BÁO CÁO THỰC HÀNH LAB 1
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

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Part I. The Very First Java Programs

2.2.1 Write, compile the first Java application:

```java
//Example 1: HelloWorld.java
//Text-printing program
public class HelloWorld {

   public static void main(String args[]){
        System.out.println("Xin chao \n cac ban!");
        System.out.println("Hello \t world!");

   } // end of method main
}
```

Kết quả:

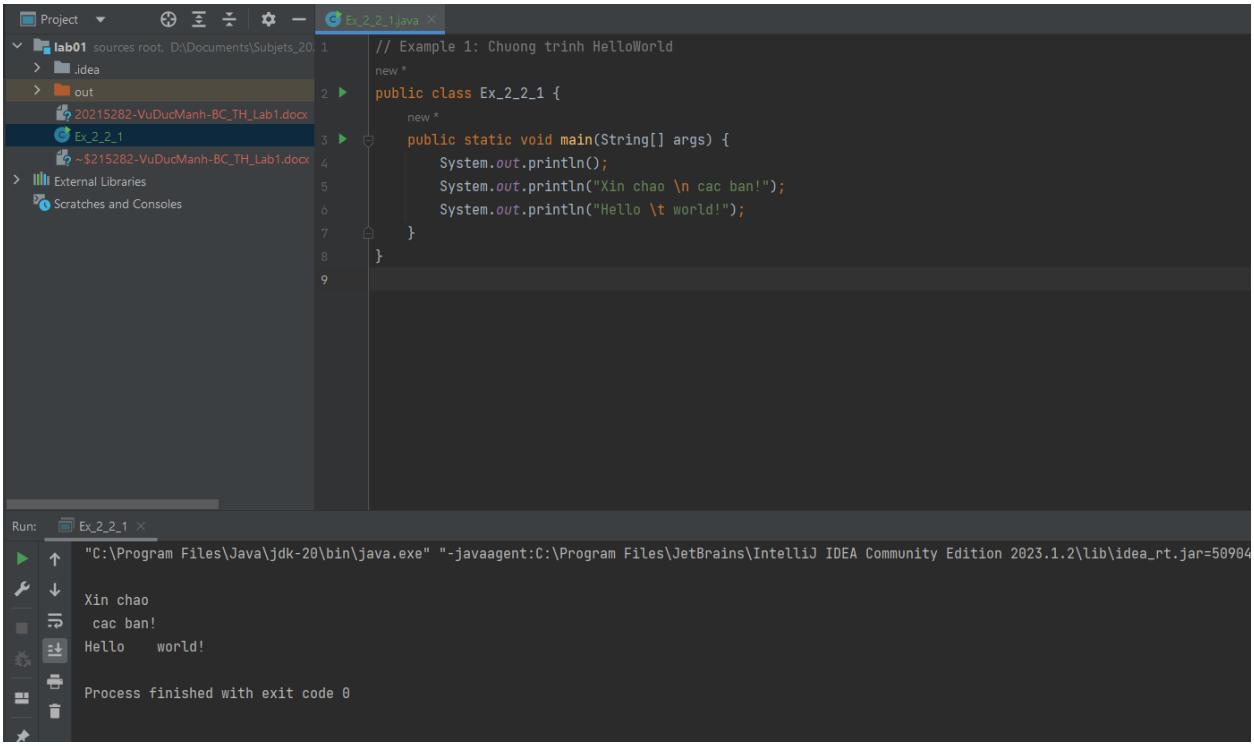


Figure 1: Chương trình đầu tiên HelloWorld

2.2.2 Write, compile the first dialog Java program

```java
// Example 2: FirstDialog.java
import javax.swing.JOptionPane;
public class FirstDialog{
    public static void main(String[] args){
        JOptionPane.showMessageDialog(null,"Hello world! How are you?");
        System.exit(0);
    }
}
```

