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Advanced Programming Practice

Assignment 5

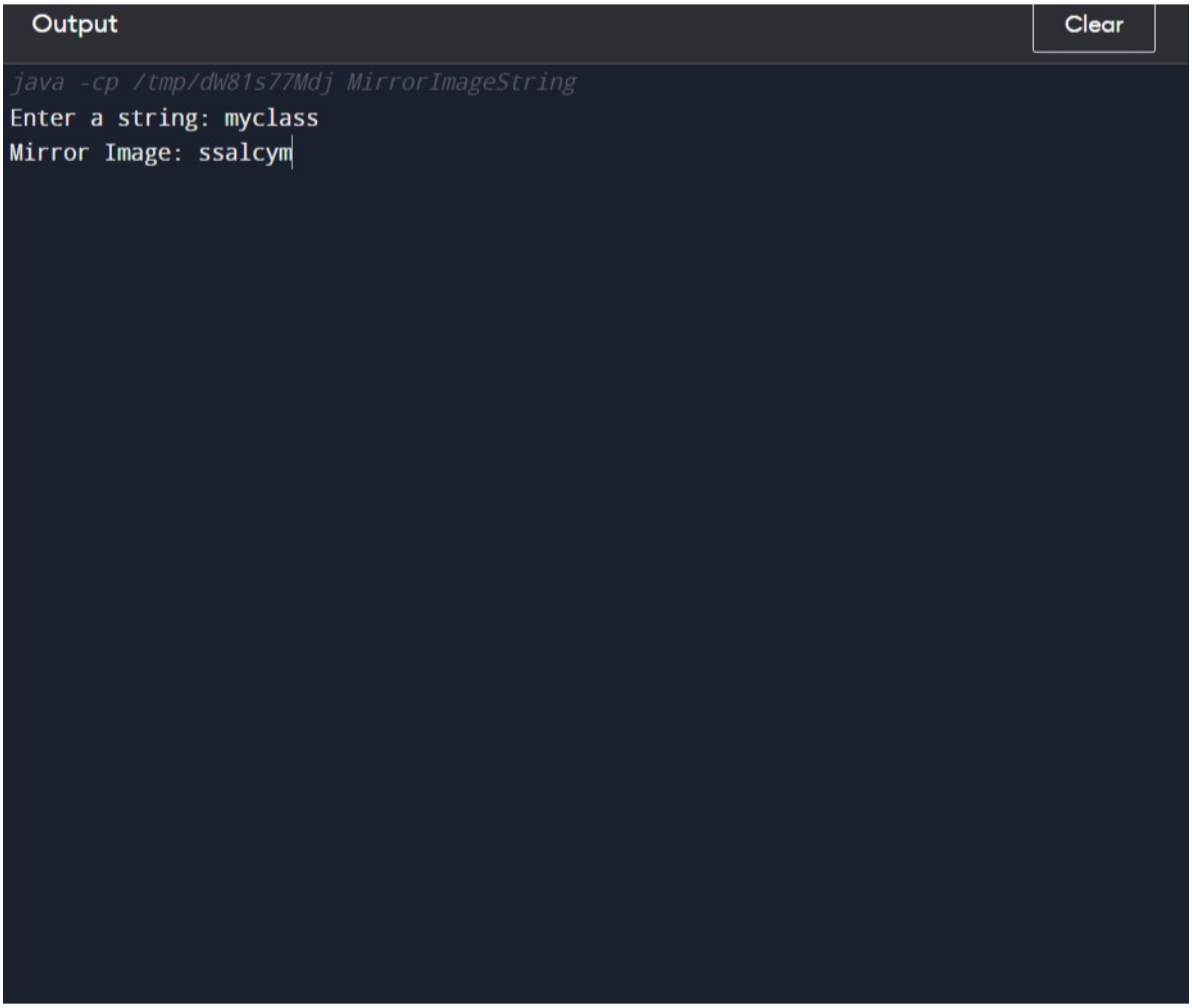
1. Write a Java program (using function) to print the mirror image of the given string.

Code –

```
import java.util.Scanner;

public class MirrorImageString {

  // Function to return the mirror image of a string

  public static String mirrorImage(String str) {

    StringBuilder mirrorStr = new StringBuilder();

    for (int i = str.length() - 1; i >= 0; i--) {

      mirrorStr.append(str.charAt(i));

    }

    return mirrorStr.toString();

  }

    public static void main(String[] args) {

    Scanner scanner = new Scanner(System.in);

    System.out.print("Enter a string: ");

    String input = scanner.nextLine();


    String mirrored = mirrorImage(input);
```

```
        System.out.println("Mirror Image: " + mirrored);
        scanner.close();
    }
}
```

