BÁO CÁO THỰC HÀNH LAP 1
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

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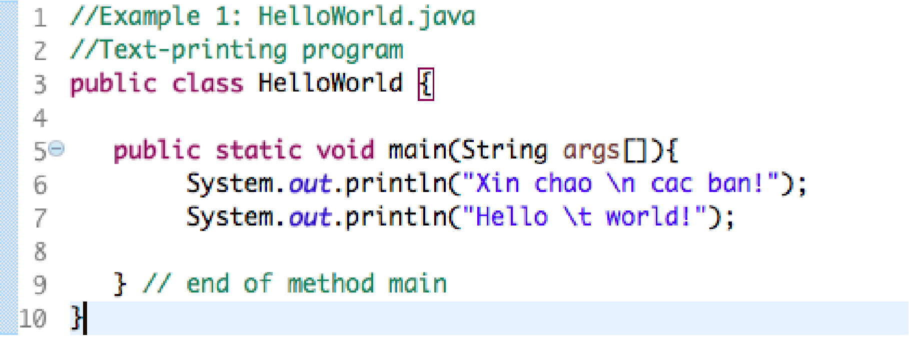
JDK: 20, IDE: Intellij

2. The Very First Java Programs

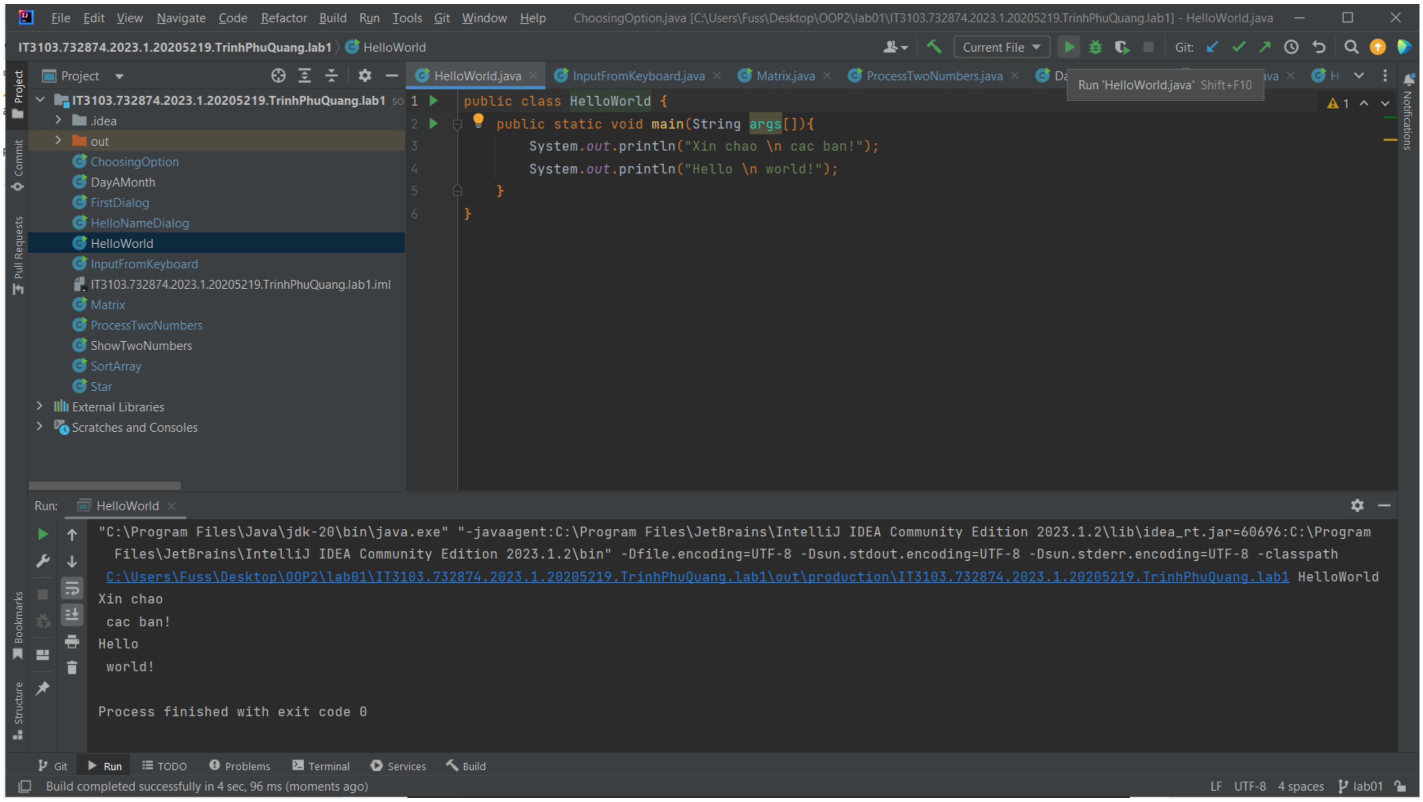
2.2.1 Write, compile the first Java application



```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
}
```

Figure 1 2.2.1 example

Result:



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

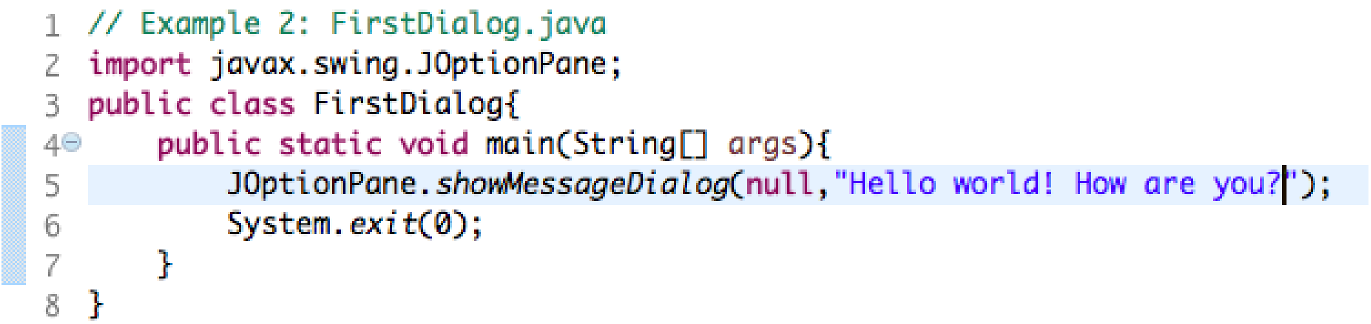
```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=60696:C:\Program
  Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
 C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1 HelloWorld
Xin chao
 cac ban!
Hello
 world!

Process finished with exit code 0
```