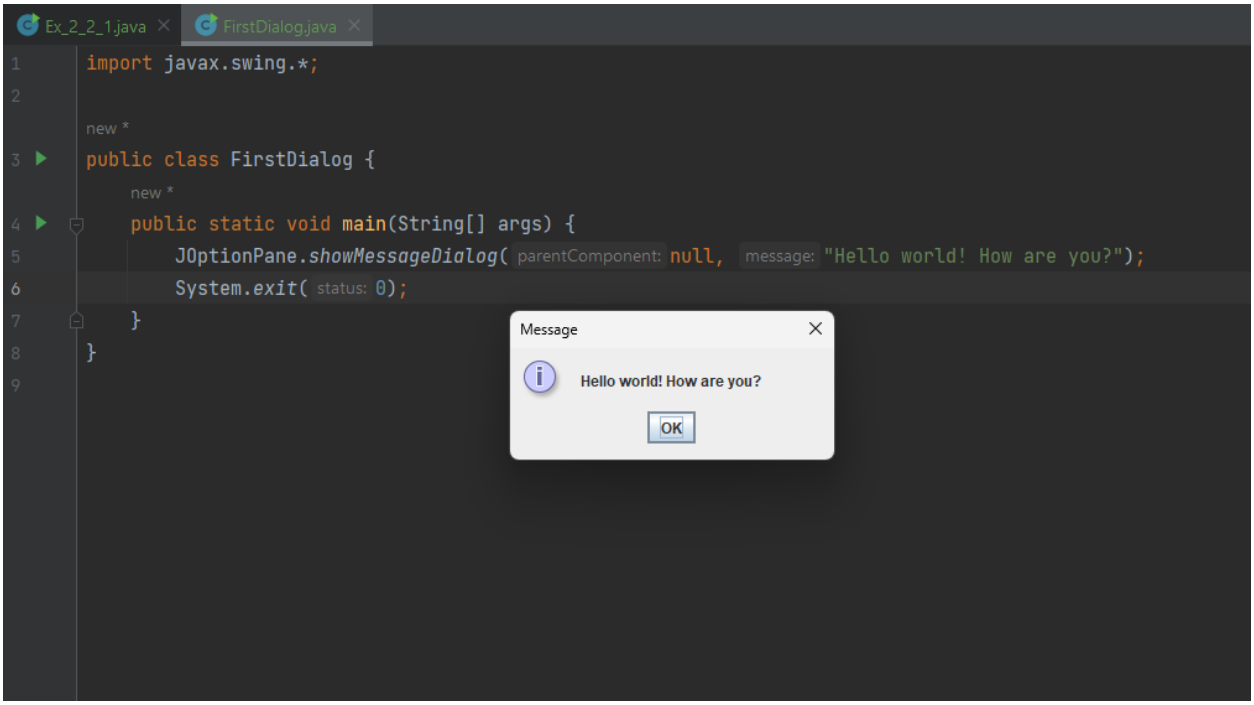


Figure 2: First dialog Java program

2.2.3 Write, compile the first input dialog Java application

```java
// Example 3: HelloNameDialog.java
import javax.swing.JOptionPane;
public class HelloNameDialog{
  public static void main(String[] args){