Output –



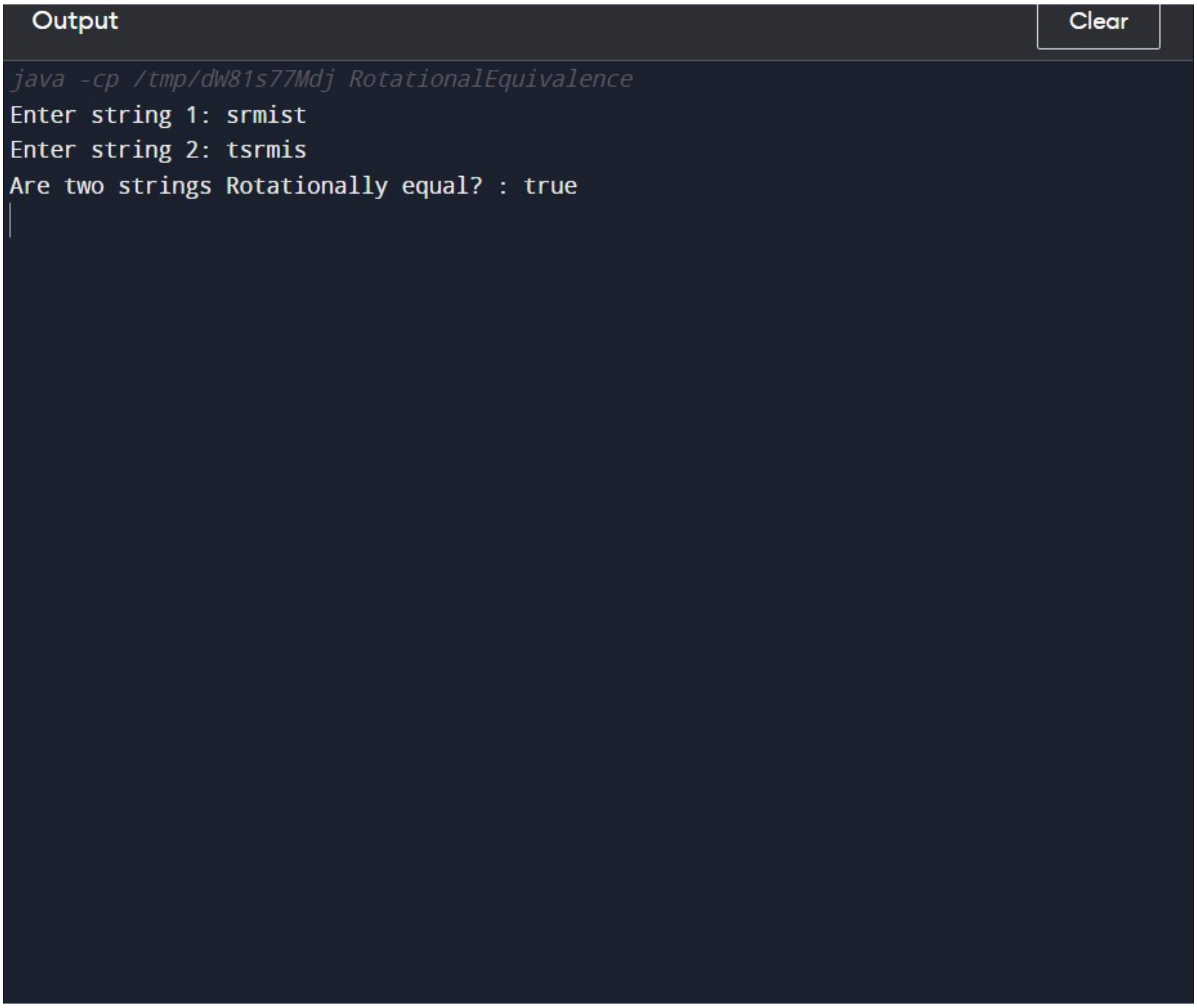
```
java -cp /tmp/dW81s77Mdj MirrorImageString
Enter a string: myclass
Mirror Image: ssalcym
```

2. Write a Java program (using function) to check if two strings are rotationally equivalent.

Code –

```
import java.util.Scanner;
public class Rotational {
    // Function to check if two strings are rotationally equivalent
    public static boolean Equivalent(String str1, String str2) {
        if (str1.length() != str2.length()) {
            return false;
        }
        String concatenated = str1 + str1; // Concatenate str1 with itself
        // Check if str2 is a substring of concatenated str1
        if (concatenated.contains(str2)) {
            return true; }
        return false;
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter string 1: ");
        String str1 = scanner.nextLine();
        System.out.print("Enter string 2: ");
        String str2 = scanner.nextLine();
        boolean areEqual = Equivalent(str1, str2);
        System.out.println("Are two strings Rotationally equal? : " + areEqual);
        scanner.close();
    }
}
```

Output –



```
java -cp /tmp/dW81s77Mdj RotationalEquivalence
Enter string 1: srmist
Enter string 2: tsrmis
Are two strings Rotationally equal? : true
```

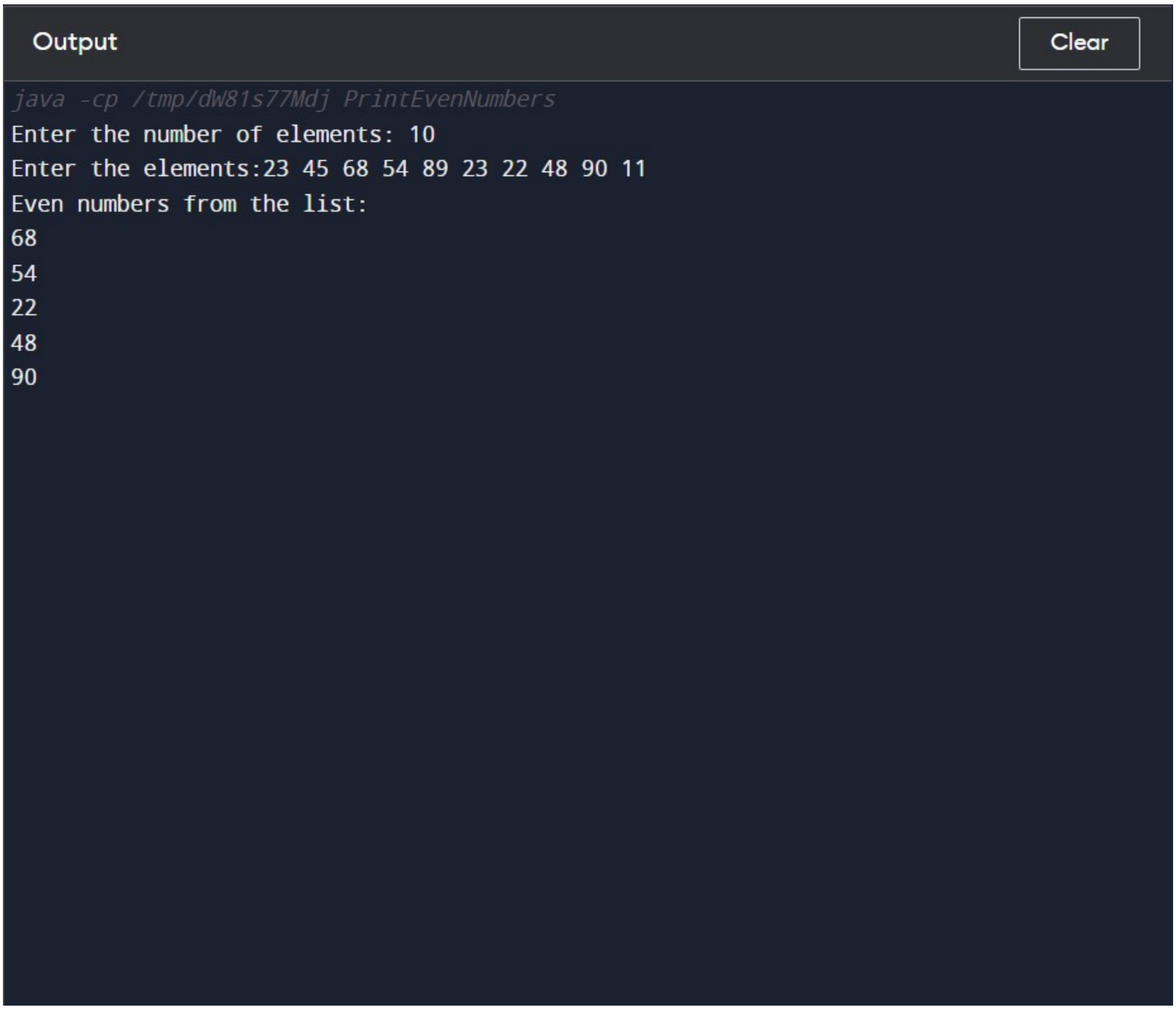
3. Write a Java program (using function) to print the even numbers from a given list.
(Note : function type - with arguments but no return values)

