United International University

Department of Computer Science and Engineering

CSE 2218: Data Structures and Algorithms II Laboratory

CT 01

Time: 1 hour 10 minutes **Total Marks:** 24

Problem 1. **[8 marks]**

You are given a non-negative integer n. Write a program that reads n and prints the sum of its digits. Use a recursive function to compute the sum of digits (do not use loops).

Input Format:

- A single integer n ($0 \leq n \leq 10^9$).

Output Format:

- A single integer: the sum of the digits of n.

Sample Input	Sample Output
2049	15

Problem 2. **[8 marks]**

You are given an array A of n integers. Write a program that reads n and the array elements, and prints how many of the elements are even. Use a recursive function to count the even numbers (do not use loops in the counting function).

Input Format:

- First line: an integer n ($0 \leq n \leq 10^5$), the number of elements.
- Second line: n space-separated integers $A_1, A_2, \ldots, A_n$.

Output Format:

- A single integer: the number of even elements in the array.

Sample Input	Sample Output
5 1 2 4 7 8	3

Problem 3. **[8 marks]**

You are given an array A of n integers. A *majority element* is an element that appears *more than* $\lfloor n/2 \rfloor$ times in the array. It is guaranteed that the majority element always exists.

Write a program that reads n and the array elements, and prints the majority element.

Input Format:

- First line: an integer n ($1 \leq n \leq 10^5$).
- Second line: n space-separated integers $A_1, A_2, \ldots, A_n$.

Output Format:

- A single integer: the majority element of the array.

Sample Input

```
7
2 2 1 2 3 2 2
```

Sample Output

```
2
```