Operating System and Systems Programming Lab (15B11CI472)
Lab Test- 1 (Thursday 10:00 AM), 18/09/2025)

Time: 50 Minutes **Max Marks:20**

ODD Machine

Q1. Write a multithreaded C program using pthreads to work on an array of integers. Thread 1 should find the maximum and minimum element. Thread 2 should calculate the sum and average of all elements. The main thread should:

- Take array input
- Create the two threads.
- Wait for both threads to complete.
- Display the results after joining both threads.

[CO2, 10 Marks]

Sample Input:

Enter size: 5
Enter array: 10 5 8 20 3

Output:

Maximum: 20
Minimum: 3
Sum: 46
Average: 9.20

Q2. A real-time system executes processes with **Priority scheduling (Preemptive)**. Each process has Process ID, Arrival Time, Burst Time and Priority (smaller number = higher priority).Write a C program to implement **Preemptive Priority Scheduling**. Compute for each process: Completion Time (CT), Turnaround Time (TAT), Waiting Time (WT), Average TAT and Average WT. **[CO3, 10 Marks]**

Sample Input:

```
Number of processes: 3
Process   Arrival Time   Burst Time   Priority
P1              0             5          2
P2              1             3          1
P3              2             8          3
```

Sample Output:

Process	AT	BT	Priority	CT	TAT	WT
P1	0	5	2	8	8	3
P2	1	3	1	4	3	0
P3	2	8	3	16	14	6

Average TAT = (8 + 3 + 14) / 3 = 25 / 3 = 8.33
Average WT = (3 + 0 + 6) / 3 = 9 / 3 = 3.0

EVEN Machine

Q1. Write a multithreaded C program using the pthread library to perform the following operations on an integer array of size N. Thread 1 should count how many even and odd numbers are present in the array. Thread 2 should search for a given element X in the array using linear search/binary search. The main thread must:

- Read the array elements and the search element X.
- Create the two threads.
- Wait for both threads to complete.
- Display the results (even/odd count and search result).

[CO2, 10 Marks]

Sample Input:

```
Enter size of array: 7
Enter array: 10 23 45 66 78 90 11
Enter element to search: 66
```

Expected Output:

```
Even numbers: 4
Odd numbers: 3
Element 66 found at position: 4
```

Q2. A real-time system executes processes with **Shortest Remaining Time First (SRTF – Preemptive SJF)** scheduling. Each process has Process ID, Arrival Time and Burst Time. Write a C program to implement **Shortest Remaining Time First (SRTF – Preemptive SJF)** scheduling. Compute for each process: Completion Time (CT), Turnaround Time (TAT), Waiting Time (WT), and average TAT, WT. **[CO3, 10 Marks]**

Sample Input:

```
Enter number of processes: 4

Process   Arrival Time   Burst Time
P1              0             7
P2              2             4
P3              4             1
P4              5             4
```

Sample Output:

Process	AT	BT	CT	TAT	WT
P1	0	7	16	16	9
P2	2	4	7	5	1
P3	4	1	5	1	0
P4	5	4	11	6	2

Average TAT = (16 + 5 + 1 + 6) / 4 = 7.0
Average WT = (9 + 1 + 0 + 2) / 4 = 3.0