Code –

```
import java.util.ArrayList;

import java.util.List;

import java.util.Scanner;


public class EvenNum {

  // Function to print even numbers from a list

  public static void printEven(List<Integer> numbers) {

    System.out.println("Even numbers from the list:");

    for (int num : numbers) {

      if (num % 2 == 0) {

        System.out.println(num);

      }

    }

  }

  public static void main(String[] args) {

    Scanner scanner = new Scanner(System.in);

    List<Integer> numberList = new ArrayList<>();

    System.out.print("Enter the number of elements: ");


    int n = scanner.nextInt();

    System.out.println("Enter the elements:");

    for (int i = 0; i < n; i++) {

      int num = scanner.nextInt();
```

```
            numberList.add(num);
        }
        printEven(numberList);
        scanner.close();
    }
}
```

Output –



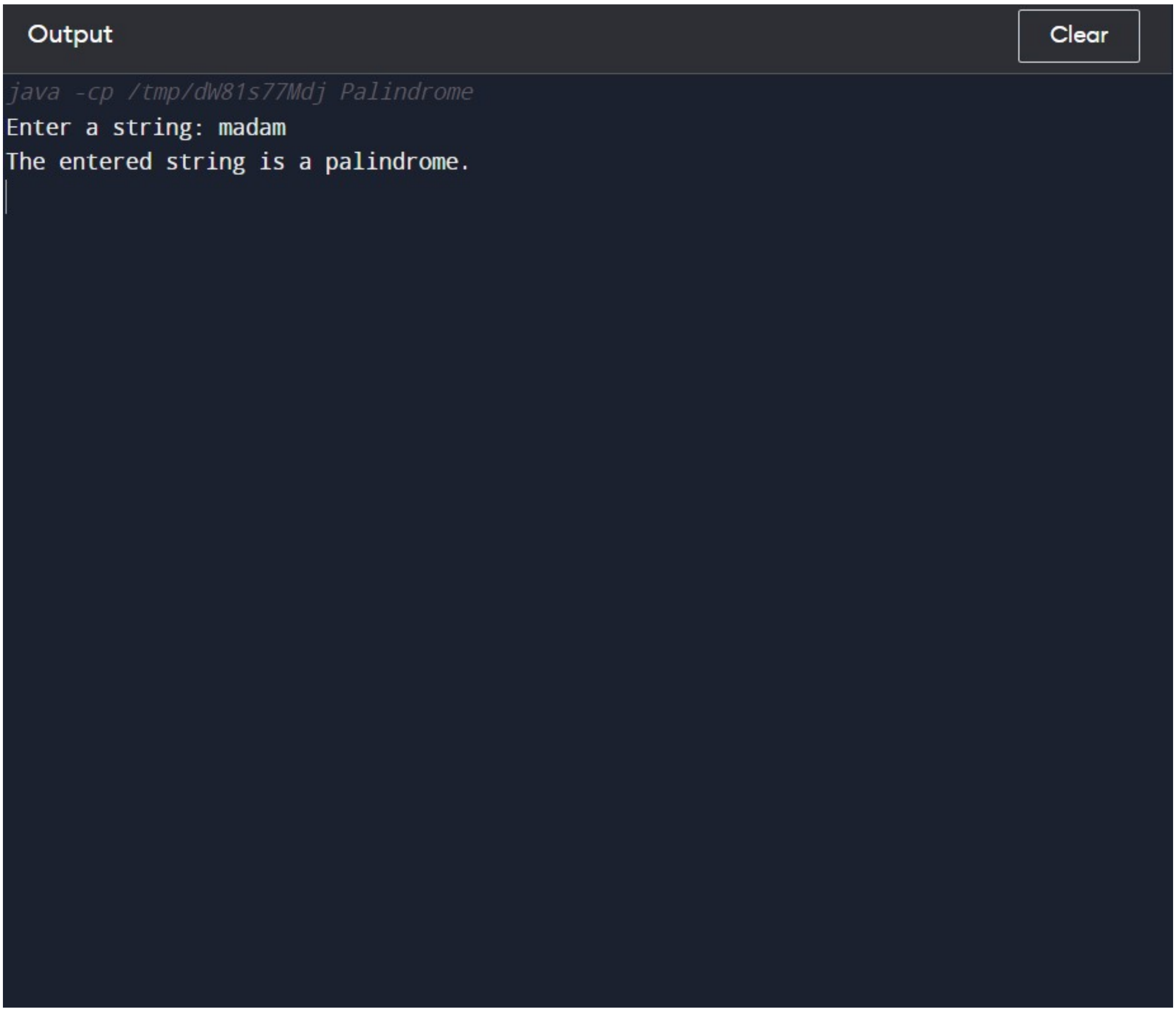
```
java -cp /tmp/dW81s77Mdj PrintEvenNumbers
Enter the number of elements: 10
Enter the elements:23 45 68 54 89 23 22 48 90 11
Even numbers from the list:
68
54
22
48
90
```

