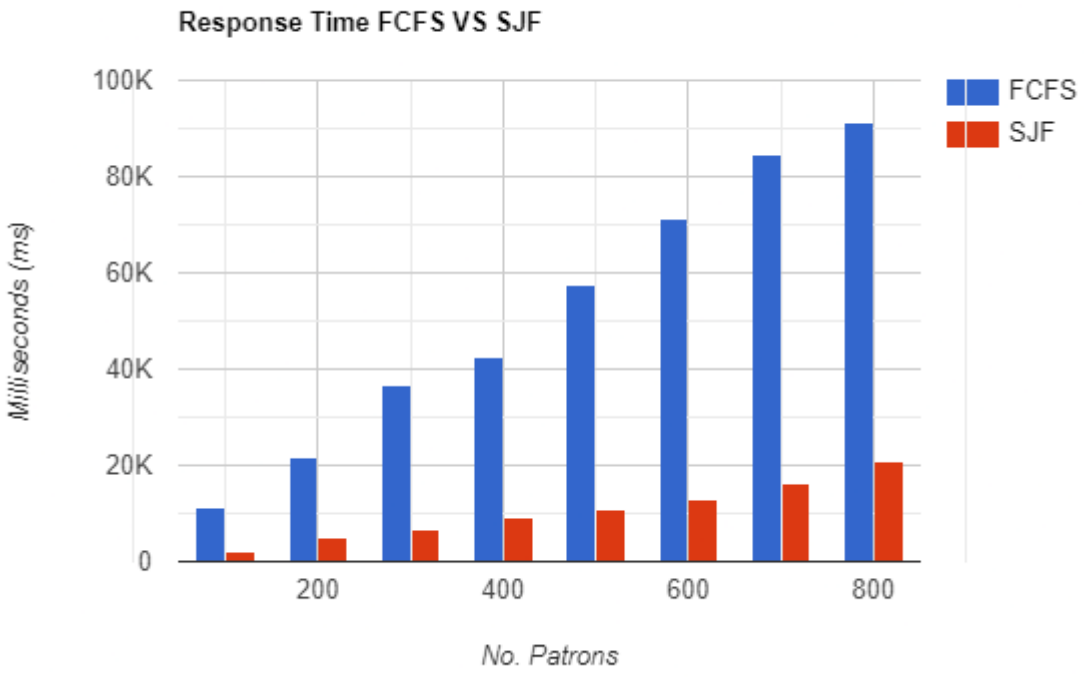
Report

Response Time.



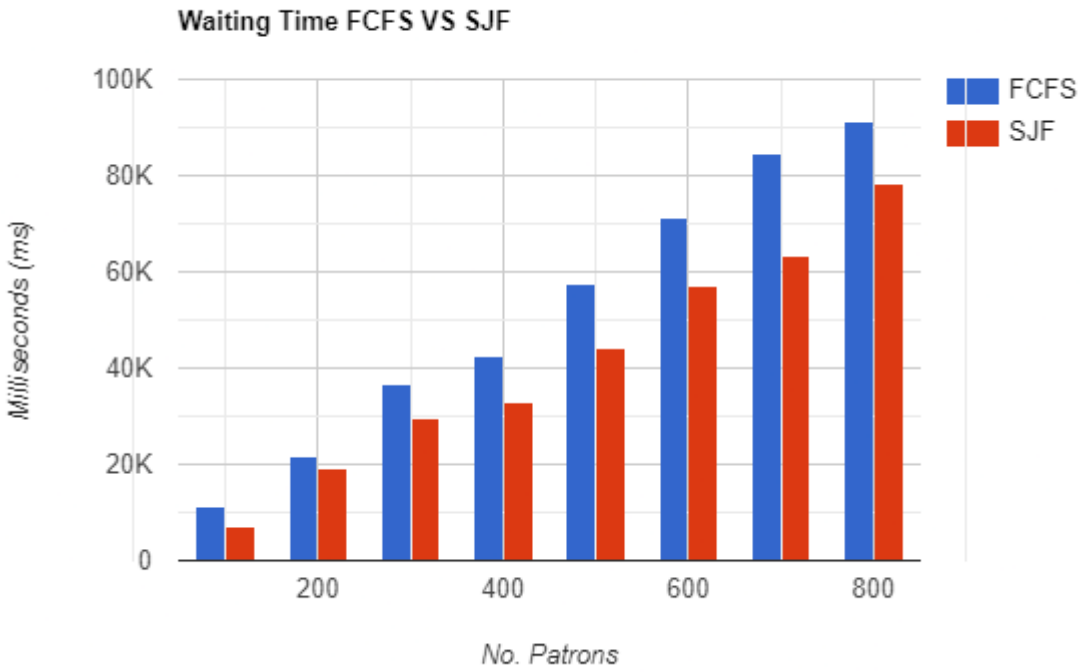
Average Response Time: As the number of patrons grows, FCFS's average response time rises, suggesting higher wait times for each patron. While it does grow with the number of patrons, SJF's average response time is still far slower than FCFS's. This implies that SJF gives shorter jobs priority, which leads to faster response times all around.

