

## BÁO CÁO THỰC HÀNH LAB 1 LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

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## The Very First Java Programs

### 2.2.1 Write, compile the first Java application:

```
1 package lab01;
2
3 //Example 1: HelloWorld.java
4 //Text-printing program
5
6 manhnguyen41 *
7 public class HelloWorld {
8     manhnguyen41 *
9     public static void main(String[] args) {
10         // Print the phrase
11         System.out.println("Xin chao \n cac ban!");
12         System.out.println("Hello \t world!");
13     } // end of method
14 }
```

Figure 1: Code 2.2.1

### Result:

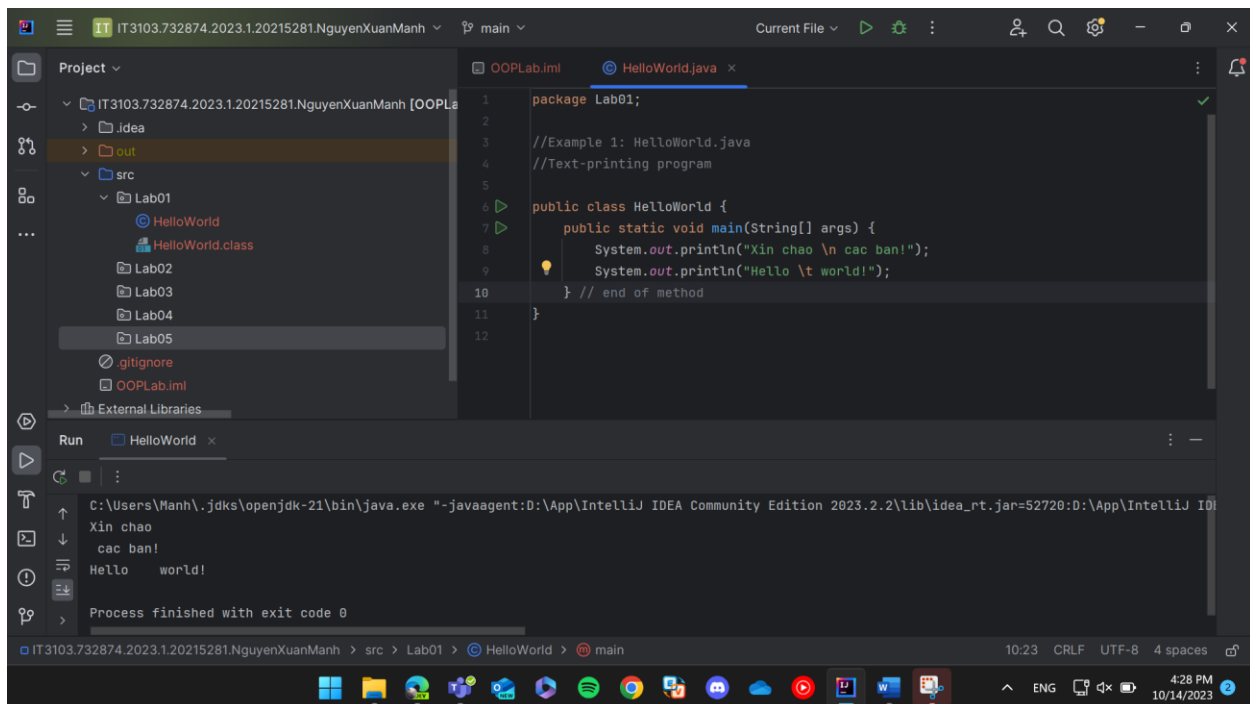


Figure 2: Result 2.2.1

## 2.2.2 Write, compile the first dialog Java program

```
1 package lab01;
2
3 // Example 2: FirstDialog.java
4 import javax.swing.JOptionPane;
5
6 * manhnghuyen41 *
7 public class FirstDialog{
8     * manhnghuyen41 *
9     public static void main(String[] args) {
10         // Display the dialog
11         JOptionPane.showMessageDialog( parentComponent: null, message: "Hello world! How are you?");
12         System.exit( status: 0);
13     }
14 }
```

Figure 3: Code 2.2.2

### Result:

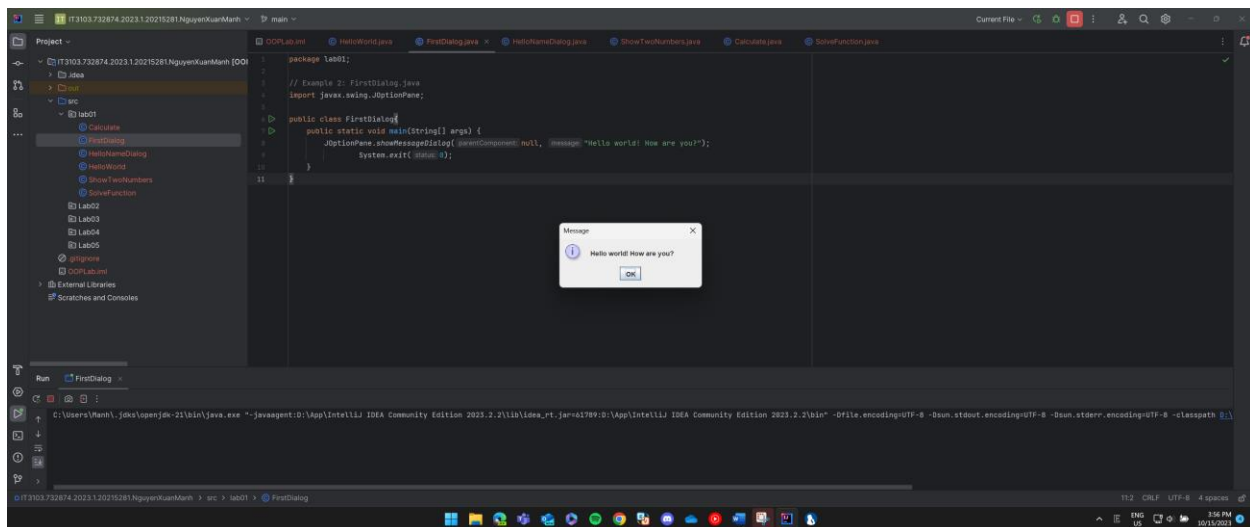


Figure 4: Result 2.2.2

### 2.2.3 Write, compile the first input dialog Java application

```

1  package lab01;
2
3  // Example 3: HelloNameDialog.java
4
5  import javax.swing.JOptionPane;
6
7  * manhnguyen41 *
8  public class HelloNameDialog {
9      * manhnguyen41 *
10     public static void main(String[] args) {
11         String result;
12
13         // Display the input dialog
14         result = JOptionPane.showInputDialog("Please enter your name:");
15
16         // Display the result
17         JOptionPane.showMessageDialog( parentComponent: null, message: "Hi " + result + "!");
18         System.exit( status: 0);
19     }
20 }

