Day 1 Analyticals Questions

Java Fundamentals and Analytical questions

Subject code	**CSA0918**
Subject Name	**Proramming in Java for Query Processing**
Year & Sem	**III YEAR**
Ac Year / Slot	**2024 / A Slot**
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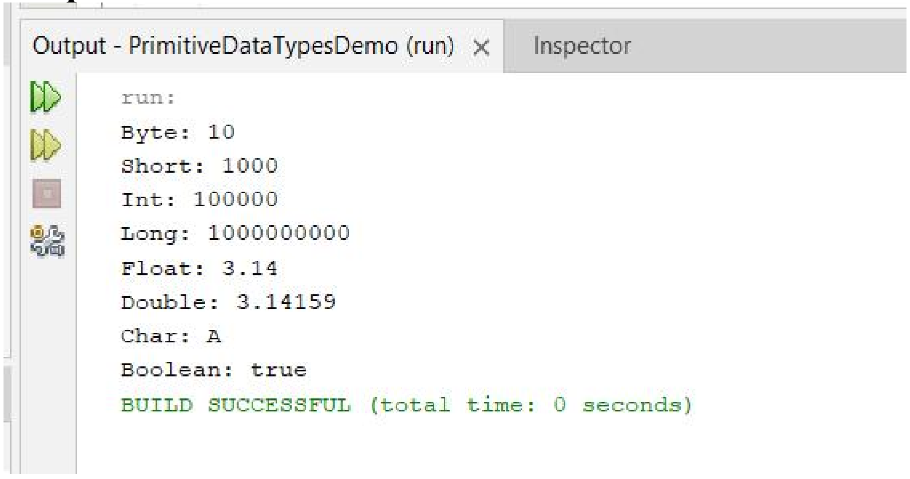
1. Write a program to demonstrate primitive datatypes in java. Below are the datatypes Integer data types: byte, short, int, and long. Floating-point data types: float and double. Character data type: char.
Boolean data type: Boolean.

Program

```
import java.util.Scanner;

public class PrimitiveDataTypes {

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

        System.out.print("Enter a byte value: ");
        byte b = scanner.nextByte();

        System.out.print("Enter a short value: ");
        short s = scanner.nextShort();

        System.out.print("Enter an int value: ");
        int i = scanner.nextInt();

        System.out.print("Enter a long value: ");
        long l = scanner.nextLong();

        System.out.print("Enter a float value: ");
        float f = scanner.nextFloat();

        System.out.print("Enter a double value: ");
        double d = scanner.nextDouble();

        System.out.print("Enter a character: ");
        char c = scanner.next().charAt(0);

        System.out.print("Enter a boolean value (true or false): ");
        boolean bool = scanner.nextBoolean();

        System.out.println("\nEntered values:");
        System.out.println("byte: " + b);
        System.out.println("short: " + s);
        System.out.println("int: " + i);
        System.out.println("long: " + l);
        System.out.println("float: " + f);
        System.out.println("double: " + d);
        System.out.println("char: " + c);
        System.out.println("boolean: " + bool);
    }
}
```

Output



```
run:
Byte: 10
Short: 1000
Int: 100000
Long: 1000000000
Float: 3.14
Double: 3.14159
Char: A
Boolean: true
BUILD SUCCESSFUL (total time: 0 seconds)
```

2. Example program demonstrating data type conversion in Java for all primitive data types:
a) Implicit conversion (widening) from smaller data types to larger ones.

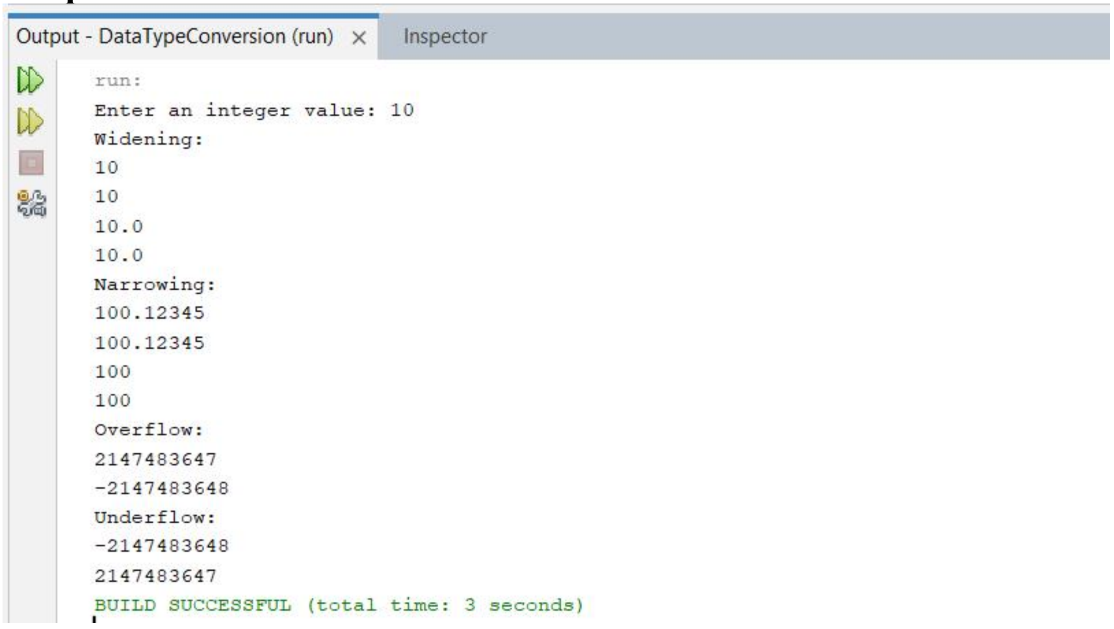
b) Explicit conversion (narrowing) from larger data types to smaller ones.

c) Overflow and underflow scenarios where the value exceeds the range of the target data type.

