

**Q.1.** Consider the following set of processes:

Process ID	Arrival Time	CPU Burst Time	I/O Burst Time	CPU Burst Time
P <sub>0</sub>	2	2	1	1
P <sub>1</sub>	0	5	5	4
P <sub>2</sub>	1	4	2	1

a) Draw Gantt charts illustrating the execution of these processes using the following algorithms.  
(note: I/O device uses FCFS scheduling)

- FCFS
- SRTF

b) Based on your work above, fill in the table below giving both the **waiting time (Wait)** and **turnaround time (tat)** for each process:

Scheduling Algorithm	Parameter	Process ID		
		P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
FCFS	Wait			
	tat			
SRTF	Wait			
	tat			

c) Calculate the CPU utilization for both FCFS and SRTF. Which of these algorithms provide a better utilization performance? Why? Explain briefly.

**Q.2.** Consider the CPU and I/O burst times, process arrival and priorities given in the table below. Assume that only one I/O device is available and it operates in FCFS manner. Ignore the switching times for both the CPU and I/O device.

Processes	CPU	I/O	CPU	Arrival time	Priority*
P1	6	2	2	0	3
P2	5	3	4	2	2
P3	3	2	4	4	1

\* (smaller number indicates higher priority)

Assume that there is only one CPU and it is scheduled using the **“preemptive priority”** scheduling algorithm. Draw the Gantt charts for CPU and I/O and complete the following table.

	P1	P2	P3
Waiting time			
Turnaround time			

**Q.3.** Consider the following process arrival, CPU burst times and priority values where "2" corresponds to the highest priority.

<b>Process</b>	<b>Arrival time</b>	<b>CPU</b>	<b>Priority</b>
A	0	10	1
B	12	10	1
C	8	10	1
D	0	10	2
E	18	10	2

Assume that quantum = 5. Draw the Gantt chart for the following two CPU scheduling algorithms:

**a) non-preemptive priority+RR algorithm**

**b) preemptive priority+RR algorithm**