```

Figure 5: Code 2.2.3

#### Result:

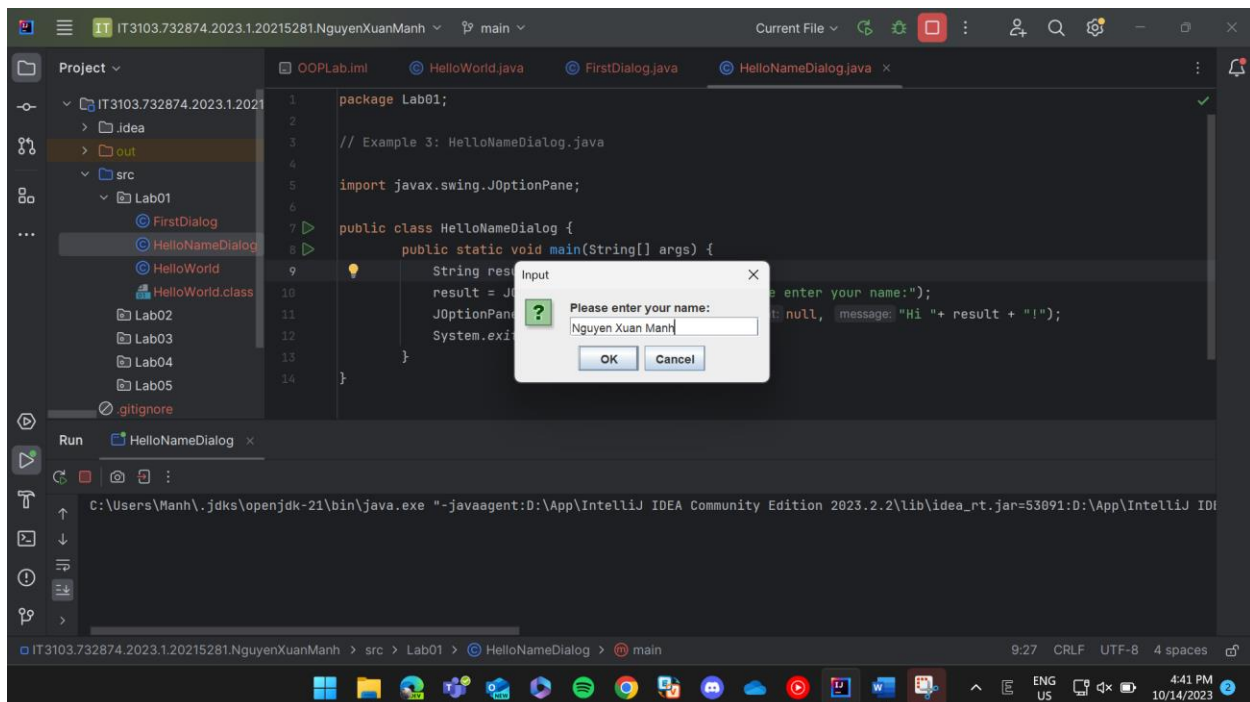


Figure 6: Input Dialog 2.2.3

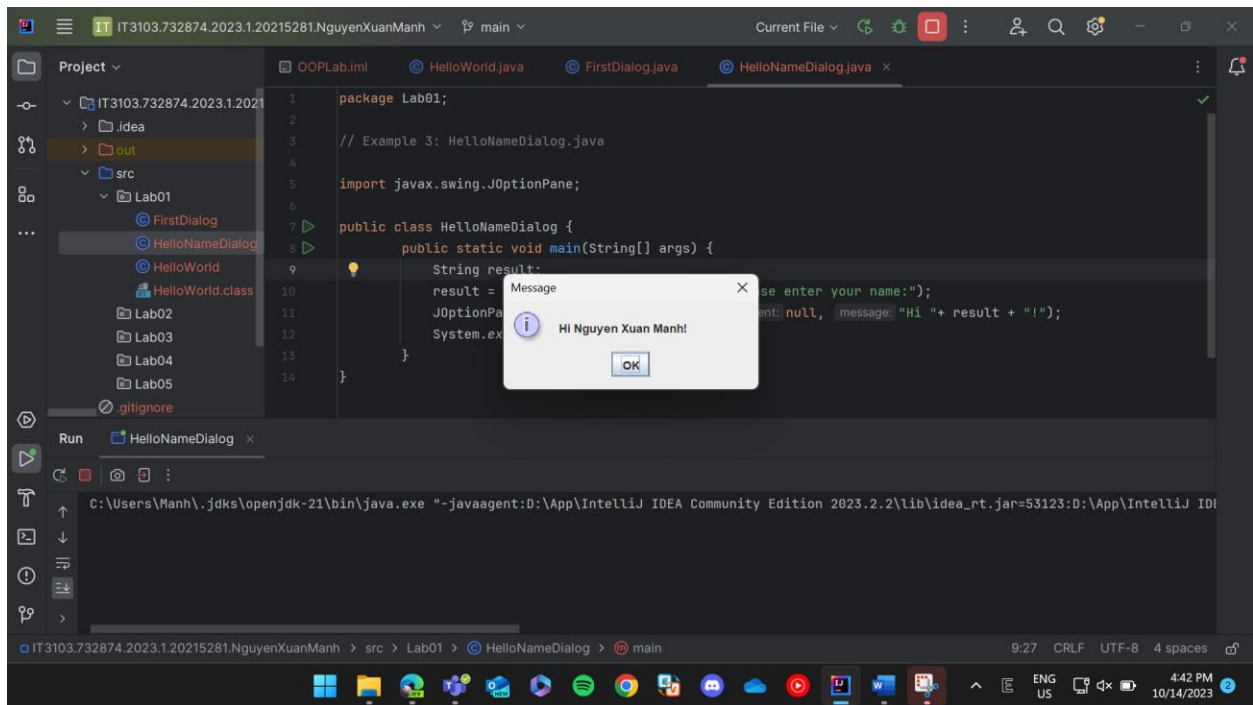


Figure 7: Result 2.2.3

### 2.2.4 Write, compile, and run the following example:

```
1 package lab01;
2
3 // Example 5: ShowTwoNumbers.java
4
5 import javax.swing.JOptionPane;
6
7 manhnguyen41 *
8 public class ShowTwoNumbers {
9     manhnguyen41 *
10     public static void main(String[] args) {
11         String strNum1, strNum2;
12         String strNotification = "You've just entered: ";
13
14         // Display the first input dialog
15         strNum1 = JOptionPane.showInputDialog( parentComponent: null,
16             message: "Please input the first number: ", title: "Input the first number",
17             JOptionPane.INFORMATION_MESSAGE);
18         strNotification += strNum1 + " and ";
19
20         // Display the second input dialog
21         strNum2 = JOptionPane.showInputDialog( parentComponent: null,
22             message: "Please input the second number: ", title: "Input the second number",
23             JOptionPane.INFORMATION_MESSAGE);
24         strNotification += strNum2;
25
26         // Display the two numbers
27         JOptionPane.showMessageDialog( parentComponent: null, strNotification,
28             title: "Show two numbers", JOptionPane.INFORMATION_MESSAGE);
29         System.exit( status: 0);
30     }
31 }
```