    String result;
    result = JOptionPane.showInputDialog("Please enter your name:");
    JOptionPane.showMessageDialog(null, "Hi "+ result + "!");
    System.exit(0);
  }
}
```

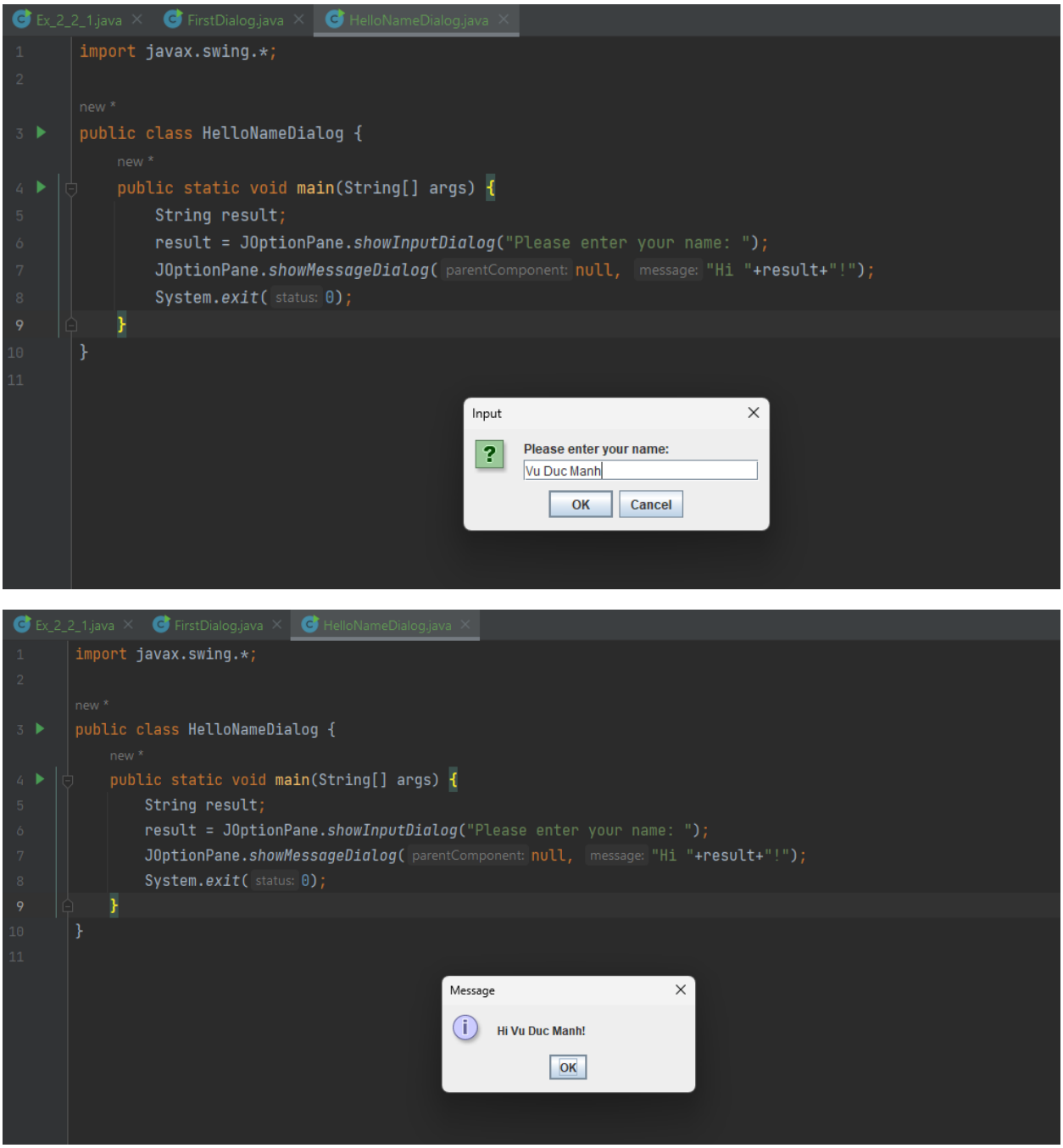
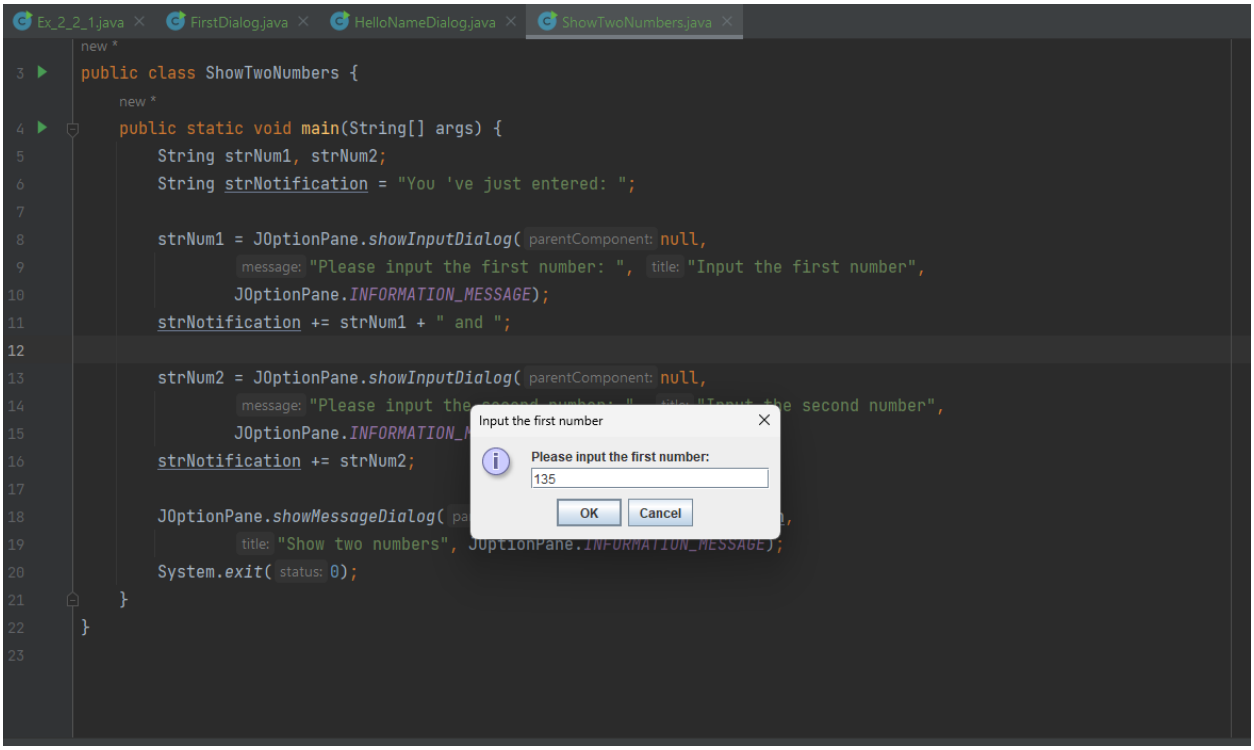