4. Write a Java function (using function) that checks whether a passed string is palindrome or not. (Note : function type - No arguments with return values)

Code –

```
import java.util.Scanner;
public class Palindrome {
    // Function to check if a string is palindrome or not
    public static boolean isPalindrome() {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a string: ");
        String input = scanner.nextLine();
        input = input.toLowerCase();
        // Convert input to lowercase
        int left = 0;
        int right = input.length() - 1;

        while (left < right) {
            if (input.charAt(left) != input.charAt(right)) {
                return false; // Characters don't match, not a palindrome
            }
            left++;
            right--;
        }
        return true; // If loop completes, the string is a palindrome
    }
    public static void main(String[] args) {
        boolean isPalin = isPalindrome();
        if (isPalin) {
            System.out.println("The entered string is a palindrome.");
        } else {
            System.out.println("The entered string is not a palindrome.");
        }
    }
}
```

Output –



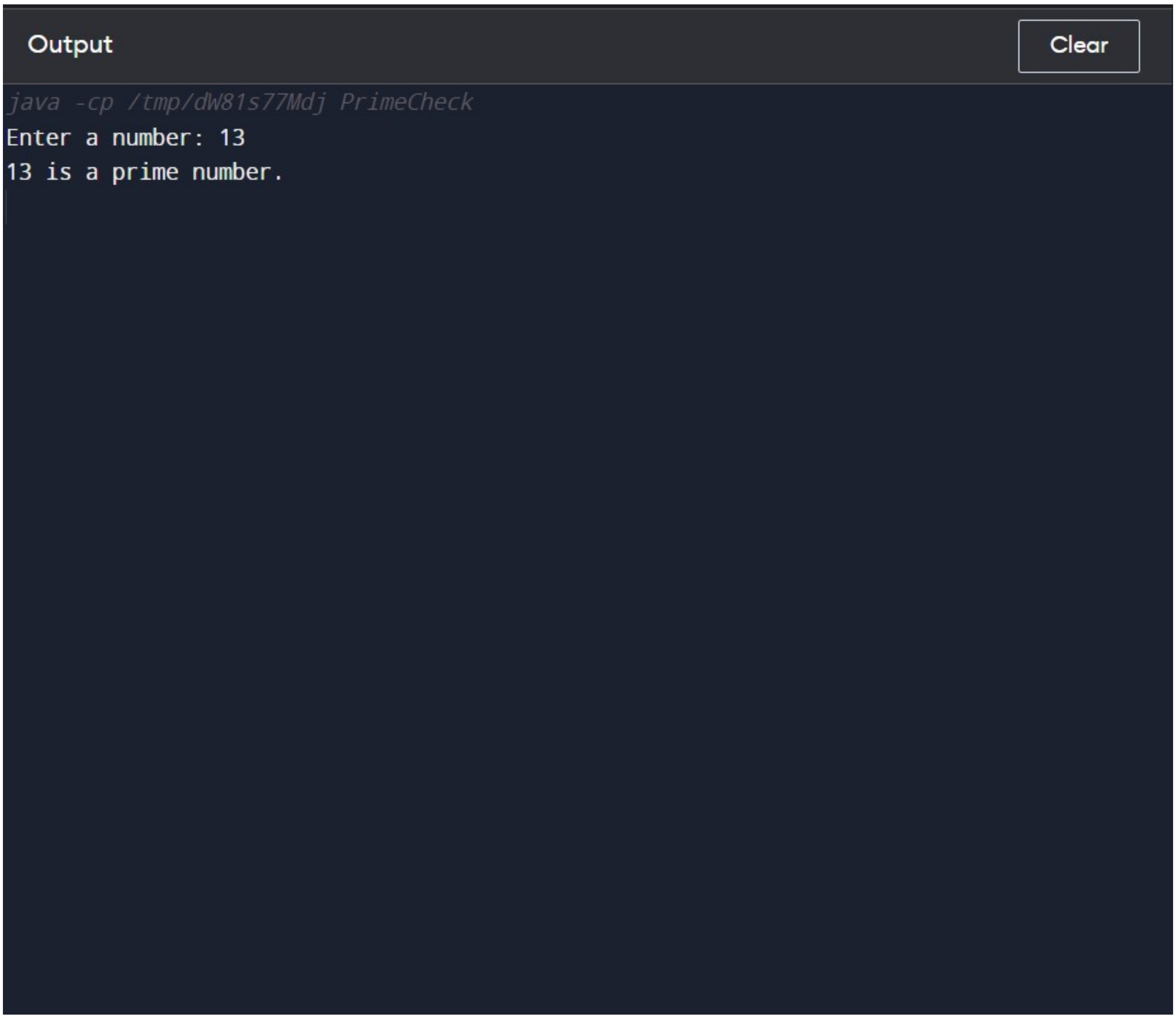
```
java -cp /tmp/dW81s77Mdj Palindrome
Enter a string: madam
The entered string is a palindrome.
```

5. Write a Java function (using function) that checks whether a given number is prime or not. (Note : function type - with arguments with return values)

Code –

```
import java.util.Scanner;
public class PrimeCheck {
    // Function to check if a number is prime or not
    public static boolean isPrime(int num) {
        if (num <= 1) {
            return false; // Numbers less than or equal to 1 are not prime
        }
        for (int i = 2; i < num; i++) {
            if (num % i == 0) {
                return false; // If the number is divisible by any integer between 2 and
num, it's not prime
            }
        }
        return true; // If no divisors are found, the number is prime
    }

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

        System.out.print("Enter a number: ");
        int input = scanner.nextInt();

        boolean isPrimeNumber = isPrime(input);
        if (isPrimeNumber) {
            System.out.println(input + " is a prime number.");
        } else {
            System.out.println(input + " is not a prime number.");
        }
        scanner.close();
    }
}
```