Figure 8: Code 2.2.4

### Result:

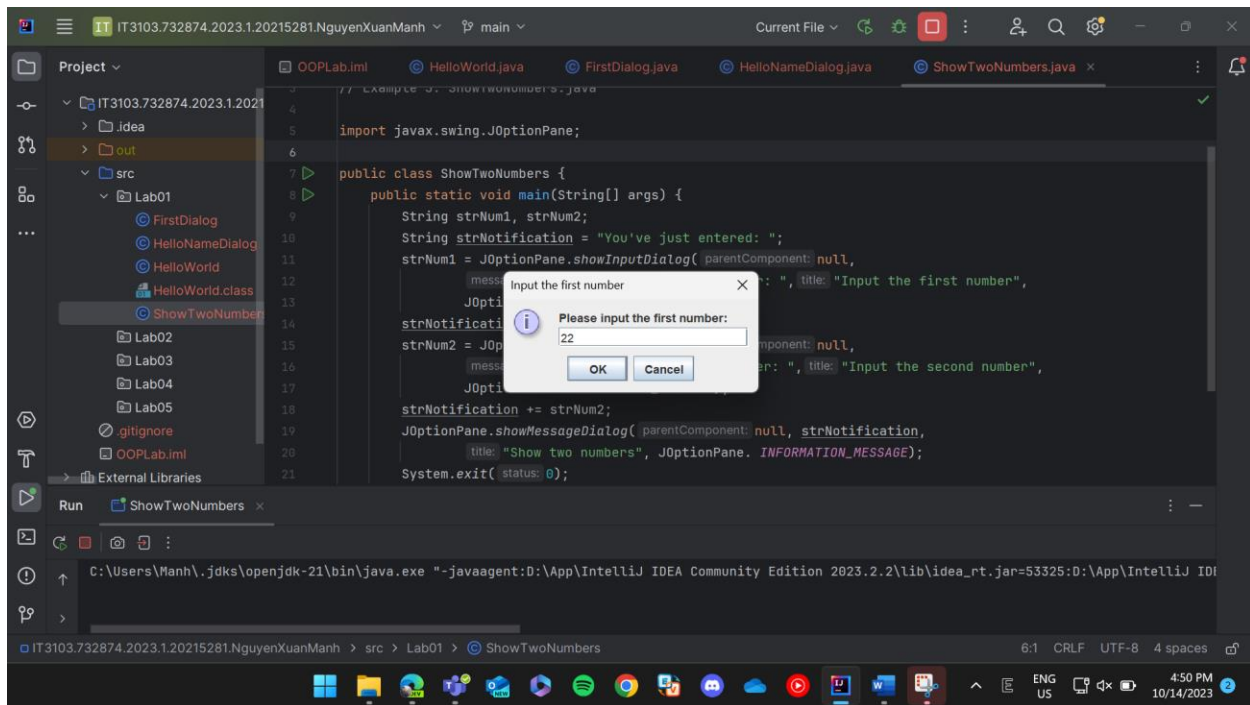


Figure 9: First Input Dialog 2.2.4

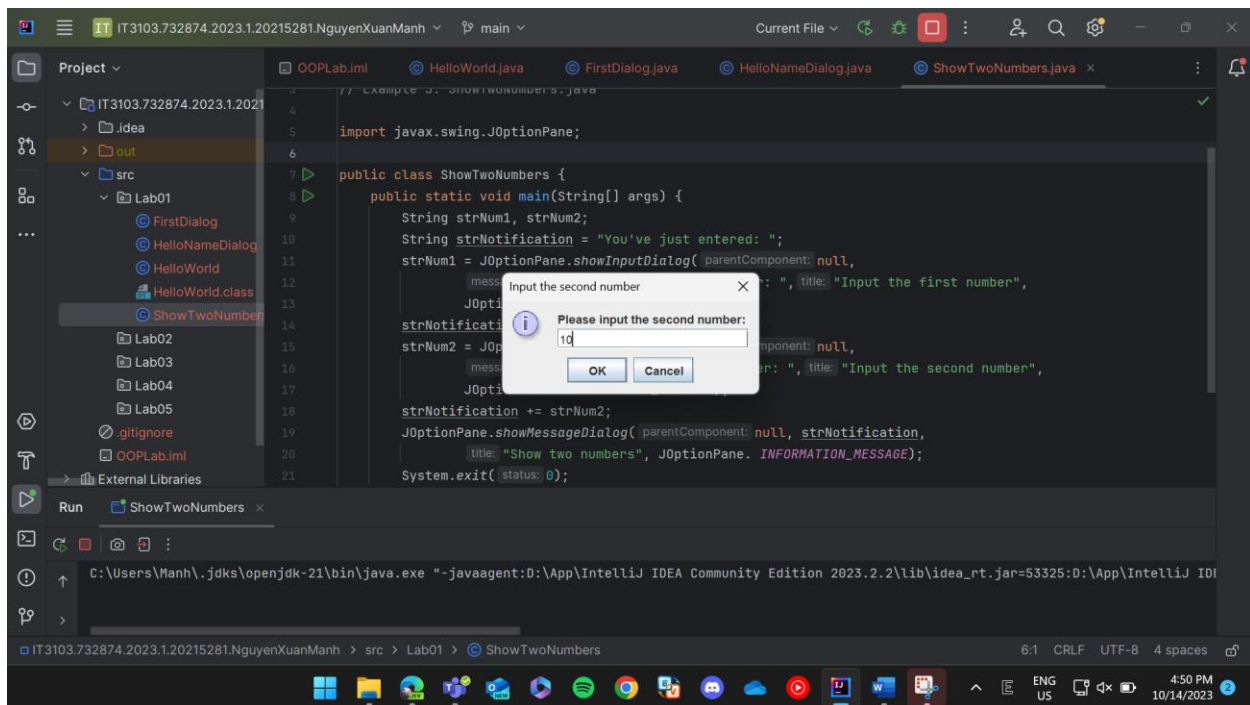


Figure 10: Second Input Dialog 2.2.4



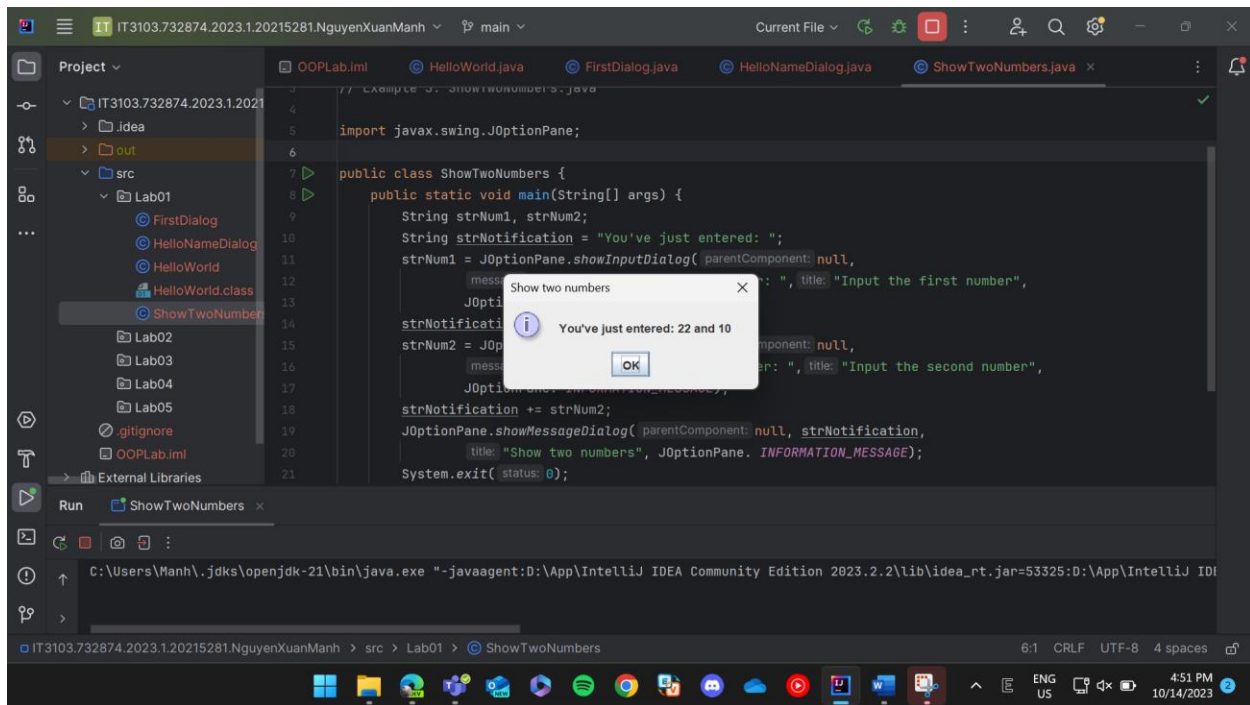


Figure 11: Result 2.2.4

2.2.5 Write a program to calculate sum, difference, product, and quotient of 2 double numbers which are entered by users.

```

1 package lab01;
2
3 // Write a program to calculate sum, difference, product, and quotient of 2 double numbers which are entered by users.
4
5 import javax.swing.JOptionPane;
6
7 public class Calculate {
8     public static void main(String[] args) {
9         String strNum1;
10        String strNum2;
11        String strNotification = "";
12
13        // Input first number
14        strNum1 = JOptionPane.showInputDialog( parentComponent: null,
15            message: "Please input the first number: ", title: "Input the first number",
16            JOptionPane. INFORMATION_MESSAGE);
17        double num1 = Double.parseDouble(strNum1);
18
19        // Input second number
20        strNum2 = JOptionPane.showInputDialog( parentComponent: null,
21            message: "Please input the second number: ", title: "Input the second number",
22            JOptionPane. INFORMATION_MESSAGE);
23        double num2 = Double.parseDouble(strNum2);
24
25        // Calculate
26        double sum = num1 + num2;
27        double difference = num1 - num2;
28        double product = num1 * num2;
29        double quotient = num1 / num2;
30

```

Figure 12: Code 2.2.5

```

31        // Display result
32        strNotification += "Sum: " + sum +
33            "\nDifference: " + difference +
34            "\nProduct: " + product +
35            "\nQuotient: " + quotient;
36
37        JOptionPane.showMessageDialog( parentComponent: null, strNotification,
38            title: "Result: ", JOptionPane. INFORMATION_MESSAGE);
39        System.exit( status: 0);
40    }
41 }