Program

```
import java.util.Scanner;

public class DataTypeConversion {

  public static void main(String[] args) {

    Scanner sc = new Scanner(System.in);

    System.out.print("Enter an integer value: ");
    int intVal = sc.nextInt();

    long longVal = intVal;
    float floatVal = longVal;
    double doubleVal = floatVal;

    System.out.println("Widening:");
    System.out.println(intVal);
    System.out.println(longVal);
    System.out.println(floatVal);
    System.out.println(doubleVal);

    double doubleVal2 = 100.12345;
    float floatVal2 = (float)doubleVal2;
    long longVal2 = (long)floatVal2;
    int intVal2 = (int)longVal2;

    System.out.println("Narrowing:");
    System.out.println(doubleVal2);
    System.out.println(floatVal2);
    System.out.println(longVal2);
    System.out.println(intVal2);

    int intMax = Integer.MAX_VALUE;
    int overflow = intMax + 1;

    System.out.println("Overflow:");
    System.out.println(intMax);
    System.out.println(overflow);

    int intMin = Integer.MIN_VALUE;
    int underflow = intMin - 1;

    System.out.println("Underflow:");
    System.out.println(intMin);
    System.out.println(underflow);

    sc.close();
  }

}
```

Output



```
run:
Enter an integer value: 10
Widening:
10
10
10.0
10.0
Narrowing:
100.12345
100.12345
100
100
Overflow:
2147483647
-2147483648
Underflow:
-2147483648
2147483647
BUILD SUCCESSFUL (total time: 3 seconds)
```

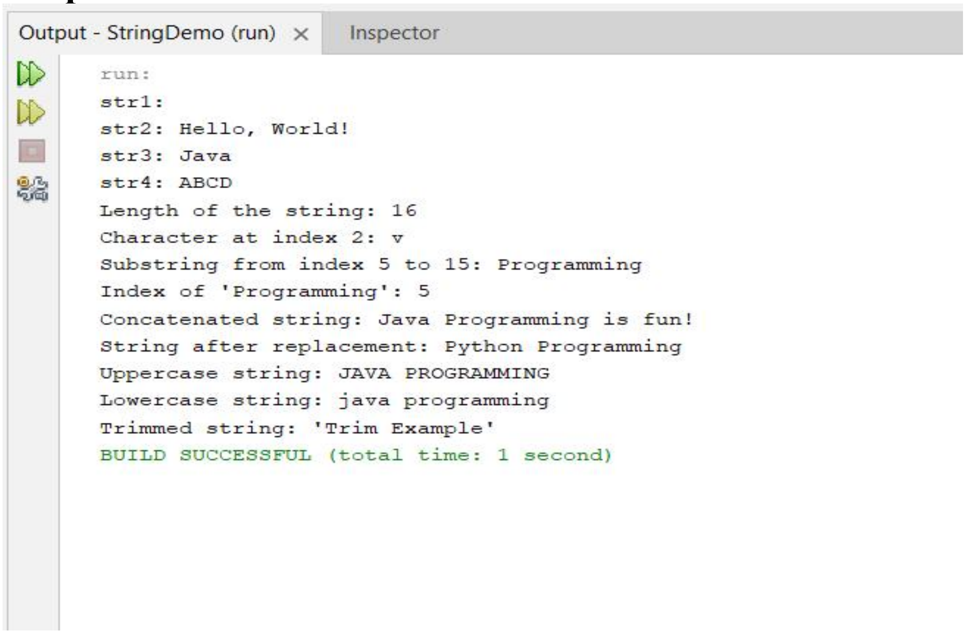
3. Java program for String methods and String constructors

Program

```
import java.util.Scanner;
public class string {
      public static void main(String[] args) {
         // String constructors
         String str1 = new String();
         String str2 = new String("Hello, World!");
         char[] charArray = {'J', 'a', 'v', 'a'};
         String str3 = new String(charArray);
         byte[] byteArray = {65, 66, 67, 68};
         String str4 = new String(byteArray);
         System.out.println("str1: " + str1);
         System.out.println("str2: " + str2);
         System.out.println("str3: " + str3);
         System.out.println("str4: " + str4);
         String originalString = "Java Programming";
         int length = originalString.length();
         System.out.println("Length of the string: " + length);
         char charAtIndex = originalString.charAt(2);
         System.out.println("Character at index 2: " + charAtIndex);
```

```
        String substring = originalString.substring(5, 16);
        System.out.println("Substring from index 5 to 15: " + substring);
        int indexOf = originalString.indexOf("Programming");
        System.out.println("Index of 'Programming': " + indexOf);
        String concatString = originalString.concat(" is fun!");
        System.out.println("Concatenated string: " + concatString);
        String replacedString = originalString.replace("Java", "Python");
        System.out.println("String after replacement: " + replacedString);
        String upperCaseString = originalString.toUpperCase();
        System.out.println("Uppercase string: " + upperCaseString);
        String lowerCaseString = originalString.toLowerCase();
        System.out.println("Lowercase string: " + lowerCaseString);
        String stringWithSpaces = "   Trim Example   ";
        String trimmedString = stringWithSpaces.trim();
        System.out.println("Trimmed string: '" + trimmedString + "'");
    }
}
```

Output



```
run:
str1:
str2: Hello, World!
str3: Java
str4: ABCD
Length of the string: 16
Character at index 2: v
Substring from index 5 to 15: Programming
Index of 'Programming': 5
Concatenated string: Java Programming is fun!
String after replacement: Python Programming
Uppercase string: JAVA PROGRAMMING
Lowercase string: java programming
Trimmed string: 'Trim Example'
BUILD SUCCESSFUL (total time: 1 second)
```

4.String builder and String buffer program differences with example
Demonstrate simple examples of StringBuilder and StringBuffer appending strings. Then compare the performance of StringBuilder and StringBuffer by appending a large number of strings in a loop (iterations times) and measuring the time taken.

Note:
The key differences between StringBuilder and StringBuffer in Java are:

Thread Safety:

StringBuffer: Synchronized and thread-safe. This means multiple threads can access and modify it concurrently without data corruption. However, this synchronization comes at a performance cost.
StringBuilder: Non-synchronized and not thread-safe. Only one thread can access and modify it at a time. If multiple threads access it without proper synchronization, it can lead to errors.
Performance:

StringBuffer: Due to synchronization overhead, it's generally slower than StringBuilder when thread safety is not required.
StringBuilder: Its lack of synchronization makes it faster than StringBuffer in single-threaded scenarios or when synchronization is managed properly.
Other Differences:

Methods: Both have the same public methods for string manipulation (append, insert, delete, etc.). However, StringBuffer has a few extra methods related to capacity and sub-sequences, which are mostly redundant with methods available in the String class.
Memory: Both allocate memory dynamically as needed but StringBuffer may allocate slightly more memory initially due to synchronization overhead.
When to use which:

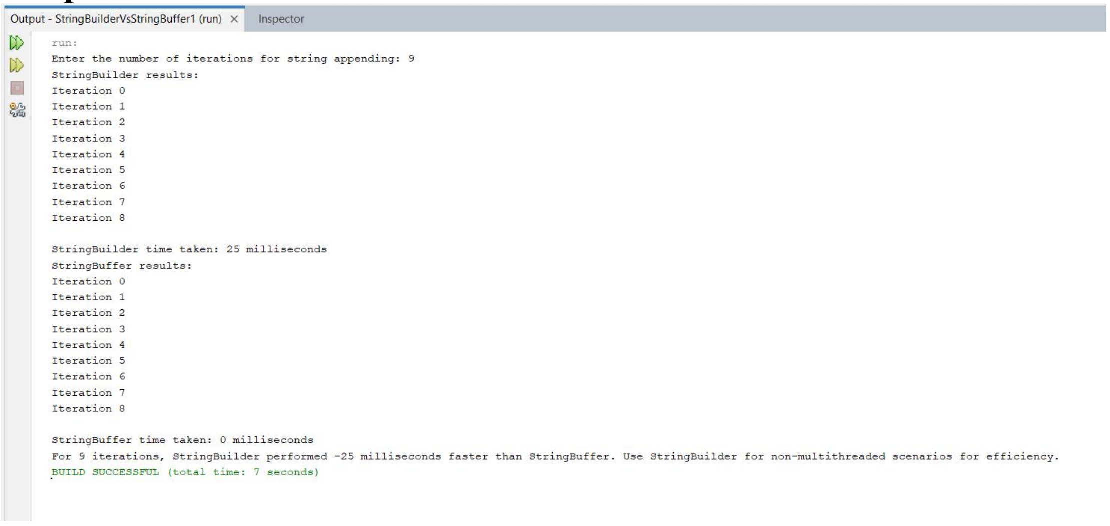
Use StringBuffer: When your application is multithreaded and multiple threads might access and modify the string concurrently.
Use StringBuilder: In single-threaded environments or when you manage synchronization yourself. It's often the preferred choice for better performance when thread safety is not a concern.
Additional considerations:

In complex scenarios, profile your application's string operations to measure the impact of thread safety and specific string manipulations on your performance.
Remember that using either StringBuilder or StringBuffer is more efficient than string concatenation using the + operator, which creates new string objects in each iteration.

Program
```
import java.util.Scanner;

public class StringBuilderVsStringBuffer1 {

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


        System.out.print("Enter the number of iterations for string
appending: ");
        int iterations = scanner.nextInt();


        long startTime = System.currentTimeMillis();


        StringBuilder sb = new StringBuilder();
        for (int i = 0; i < iterations; i++) {
            sb.append("Iteration " + i + "\n");
        }
        String sbResult = sb.toString();


        long endTime = System.currentTimeMillis();
        long sbTime = endTime - startTime;


        startTime = System.currentTimeMillis();

        StringBuffer sbuffer = new StringBuffer();
        for (int i = 0; i < iterations; i++) {
            sbuffer.append("Iteration " + i + "\n");
        }
        String sbufferResult = sbuffer.toString();

        endTime = System.currentTimeMillis();
        long sbufferTime = endTime - startTime;


        System.out.println("StringBuilder results:\n" + sbResult);
        System.out.println("StringBuilder time taken: " + sbTime + "
milliseconds");
```

```
        System.out.println("StringBuffer results:\n" + sbufferResult);
        System.out.println("StringBuffer time taken: " + sbufferTime + " 
milliseconds");


        String conclusion = "For " + iterations + " iterations, StringBuilder 
performed " + (sbufferTime - sbTime) +
                    " milliseconds faster than StringBuffer. Use StringBuilder for 
non-multithreaded scenarios for efficiency.";
        System.out.println(conclusion);
}
}
```

Output



Output - StringBuilderVsStringBuffer1 (run) × Inspector

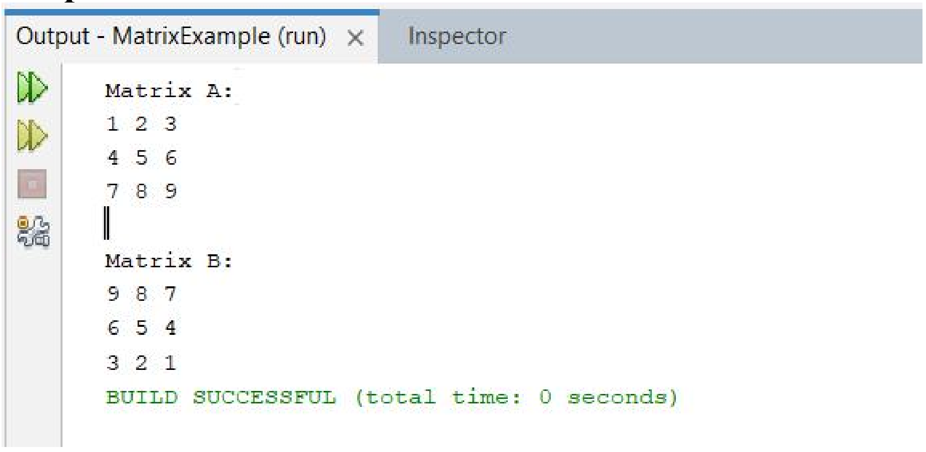
```
run:
Enter the number of iterations for string appending: 9
StringBuilder results:
Iteration 0
Iteration 1
Iteration 2
Iteration 3
Iteration 4
Iteration 5
Iteration 6
Iteration 7
Iteration 8

StringBuilder time taken: 25 milliseconds
StringBuffer results:
Iteration 0
Iteration 1
Iteration 2
Iteration 3
Iteration 4
Iteration 5
Iteration 6
Iteration 7
Iteration 8

StringBuffer time taken: 0 milliseconds
For 9 iterations, StringBuilder performed -25 milliseconds faster than StringBuffer. Use StringBuilder for non-multithreaded scenarios for efficiency.
BUILD SUCCESSFUL (total time: 7 seconds)
```

5. Java Array for printing first loop from 1 to 9 and second loop from 9 to 1 and store them in matrix A and matrix B

Program

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

    public static void main(String[] args) {
        int n = 3;


        int[][] A = new int[n][n];


        // Assigning values 1 to 9 for A matrix
        int counter = 1;
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                A[i][j] = counter;
                counter++;
            }
        }

        int[][] B = new int[n][n];


        // Assigning value 9 to 1 for B matrix
        counter = 9;
        for (int i = 0; i < n; i++) {
            for (int j = n - 1; j >= 0; j--) {
                B[i][j] = counter;
                counter--;
            }
        }

        // Printing matrix A
        System.out.println("Matrix A (1 to 9):");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                System.out.print(A[i][j] + " ");
            }
            System.out.println();
        }

        // Printing matrix B
        System.out.println("\nMatrix B (9 to 1):");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                System.out.print(B[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Output