Output –



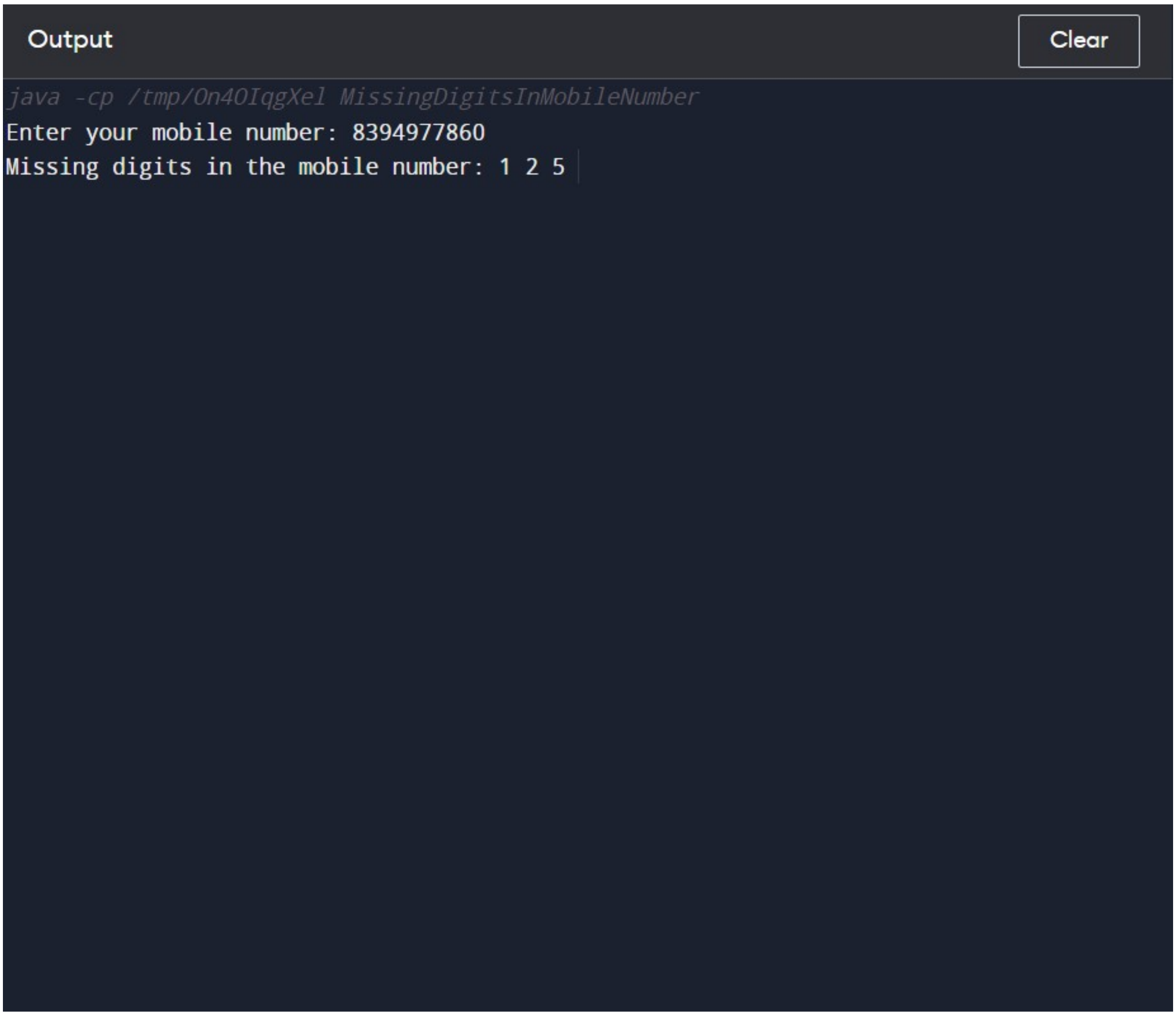
```
java -cp /tmp/dW81s77Mdj PrimeCheck
Enter a number: 13
13 is a prime number.
```

6. Write a Java program to find the digits which are absent in a given mobile number (using function)

Code –

```
import java.util.Scanner;
public class MobileNumber {

    // Function to find the missing digits in a given mobile number
    public static boolean isDigitPresent(String mobileNumber, char digit) {
        for (int i = 0; i < mobileNumber.length(); i++) {
            if (mobileNumber.charAt(i) == digit) {
                return true;
            }
        }
        return false;
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter your mobile number: ");
        String mobileNumber = scanner.nextLine();

        System.out.print("Missing digits in the mobile number: ");
        for (char digit = '0'; digit <= '9'; digit++) {
            if (!isDigitPresent(mobileNumber, digit)) {
                System.out.print(digit + " ");
            }
        }
        scanner.close();
    }
}
```