Build completed successfully in 4 sec, 96 ms (moments ago)

File Edit View Navigate Code Refactor Build Run Tools Git Window Help
ChoosingOption.java [C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1] - HelloWorld.java
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1 HelloWorld
Current File
Git:
Project
HelloWorld.java
InputFromKeyboard.java
Matrix.java
ProcessTwoNumbers.java
Run 'HelloWorld.java' Shift+F10
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
.idea
out
ChoosingOption
DayAMonth
FirstDialog
HelloNameDialog
HelloWorld
InputFromKeyboard
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1.iml
Matrix
ProcessTwoNumbers
ShowTwoNumbers
SortArray
Star
External Libraries
Scratches and Consoles
Run: HelloWorld
Git Run TODO Problems Terminal Services Build
LF UTF-8 4 spaces lab01

Figure 2 2.2.1 result

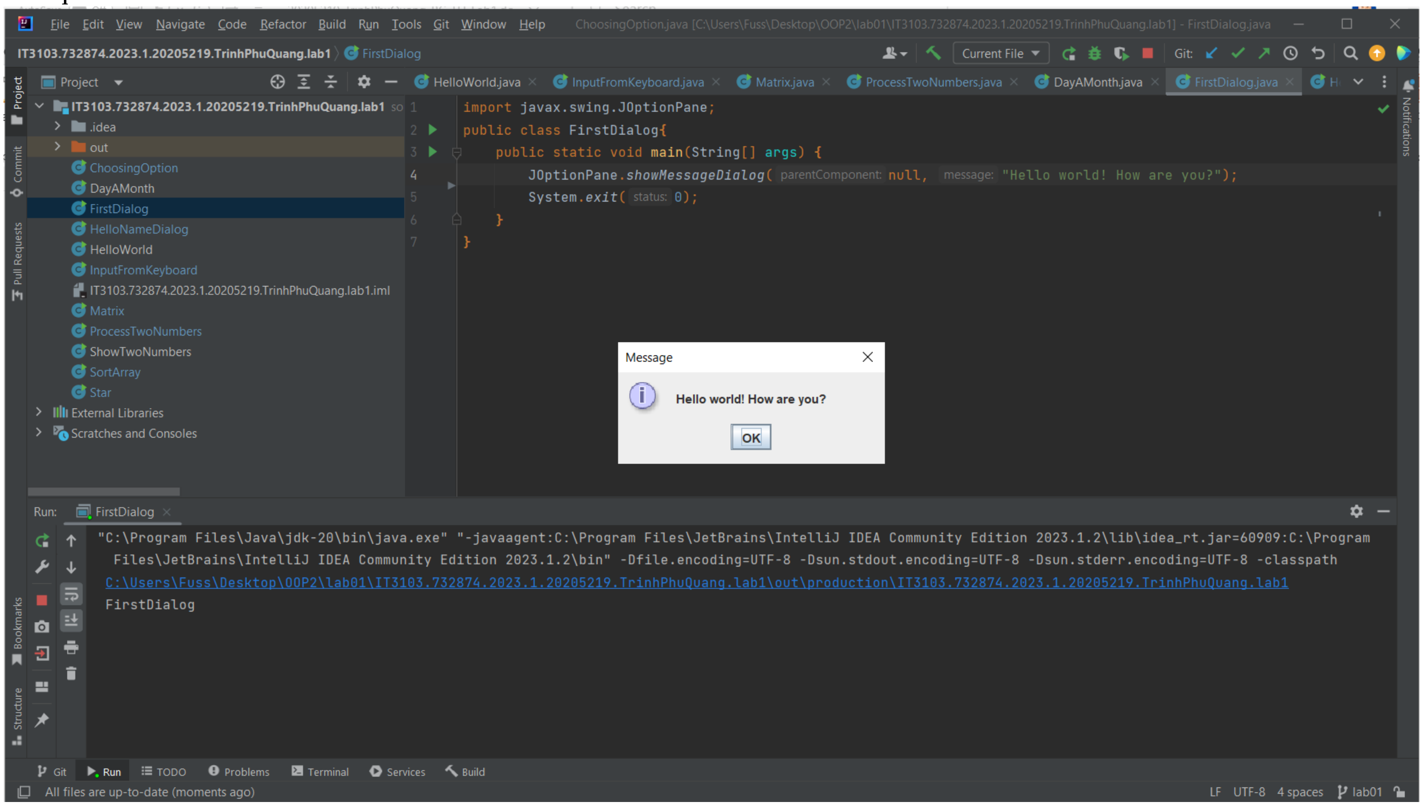
2.2.2 Write, compile the first dialog Java program



```
// 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 3 2.2.2 example

Kết quả:



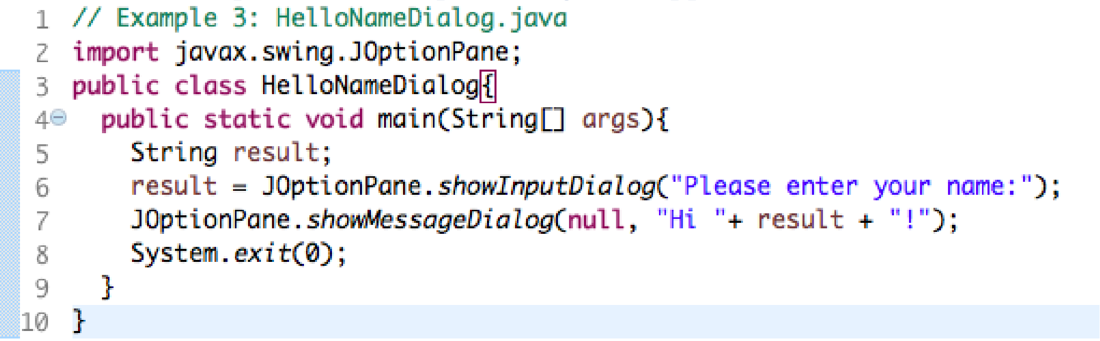
```
import javax.swing.JOptionPane;
public class FirstDialog{
    public static void main(String[] args) {
        JOptionPane.showMessageDialog( parentComponent: null,  message: "Hello world! How are you?");
        System.exit( status: 0);
    }
}
```

Hello world! How are you?

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=60909:C:\Program
  Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
  C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
  FirstDialog
```

