

Question:

Consider a multilevel feedback queue scheduling with three queues, numbered as Q1,Q2,Q3.

- The scheduler first executes processes in Q1, which is given a time quantum of 10 milli-seconds.
- If a process does not finish within this time, it is moved to the tail of the Q2.
- The scheduler executes processes in Q2 only when Q1 is empty.
- The process at the head of the Q2 is given a quantum of 16 milli-seconds.
- If it does not complete, it is preempted and is put into Q3.
- Processes in Q3 are run on an FCFS basis, only when Q1 and Q2 are empty.
- A process that arrives for queue 2 will preempt a process in queue 3. A process in queue 2 will in turn be preempted by a process arriving for queue 1.
- If a process does not use up its quantum in queue 2 due to preemption by queue 1, it will keep its current queuing level and be put into the end of the queue. Then, it can still get the same amount of quantum (not remaining quantum) next time when it is picked.



The following set of processes, with the arrival times and the length of the CPU-burst times given in milliseconds, have to be scheduled using this Multilevel Feedback Queue Scheduler:

Processes	Arrival time	Burst time
P1	0	17
P2	12	25
P3	28	8
P4	36	32
P5	46	18

- Draw a Gantt chart illustrating the execution of these processes.
- Calculate the average waiting time and the average turnaround time for the scheduling.