Figure 3: First input dialog Java application

2.2.4 Write, compile, and run the following example:

```java
// Example 5: ShowTwoNumbers.java
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
  public static void main(String[] args){
    String strNum1, strNum2;
    String strNotification = "You've just entered: ";

    strNum1 = JOptionPane.showInputDialog(null,
                "Please input the first number: ","Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
    strNotification += strNum1 + " and ";

    strNum2 = JOptionPane.showInputDialog(null,
                "Please input the second number: ","Input the second number",
                JOptionPane.INFORMATION_MESSAGE);
    strNotification += strNum2;

    JOptionPane.showMessageDialog(null,strNotification,
                "Show two numbers", JOptionPane.INFORMATION_MESSAGE);
    System.exit(0);
  }
}
```



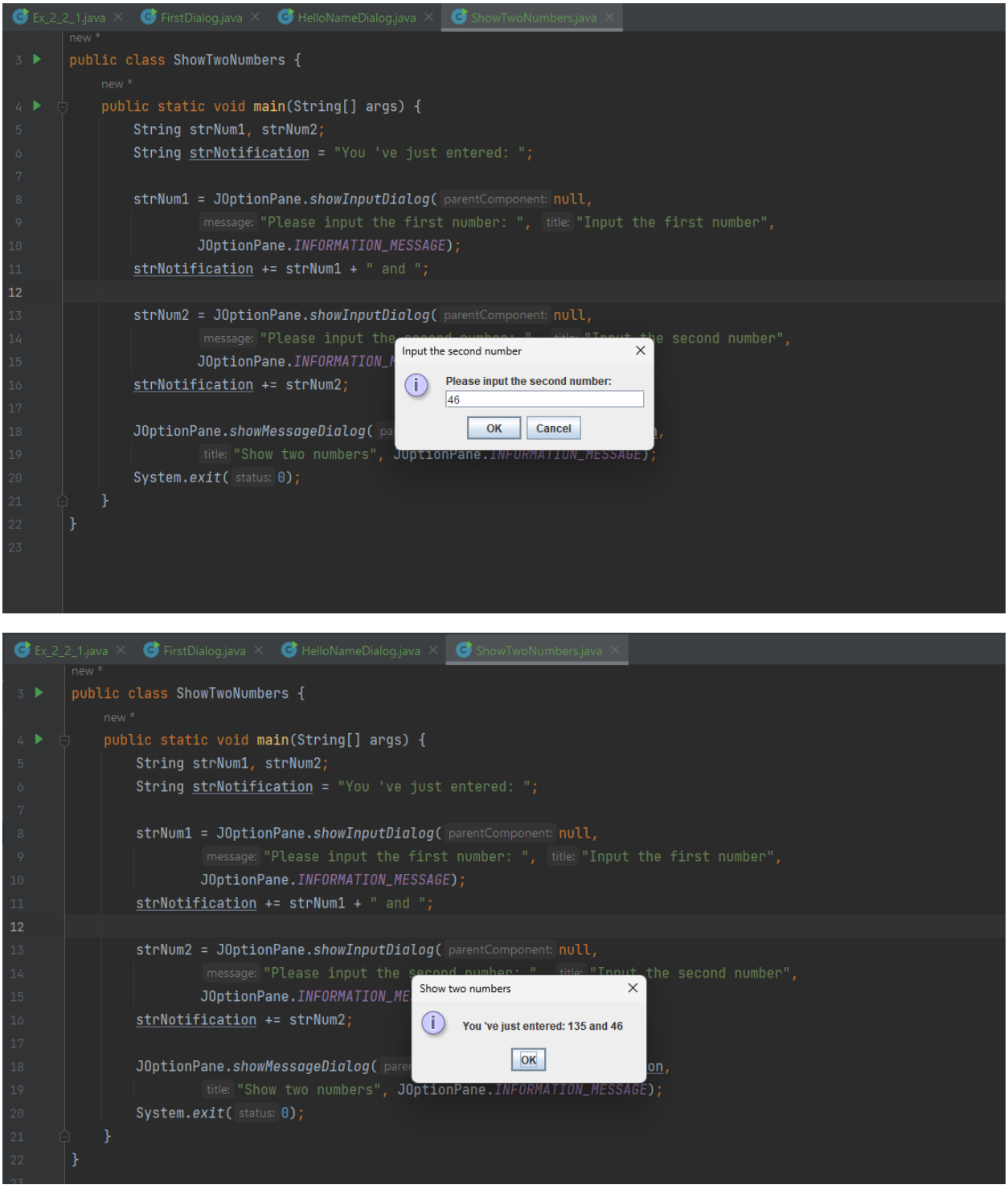


Figure 4: Show Two Numbers

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

Notes

- To convert from String to double, you can use

  double num1 = Double.parseDouble(strNum1)

- Check the divisor of the division

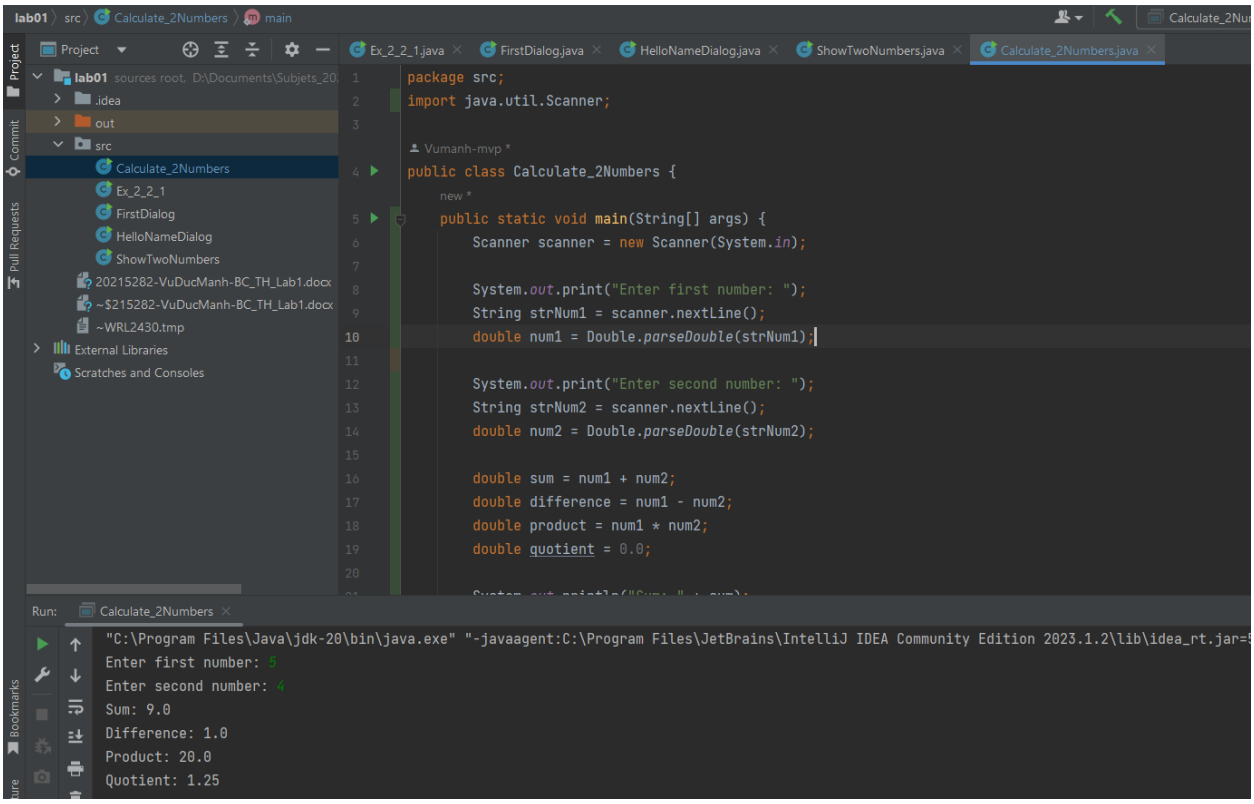
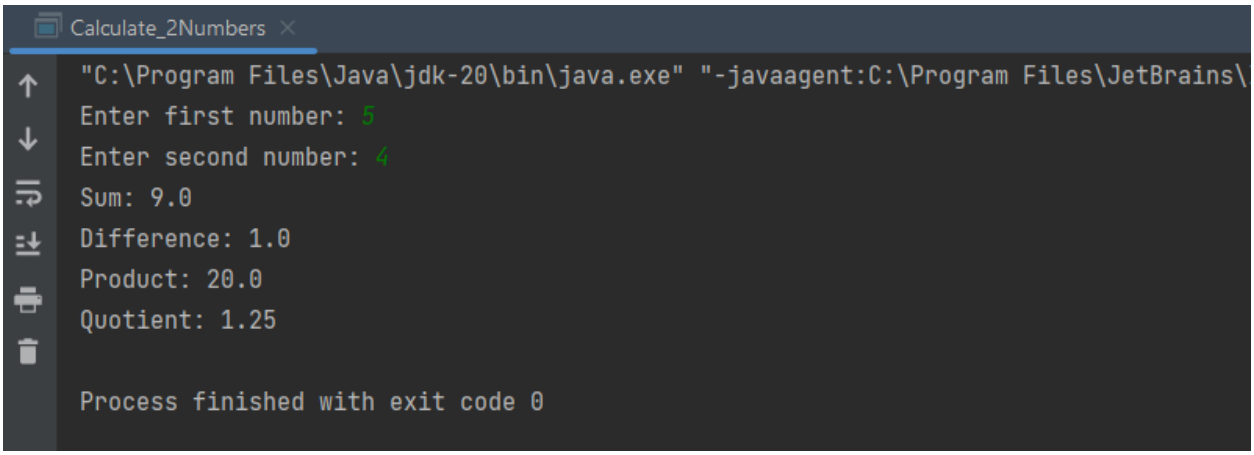