```

Figure 13: Code 2.2.5

**Result:**

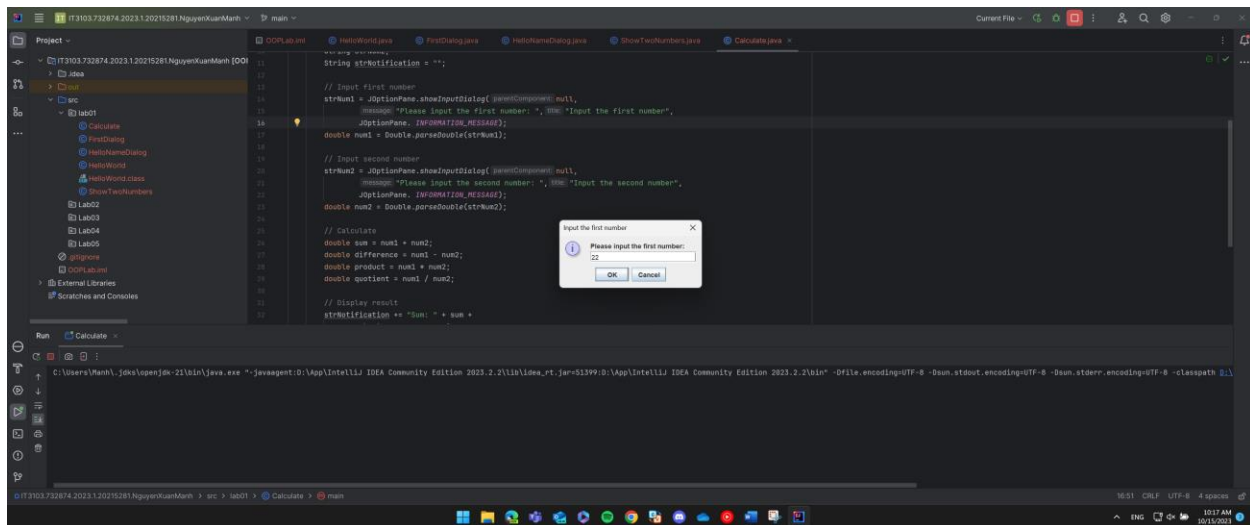


Figure 14: First Input Dialog 2.2.5

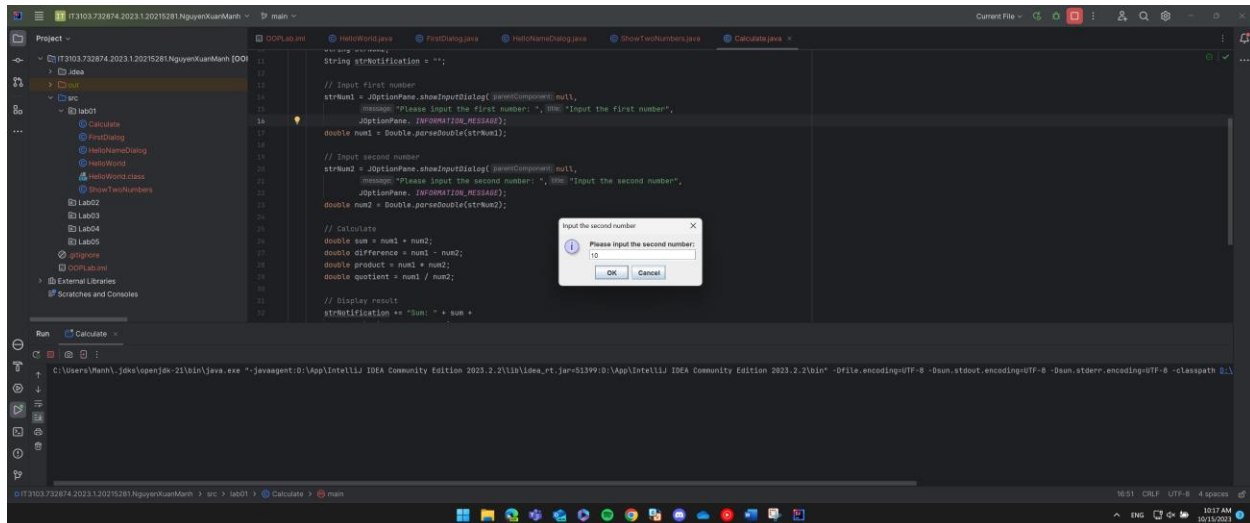


Figure 15: Second Input Dialog 2.2.5

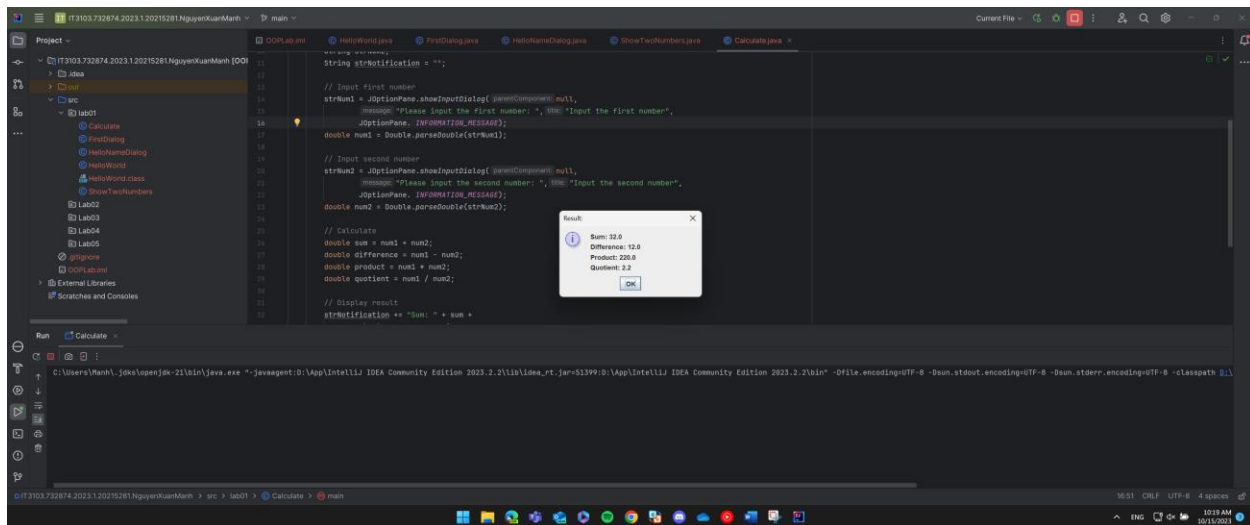


Figure 16: Result 2.2.5

### 2.2.6 Write a program to solve

```
1 package lab01;
2
3 // Write a program to solve
4
5 import java.util.Scanner;
6
7 public class SolveFunction {
8     public static void main(String[] args) {
9         Scanner scanner = new Scanner(System.in);
10        double a;
11        double b;
12        double c;
13        double [][]matrixA = new double[3][3];
14        double []matrixB = new double[3];
15
16        // The first-degree equation (linear equation) with one variable
17        System.out.println("The first-degree equation (linear equation) with one variable:");
18        // Input a and b
19        System.out.print("Input a: ");
20        a = scanner.nextDouble();
21        System.out.print("Input b: ");
22        b = scanner.nextDouble();
23        // Calculate and display
24        if (a == 0) {
25            if (b == 0) {
26                System.out.println("Many solutions");
27            } else {
28                System.out.println("No solution");
29            }
30        } else {
```