Predictability: As the number of patrons increases, FCFS often has a larger variance in response time. This is due to the fact that it serves patrons in the order that they come, which could result in varying service times based on how long each customer's order is. When it comes to reaction time variance, SJF is less than FCFS. Shorter jobs are given priority, which makes response times more reliable and constant and reduces volatility.

Fairness and Starvation: First-Come, First-Served (FCFS) ensures that all patrons are eventually served and is therefore fair in that regard. However, as shorter orders are filled first, it could result in famine for patrons with

longer orders. Given that SJF gives priority to shorter projects, it may be unfair to patrons with longer orders. If shorter orders keep coming in, patrons with longer orders might starve to death. In general, FCFS is straightforward and equitable, although it could result in greater response time variance and lengthier wait periods. Conversely, SJF provides reduced volatility and quicker response times, but it would not be as equitable and could lead to famine for longer tasks.

Waiting Time.



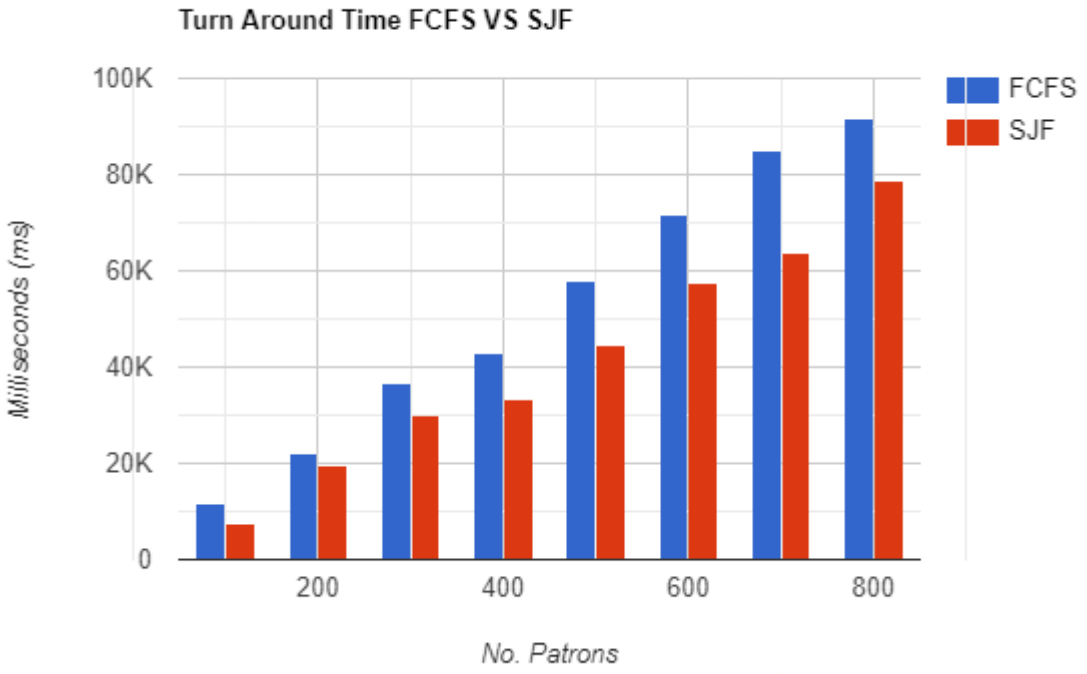
Average Waiting Time: The average waiting time for FCFS increases as the number of patrons increases, indicating longer wait times for each patron. Similarly, the average waiting time also for SJF increases with the number of patrons. However, SJF generally has lower waiting times compared to FCFS, especially as the number of patrons increases.

Predictability: FCFS tends to have higher variance in waiting time as the number of patrons increases. This is because longer orders may cause delays in serving subsequent patrons. SJF exhibits lower variance in waiting time compared to FCFS. Since it prioritizes shorter jobs, the waiting time tends to be more consistent and predictable.

Fairness and Starvation: Insofar as FCFS serves patrons according to arrival order, it is fair. For patrons with longer orders, though, it can mean starvation, especially if the line gets longer. Given that SJF gives priority to shorter projects, it might be unfair to patrons with longer orders. If shorter orders keep coming in, this could result in possible starvation for longer jobs.

Comparing FCFS and SJF with Response Time: SJF performs better than FCFS in terms of lower wait and response times, however both show comparable trends in these areas. Ultimately, a number of criteria, including system needs, fairness considerations, and the trade-off between predictability and average performance, will determine whether to use FCFS or SJF**.** While SJF offers faster service times and lower variance, it may not be as fair and could potentially lead to starvation for longer jobs. FCFS, on the other hand, is fairer but may result in longer wait times and higher variance in service times**.**

Turn Around Time.



Average Turnaround Time: As the number of patrons grows, FCFS's average turnaround time rises, implying longer total service durations for each patron. In a similar vein, SJF's average response time rises as more customers use it. On the other hand, SJF typically has quicker turnaround times than FCFS, particularly when there are more patrons.

