Design and Analysis of Algorithms
Assignment No. 2

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Basic Level

Q1. Find an element in an array using Linear Search.

Input:
Array: [10, 20, 30, 40, 50]
Target: 30

Output:
Element found at index 2

Q2. Find the first occurrence of a target element in an array.

Input:
Array: [10, 20, 30, 20, 40]
Target: 20

Output:
First occurrence at index 1

Q3. Find the last occurrence of a target element in an array.

Input:
Array: [10, 20, 30, 20, 40]
Target: 20

Output:
Last occurrence at index 3

Q4. Search for a target element in a 2D array using Linear Search.

Input:
Matrix:
1 2 3
4 5 6
7 8 9
Target: 5

Output:
Element found at position (1,1)

Q5. Count occurrences of a target element in an array.

Input:
Array: [1, 2, 3, 2, 4, 2, 5]
Target: 2

Output:
Element occurs 3 times

Q6. Find the maximum element in an array using Linear Search.

Input:
Array: [5, 1, 7, 3, 9, 2]

Output:
Maximum element is 9

Q7. Find the minimum element in an array using Linear Search.

Input:
Array: [5, 1, 7, 3, 9, 2]

Output:
Minimum element is 1

Q8. Check if an element exists in an array or not.

Input:
Array: [10, 20, 30, 40, 50]
Target: 25

Output:
Element not found

Q9. Search for a character in a string using Linear Search.

Input:
String: "hello"
Target: 'e'

Output:
Character found at index 1

Q10. Check if the array is sorted using Linear Search.

Input:
Array: [1, 2, 3, 4, 5]

Output:
Array is sorted

Medium Level

Q1. Find the second largest element in an array.

Input:
Array: [10, 20, 5, 15, 25]

Output:
Second largest element is 20

Q2. Find the second smallest element in an array.

Input:
Array: [10, 20, 5, 15, 25]

Output:
Second smallest element is 10

Q3. Find all elements that occur only once in an array.

Input:
Array: [1, 2, 3, 2, 4, 1, 5]

Output:
Elements occurring once: 3, 4, 5

Q4. Find the missing element from 1 to n in an array using Linear Search.

Input:
Array: [1, 2, 4, 5]
n = 5

Output:
Missing element is 3

Q5. Count frequency of all elements in an array using Linear Search.

Input:
Array: [1, 2, 2, 3, 1, 4]

Output:
1 occurs 2 times
2 occurs 2 times
3 occurs 1 time
4 occurs 1 time

Q6. Find the element with maximum frequency using Linear Search.

Input:
Array: [1, 2, 2, 3, 1, 4, 2]

Output:
Element with maximum frequency: 2

Q7. Find all duplicate elements in an array.

Input:
Array: [1, 2, 3, 2, 4, 1, 5]

Output:
Duplicate elements: 1, 2

Q8. Find the smallest positive missing number in an unsorted array.

Input:
Array: [3, 4, -1, 1]

Output:
Smallest missing positive number is 2

Q9. Move all zeros to the end of the array using Linear Search.

Input:
Array: [0, 1, 0, 3, 12]

Output:
Modified Array: [1, 3, 12, 0, 0]

Q10. Search an element in a rotated sorted array using Linear Search.

Input:
Array: [4, 5, 6, 7, 0, 1, 2]
Target: 0

Output:
Element found at index 4