C-DAC Mumbai

Subject: Algorithm and Data Structure
Assignment 1

Solve the assignment with following thing to be added in each question.

-Program
-Flow chart
-Explanation
-Output
-Time and Space complexity

1. Printing Patterns
Problem: Write a Java program to print patterns such as a right triangle of stars.

Test Cases:

Input: n = 3
Output:
*
**
***
Input: n = 5
Output:
*
**
***
****
*****

2. Remove Array Duplicates
Problem: Write a Java program to remove duplicates from a sorted array and return the new length of the array.

Test Cases:

Input: arr = [1, 1, 2]
Output: 2
Input: arr = [0, 0, 1, 1, 2, 2, 3, 3]
Output: 4

3. Remove White Spaces from String
Problem: Write a Java program to remove all white spaces from a given string.

Test Cases:

Input: "Hello World"
Output: "HelloWorld"
Input: " Java Programming "

Output: "JavaProgramming"

4. Reverse a String
Problem: Write a Java program to reverse a given string.

Test Cases:

Input: "hello"
Output: "olleh"
Input: "Java"
Output: "avaJ"

5. Reverse Array in Place
Problem: Write a Java program to reverse an array in place.

Test Cases:

Input: arr = [1, 2, 3, 4]
Output: [4, 3, 2, 1]
Input: arr = [7, 8, 9]
Output: [9, 8, 7]

6. Reverse Words in a String
Problem: Write a Java program to reverse the words in a given sentence.

Test Cases:

Input: "Hello World"
Output: "World Hello"
Input: "Java Programming"
Output: "Programming Java"

7. Reverse a Number
Problem: Write a Java program to reverse a given number.

Test Cases:

Input: 12345
Output: 54321
Input: -9876
Output: -6789

8. Array Manipulation
Problem: Perform a series of operations to manipulate an array based on range update queries. Each query adds a value to a range of indices.

Test Cases:

Input: n = 5, queries = [[1, 2, 100], [2, 5, 100], [3, 4, 100]]
Output: 200
Input: n = 4, queries = [[1, 3, 50], [2, 4, 70]]

Output: 120

9. String Palindrome
Problem: Write a Java program to check if a given string is a palindrome.

Test Cases:

Input: "madam"
Output: true
Input: "hello"
Output: false
Here's a continuation of the list of assignment questions starting from question 21, with two test cases for each:

10. Array Left Rotation
Problem: Write a Java program to rotate an array to the left by d positions.

Test Cases:

Input: arr = [1, 2, 3, 4, 5], d = 2
Output: [3, 4, 5, 1, 2]
Input: arr = [10, 20, 30, 40], d = 1
Output: [20, 30, 40, 10]