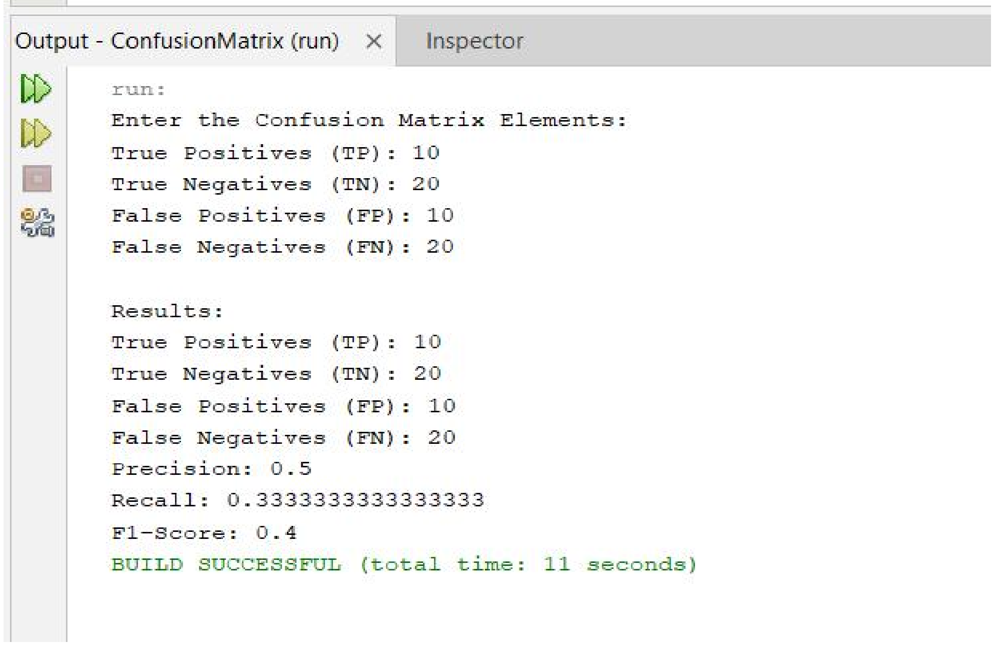
```
Matrix A:
1 2 3
4 5 6
7 8 9

Matrix B:
9 8 7
6 5 4
3 2 1
BUILD SUCCESSFUL (total time: 0 seconds)
```

6. Java program to create confusion matrix and calculate TP (True Positive), TN (True Negative), FP (False Positive), FN (False Negative), and F1- score:

Program:

```
import java.util.Scanner;

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

        // Input confusion matrix elements from the user
        System.out.println("Enter the Confusion Matrix Elements:");
        System.out.print("True Positives (TP): ");
        int TP = scanner.nextInt();
        System.out.print("True Negatives (TN): ");
        int TN = scanner.nextInt();
        System.out.print("False Positives (FP): ");
        int FP = scanner.nextInt();
        System.out.print("False Negatives (FN): ");
        int FN = scanner.nextInt();

        // Calculate True Positive (TP), True Negative (TN), False Positive
(FP), False Negative (FN)
        double precision = (double) TP / (TP + FP);
        double recall = (double) TP / (TP + FN);
        double f1Score = 2 * (precision * recall) / (precision + recall);

        // Output the results
        System.out.println("\nResults:");
        System.out.println("True Positives (TP): " + TP);
        System.out.println("True Negatives (TN): " + TN);
        System.out.println("False Positives (FP): " + FP);
        System.out.println("False Negatives (FN): " + FN);
        System.out.println("Precision: " + precision);
        System.out.println("Recall: " + recall);
        System.out.println("F1-Score: " + f1Score);

        scanner.close();
    }
}
```

Output:



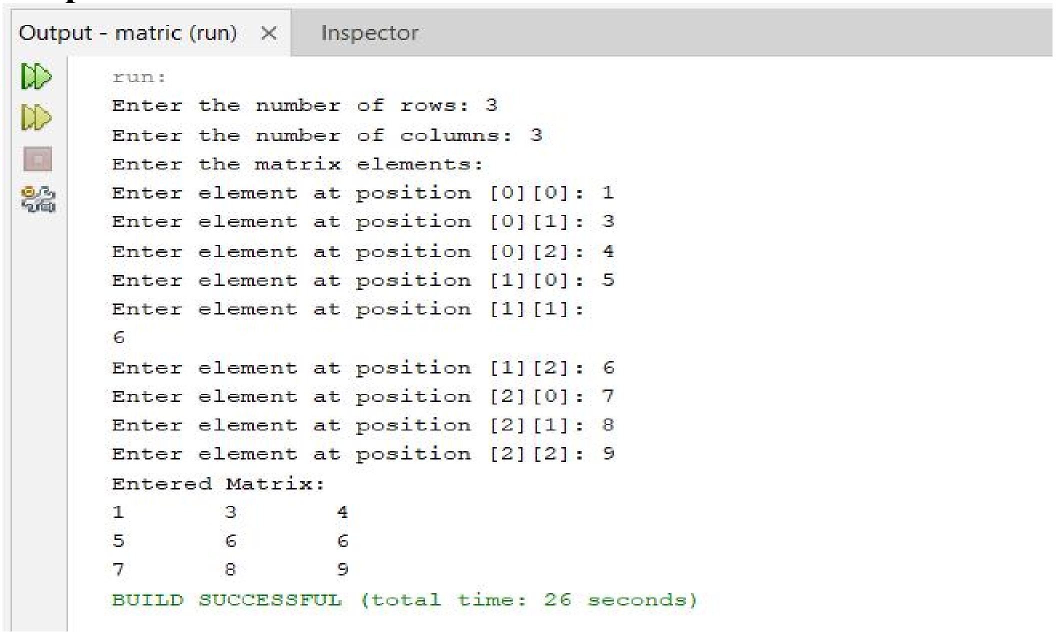
```
run:
Enter the Confusion Matrix Elements:
True Positives (TP): 10
True Negatives (TN): 20
False Positives (FP): 10
False Negatives (FN): 20

Results:
True Positives (TP): 10
True Negatives (TN): 20
False Positives (FP): 10
False Negatives (FN): 20
Precision: 0.5
Recall: 0.3333333333333333
F1-Score: 0.4
BUILD SUCCESSFUL (total time: 11 seconds)
```