Figure 4 2.2.2 result

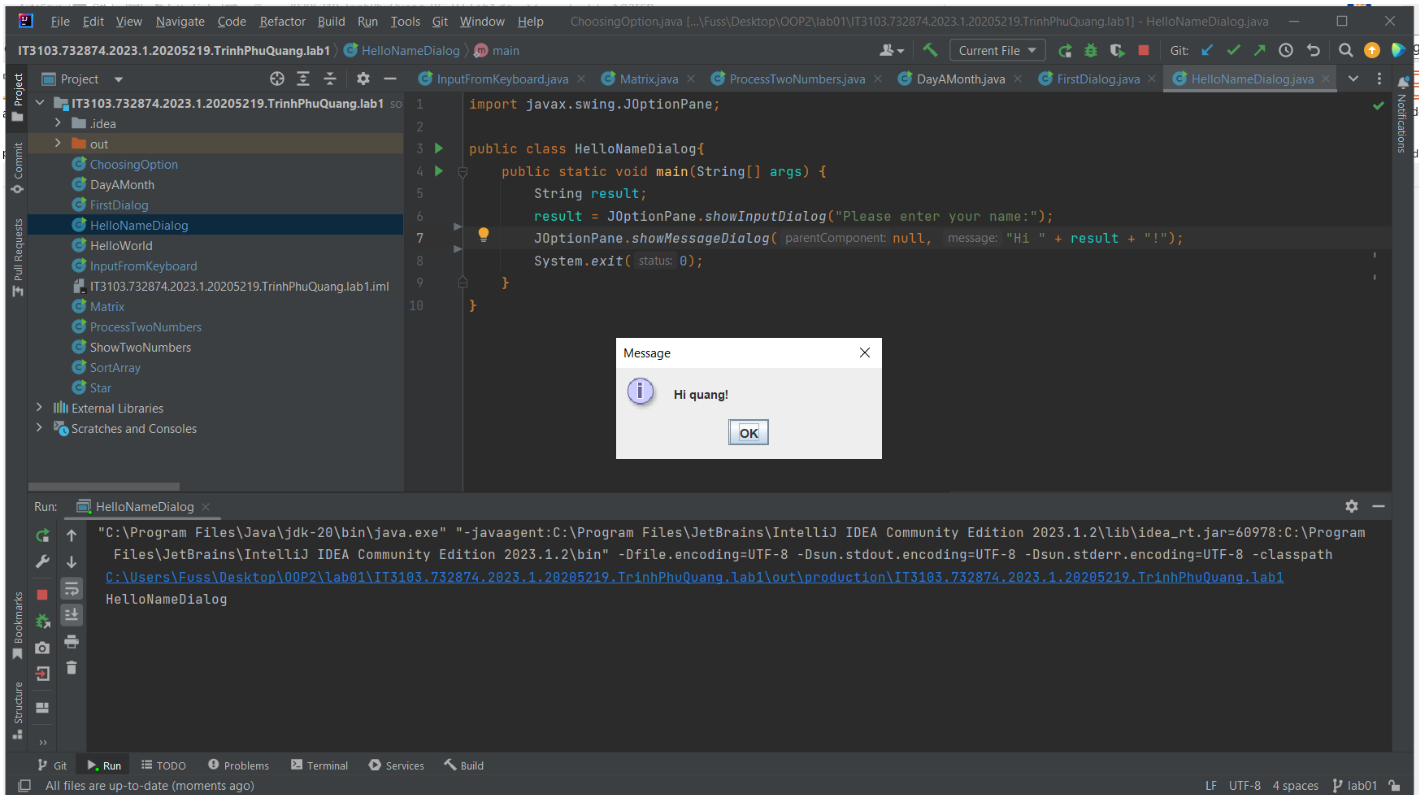
2.2.3 Write, compile the first input dialog Java application



```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 6 2.2.3 example

Kết quả:



```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);
    }
}
```

Message

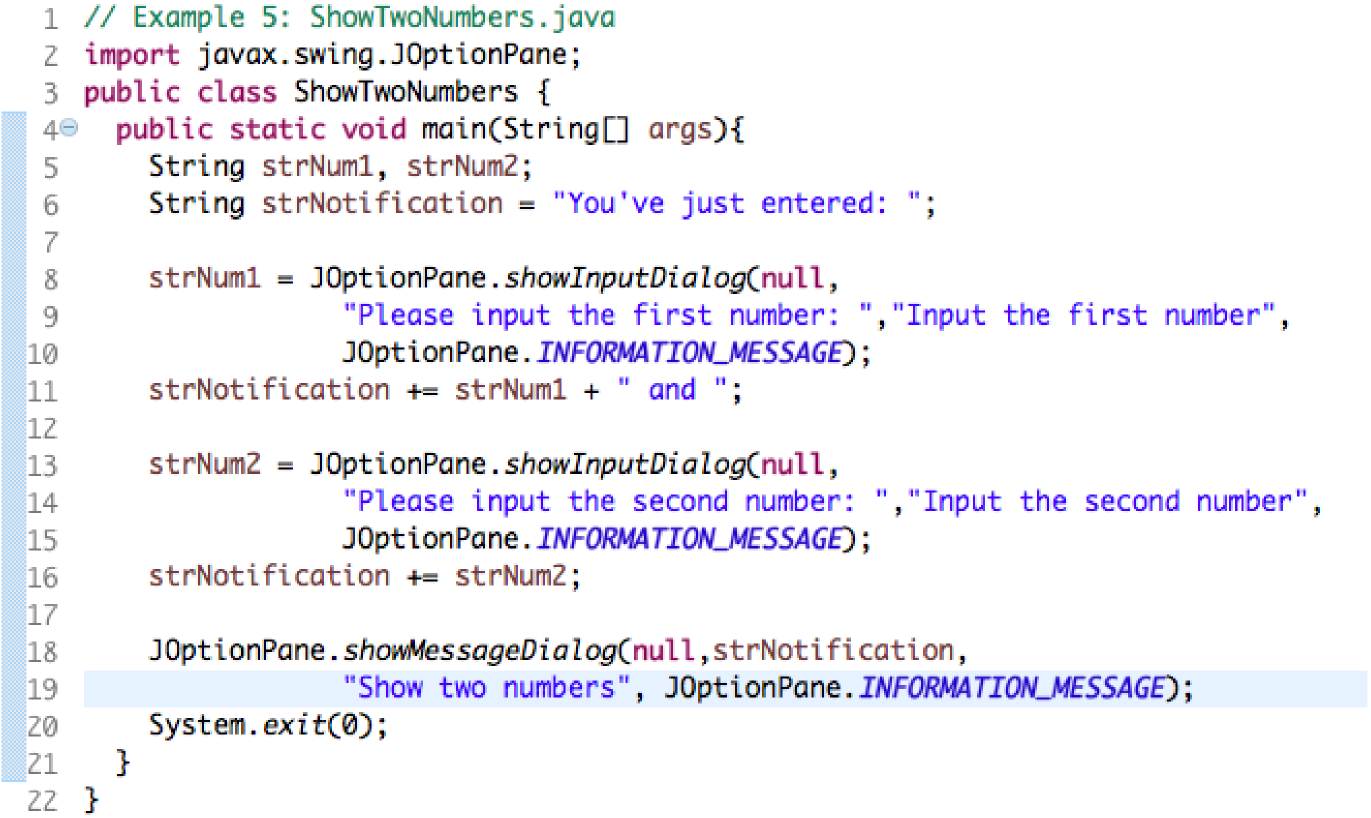
Hi quang!

OK

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=60978:C:\Program
 Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
 C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
 HelloNameDialog
```

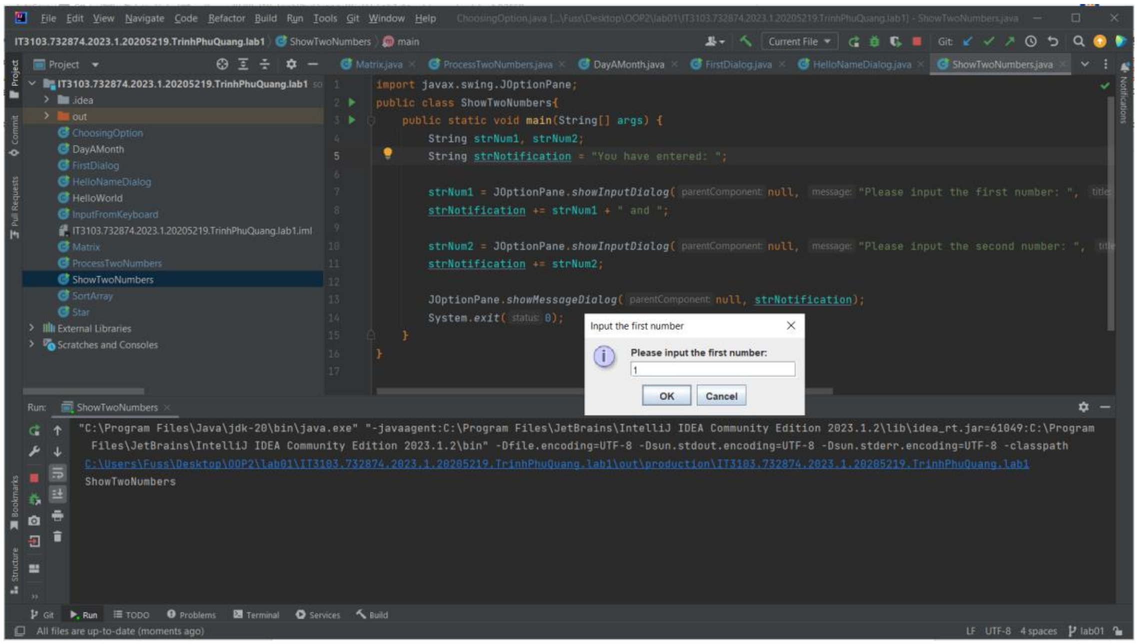
Figure7 2.2.3 result (1)

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 8 2.2.4 example



File Edit View Navigate Code Refactor Build Run Tools Git Window Help
ChoosingOption.java [...\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1] - ShowTwoNumbers.java
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1 › ShowTwoNumbers › main
Current File
Project
Matrix.java
ProcessTwoNumbers.java
DayAMonth.java
FirstDialog.java
HelloNameDialog.java
ShowTwoNumbers.java
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
.idea
out
ChoosingOption
DayAMonth
FirstDialog
HelloNameDialog
HelloWorld
InputFromKeyboard
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1.iml
Matrix
ProcessTwoNumbers
ShowTwoNumbers
SortArray
Star
External Libraries
Scratches and Consoles
Run: ShowTwoNumbers
Git Run TODO Problems Terminal Services Build
All files are up-to-date (moments ago)
LF UTF-8 4 spaces lab01

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

        strNum1 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the first number: ",  title
        strNotification += strNum1 + " and ";

        strNum2 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the second number: ",  title
        strNotification += strNum2;

