OPERATING SYSTEM

Assignment 2

Ans-1 a) **FCFS:**

P1	P2	P3	P4

0 3 9 13 15

b)SJF:

P1	P2	P3	P4

0 3 9 13 15

b)SRT:

P1	P2	P3	P3	P3	P4	P2

0 3 4.001 5.001 6.001 8.001 10.001 15

c) Round Robin(quantum=2)

P1	P2	P1	P2	P3	P4	P2	P3

0 2 4 5 7 9 11 13 15

d) Round Robin(quantum=1)

P1	P1	P2	P1	P2	P3	P2	P3	P4	P2	P3	P4	P2	P3	P2

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Ans 2)FCFS:

Turn Around Time:

P1=3-0=3

P2=9-1.001=7.999

P3=13-4.001=8.999

P4=15-6.001=8.999

SJF:

Turn Around Time:

P1=3-0=3

P2=9-1.001=7.999

P3=13-4.001=8.999

P4=15-6.001=8.999

SRT:

Turn Around Time:

P1=3-0=3

P2=15-1.001=13.999

P3=8.001-4.001=4

P4=10.001-6.001=4

Round Robin(q=2):

Turn Around Time:

P1=5-0=5

P2=13-1.001=11.999

P3=15-4.001=10.999

P4=11-6.001=4.999

Round Robin(q=1):

Turn Around Time:

P1=4-0=4

P2=15-1.001=13.999

P3=14-4.001=9.999

P4=12-6.001=5.999

Average throughput for the processes: No. of process/ Total Time Taken

=4/15

=0.2666.

Ans 3) (a) Preemptive:

P1	P2	P3	P4	P2	P1

0 1.0001 2.0001 5.0001 10.0001 12.0001 15

(b) Non- Preemptive:

P1	P3	P4	P2

0 4 7 12 15

Ans 4) The process will be terminated at time 2 in the first queue, time 2+7 in the second queue , time 9+12 in the third queue , time 21+17 in the fourth queue and will be running in the fifth queue when it terminates. There were four interrupts.

Ans 5)

P2	P3	P2	P5	P4	P1

0 2 6 9 11 21 31

Average throughput= 5/31=0.16129.

Ans 6) Using the Non-preemption scheduling algorithm for an interactive system is not a good choice as Non-preemptive scheduling ensures that a process relinquishes control of the CPU only when it finishes with its current CPU burst while Preemptive scheduling allows a process to be interrupted in the midst of its execution, taking the CPU away and allocating it to another process.

Ans 7) If a parent process dies, the child should die. However , UNIX does allow child processes to continue by giving them init as the parent when the real parent dies. A parent process should acknowledge that a child process has excited through the wait() system call otherwise the child will become a zombie.

Ans 8)

P1	P2	P3	P2	P4

0 20 30 40 55 70

Waiting time for P2 is 5+10=15.

Ans 9)SRT and RR requires a timer interrupt facility on the CPU to allow the current process to be interrupted and the scheduler to run and either select the next process to run from the ready queue or resume the currently running process, if the quantum has not expired in the case of RR and if there are no processes in the ready queue with a shorter remaining time as in case of SRT.

Ans 10)a) Preemptive:

P3	P2	P1	P2	P3

0 3 5 25 34 45

Turn Around time=34-3=31.

Non- Preemptive:

P3	P1	P2

0 15 25 33

Turn Around time=33-3=30.

Ans 11) Total Time: 3/20+2/5+1/10

=0.15+0.4+0.1

=0.65<1, So, it can be scheduled.

The schedule is:

T2	T1	T3	T2	Processor idle	T2	T3

0 2 5 6 8 10 12 13

At time t=0, the three tasks are ready to execute and the task with the smallest absolute deadline is T2 and T2 is executed. At time t=2, task T2 completes.The task with the smallest absolute deadline is now T1 and T1 executes. At time t=5,task T1 completes and task T2 is again ready, However, the task with the smallest absolute deadline is now T3, which begins to execute. When T3 finishes, T2 again starts executing.

Ans 12) The laxity values are computed at task arrival time. At time t=0, the three tasks are ready to execute. Relative laxity values of the tasks are:

L(T1)=7-3=4

L(T2)=4-2=2

L(T3)=8-1=7

Thus the task with the smallest relative laxity is T2. Then T2 is executed. At time t=5, a new request of task T2 enters the system. Its relative laxity value is equal to the relative laxity of task T3.So task T3 or task T2 is executed.

T2	T1	T3	T2	Processor idle	T2	T3

0 2 5 6 8 10 12 13

Ans 13)(a) Possible, when a process is selected by the the short term scheduler.

(b)Not possible.

(c) Not possible

(d)Possible, when an I/O operation completes.

(e)Possible, when an I/O operation completes.

Ans 14) 5, 9, 12, 18(Shortest Job First).

Ans 15)

P	Q	R	S	T	P	R	T	P	R	P

0 1 2 3 4 5 6 7 8 9 10 11

So , process P will finish at time 11.

Ans 16) The system is IO bound because the CPU burst is quite smaller, an average of 8ms.

Average user request needs 80+100ms=180ms.

So in 1 sec , number of user served is = 1000/180=5.5=5 users maximum.

If the disk is used 50% of the time then average user request is 80 + 50ms=130ms.

So, number of users serviced per second is =1000/130=7 users.

Ans 17)

P1	**P2**	**P3**

0 11 21 51

a) 4 context switches.
b) 2 context switches.

Ans 18)

P3	P2	P3	P2	P3	P1	P2	P3	P1	P2	P3

0 4 5 6 7 8 9 10 11 12 13 14

Turn Around Time :

P1=12

P2=13

P3=14

Average Turn Around Time: 39/3=13.

Ans 19) For P1:

I/O	**CPU**	**I/O**

0 3 9 10

For P2:

I/O		******CPU******	**I/O**

0 6 9 21 23

For P3:

I/O		******CPU******	**I/O**

0 9 21 39 42

Therefore , CPU idle percentage is: (3+3/42)*100=100/7=14.285%.

Ans 20) Jobs in the highest level queues have the highest priority. The longer time quantum for the lower level queues compensates for their lower priority providing fairer distribution of CPU time to the different kind of processes.