1. Consider the following set of processes with arrival times and CPU burst times.

|  |  |  |
| --- | --- | --- |
| **Process** | **Arrival time** | **Burst time** |
| P1 | 0 | 9 |
| P2 | 3 | 4 |
| P3 | 4 | 2 |
| P4 | 5 | 9 |
| P5 | 6 | 7 |

Draw a Gantt chart for the CPU schedule for each of the following process scheduling algorithms, and calculate the wait time for each process for each algorithm. Show your work.

* Round-robin (quantum of 4)
* Shortest job first pre-emptive
* Shortest job first non-pre-emptive
* First come first served

1. Assume the following scheduling algorithm:

* It has 3 levels with priorities 3, 2, 1 (with 3 being the highest priority)
* Each level uses a round-robin scheduler with quantum

**q = 2(maxlevel-level)**, with maxlevel = 3

* Each time a process is executed for time **q**, it is moved to a level with priority **level-1** below
* Each new process starts at level with highest priority, i.e. 3
* If a process remains on level 1 for 10 time units, then it is moved back up to the level 3. The moving of processes between levels always happens AFTER they are finished being executed
* Only one process is executed at a time, and there is no pre-emption
* At each and every step a process must be executed, or a process is executed and another (or the same) process moves to another level

Your work is to show the scheduling of the following processes (and show your calculations):

|  |  |  |
| --- | --- | --- |
| **PID** | **Arrival Time** | **CPU Burst** |
| P1 | 0 | 10 |
| P2 | 4 | 8 |
| P3 | 4 | 7 |