

MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY

Department of Computer Science and Engineering

Assignment No.-1.

Subject Name:	Operating Systems
Subject Code:	CIC-305

Max Marks:20

Unit 1

- What is the purpose of system calls and how do system calls relate to the operating system and to the concept of dual mode (Kernel mode and user mode) operation?(CO1) **2**
- Differentiate between user level threads and kernel level threads? How does an OS deals with them? Write an algorithm for any one type of thread as serviced by an OS.(CO1) **2**
- Consider the following set of processes with the length of CPU burst given in milliseconds

Process	burst time	Priority
P1	20	3
P2	5	1
P3	2	3
P4	6	4
P5	8	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.

- Draw four Gantt Charts that illustrate the execution of these processes using the following scheduling algorithms:
 - First come first serve
 - Shortest job first
 - Non pre-emptive priority (a smaller priority number implies a higher priority).
 - Round Robin (quantum=2)
 - What is the turn around time of each process for each of the scheduling algorithms in part (i)
 - What is the waiting time of each process for each of the scheduling algorithms in part(i)
 - Which of the algorithm in parts has the minimum average waiting time (over all processes)?(CO1) **3**
- Consider the following set of processes with the length of CPU burst time given in milliseconds.

Process Name	Arrival Time	CPU Burst Time
A	0	3
B	1	5
C	3	2
D	9	6
E	12	5

Calculate average waiting time and turnaround time (for each process) for the Round Robin (quantum=2ms) and SJF (pre-emptive) CPU scheduling. (CO1) **3**

Unit 2

5. If the hit ratio to a TLB is 80%, and it takes 15 nanoseconds to search the TLB, and 150 nanoseconds to access the main memory, then what must be the effective memory access time in nanoseconds? (CO2) **2**
6. Consider following page reference string 1,2,3,4,21,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for following replacement algorithm (assuming one, two, three frames): (i) LRU (ii) FIFO (iii) Optimal replacement. (CO2) **3**
7. Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would each of the first fit, best fit, and worst fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? (CO2) **3**
8. What is a race condition? How can race conditions be avoided? (CO2) **2**