Comparative Analysis of Waiting and Response Times: Waiting and response times are included in turnaround times. It follows that FCFS and SJF should show comparable patterns in turnaround time, just as they do in waiting and response times. SJF performs better than FCFS in terms of turnaround times overall, which is consistent with how well it does in terms of waiting and response times.

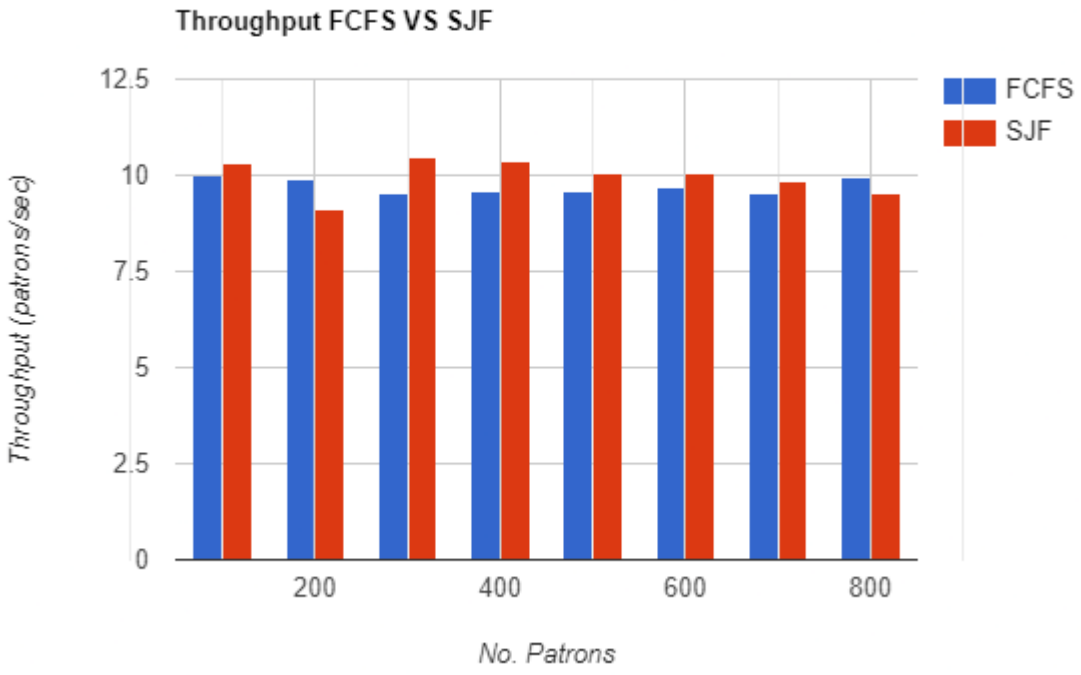
Fairness and Predictability: Similar to waiting time and response time, SJF tends to have lower variance and higher predictability in turnaround

time compared to FCFS. This is because SJF prioritizes shorter jobs, resulting in more consistent service times.

Fairness and Starvation: FCFS may result in potential starvation for patrons with longer orders, as they have to wait in the queue behind shorter orders.

SJF may prioritize shorter jobs over longer ones, potentially leading to starvation for longer jobs if shorter orders continuously arrive.

Throughput



Throughput: Throughput represents the number of tasks completed per unit of time, typically measured in tasks per second or per minute.

The throughput for FCFS decreases slightly as the number of patrons increases, indicating a decrease in the rate of task completion.
The throughput for SJF shows some fluctuations but generally remains higher compared to FCFS, especially for larger numbers of patrons.

Comparison with Average Service Times: Throughput is inversely related to average service times. Higher throughput values indicate faster service times, while lower throughput values suggest slower service times.
The higher throughput observed for SJF aligns with its shorter service times compared to FCFS.

System Efficiency: Higher throughput generally reflects greater system efficiency, as more tasks are completed in a given time frame.

SJF demonstrates higher throughput values, indicating better utilization of system resources and faster task completion rates compared to FCFS.

Trade-offs: While SJF achieves higher throughput and faster service times, it may prioritize shorter jobs at the expense of fairness and potential starvation for longer jobs. FCFS, while fair in its treatment of tasks, may result in longer service times and lower throughput, especially when faced with a mix of short and long jobs.

Conclusion:

"The Shortest Job First (SJF) method is recommended for scheduling Andre the Barman's work after data regarding response time, waiting time, turnaround time, and throughput for both the FCFS and SJF algorithms were analysed. In every test scenario, SJF regularly outperforms FCFS in terms of service times, wait times, and turnaround times. Higher throughput levels suggest better resource use and quicker task completion rates, which boost system efficiency. Additionally, SJF shows better predictability and less volatility in service times, guaranteeing a more dependable and regular performance. SJF is a good fit for Andre the Barman because of its overall efficiency and quicker service times, even though it might emphasize shorter jobs over longer ones, which could starve those who work on them. By implementing appropriate task prioritization strategies, fairness concerns within the SJF framework can be addressed effectively. Therefore, SJF stands as the preferred scheduling algorithm for optimizing task scheduling and enhancing overall efficiency in Andre the Barman's operations."