7. Write a program using Arrays class in java for creating 2D matrix

Program:

```
import java.util.Scanner;
public class Matrix {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of rows: ");
        int rows = scanner.nextInt();

        System.out.print("Enter the number of columns: ");
        int columns = scanner.nextInt();
        int[][] matrix = new int[rows][columns];
        System.out.println("Enter the matrix elements:");

        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                System.out.print("Enter element at position [" + i + "][" + j + "]: 
");
                matrix[i][j] = scanner.nextInt();
            }
        }
        System.out.println("Entered Matrix:");3
        printMatrix(matrix);

        scanner.close();
    }
    private static void printMatrix(int[][] matrix) {
        for (int[] row : matrix) {
            for (int element : row) {
                System.out.print(element + "\t");
            }
            System.out.println();
        }
    }
}
```

Output:



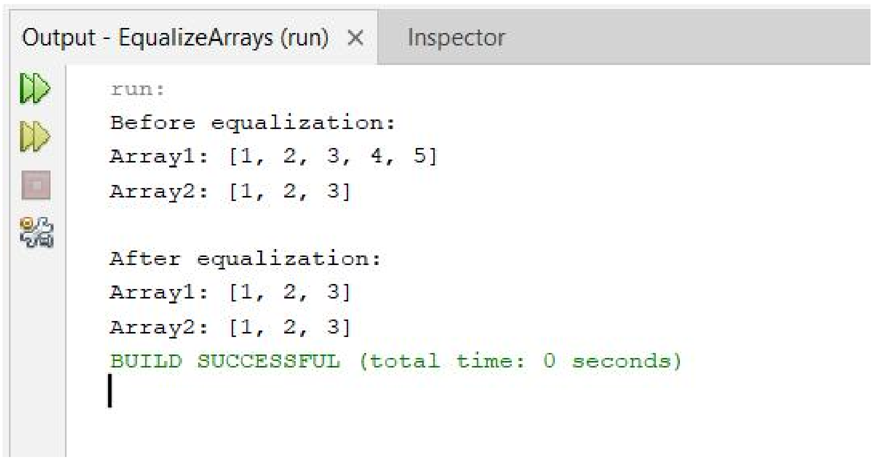
```
run:
Enter the number of rows: 3
Enter the number of columns: 3
Enter the matrix elements:
Enter element at position [0][0]: 1
Enter element at position [0][1]: 3
Enter element at position [0][2]: 4
Enter element at position [1][0]: 5
Enter element at position [1][1]: 
6
Enter element at position [1][2]: 6
Enter element at position [2][0]: 7
Enter element at position [2][1]: 8
Enter element at position [2][2]: 9
Entered Matrix:
1       3       4
5       6       6
7       8       9
BUILD SUCCESSFUL (total time: 26 seconds)
```

7. Java program to find if 2 arrays have equal length, if not make it equal according to the smallest array among the both, use Arrays class and copyOf() function

Program

```
import java.util.Arrays;
public class EqualizeArrays {
 public static void main(String[] args) {
 int[] array1 = {1, 2, 3, 4, 5};
 int[] array2 = {1, 2, 3};

 System.out.println("Before equalization:");
 System.out.println("Array1: " + Arrays.toString(array1));
 System.out.println("Array2: " + Arrays.toString(array2));

 // Check if arrays have equal length
 if (array1.length != array2.length) {
 // Make them equal according to the smallest array length
 int minSize = Math.min(array1.length, array2.length);
 if (array1.length > minSize) {
 array1 = Arrays.copyOf(array1, minSize);
 } else {
 array2 = Arrays.copyOf(array2, minSize);
 }
 }

 System.out.println("\nAfter equalization:");
 System.out.println("Array1: " + Arrays.toString(array1));
 System.out.println("Array2: " + Arrays.toString(array2));
 } }
```

Output



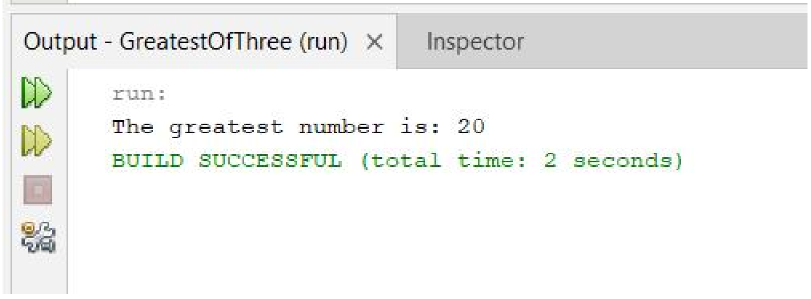
```
run:
Before equalization:
Array1: [1, 2, 3, 4, 5]
Array2: [1, 2, 3]

After equalization:
Array1: [1, 2, 3]
Array2: [1, 2, 3]
BUILD SUCCESSFUL (total time: 0 seconds)
```

9. Find greatest of 3 numbers in java, without using If statement
Hint: Ternary operators

Program

```
Import java.util.Scanner;
public class GreatestOfThree {
 public static void main(String[] args) {
 int num1 = 10;
 int num2 = 20;
 int num3 = 15;

 int greatest = num1 > num2 ? (num1 > num3 ? num1 : num3) : (num2 >
num3 ?
num2 : num3);

 System.out.println("The greatest number is: " + greatest);
 } }
```

Output



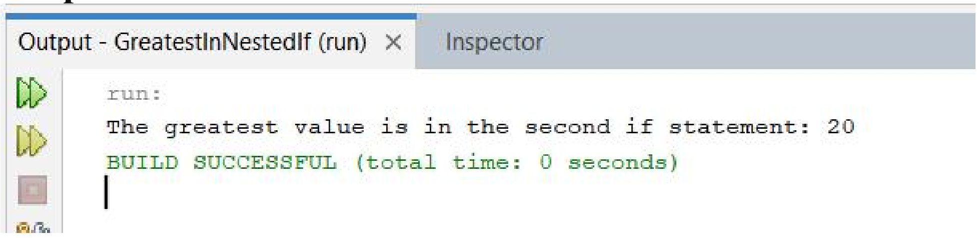
```
run:
The greatest number is: 20
BUILD SUCCESSFUL (total time: 2 seconds)
```

10. Use nested if to find which if statement contains the greatest value

Program

```
import java.util.Scanner;
public class GreatestInNestedIf {
 public static void main(String[] args) {
 int num1 = 10;
 int num2 = 20;
 int num3 = 15;

 if (num1 > num2) {
 if (num1 > num3) {
 System.out.println("The greatest value is in the first if statement: " +
num1);
 } else {
 System.out.println("The greatest value is in the third if statement: " +
num3);
 }
 } else {
 if (num2 > num3) {
 System.out.println("The greatest value is in the second if statement: " +
num2);
 } else {
 System.out.println("The greatest value is in the third if statement: " +
num3);
 }
 }
 } }
```