Output –



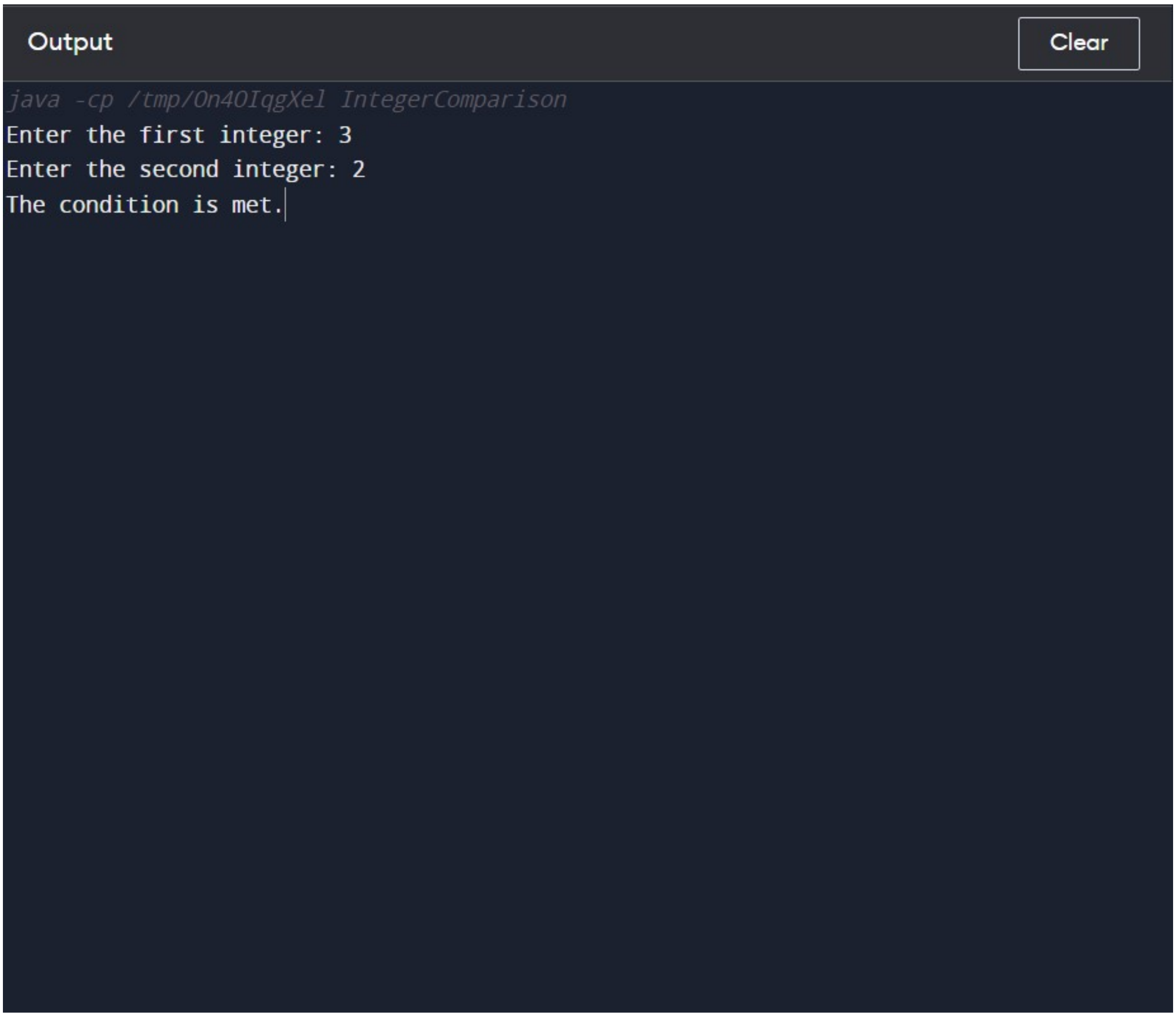
```
java -cp /tmp/On4OIqgXel MissingDigitsInMobileNumber
Enter your mobile number: 8394977860
Missing digits in the mobile number: 1 2 5
```

7. Write a Java program using function that will return true if the two given integer values are equal or their sum or difference is 5.

Code –

```
import java.util.Scanner;
public class IntegerComparison {

    // Function to check if two integers meet the condition
    public static boolean checkCondition(int a, int b) {
        return a == b || Math.abs(a - b) == 5 || a + b == 5;
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the first integer: ");
        int num1 = scanner.nextInt();
        System.out.print("Enter the second integer: ");
        int num2 = scanner.nextInt();

        boolean result = checkCondition(num1, num2);
        if (result) {
            System.out.println("The condition is met.");
        } else {
            System.out.println("The condition is not met.");
        }
        scanner.close();
    }
}
```

Output –



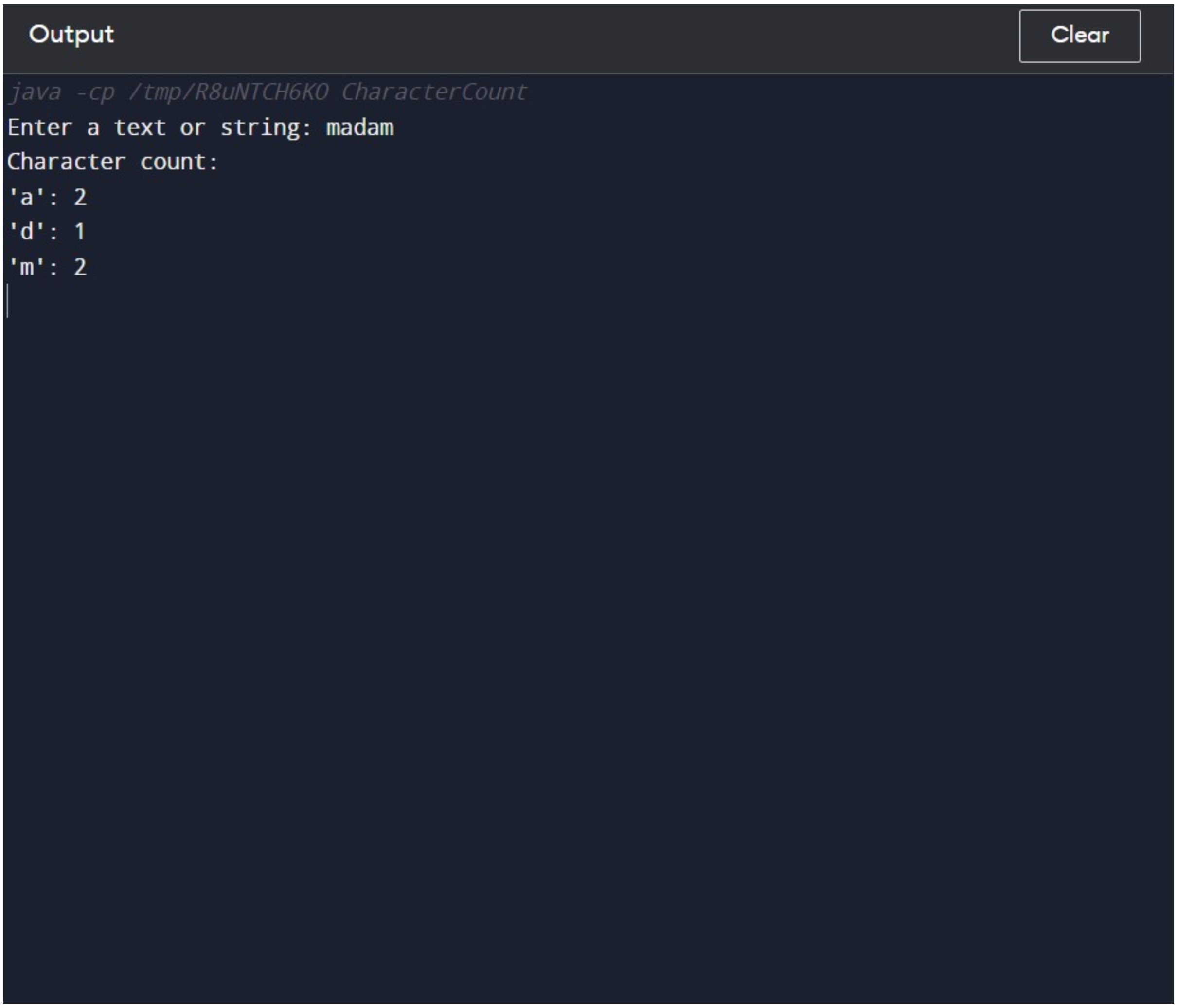
```
java -cp /tmp/On4OIqgXel IntegerComparison
Enter the first integer: 3
Enter the second integer: 2
The condition is met.
```