        JOptionPane.showMessageDialog( parentComponent: null, strNotification);
        System.exit( status: 0);
    }
}
```

Input the first number

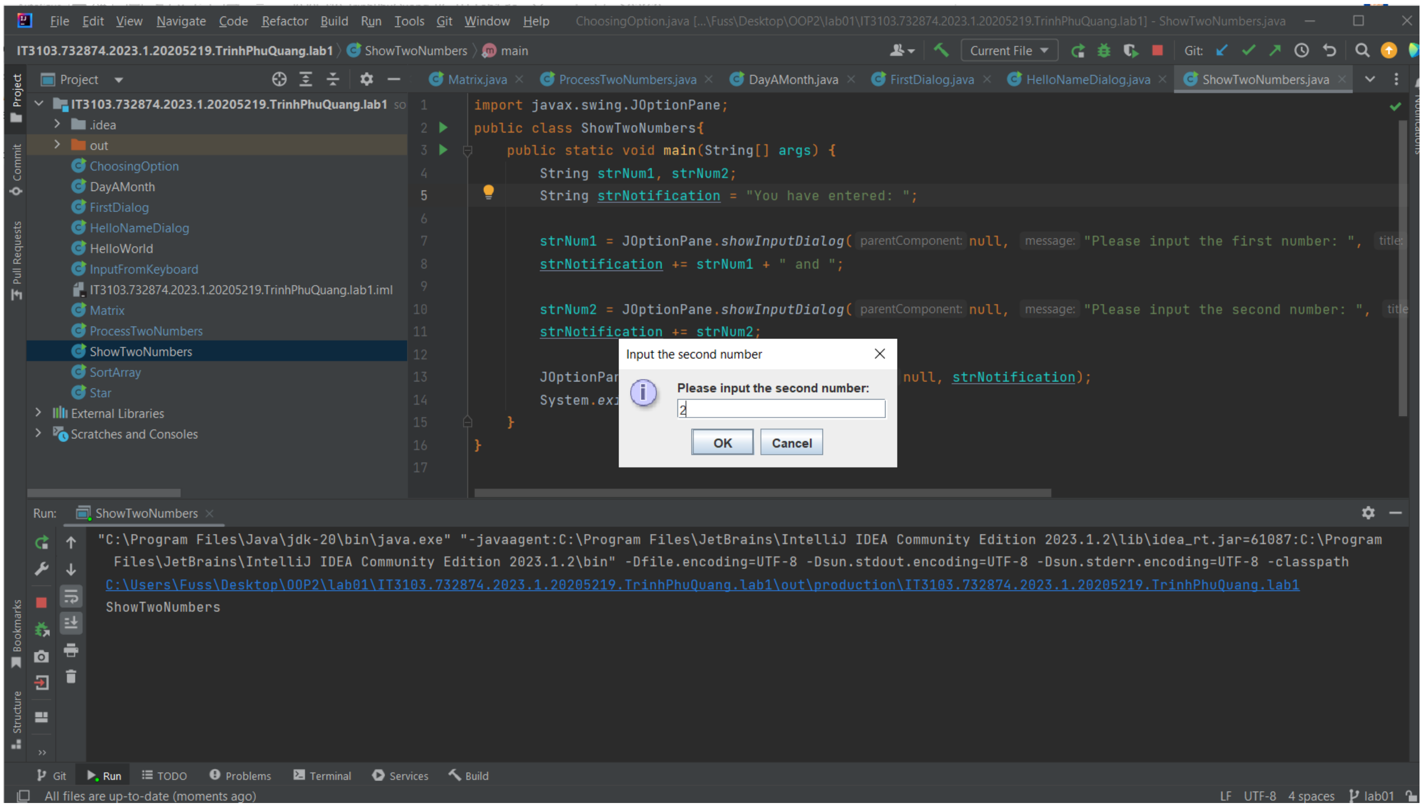
Please input the first number:

1

OK Cancel

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=61049:C:\Program
 Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
 C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
 ShowTwoNumbers
```

Figure 9 2.2.4 result (1)



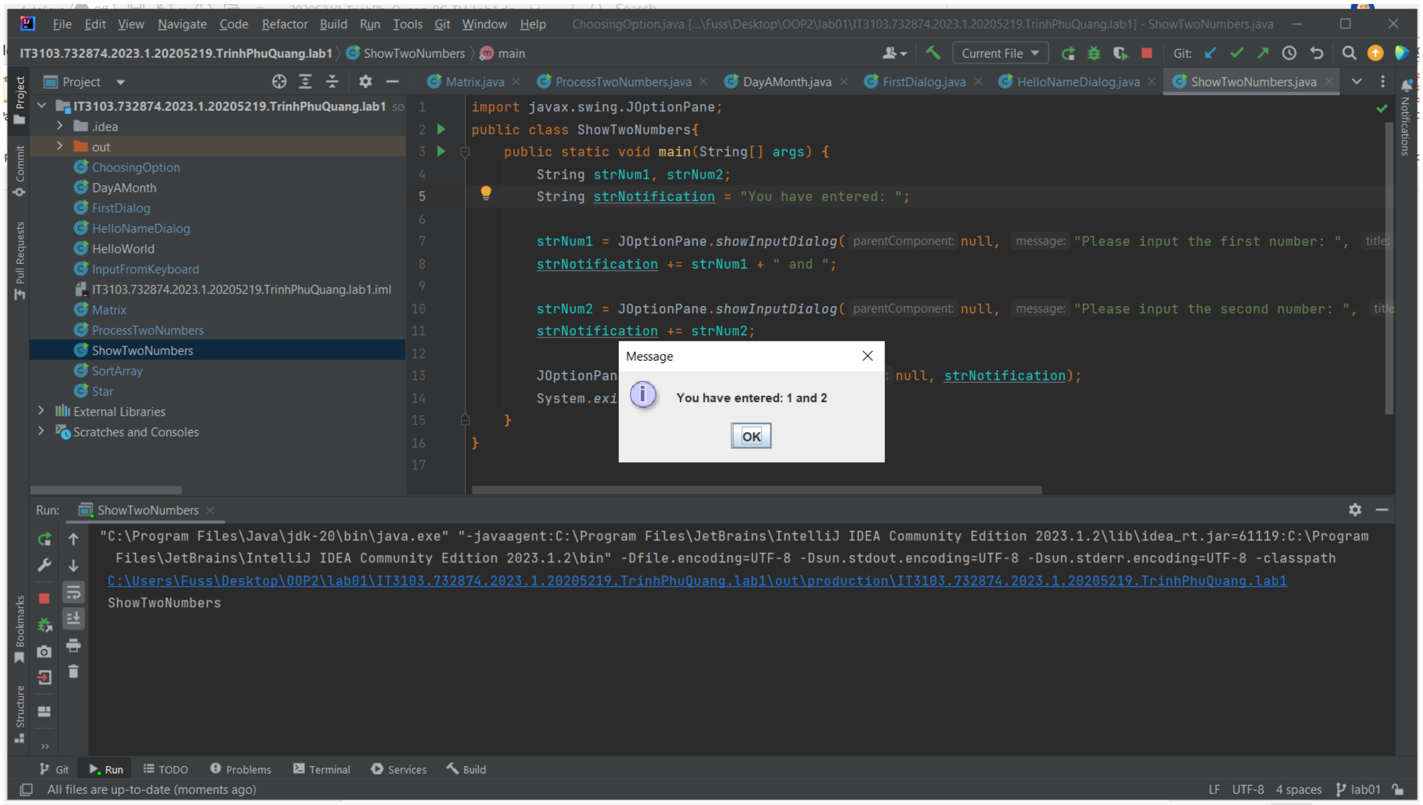
```
import javax.swing.JOptionPane;
public class ShowTwoNumbers{
    public static void main(String[] args) {
        String strNum1, strNum2;
        String strNotification = "You have entered: ";

        strNum1 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the first number: ",  title
        strNotification += strNum1 + " and ";

        strNum2 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the second number: ",  title
        strNotification += strNum2;

        JOptionPar                    null, strNotification);
        System.exi
    }
}
```

