Assignment 1 - Uniprocessor Scheduling

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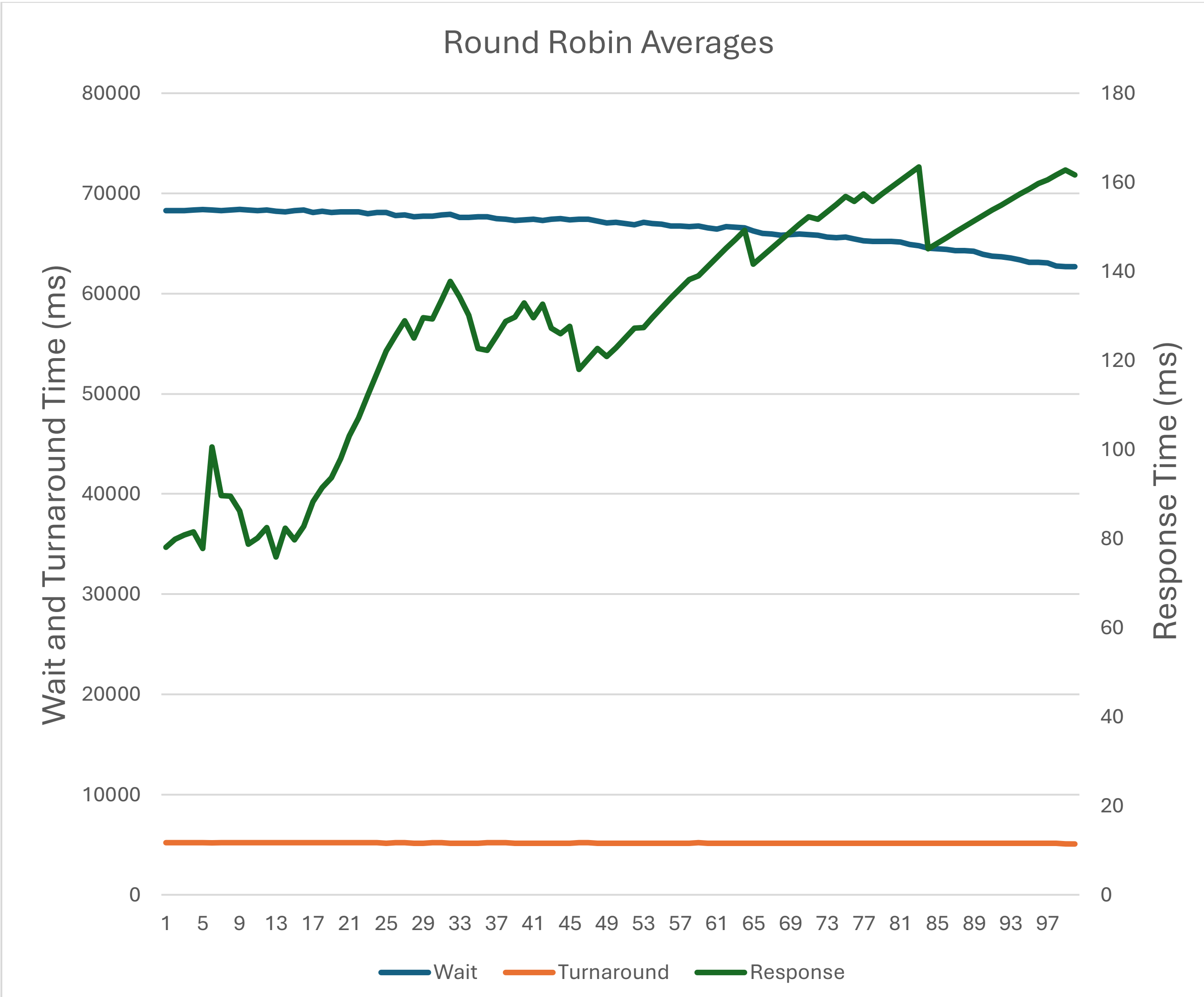