Output



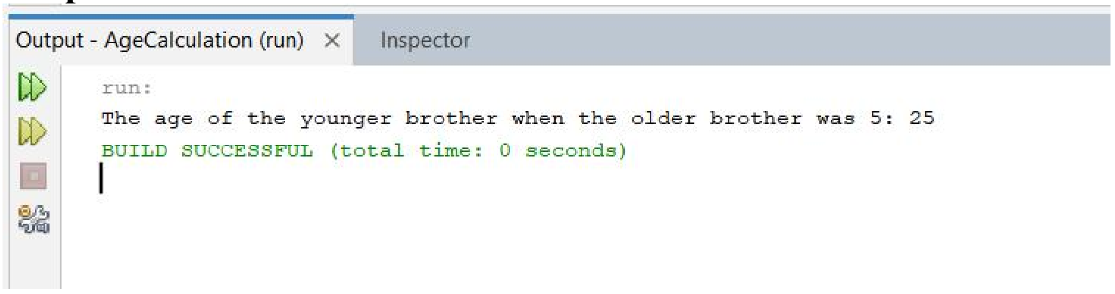
```
run:
The greatest value is in the second if statement: 20
BUILD SUCCESSFUL (total time: 0 seconds)
```

11. If a person is age 28 when his younger brother is 24, what will be his age when the older brother is 56. If age difference is more than 3 then find the age of younger brother when older brother was 5.

Program

```
import java.util.Scanner;
public class AgeCalculation {
 public static void main(String[] args) {
 int personAgeAt28 = 28;
 int youngerBrotherAgeAt28 = 24;

 // Find the age difference
 int ageDifference = personAgeAt28 - youngerBrotherAgeAt28;

 // Calculate the age of the person when the older brother is 56
 int personAgeAt56 = 56 + ageDifference;

 // Check if the age difference is more than 3
 if (ageDifference > 3) {
 // Calculate the age of the younger brother when the older brother was 5
 int youngerBrotherAgeAt5 = youngerBrotherAgeAt28 - ageDifference +
5;
 System.out.println("The age of the younger brother when the older
brother was 5: " + youngerBrotherAgeAt5);
 }
 else {
 // Print the age of the person when the older brother is 56
 System.out.println("The age of the person when the older brother is 56: "
+ personAgeAt56);
 }
 } }
```

Output



```
run:
The age of the younger brother when the older brother was 5: 25
BUILD SUCCESSFUL (total time: 0 seconds)
```

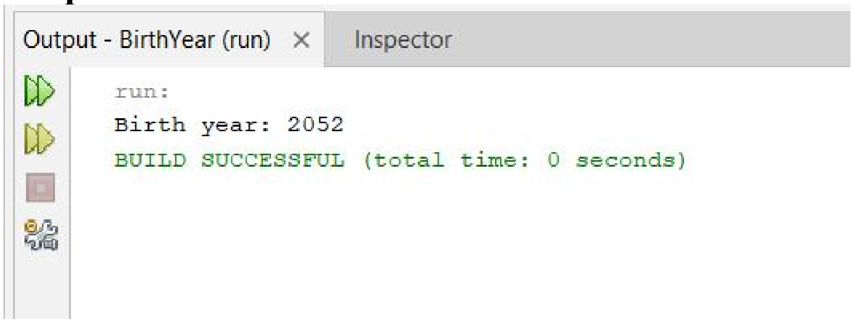
12. Find a person's birth year based on their eligibility to vote, given that the current year is 2073 and the eligibility age is 21 years, we first need to calculate the birth year. If the birth year is more than 2060, we then find the years between the person's vote-eligible year and 2023 else find median of birth year and 2023

Program

```
public class BirthYear {
```

```
public static void main(String[] args) {
int currentYear = 2073;
int eligibilityAge = 21;
int voteEligibleYear = currentYear - eligibilityAge;
if (voteEligibleYear > 2060) {
System.out.println("Birth year is more than 2060.");
System.out.println("Years between vote-eligible year and 2023:");
for (int year = voteEligibleYear; year >= 2023; year--) {
System.out.println(year);
}
} else {
int birthYear = currentYear - eligibilityAge;
System.out.println("Birth year: " + birthYear);
}
} }
```

Output



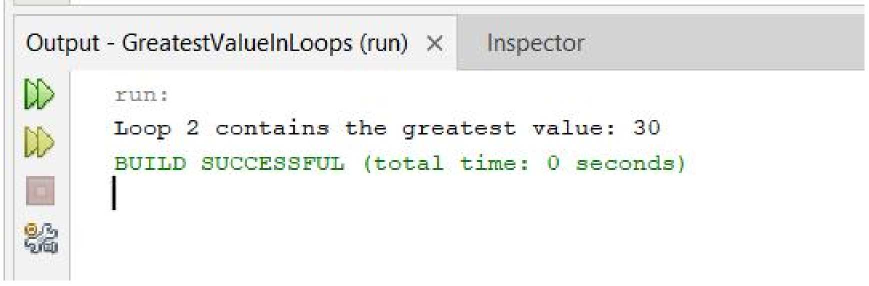
```
run:
Birth year: 2052
BUILD SUCCESSFUL (total time: 0 seconds)
```

13. Use nested if to find which loop contains the greatest value

Program

```
public class GreatestValueInLoops {
   public static void main(String[] args) {
      int[] loop1 = {10, 15, 8, 20, 12};
      int[] loop2 = {25, 18, 22, 30, 28};

      int maxInLoop1 = findMax(loop1);
      int maxInLoop2 = findMax(loop2);

      if (maxInLoop1 > maxInLoop2) {
         System.out.println("Loop 1 contains the greatest value: " +
maxInLoop1);
      } else if (maxInLoop2 > maxInLoop1) {
            System.out.println("Loop 2 contains the greatest value: " +
maxInLoop2);
        } else {
            System.out.println("Both loops contain the same greatest value: "
+ maxInLoop1);
        }
    }
    private static int findMax(int[] loop) {
        int max = loop[0];
        for (int i = 1; i < loop.length; i++) {
            if (loop[i] > max) {
                max = loop[i];
            }
        }
        return max;
    }
}
```