Please input the second number:

2

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=61087:C:\Program
  Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
 C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
 ShowTwoNumbers
```

Figure 10 2.2.4 result (2)



```
import javax.swing.JOptionPane;
public class ShowTwoNumbers{
    public static void main(String[] args) {
        String strNum1, strNum2;
        String strNotification = "You have entered: ";

        strNum1 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the first number: ",  title
        strNotification += strNum1 + " and ";

        strNum2 = JOptionPane.showInputDialog( parentComponent: null,  message: "Please input the second number: ",  title
        strNotification += strNum2;

        JOptionPan                    null, strNotification);
        System.exi
    }
}
```

You have entered: 1 and 2

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=61119:C:\Program
  Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\bin" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 -classpath
 C:\Users\Fuss\Desktop\OOP2\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1\out\production\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
 ShowTwoNumbers
```

Figure 11 2.2.4 result (3)

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

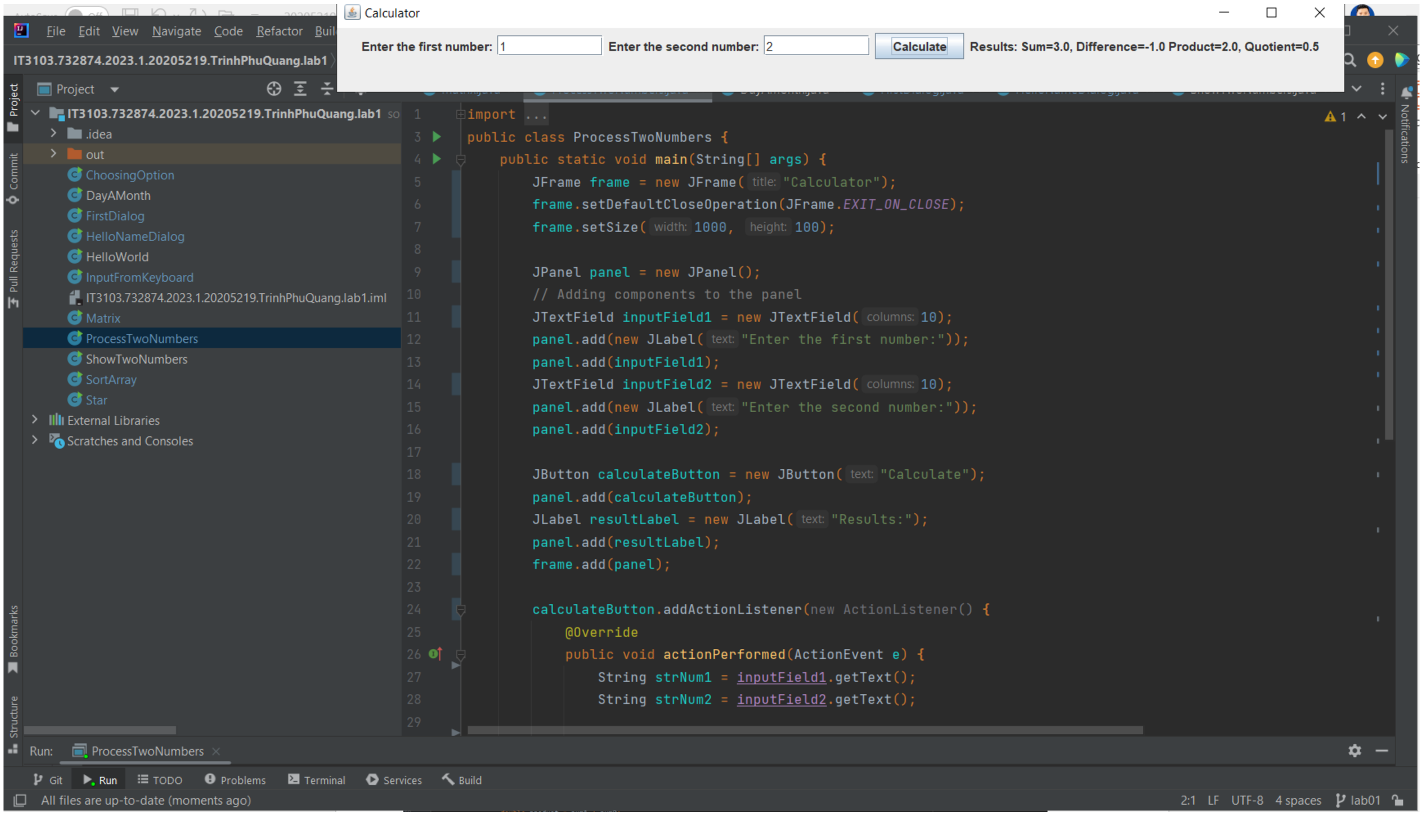
Notes

- To convert from String to double, you can use

  double num1 = Double.parseDouble(strNum1)