Figure 5: Caculate 2 numbers program



2.2.6. Write a program to solve:

- The first-degree equation (linear equation) with one variable
- The system of first-degree equations (linear system) with two variables
- The second-degree equation with one variable

```java
package src;
import java.util.Scanner;

new *
public class Ex_2_2_6 {
    new *
    public static void main(String[] args) {
        System.out.println("----------Menu---------\n" +
                "1. The first-degree equation with one variable\n" +
                "2. The system of first-degree equations with two variables\n" +
                "3. The second-degree equation with one variable");
        Scanner sc = new Scanner(System.in);

        while(true){
            System.out.print("Enter your choice: ");
            int cmd = sc.nextInt();
            if (cmd == 1) {
                solveFirstDegreeEquation();
            } else if (cmd == 2) {
                solveSystemOfFirstDegreeEquations();
            } else if (cmd == 3) {
                solveSecondDegreeEquation();
            } else {
                System.out.println("Invalid choice. Finished!");
            }
        }
    }
```

```java
public static void solveFirstDegreeEquation() {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter the value of a: ");
    double a = sc.nextDouble();
    System.out.print("Enter the value of b: ");
    double b = sc.nextDouble();

    if (a == 0) {
        System.out.println("The equation is not of the first degree.");
    } else {
        double x = -b / a;
        System.out.println("The solution is x = " + x);
    }
}
```

Figure 6: The first-degree equation with one variable

```java
public static void solveSystemOfFirstDegreeEquations() {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter the coefficients a11, a12, b1, a21, a22, b2: ");
    double a11 = sc.nextDouble();
    double a12 = sc.nextDouble();
    double b1 = sc.nextDouble();
    double a21 = sc.nextDouble();
    double a22 = sc.nextDouble();
    double b2 = sc.nextDouble();

    double D = a11 * a22 - a21 * a12;
    double D1 = b1 * a22 - b2 * a12;
    double D2 = a11 * b2 - a21 * b1;

    if (D != 0) {
        double x1 = D1 / D;
        double x2 = D2 / D;
        System.out.println("The solution is x1 = " + x1 + ", x2 = " + x2);
    } else {
        if (D1 == 0 && D2 == 0) {
            System.out.println("The system has infinitely many solutions.");
        } else {
            System.out.println("The system has no solution.");
        }
    }
```

Figure 7: The system of first-degree equations with two variables

```java
public static void solveSecondDegreeEquation() {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter the value of a: ");
    double a = sc.nextDouble();
    System.out.print("Enter the value of b: ");
    double b = sc.nextDouble();
    System.out.print("Enter the value of c: ");
    double c = sc.nextDouble();

    double discriminant = b * b - 4 * a * c;

    if (a == 0) {
        System.out.println("The equation is not a second-degree equation.");
    } else if (discriminant > 0) {
        double x1 = (-b + Math.sqrt(discriminant)) / (2 * a);
        double x2 = (-b - Math.sqrt(discriminant)) / (2 * a);
        System.out.println("The solutions are x1 = " + x1 + ", x2 = " + x2);
    } else if (discriminant == 0) {
        double x = -b / (2 * a);
        System.out.println("The solution is a double root: x = " + x);
    } else {
        System.out.println("The equation has no real roots.");
    }
}
```