8. Write a Java program using function to count the number of each character of a given text/string.

Code –

```
import java.util.Scanner;
public class CharacterCount {

    // Function to count the number of each character in a given string
    public static void countCharacters(String text) {
        int[] charCount = new int[256]; // Assuming ASCII characters

        for (int i = 0; i < text.length(); i++) {
            charCount[(int) text.charAt(i)]++;
        }
        System.out.println("Character count:");
        for (int i = 0; i < charCount.length; i++) {
            if (charCount[i] > 0) {
                System.out.println("'" + (char) i + "': " + charCount[i]);
            }
        }
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a text or string: ");
        String inputText = scanner.nextLine();
        countCharacters(inputText);
        scanner.close();  }
    }
```

Output –



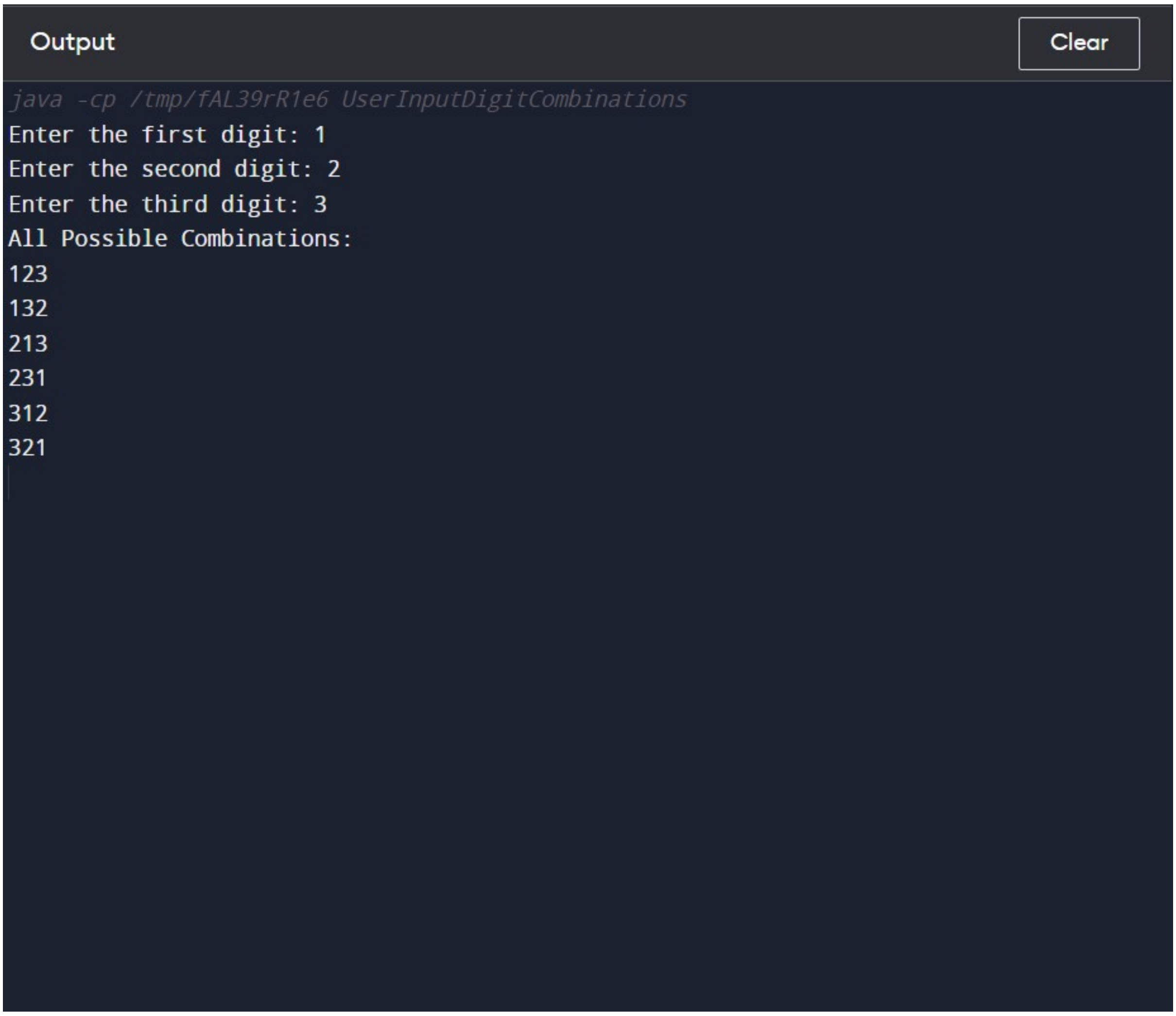
```
java -cp /tmp/R8uNTCH6KO CharacterCount
Enter a text or string: madam
Character count:
'a': 2
'd': 1
'm': 2
```

