

Main Problem with Multiple Queue Priority Scheduler:

The most common problem with Multiple Queue Priority Scheduler is starvation. Since the processes are divided into priority queues, the processes in the low-priority queues are starved of CPU time. This means they might not get scheduled for a long time or never at all which can lead to poor performance and reduced results.

Advance Task Explanation:

The solution I came up with to combat this problem is providing a particular CPU time slice to each queue and implementing different algorithm for each priority queue as shown in the table below:

Queue(in order of priority)	% of CPU time	Algorithm
REALTIME	40	Round Robin
INTERACTIVE	30	Round Robin
NORMAL	20	Shortest Job First
DAEMON	10	Shortest Job First

The time slices were decided taking into consideration the priority of the queue.

The Round Robin algorithm is implemented in the first 2 priority queues as they have enough CPU time slice, so the time slice provided for each task in the queue is fair.

The Shortest Job First Algorithm is implemented for the 2 low-level priority queues as they have smaller CPU time slices, so this algorithm minimizes the average waiting time for all processes in the queue.

Problems with Advance Scheduler:

The implementation of Advance Scheduler is a bit more complex since multiple algorithms are being used and the time slice for each queue can be changed depending on the current need.

Round Robin algorithm is implemented in both the Multiple Priority queue scheduler and Advance Scheduler which nullifies its demerit of not being optimal for processes with varying execution times. But the demerit of using Shortest Job First is that it requires the knowledge of the CPU time for each process which makes it more complex.

Sources used:

1. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne
2. <https://www.geeksforgeeks.org/difference-between-multi-level-queue-scheduling-mlq-and-priority-scheduling/>
3. CS 326: Operating Systems: Multi-Level Feedback Queues
4. Operating Systems (INFR10079) 2022/2023 Semester 2 Scheduling (Algorithms)