Figure 17: Code 2.2.6

```

31         System.out.println("x = " + -b / a);
32     }
33
34     // The system of first-degree equations (linear system) with two variables
35     System.out.println("The system of first-degree equations (linear system) with two variables:");
36     // Input matrixA and matrixB
37     for (int i = 1; i <= 2; i++) {
38         for (int j = 1; j <= 2; j++) {
39             System.out.print("a" + i + j + " = ");
40             matrixA[i][j] = scanner.nextDouble();
41         }
42     }
43     for (int i = 1; i <= 2; i++) {
44         System.out.print("b" + i + " = ");
45         matrixB[i] = scanner.nextDouble();
46     }
47     // Calculate and display
48     double d = matrixA[1][1] * matrixA[2][2] - matrixA[2][1] * matrixA[1][2];
49     double d1 = matrixB[1] * matrixA[2][2] - matrixB[2] * matrixA[1][2];
50     double d2 = matrixA[1][1] * matrixB[2] - matrixA[2][1] * matrixB[1];
51     if (d == 0) {
52         if (matrixB[2] / matrixB[1] == matrixA[2][1] / matrixA[1][1]) {
53             System.out.println("Many solutions");
54         } else {
55             System.out.println("No solution");
56         }
57     } else {
58         System.out.println("x1 = " + d1 / d);
59         System.out.println("x2 = " + d2 / d);
60     }

```

Figure 18: Code 2.2.6

```

61
62     // The second-degree equation with one variable
63     System.out.println("The second-degree equation with one variable:");
64     // Input a, b and c
65     System.out.print("Input a: ");
66     a = scanner.nextDouble();
67     System.out.print("Input b: ");
68     b = scanner.nextDouble();
69     System.out.print("Input c: ");
70     c = scanner.nextDouble();
71     // Calculate and display
72     double delta = b * b - 4 * a * c;
73
74     if (delta < 0) {
75         System.out.println("No solution");
76     } else {
77         if (delta == 0) {
78             System.out.println("x = " + -b / 2 / a);
79         } else {
80             System.out.println("x1 = " + (-b - Math.sqrt(delta)) / 2 / a + "x2 = " + (-b + Math.sqrt(delta)) / 2 / a);
81         }
82     }
83 }
84 }

```

Figure 19: Code 2.2.6

**Result:**

```
C:\Users\Manh\.jdk\openjdk-21\bin\java.exe "-javaagent:D:\App\IntelliJ IDE\
The first-degree equation (linear equation) with one variable:
Input a: 1
Input b: 1
x = -1.0
The system of first-degree equations (linear system) with two variables:
a11 = 1
a12 = 2
a21 = 3
a22 = 4
b1 = 5
b2 = 6
x1 = -4.0
x2 = 4.5
The second-degree equation with one variable:
Input a: 1
Input b: 2
Input c: 1
x = -1.0

Process finished with exit code 0
```

*Figure 20: Result 2.2.6*

## Exercises

### 6.1 Write, compile and run the ChoosingOption program:

```

1  package lab01;
2
3  // Write, compile and run the ChoosingOption program
4
5  import javax.swing.JOptionPane;
6
7  public class ChoosingOption {
8      public static void main(String[] args){
9          // Display Yes/No dialog
10         int option = JOptionPane.showConfirmDialog( parentComponent: null,
11             message: "Do you want to change to the first class ticket?");
12
13         // Display the result
14         JOptionPane.showMessageDialog( parentComponent: null, message: "You've chosen: "
15             + (option==JOptionPane.YES_OPTION?"Yes":"No"));
16         System.exit( status: 0);
17     }
18 }
19