9. Write a Java program using function to print all Possible Combinations from the three Digits.

Code –

```
import java.util.Scanner;
public class Combinations {

    // Function to generate all possible combinations of three given digits
    public static void generateCombinations(int digit1, int digit2, int digit3) {
        System.out.println("All Possible Combinations:");
        int[] digits = {digit1, digit2, digit3};
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                if (j != i) {
                    for (int k = 0; k < 3; k++) {
                        if (k != i && k != j) {
                            System.out.println("" + digits[i] + digits[j] + digits[k]);
                        }
                    }
                }
            }
        }
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the three digits: ");
        int digit1 = scanner.nextInt();
        int digit2 = scanner.nextInt();

        int digit3 = scanner.nextInt();

        generateCombinations(digit1, digit2, digit3);

        scanner.close();

    }

}
```

Output –



```
java -cp /tmp/fAL39rR1e6 UserInputDigitCombinations
Enter the first digit: 1
Enter the second digit: 2
Enter the third digit: 3
All Possible Combinations:
123
132
213
231
312
321
```

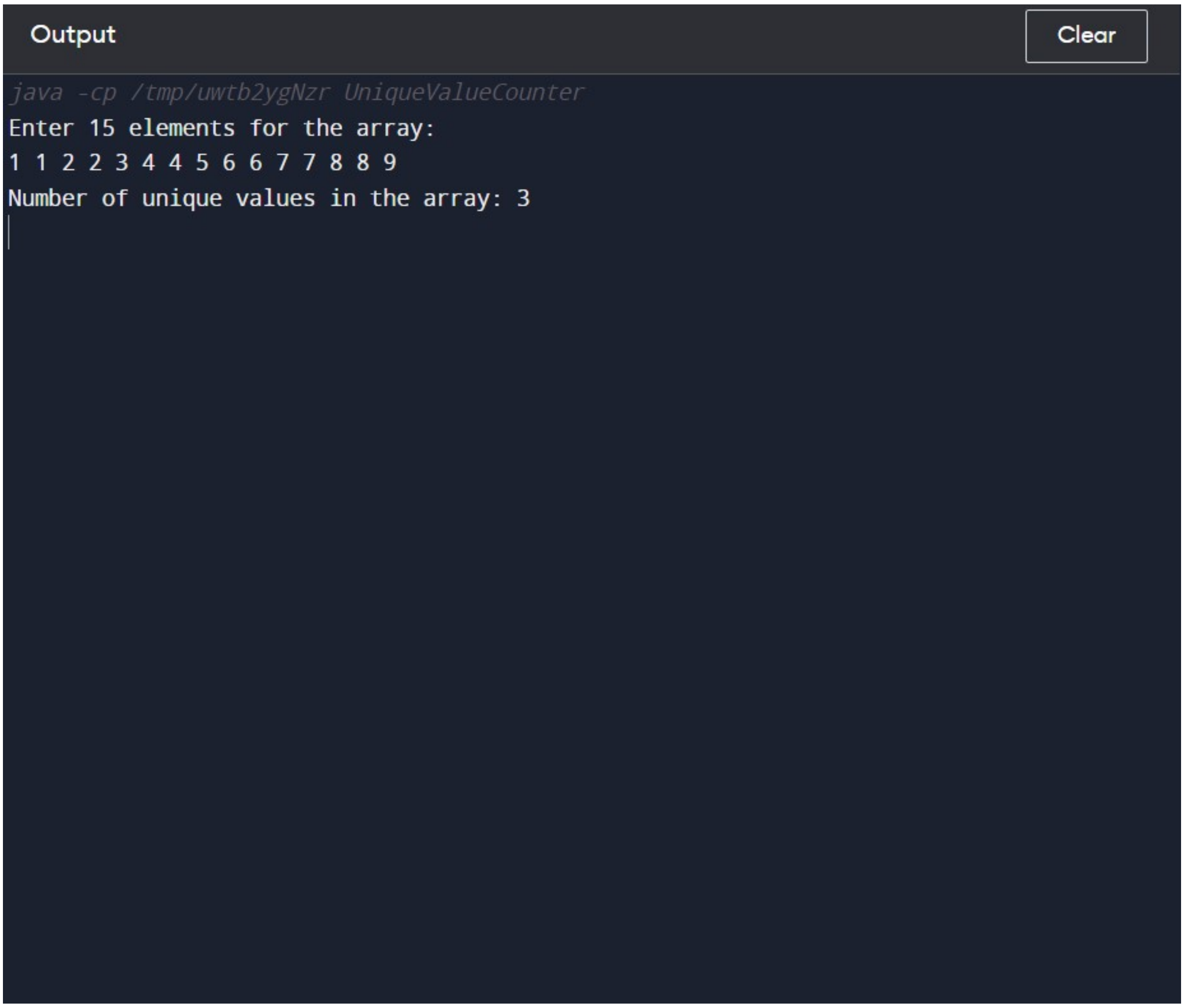
10. Write a Java program using function to count unique values in an array of 15 elements.

Code –

```
import java.util.Scanner;
public class UniqueValueCounter {

  // Function to check if a value is unique in the array
  public static boolean isUnique(int[] arr, int index) {
    for (int i = 0; i < arr.length; i++) {
      if (i != index && arr[i] == arr[index]) {
        return false; }
    }
    return true;
  }
  // Function to count unique values in an array
  public static int countUniqueValues(int[] arr) {
    int uniqueCount = 0;

    for (int i = 0; i < arr.length; i++) {
      if (isUnique(arr, i)) {
        uniqueCount++; }
    }
    return uniqueCount;
  }
  public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    int[] arr = new int[15];
```

```
        System.out.println("Enter 15 elements for the array:");
        for (int i = 0; i < arr.length; i++) {
            arr[i] = scanner.nextInt();
        }
        int uniqueCount = countUniqueValues(arr);
        System.out.println("Number of unique values in the array: " + uniqueCount);
        scanner.close();
    }
}
```

Output –



```
java -cp /tmp/uwtb2ygNzr UniqueValueCounter
Enter 15 elements for the array:
1 1 2 2 3 4 4 5 6 6 7 7 8 8 9
Number of unique values in the array: 3
```