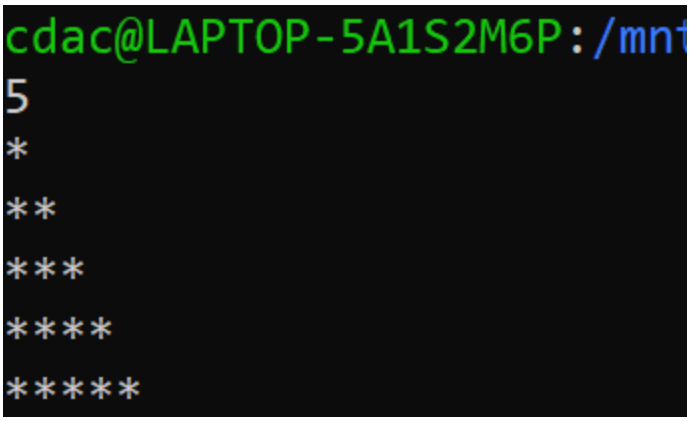
ADS: Assignment 2

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

```
import java.util.*;
public class Question1{
    public static void star(int size, int i){
        if(i==size){
            System.out.println("*".repeat(i));
            return;
        }

        System.out.println("*".repeat(i));
        star(size,i+1);

    }

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        int num = sc.nextInt();
        star(num,1);
    }

}
```



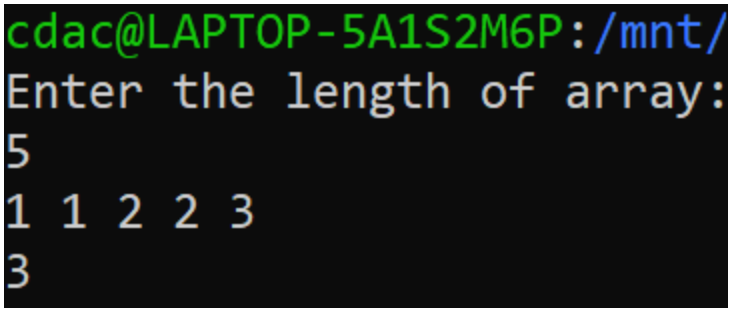
2. Remove Array Duplicates
   Problem: Write a Java program to remove duplicates from a sorted array and return the new length of the array.

   Test Cases:

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

```
import java.util.*;
public class Question2{
    public static void main(String... args){
        Scanner sc = new Scanner(System.in);

        System.out.println("Enter the length of array: ");
        int num = sc.nextInt();
        int[] arr = new int[num];

        for(int i=0; i<num; i++){
            arr[i] = sc.nextInt();
        }

        int currentNum = -1;
        int count = 0;
```

```
        for(int i=0; i<num; i++){
            if(i==0){
                currentNum = arr[0];
                count++;
                continue;
            }
            if(arr[i]==currentNum){
                continue;
            }
            currentNum = arr[i];
            count++;
        }

        System.out.println(count);
    }

}
```

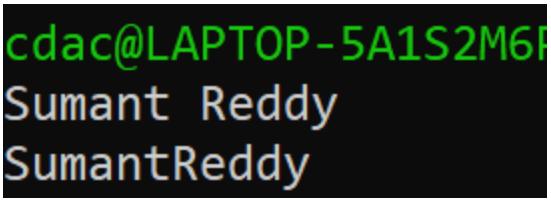


3. Remove White Spaces from String
   Problem: Write a Java program to remove all white spaces from a given string.

   Test Cases:

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

```java
import java.util.*;
public class Question3{
    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        String str = sc.nextLine();

        System.out.println(str.replaceAll(" ",""));
    }
}
```



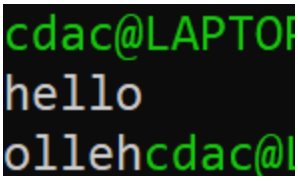
4. Reverse a String
   Problem: Write a Java program to reverse a given string.

   Test Cases:

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

```java
import java.util.*;
public class Question4{
    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        String str = sc.next();

        for(int i= str.length()-1; i>=0; i--){
            System.out.print(str.charAt(i));
        }
```

```
    }
}
```



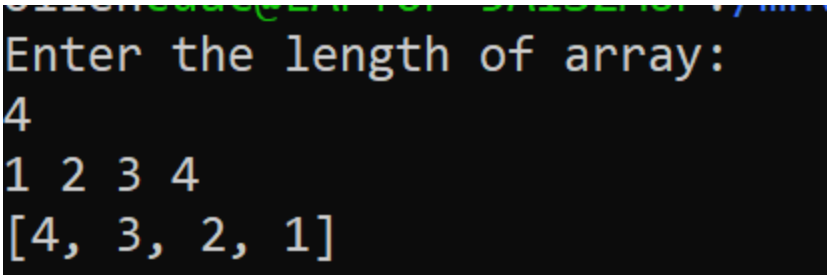
5. Reverse Array in Place
   Problem: Write a Java program to reverse an array in place.