1. Wait Time:

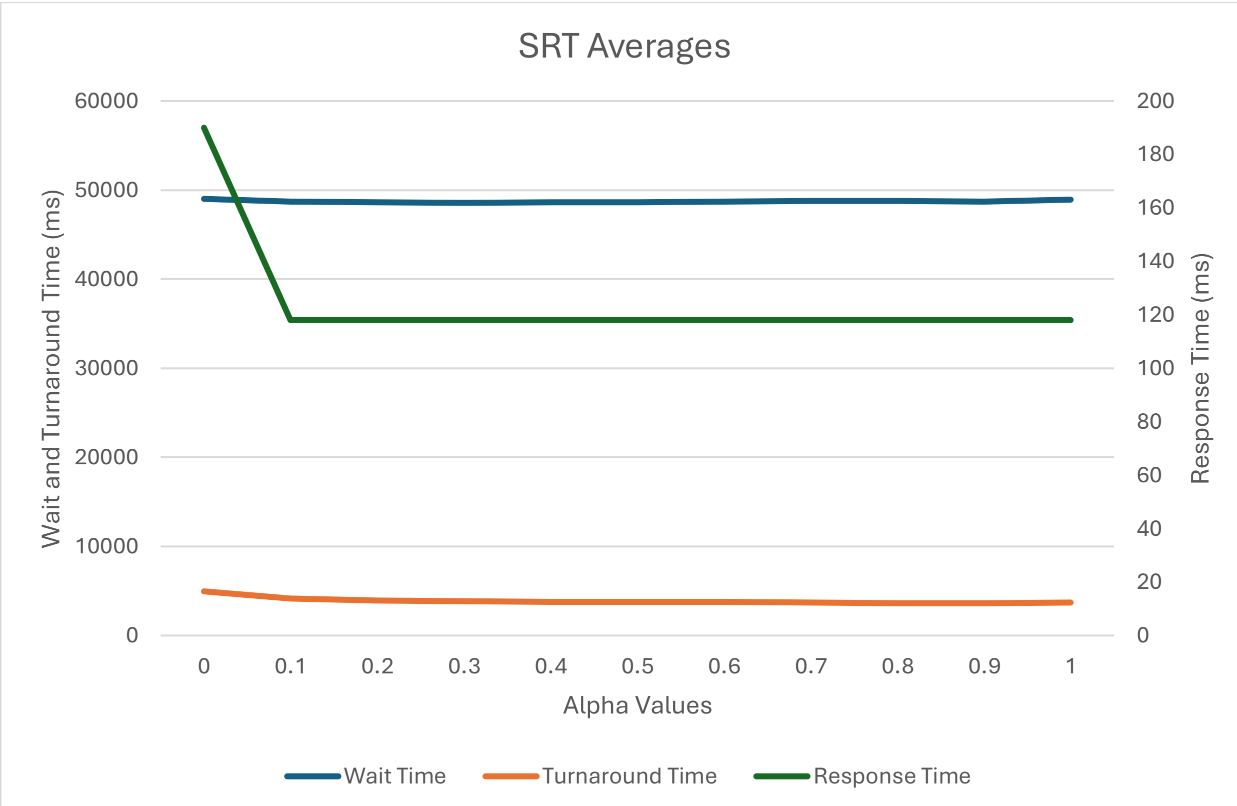
- As the quantum size increases, the wait time generally decreases. For instance, the wait time drops from 68,282.54 at a quantum of 1 to 62,687.39 at a quantum of 100.
- In round robin scheduling, smaller quanta lead to more frequent context switches, increasing the overhead and leading to longer waiting times for each process to get back on the CPU. As the quantum increases, each process gets more time to execute, leading to fewer context switches and reduced wait time.

2. Turnaround Time:

- The turnaround time remains relatively stable across different quantum sizes, fluctuating only slightly around the 5,100 to 5,200 range.
- Turnaround time depends largely on the total time a process spends in the system (including both execution and waiting times). Since the total execution time of processes remains the same regardless of quantum size, the turnaround time is less sensitive to changes in quantum compared to wait and response times.

3. Response Time:

- The response time increases significantly as the quantum increases. Starting from 78.01 at a quantum of 1, it rises steadily to a peak of around 162 at a quantum of 99, then slightly decreases at quantum 100.
- In round robin scheduling, response time is the time it takes for a process to start after arriving. With smaller quanta, processes are frequently switched in and out of the CPU, so they begin execution quickly. As the quantum increases, each process has more time on the CPU, which delays the response for the next process in line.



Alpha	Wait Time	Turnaround T	Response Tin
0	49018.43	4960	190.01
0.1	48696.51	4128.49	118.02
0.2	48622.04	3942.44	118.02
0.3	48570.94	3831.31	118.02
0.4	48635.1	3800.44	118.02
0.5	48623	3763.56	118.02
0.6	48703.62	3747.31	118.02
0.7	48767.85	3715.66	118.02
0.8	48757.66	3663.9	118.02
0.9	48691.71	3626.81	118.02
1	48917.27	3677.2	118.02

1. Wait Time:

- The wait time fluctuates slightly as alpha increases, but it remains relatively stable. At alpha = 0, the wait time is 49,018.43, and at alpha = 1, it rises to 48,917.27. There is a small dip around alpha values of 0.5–0.9.
- In exponential averaging, alpha controls how much weight is given to recent observations of process burst times. A lower alpha value (closer to 0) heavily favors past history, while a higher alpha (closer to 1) places more emphasis on recent behavior. Despite this, the impact on wait time is minimal, as SRTF is primarily driven by the immediate burst time of processes.

2. Turnaround Time:

- The turnaround time shows a clear downward trend as alpha increases. At alpha = 0, the turnaround time is 4,960.0, and it decreases to 3,677.2 at alpha = 1.0.
- Turnaround time tends to decrease with higher alpha values because the scheduling becomes more reactive to recent burst times. When alpha is higher, the scheduler better anticipates short bursts, allowing processes to complete sooner, reducing overall turnaround time. At lower alpha values, the scheduler places more emphasis on historical data, potentially leading to suboptimal scheduling decisions for processes with changing burst times.

3. Response Time:

- The response time is constant at 118.02 across all alpha values, except for alpha = 0, where the response time is significantly higher at 190.01.
- With alpha = 0, the system is entirely reliant on past burst times, meaning it doesn't react well to processes that have changing or unpredictable execution times. This leads to a delayed initial response. For all other alpha values (0.1 to 1.0), the response time remains constant because SRTF pre-emptively schedules processes with the shortest remaining time first, leading to consistent initial scheduling behavior once it begins reacting to current burst times.