A common problem with the algorithm would be the starvation of processes with lower priorities. For example, if there was a large influx of high-priority processes, the process with lower priorities will be starved of any CPU share.

To combat this issue, a proposed solution would be to divide processes into 2 levels: High and Low, where processes are scheduled in essentially a weighted round robin manner with High priority getting priority when the turn counter is [0,6], essentially representing a weightage of 70% , while Low gets priority when the turn counter is {7,8,9} , representing a weightage of 30%. The processes in these queues are also executed using a round robin process, like the round robin process of each priority queue in the MQ algorithm. If one of the queues are empty and the other isn't, a process from the non-empty queue is enqueued.

Processes in High Queue get 7 time slices for every 3 time slices the Low Queue gets. This could be altered based on the needs of the processes and a different split can be provided. Another option would be to include a third queue with a priority and turn counter between that of the high and low queue to allow a fairer distribution of resources. Within the priority queues, they are executed in a RR manner to prevent any of the processes taking up too many time slices.

An obvious shortcoming with the proposed algorithm would be a large overhead caused by context switching but it takes care of the issue of starvation. A way to reduce the number of context switches would be to use a FCFS approach for the processes in their respective priority queues as opposed to a RR approach but that would cause the share of resources to be distributed within the queues unfairly. A way to combat this would be to use a Proportional Weighted Round Robin [PWRR] (Mostafa) implementation, where the time slices are dynamically assigned based on the burst times of the processes as opposed to being fixed.

(PWRR has not been implemented, only a type of WRR has been implemented.)

References:

Mostafa, Samih Mohemmed. "Proportional Weighted Round Robin: A Proportional Share CPU Scheduler in Time Sharing Systems." International journal of new computer architectures and their applications 8 (2018): 142-147.