Data Structures Lab – Assignment 1

Topic: Array Operations

Objective

To understand single-dimensional arrays and implement basic array operations such as sum, maximum, minimum, searching, and reversal using multiple test cases.

Instructions

- Programs must use arrays only (no advanced data structures).

- Input size should be user-defined and not hard-coded.

- Display clear input and output as per the sample test case.

- Use proper indentation and comments.

- Language: Choose as per your interest.

- Ensure that the **execution time** of each code is saved for later use.

Q1. Sum and Average of Array Elements

Write a program to compute the **sum** and **average** of elements of an array.

Input Format

- First line: T (number of test cases)

- For each test case:

  - Integer N (size of array)
  - N integers

Output Format

Print the sum and average for each test case.

Sample Input

```
2
5
1 2 3 4 5
3
10 20 30
```

Sample Output

```
Sum = 15, Average = 3
Sum = 60, Average = 20
```

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Q2. Linear Search

Perform **linear search** to check whether a given element exists in the array.

Sample Input

```
1
5
10 20 30 40 50
30
```

Sample Output

```
Element found at index 2
```

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Q3. Reverse an Array

Write a program to **reverse the array** and display the result.

Sample Input

```
1
4
10 20 30 40
```

Sample Output

```
Reversed Array: 40 30 20 10
```

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Q4. Insert an Element at a Given Index

Write a program to **add an element at a given index** in the array and display the result.

Sample Input (1)

```
1
4
10 20 30 40
element to add = 25
at index = 2
```

Sample Output

```
Updated Array: 10 20 25 30
```

Sample Input (2)

```
1
10
10 20 30 40
element to add = 25
at index = 2
```

Sample Output

```
Updated Array: 10 20 25 30 40
```

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Q5. Delete an Element from the Array

Write a program to **delete a given element** from the array and display the result.

Sample Input

```
1
4
10 20 30 40
element to delete = 20
```

Sample Output

```
Updated Array: 10 30 40
```