Figure 8: The second-degree equation with one variable

Part II: 6. Exercises:

6.1. Write, compile, and run the Choosing Option program:

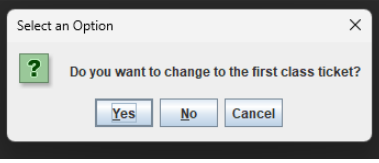
ChoosingOption.java

```
1  package src;
2
3  import javax.swing.*;
4
   new *
5  public class ChoosingOption {
       new *
6      public static void main(String[] args) {
7          int option = JOptionPane.showConfirmDialog( parentComponent: null,
8                  message: "Do you want to change to the first class ticket?");
9          JOptionPane.showMessageDialog( parentComponent: null, message: "You 've chosen: " +
10                 (option == JOptionPane.YES_OPTION?"Yes":"No"));
11         System.exit( status: 0);
12     }
13 }
```

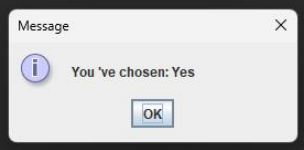
Figure 9: Choosing Option program_ver1.0

ChoosingOption.java

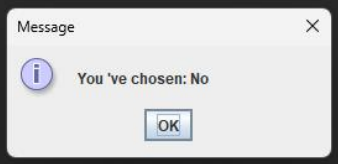
```
1  package src;
2
3  import javax.swing.*;
4
   new *
5  public class ChoosingOption {
       new *
6      public static void main(String[] args) {
7          int option = JOptionPane.showConfirmDialog( parentComponent: null,
8                  message: "Do you want to change to the first class ticket?");
9          JOptionPane.showMessageDialog( parentComponent: null, message: "You 've chosen: " +
10                (option == JOptionPane.YES_OPTION?"Yes":"No"));
11         System.exit( status: 0);
12     }
13 }
14
```



```java
package src;

import javax.swing.*;

new *
public class ChoosingOption {
    new *
    public static void main(String[] args) {
        int option = JOptionPane.showConfirmDialog( parentComponent: null,
                message: "Do you want to change to the first class ticket?");
        JOptionPane.showMessageDialog( parentComponent: null, message: "You 've chosen: " +
                (option == JOptionPane.YES_OPTION?"Yes":"No"));
        System.exit( status: 0);
    }
}
```




```java
package src;

import javax.swing.*;

new *
public class ChoosingOption {
    new *
    public static void main(String[] args) {
        int option = JOptionPane.showConfirmDialog( parentComponent: null,
                message: "Do you want to change to the first class ticket?");
        JOptionPane.showMessageDialog( parentComponent: null, message: "You 've chosen: " +
                (option == JOptionPane.YES_OPTION?"Yes":"No"));
        System.exit( status: 0);
    }
}
```



- Nếu người dùng chọn "Cancel”, thì biến **option** sẽ nhận giá trị **JOptionPane.CANCEL_OPTION**. Sau đó, thông điệp "You've chosen: No" sẽ được hiển thị
- Sửa với 4 options: “Yes”, “No”, “I do”, “I don’t”.

```java
public static void main(String[] args) {
    String[] options = {"Yes", "No", "I do", "I don't"};
    int option = JOptionPane.showOptionDialog( parentComponent: null, message: "Enter your choice:", title: "User's choice",
            JOptionPane.YES_NO_OPTION, JOptionPane.QUESTION_MESSAGE, icon: null, options, options[0]);
    if (option >= 0) {
        JOptionPane.showMessageDialog( parentComponent: null, message: "You've chosen: " + options[option]);
    } else {
        JOptionPane.showMessageDialog( parentComponent: null, message: "You've closed the dialog .");
    }
    System.exit( status: 0);
}
```

Figure 10: Choosing Option program_ver2.0

6.2. Write a program for input/output from keyboard

ChoosingOption.java | ChoosingOption_Fix.java | InputFromKeyboard.java

```java
package src;

import java.util.Scanner;

new *
public class InputFromKeyboard {
    new *
    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
        System.out.println("What's your name?");
        String strName = keyboard.nextLine();
        System.out.println("Hold old are you?");
        int iAge = keyboard.nextInt();
        System.out.println("How tall are you (m)?");
        double dHeight = keyboard.nextDouble();

        System.out.println("Mrs/Ms. "+strName+", "+iAge+" years old."
        + "Your height is "+dHeight+".");
    }
}
```

Figure 11: Program for input/output from keyboard

Ex_2_2_6 | InputFromKeyboard

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Intell
What's your name?
Vu Duc Manh
Hold old are you?
20
How tall are you (m)?
175
Mrs/Ms. Vu Duc Manh, 20 years old.Your height is 175.0.
```

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

Ex_2_2_6 | TrianglePattern

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Intelli
Enter the height of the triangle: 5
    *
   ***
  *****
 *******
*********

Process finished with exit code 0
```

```java
package src;
import java.util.Scanner;

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

        System.out.print("Enter the height of the triangle: ");
        int n = scanner.nextInt();

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n - i; j++) {
                System.out.print(" ");
            }
            for (int k = 1; k <= 2 * i - 1; k++) {
                System.out.print("*");
            }
            System.out.println();
        }
        scanner.close();
    }
}
```

Figure 12: Program to display a triangle

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.

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Intell
Nhap thang: jan.
Nhap nam: 2023
There are 31 days in jan. 2023.