- Check the divisor of the division

Kết quả



Enter the first number: 1 Enter the second number: 2 Results: Sum=3.0, Difference=-1.0 Product=2.0, Quotient=0.5

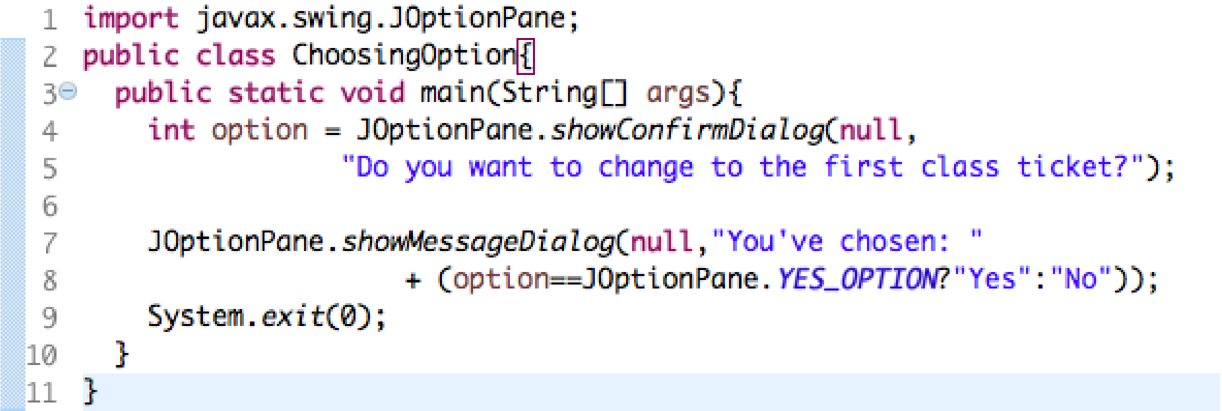
```java
import ...
public class ProcessTwoNumbers {
    public static void main(String[] args) {
        JFrame frame = new JFrame("Calculator");
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setSize(1000, 100);

        JPanel panel = new JPanel();
        // Adding components to the panel
        JTextField inputField1 = new JTextField(10);
        panel.add(new JLabel("Enter the first number:"));
        panel.add(inputField1);
        JTextField inputField2 = new JTextField(10);
        panel.add(new JLabel("Enter the second number:"));
        panel.add(inputField2);

        JButton calculateButton = new JButton("Calculate");
        panel.add(calculateButton);
        JLabel resultLabel = new JLabel("Results:");
        panel.add(resultLabel);
        frame.add(panel);

        calculateButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                String strNum1 = inputField1.getText();
                String strNum2 = inputField2.getText();
```

Calculator
Calculate
File Edit View Navigate Code Refactor Build
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1
Project
.idea
out
ChoosingOption
DayAMonth
FirstDialog
HelloNameDialog
HelloWorld
InputFromKeyboard
IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1.iml
Matrix
ProcessTwoNumbers
ShowTwoNumbers
SortArray
Star
External Libraries
Scratches and Consoles
Run: ProcessTwoNumbers
Git Run TODO Problems Terminal Services Build
All files are up-to-date (moments ago)
2:1 LF UTF-8 4 spaces lab01