```

Figure 21: Code 6.1

### Result:

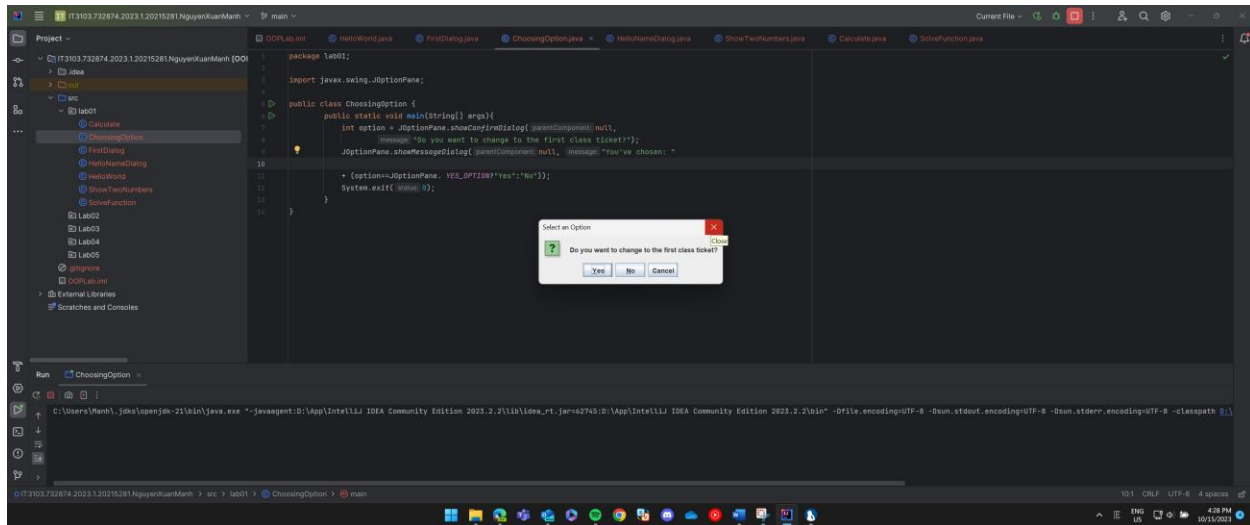


Figure 22: Yes/No Dialog 6.1



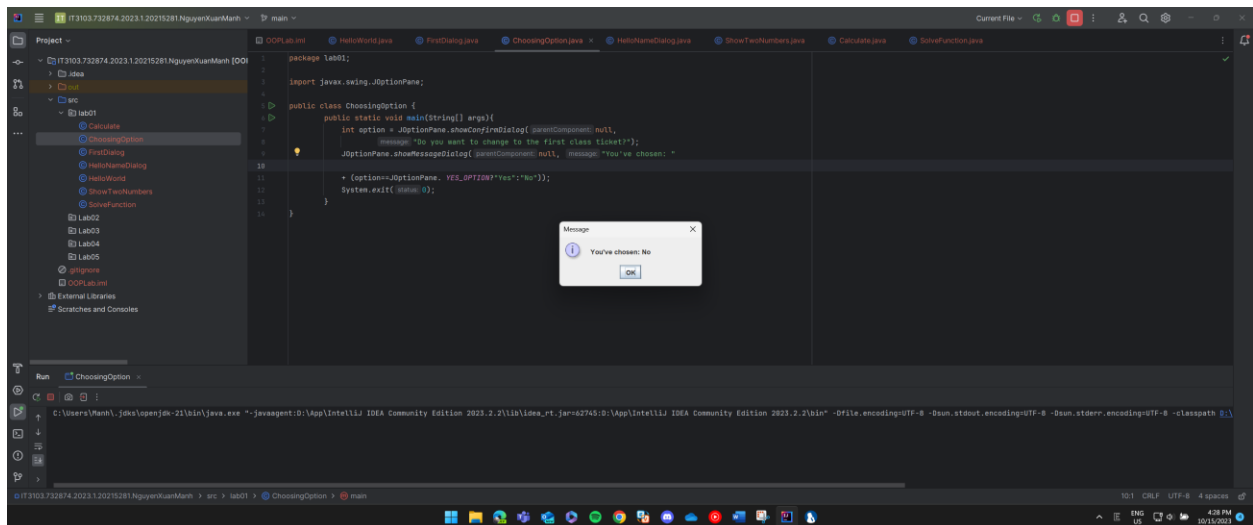


Figure 23: Result 6.1

## 6.2 Write a program for input/output from keyboard

```
1 package lab01;
2
3 // Write a program for input/output from keyboard
4
5 import java.util.Scanner;
6
7 * manhnguyen41 *
8 public class InputFromKeyboard {
9     * manhnguyen41 *
10     public static void main(String []args) {
11         Scanner keyboard = new Scanner(System.in);
12
13         // Input the string Name
14         System.out.println("What's your name?");
15         String strName = keyboard.nextLine();
16
17         // Input the int age
18         System.out.println("How old are you?");
19         int iAge = keyboard.nextInt();
20
21         // Input the double height
22         System.out.println("How tall are you (m)?");
23         double dHeight = keyboard.nextDouble();
24
25         //similar to other data types
26         //nextByte(), nextShort(), nextLong()
27         //nextFloat(), nextBoolean()
28
29         // Print the result
30         System.out.println("Mrs/Ms. " + strName + ", " + iAge + " years old. "
31             + "Your height is " + dHeight + ".");
32     }
33 }
```

Figure 24: Code 6.2

**Result:**

```

C:\Users\Manh\.jdk\openjdk-21\bin\java.exe "-javaagent:
What's your name?
Manh
How old are you?
19
How tall are you (m)?
1.81
Mrs/Ms. Manh, 19 years old. Your height is 1.81.

Process finished with exit code 0

```

Figure 25: Result 6.2

6.3 Write a program to display a triangle with a height of  $n$  stars (\*),  $n$  is entered by users.

```

1 package lab01;
2
3 // Write a program to display a triangle with a height of n stars (*), n is entered by users.
4
5 import java.util.Scanner;
6
7 manhnguyen41*
8 public class StarTriangle {
9     manhnguyen41*
10     public static void main(String[] args) {
11         Scanner scanner = new Scanner(System.in);
12
13         // Input the height
14         int n = scanner.nextInt();
15
16         // Print the triangle
17         for (int i = 1; i <= n; i++) {
18             for (int j = 1; j <= n - i + 1; j++) {
19                 System.out.print(" ");
20             }
21             for (int j = 1; j <= i * 2 - 1; j++) {
22                 System.out.print("*");
23             }
24             for (int j = 1; j <= n - i + 1; j++) {
25                 System.out.print(" ");
26             }
27             System.out.println();
28         }
29     }
30 }

```

Figure 26: Code 6.3

**Result:**

```

C:\Users\Manh\.jdk\openjdk-21\bin\jav
5

  *
 ***
*****
*****
*****

Process finished with exit code 0

```

Figure 27: Result 6.3

6.4 Write a program to display the number of days of a month, which is entered by users (both month and year). If it is an invalid month/year, ask the user to enter again.

```

1  package lab01;
2
3  // Write a program to display the number of days of a month, which is entered by users (both month and year).
4  // If it is an invalid month/year, ask the user to enter again.
5
6  import java.util.Scanner;
7
8  manhnguyen41 *
9  public class DayOfMonth {
10     31 usages
11     public static String [][]months = new String[5][12];
12
13     // Check if year is valid
14     1 usage manhnguyen41
15     public static boolean checkYear(String year) {
16         // Check if year is not a number
17         for (int i = 0; i < year.length(); i++) {
18             if (year.charAt(i) < 48 || year.charAt(i) > 57) {
19                 return false;
20             }
21         }
22         return true;
23     }
24
25     // Check if month is valid
26     // Return index of month
27     1 usage manhnguyen41
28     public static int checkMonth(String month) {
29         for (int i = 0; i < 4; i++) {
30             for (int j = 0; j < 12; j++) {
31                 if (months[i][j].equals(month)) {
32                     return j;
33                 }
34             }
35         }
36     }
37 }