Process finished with exit code 0
```

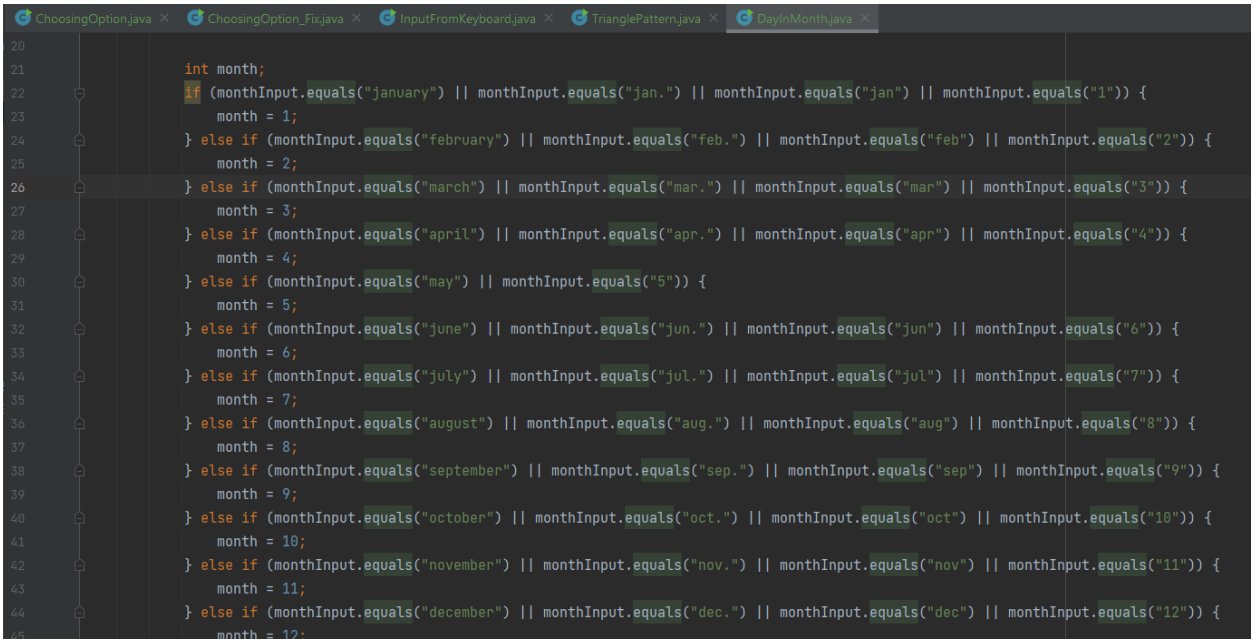


Figure 13: Program to display the number of days of a month

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

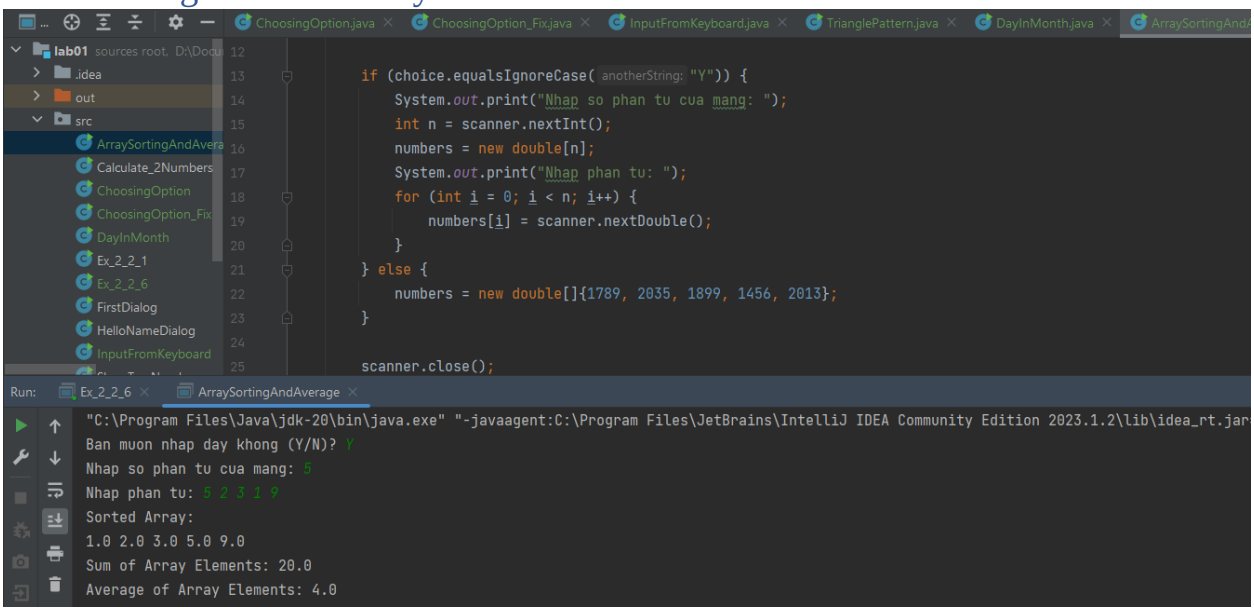
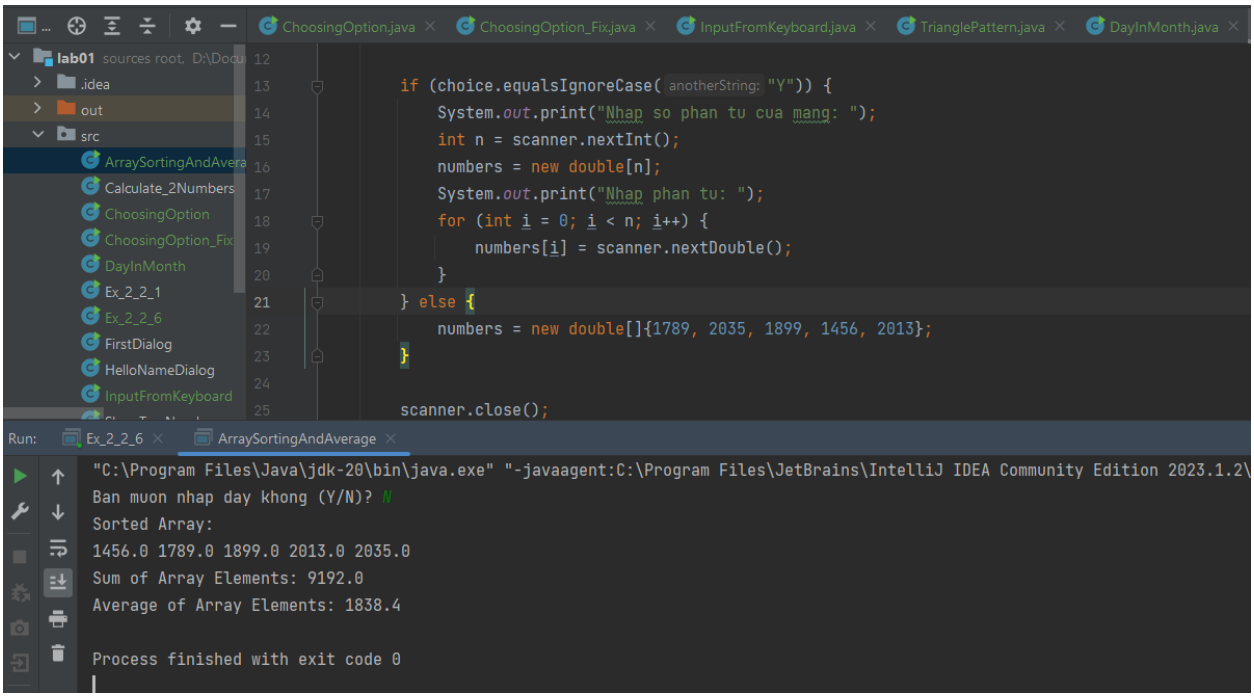