Output



Output - GreatestValueInLoops (run) × Inspector

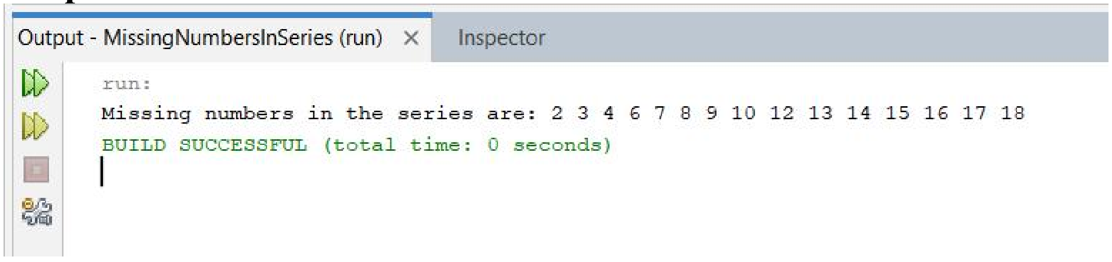
```
run:
Loop 2 contains the greatest value: 30
BUILD SUCCESSFUL (total time: 0 seconds)
```

14. Find missing numbers in the series 1,5,11,19 using java.

Program

```
public class MissingNumbersInSeries {
    public static void main(String[] args) {
        int[] series = {1, 5, 11, 19};
        findMissingNumbers(series);
    }
    private static void findMissingNumbers(int[] series) {
        System.out.print("Missing numbers in the series are: ");

        for (int i = 0; i < series.length - 1; i++) {
            int diff = series[i + 1] - series[i];
            if (diff > 1) {
                for (int j = 1; j < diff; j++) {
                    int missingNumber = series[i] + j;
                    System.out.print(missingNumber + " ");
                }
            }
        }

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

Output



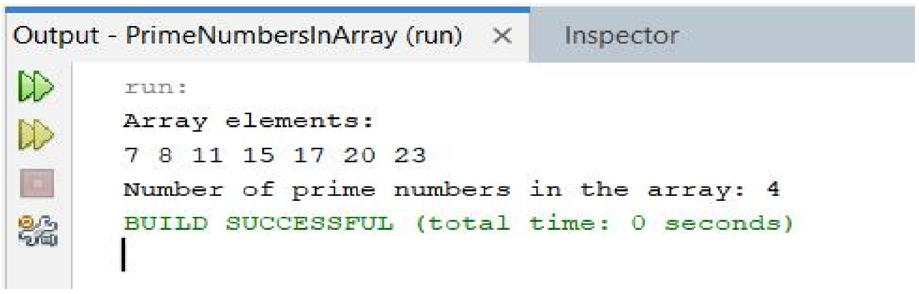
```
run:
Missing numbers in the series are: 2 3 4 6 7 8 9 10 12 13 14 15 16 17 18
BUILD SUCCESSFUL (total time: 0 seconds)
```

15. write java program to iterate through array elements using enhanced for loop. And find no. of prime numbers

Program

```
public class PrimeNumbersInArray {
// Function to check if a number is prime
public static boolean isPrime(int n) {
if (n <= 1) {
return false;
}
for (int i = 2; i <= Math.sqrt(n); i++) {
if (n % i == 0) {
return false;
}
}
return true;
}
public static void main(String[] args) { int[] array = {7, 8, 11, 15, 17, 20,
23};
int primeCount = 0;
System.out.println("Array elements:");
for (int num : array) {
System.out.print(num + " ");
if (isPrime(num)) {
primeCount++;
}
}
System.out.println("\nNumber of prime numbers in the array: " +
primeCount);
}
}
```

Output



Output - PrimeNumbersInArray (run) × Inspector

```
run:
Array elements:
7 8 11 15 17 20 23
Number of prime numbers in the array: 4
BUILD SUCCESSFUL (total time: 0 seconds)
```

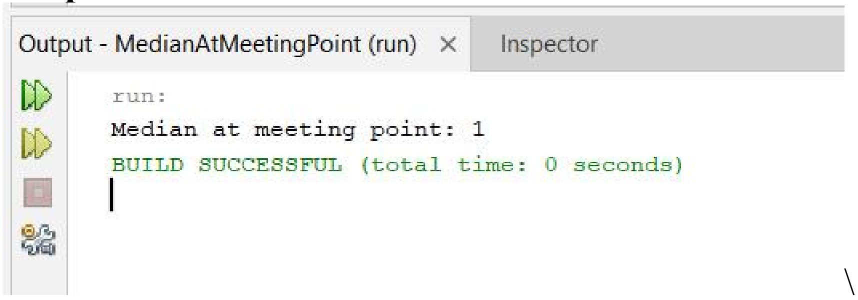
16 .Iterate to two for loops, both contains 10 array elements, one is normal order, another in reverse order, find the median where they will meet

Program

```
public class MedianAtMeetingPoint {
 public static void main(String[] args) {
 int[] normalOrder = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
 int[] reverseOrder = {10, 9, 8, 7, 6, 5, 4, 3, 2, 1};
 int median = -1; // Initialize median to a default value
 // Iterate through both arrays simultaneously
 for (int i = 0, j = reverseOrder.length - 1; i < normalOrder.length &&
j >= 0; i++, j--) {
 // If the current element from normalOrder array is greater than or equal
to the current element
 // from reverseOrder array, we have reached or passed the meeting point
of the median
 if (normalOrder[i] >= reverseOrder[j]) {
```

```
 median = normalOrder[i]; // Set the median value
 break; // Exit the loop
 }
 }
 System.out.println("Median at meeting point: " + median);
 } }
```

Output



Output - MedianAtMeetingPoint (run) × Inspector

```
run:
Median at meeting point: 1
BUILD SUCCESSFUL (total time: 0 seconds)
```

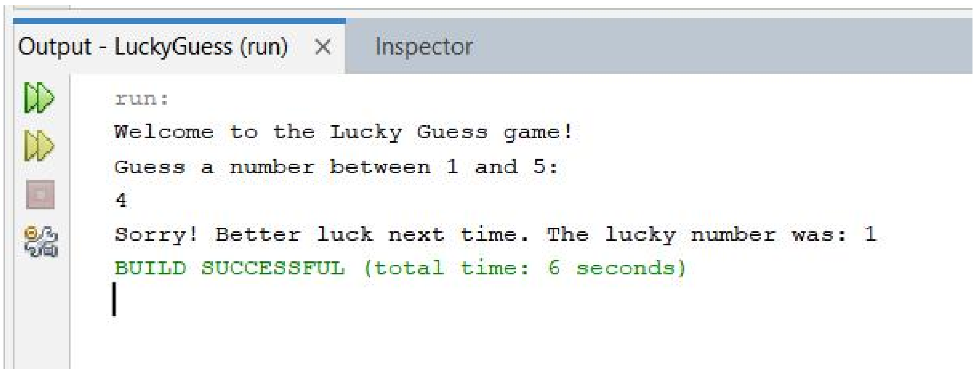
\

17. Write java program using switch case to find luck guess

Program

