average response time is over 166 seconds. The job of any scheduler in terms of acting as an interactive UI would be to be as responsive as possible to user input. Having response time be as low as possible in this scenario is the key to an enjoyable experience for the user.

☐   Compare the FCFS Trial 3 and FCFS Trial 4 results. What does it suggest about the predictability of the overall system's performance? (5 pts)

This suggest that the overall performance for this model is very unpredictable through each run since the total work time and context switches for both systems is the same, but the average turnaround time has a very high difference. This most likely occured based on what process was run first on the scheduler, most likely a process that needed more time in order to run was prioritize in FCFS Trial 4, making the average become a really high number thus starving processers that have need a much shorter time on the processor.

☐   When comparing FCFS Trial 1 to RR(Q=10) Trial 1, what do you observe? (5 pts)

FCFS Trial 1 and RR trial 1 are exactly the same from the average turn around to the number of context switches. This suggests that all the processors in this case have a load case where each are lower than 10 until at least the very last processor. Quantum times in round robin only make a differnce if the processors are not lower than the quantum time.

☐   What do you notice about the FCFS Trial 2 and RR(Q=10) Trial 2 results? If this is an interactive system, would you choose the RR scheduler over FCFS? (5 pts)

For FCFS Trial 2, even though it has a lower turnaround time than rr trial 2, the response time for this scheduler is much higher than round robin, making round robin the superior choice in terms of schedulers for an interactive system involving ui.

☐ How do RR(Q=10) Trial 1 and RR(Q=4) Trial 3 schedulers compare? If context switches produced 4 ticks of overhead, which would be the better option? (5 pts)

Trial 1 for round robin has a lower average turnaround time, wait time, and a lower number of context switches, however these are not by much. Trial 3 even though the value for the wait time is much higher than the first trial, the response time is much quicker. However, if a context switch produced 4 ticks for every context switch, the first trial would be vastly superior, since overhead created by context switches would negatively impact the other performances, and by the fact that trial 1 only has 10 context switches, which trial 3 has 14 context switches

☐ Assume the system represented in FCFS Trial 2 and RR(Q=10) Trial 2 is a non-interactive batch system. Assume that context switches have an overhead of 4 ticks. Which scheduler would you prefer for the system to use? (5 pts)

Assuming that it was a non interactive batch system, I would use FCFS trial 2 over RR Trial 2 because it has significantly less context switches than round robin, and since round robin has such a large number of context switches it would overall affect the performance.