Figure 14: Program to sort an array and calculate the sum and average value



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

Note: You must create a new Java project for this exercise.

- The matrices can be entered by the user or constants.

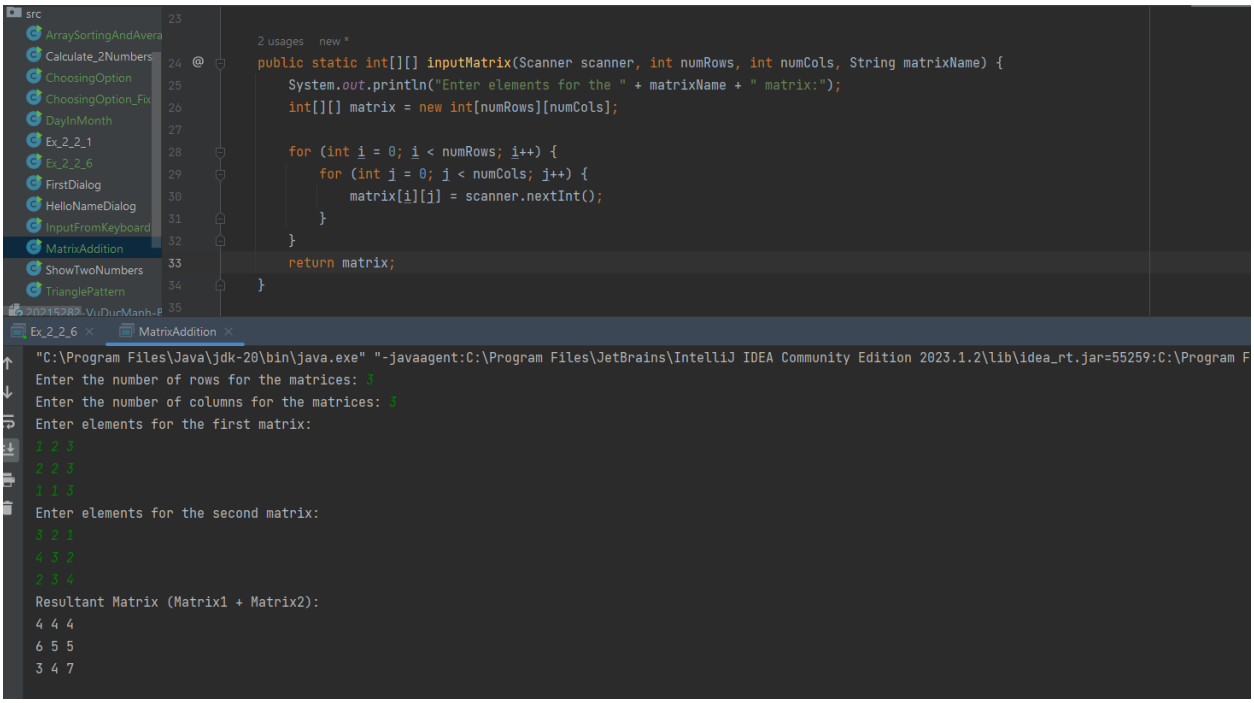


Figure 15: Java program to add two matrices of same size