```

Figure 28: Code 6.4

```
31     }
32
33     // Return -1 when month is invalid
34     return -1;
35 }
36
37 // Check if a year is leap
38 1 usage  🧑 manhnghuyen41
39 public static boolean checkLeapYear(String year) {
40     int yearNum = Integer.parseInt(year);
41
42     if (yearNum % 4 != 0) {
43         return false;
44     }
45
46     return yearNum % 100 != 0 || yearNum % 400 == 0;
47 }
48
49 🧑 manhnghuyen41 *
50 public static void main(String[] args) {
51     Scanner scanner = new Scanner(System.in);
52
53     String year, month;
54     int monthNum;
55
56     // Generate the name and date of months
57     months[0][0] = "January"; months[4][0] = "31";
58     months[0][1] = "February"; months[4][1] = "28";
59     months[0][2] = "March"; months[4][2] = "31";
60     months[0][3] = "April"; months[4][3] = "30";
61     months[0][4] = "May"; months[4][4] = "31";
62     months[0][5] = "June"; months[4][5] = "30";
```

Figure 29: Code 6.4

```
61 months[0][6] = "July"; months[4][6] = "31";
62 months[0][7] = "August"; months[4][7] = "31";
63 months[0][8] = "September"; months[4][8] = "30";
64 months[0][9] = "October"; months[4][9] = "31";
65 months[0][10] = "November"; months[4][10] = "30";
66 months[0][11] = "December"; months[4][11] = "31";
67
68 for (int i = 0; i < 12; i++) {
69     // Add the case Jan, Feb, etc.
70     months[2][i] = months[0][i].substring(0, 3);
71
72     // Add the case Jan., Feb., Sept., etc.
73     months[1][i] = months[2][i] + (i == 8 ? "t" : "") + ".";
74
75     // Add the case 1, 2, 3, etc.
76     months[3][i] = Integer.toString(i + 1);
77 }
78
79 // Input year
80 do {
81     System.out.print("Year: ");
82     year = scanner.next();
83 } while (!checkYear(year));
84
85 // Input month
86 do {
87     System.out.print("Month: ");
88     month = scanner.next();
89     monthNum = checkMonth(month);
90 } while (monthNum == -1);
```

Figure 30: Code 6.4

```
91
92 // Print the result
93 System.out.println(Integer.parseInt(months[4][monthNum]) +
94                     ((checkLeapYear(year) && monthNum == 1) ? 1 : 0));
95 }
96 }
97
```

Figure 31: Code 6.4

**Result:**

```
C:\Users\Manh\.jdk\openjdk-21\bin\ja
Year: 1800
Month: 13
Month: -1
Month: Jands
Month: Feb.
28

Process finished with exit code 0
```

Figure 32: Result 6.4

```
C:\Users\Manh\.jdk\openjdk-21\bin\j
Year: 2000
Month: Feb
29

Process finished with exit code 0
```

Figure 33: Result 6.4

```
C:\Users\Manh\.jdk\openjdk-21\bin
Year: 2023
Month: Sept.
30

Process finished with exit code 0
```

Figure 34: Result 6.4

6.5 Write a Java program to sort a numeric array, and calculate the sum and average value of array elements.

```
1 package lab01;
2
3 // Write a Java program to sort a numeric array, and calculate the sum and average value of array elements.
4
5 import java.util.Arrays;
6
7 manhnguyen41 *
8 public class Ex65 {
9     manhnguyen41 *
10     public static void main(String[] args) {
11         // Generate the example array
12         double []arr = new double[]{1789, 2035, 1899, 1456, 2013};
13
14         // Calculate the sum of the array
15         double sum = 0;
16         for (double number: arr) {
17             sum += number;
18         }
19
20         // Calculate the average of the array
21         double average = sum / arr.length;
22
23         // Print the result
24         Arrays.sort(arr);
25         System.out.print("Array after sort: ");
26         System.out.println(Arrays.toString(arr));
27
28         System.out.print("Sum: ");
29         System.out.println(sum);
30
31         System.out.print("Average: ");
32         System.out.println(average);
33     }
34 }
```

Figure 35: Code 6.5

### Result:

```
C:\Users\Manh\.jdk\openjdk-21\bin\java.exe "-javaagent:D:\App
Array after sort: [1456.0, 1789.0, 1899.0, 2013.0, 2035.0]
Sum: 9192.0
Average: 1838.4

Process finished with exit code 0
```

Figure 36: Result 6.5



6.6 Write a Java program to add two matrices of the same size.

```
1 package lab01;
2
3 // Write a Java program to add two matrices of the same size.
4
5 manhnguyen41 *
6 public class AddMatrix {
7     // Print a matrix
8     3 usages manhnguyen41
9     public static void print(int [][]matrix) {
10         for (int i = 0; i < 5; i++) {
11             for (int j = 0; j < 5; j++) {
12                 System.out.print(matrix[i][j]);
13                 System.out.print(" ");
14             }
15             System.out.println();
16         }
17     }
18
19 manhnguyen41 *
20 public static void main(String[] args) {
21     int [][]matrixA = new int[5][5];
22     int [][]matrixB = new int[5][5];
23     int [][]matrixC = new int[5][5];
24
25     // Generate 2 matrices and calculate sum of them
26     for (int i = 0; i < 5; i++) {
27         for (int j = 0; j < 5; j++) {
28             matrixA[i][j] = i + j;
29             matrixB[i][j] = i * j;
30             matrixC[i][j] = matrixA[i][j] + matrixB[i][j];
31         }
32     }
33 }
```

Figure 37: Code 6.6

```
31 // Print first matrix
32 System.out.println("First matrix:");
33 print(matrixA);
34
35 // Print second matrix
36 System.out.println("Second matrix:");
37 print(matrixB);
38
39 // Print sum of them
40 System.out.println("Sum of them:");
41 print(matrixC);
42 }
43 }
44
```

Figure 38: Code 6.6

### Result:

```
C:\Users\Manh\.jdk\openjdk-21\bin\java
First matrix:
0 1 2 3 4
1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
Second matrix:
0 0 0 0 0
0 1 2 3 4
0 2 4 6 8
0 3 6 9 12
0 4 8 12 16
Sum of them:
0 1 2 3 4
1 3 5 7 9
2 5 8 11 14
3 7 11 15 19
4 9 14 19 24

Process finished with exit code 0
```

Figure 39: Result 6.6