1. Calculate the turnaround time using Round Robin for the given processes with quantum =20. The CPU bursts for the processes are P1=52 P2=16 P3=68 and P4=25.
2. We have the following table of arrival time and burst time for five processes P1, P2, P3, P4, and P5, apply preemptive Priority Scheduling, create a Gantt chart, and calculate the average waiting time of the process.

Processes	Arrival Time (ms)	Burst Time (ms)	Priority
P1	0	4	1
P2	0	3	2
P3	6	7	1
P4	11	4	3
P5	12	2	2

3. Given page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6; Compare the number of page faults for LRU, FIFO, and Optimal page replacement algorithm; where the Frame size = 4.
4. Disk requests come to a disk driver for tracks in the order 10, 22, 20, 2, 40, 6, and 38 at a time when the disk drive is reading from head 20. What is the total seek time, if the disk arm scheduling algorithm is first-come-first-served?
5. Consider a disk queue with requests for I/O to blocks on tracks 47,38,121,191,87,11, 92, 10. The C-LOOK scheduling algorithm is used. The head is initially at track number 63, moving towards larger track numbers on its servicing pass. The tracks are numbered from 0 to 199. Calculate the seek-time.
6. Assume that there are 5 processes, P0 through P4, and 4 types of resources. At T0 we have the following system state:

   Max Instances of Resource Type A = 3 (2 allocated + 1 Available)
   Max Instances of Resource Type B = 17 (12 allocated + 5 Available)
   Max Instances of Resource Type C = 16 (14 allocated + 2 Available)
   Max Instances of Resource Type D = 12 (12 allocated + 0 Available)

   a. Create a matrix of the above-given system state
   b. Create the need matrix
   c. Find out if the system is in a safe state or not.

7. Assume that there are three resources, A, B, and C. There are 4 processes P0 to P3. At T0 we have the following snapshot of the system:

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	0	1	2	1	1	2	1	1
P1	2	1	2	5	4	4			
P2	3	0	0	3	1	1			
P3	1	0	1	1	1	1			

   a. Create the need matrix
   b. Is the system in a safe state? Why or why not?

8. What is Belady's anomaly? Justify your answer with an example
9. What is a critical section? What are the three requirements for correctly solving a critical section problem?
10. Draw the resource allocation graph of the following situation:
    - P={P1, P2, P3 }
    - R={R1, R2, R3}
    - E={P1 → R1, P2 → R3, R1 → P2, R2 → P2, R2 → P1, P3 → R3}
11. Revise the all Scheduling algorithms