```
import java.util.Scanner;
public class LuckyGuess {
 public static void main(String[] args) {
 Scanner scanner = new Scanner(System.in);
 System.out.println("Welcome to the Lucky Guess game!");
 System.out.println("Guess a number between 1 and 5:");
 int luckyNumber = (int) (Math.random() * 5) + 1;
// Generate a random number between 1 and 5
 int guess = scanner.nextInt(); // Get user's guess
 switch (guess) {
 case 1:
 case 2:
 case 3:
 case 4:
 case 5:
 if (guess == luckyNumber) {
 System.out.println("Congratulations! You guessed the lucky number: " +
luckyNumber);
 } else {
 System.out.println("Sorry! Better luck next time. The lucky number was:
" +
luckyNumber);
 }
 break;
 default:
 System.out.println("Invalid guess! Please guess a number between 1 and
5.");
 }
 scanner.close();
 }
}
```

Output



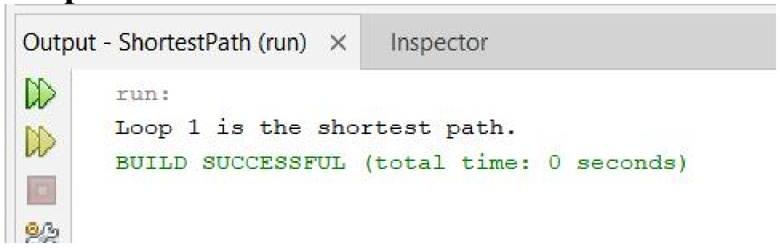
```
run:
Welcome to the Lucky Guess game!
Guess a number between 1 and 5:
4
Sorry! Better luck next time. The lucky number was: 1
BUILD SUCCESSFUL (total time: 6 seconds)
```

18. Java switch case to find which for loop is shortest path first

Program

```
public class ShortestPath {
 public static void main(String[] args) {
 int[] loop1 = {1, 2, 3, 4, 5};
 int[] loop2 = {10, 20, 30, 40, 50, 60};
 int loop1Iterations = loop1.length;
 int loop2Iterations = loop2.length;
 switch (Integer.compare(loop1Iterations, loop2Iterations)) {
 case -1:
 System.out.println("Loop 1 is the shortest path.");
 break;
 case 0:
 System.out.println("Both loops have the same number of iterations.");
 break;
 case 1:
 System.out.println("Loop 2 is the shortest path.");
 break;
 }
 } }
```

Output



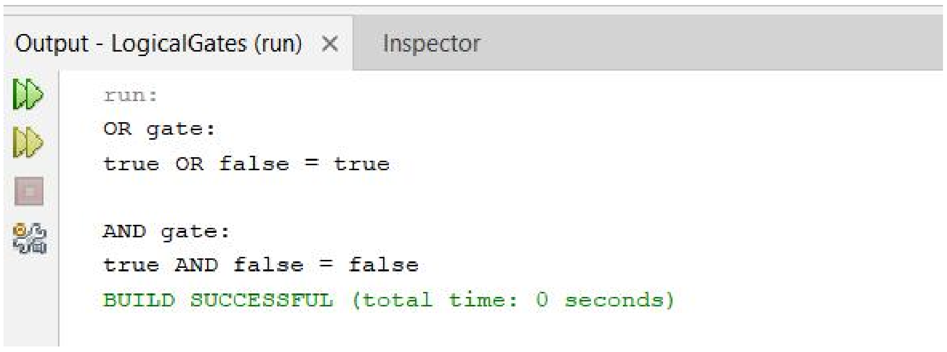
```
run:
Loop 1 is the shortest path.
BUILD SUCCESSFUL (total time: 0 seconds)
```

19. Write a java program to implement OR gate and AND gate

Program

```
public class LogicalGates {

 // OR gate implementation
 public static boolean OR(boolean input1, boolean input2) {
 return input1 || input2;
 }

 // AND gate implementation
 public static boolean AND(boolean input1, boolean input2) {
 return input1 && input2;
 }
 public static void main(String[] args) {
 // Testing OR gate
 boolean input1 = true;
 boolean input2 = false;
 System.out.println("OR gate:");
 System.out.println(input1 + " OR " + input2 + " = " + OR(input1,
input2));

 // Testing AND gate
 input1 = true;
 input2 = false;
 System.out.println("\nAND gate:");
 System.out.println(input1 + " AND " + input2 + " = " + AND(input1,
input2));
 } }
```

Output

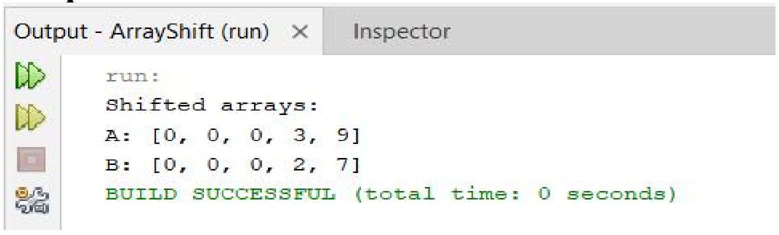


```
run:
OR gate:
true OR false = true

AND gate:
true AND false = false
BUILD SUCCESSFUL (total time: 0 seconds)
```

20. Write a program to shift values from left to right if A>B else shift right to left using logical shift operators. Where A and B are arrays
Program

```
public class ArrayShift {
public static void main(String[] args) {
int[] A = {5, 8, 3, 9, 2};
int[] B = {3, 6, 2, 7, 4};
if (A.length != B.length) {
System.out.println("Arrays A and B must have the same length.");
return;
}
// Check each pair of elements in arrays A and B
for (int i = 0; i < A.length; i++) {
if (A[i] > B[i]) {
// Shift elements from left to right
for (int j = 0; j < A.length - 1; j++) {
A[j] = A[j + 1];
B[j] = B[j + 1]; }
A[A.length - 1] = 0;
B[B.length - 1] = 0;
} else {
// Shift elements from right to left
for (int j = A.length - 1; j > 0; j--) {
A[j] = A[j - 1];
B[j] = B[j - 1];
}
A[0] = 0;
B[0] = 0;
}
}
// Print the shifted arrays
System.out.println("Shifted arrays:");
System.out.println("A: " + java.util.Arrays.toString(A));
System.out.println("B: " + java.util.Arrays.toString(B));
}
}
```

Output



```
run:
Shifted arrays:
A: [0, 0, 0, 3, 9]
B: [0, 0, 0, 2, 7]
BUILD SUCCESSFUL (total time: 0 seconds)
```