   Test Cases:

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

```
import java.util.*;
public class Question5{

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the length of array: ");
        int num = sc.nextInt();
        int[] arr = new int[num];

        for(int i=0; i<num; i++){
            arr[i] = sc.nextInt();
        }

        int j = num-1;

        for(int i=0; i<j; i++, j--){
            int temp = arr[j];
            arr[j] = arr[i];
```

```
            arr[i] = temp;
        }

        System.out.println(Arrays.toString(arr));
    }
}
```



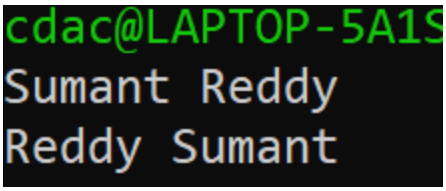
6. Reverse Words in a String
   Problem: Write a Java program to reverse the words in a given sentence.

   Test Cases:

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

```
import java.util.*;

public class Question6{
    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        String str = sc.nextLine();

        String[] arr = str.split(" ");

        for(int i=arr.length-1; i>=0; i--){
            System.out.print(arr[i]+" ");
        }
```

```
        System.out.println();
    }
}
```



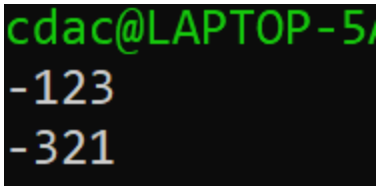
7. Reverse a Number
   Problem: Write a Java program to reverse a given number.

   Test Cases:

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

```
import java.util.*;

public class Question7{

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        int num = sc.nextInt();

        boolean isNegative = num<0 ? true : false;

        String str = Integer.toString(num);

        if(isNegative) str = str.replace("-","");

        char[] arr = str.toCharArray();

        if(isNegative) System.out.print("-");
```

```
        for(int i=arr.length-1; i>=0; i--){
            System.out.print(arr[i]);
        }
        System.out.println();
    }
}
```



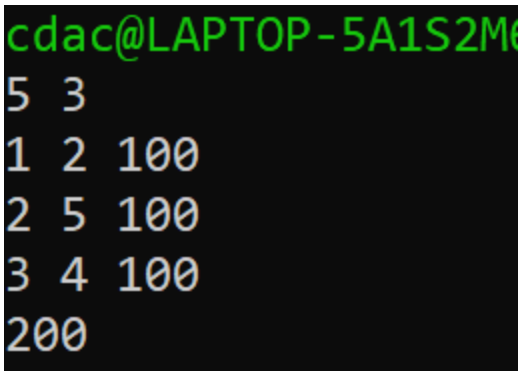
8. Array Manipulation
   Problem: Perform a series of operations to manipulate an array based on range update queries. Each query adds a value to a range of indices.

   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

```
import java.util.*;

public class Question8{

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        int size = sc.nextInt();
        int operations = sc.nextInt();

        int maxNum = 0;

        int[] arr = new int[size];
```

```
        for(int i=0; i<operations; i++){
            int idx1 = sc.nextInt()-1;
            int idx2 = sc.nextInt()-1;
            int num = sc.nextInt();

            for(int j=idx1; j<=idx2; j++){
                arr[j] += num;

                maxNum = arr[j]>maxNum ? arr[j] : maxNum;
            }
        }

        System.out.println(maxNum);

    }
}
```



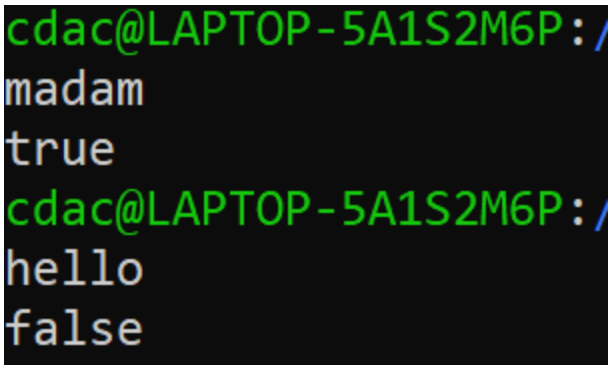
9. String Palindrome
   Problem: Write a Java program to check if a given string is a palindrome.

   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:

```
import java.util.*;

public class Question9{

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);

        String str = sc.next();
        char[] arr = str.toCharArray();

        int j = arr.length - 1;
        boolean flag = true;

        for(int i=0; i<j; i++, j--){
            if(arr[i] != arr[j]){
                flag = false;
                break;
            }
        }

        System.out.println(flag);

    }
}
```



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]

```
import java.util.*;

public class Question10{

    public static void main(String... args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter size of array: ");
        int size = sc.nextInt();
        System.out.println("Enter array elements: ");
        int[] arr = new int[size];
        for(int i=0; i<size; i++){
            arr[i] = sc.nextInt();
        }

        System.out.println("Enter the index for rotation:
");
        int index = sc.nextInt();
```

```
        int i=index;
        while(true){
            System.out.print(arr[i]+" ");
            i = (i+1)%size;
            if(i==index-1){
                System.out.println(arr[index-1]);
                break;
            }
        }
    }
}
```

```
cdac@LAPTOP-5A1S2M6P:/mnt/c/Us
Enter size of array:
5
Enter array elements:
1 2 3 4 5
Enter the index for rotation:
2
3 4 5 1 2
```