Figure 12 2.2.5 result

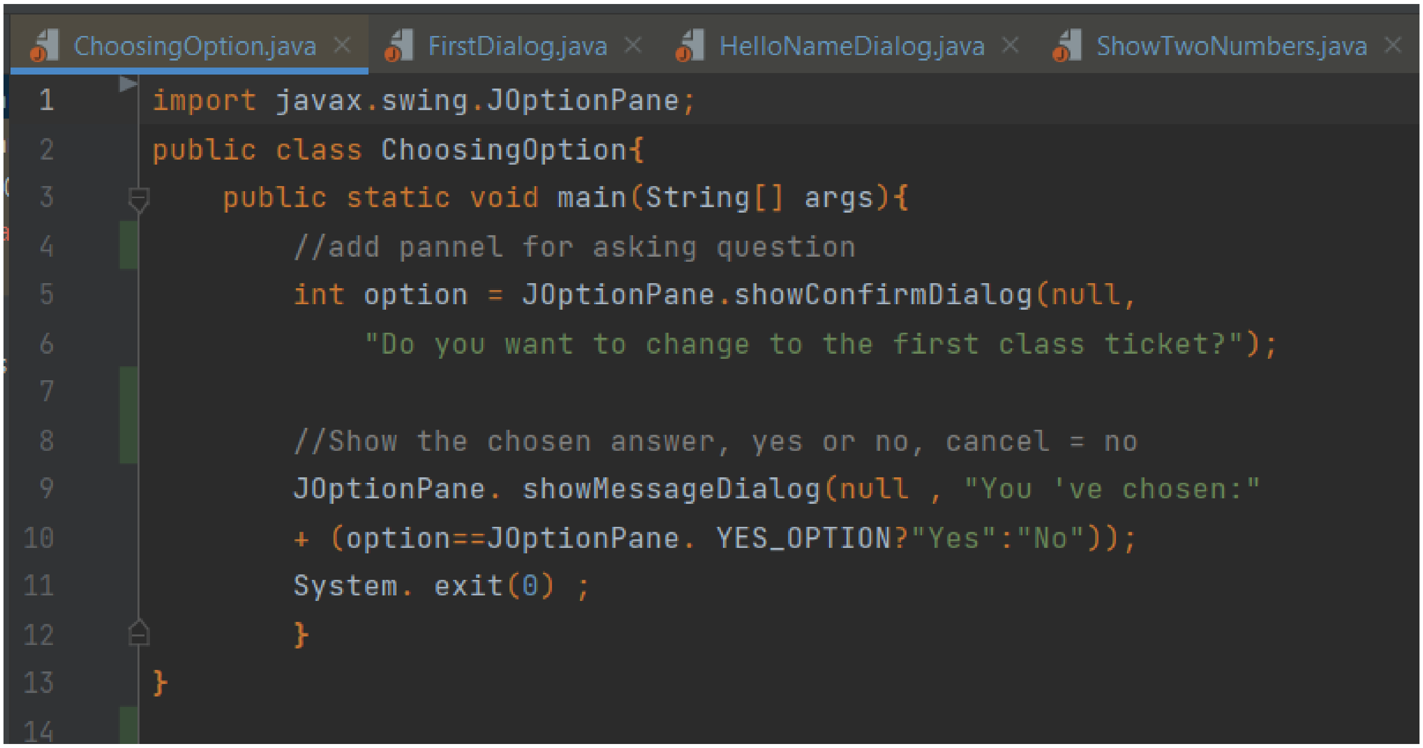
6. Exercises

6.1 Write, compile and run the ChoosingOption program:



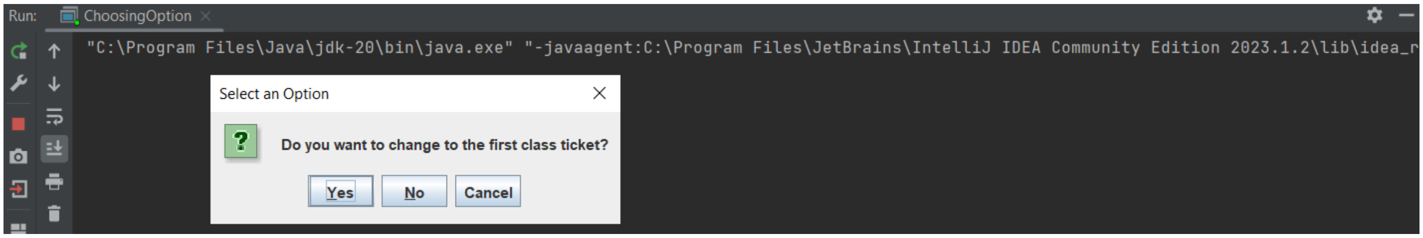
```java
import javax.swing.JOptionPane;
public class ChoosingOption{
  public static void main(String[] args){
    int option = JOptionPane.showConfirmDialog(null,
                "Do you want to change to the first class ticket?");

    JOptionPane.showMessageDialog(null,"You've chosen: "
                  + (option==JOptionPane.YES_OPTION?"Yes":"No"));
    System.exit(0);
  }
}
```

Figure 13 6.1 example



```
import javax.swing.JOptionPane;
public class ChoosingOption{
    public static void main(String[] args){
        //add pannel for asking question
        int option = JOptionPane.showConfirmDialog(null,
            "Do you want to change to the first class ticket?");

        //Show the chosen answer, yes or no, cancel = no
        JOptionPane. showMessageDialog(null , "You 've chosen:"
        + (option==JOptionPane. YES_OPTION?"Yes":"No"));
        System. exit(0) ;
        }
}
```

Figure 14 6.1 code

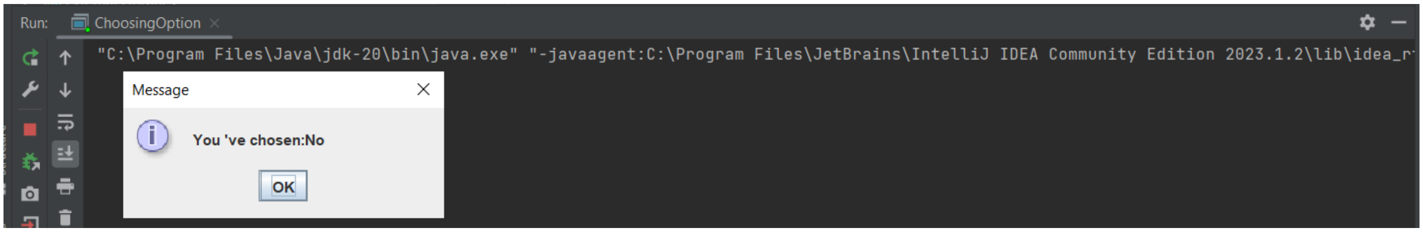


```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_r
```

Do you want to change to the first class ticket?

Figure 15 6.1 result (1)

IF cancel:

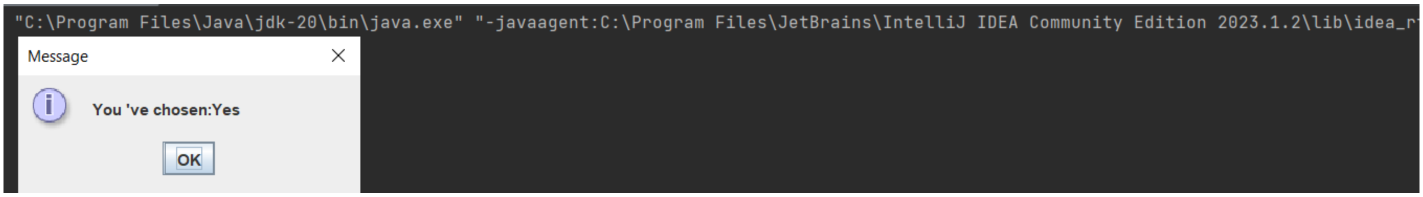


```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_r
```

You 've chosen:No

Figure 16 6.1 result (2)

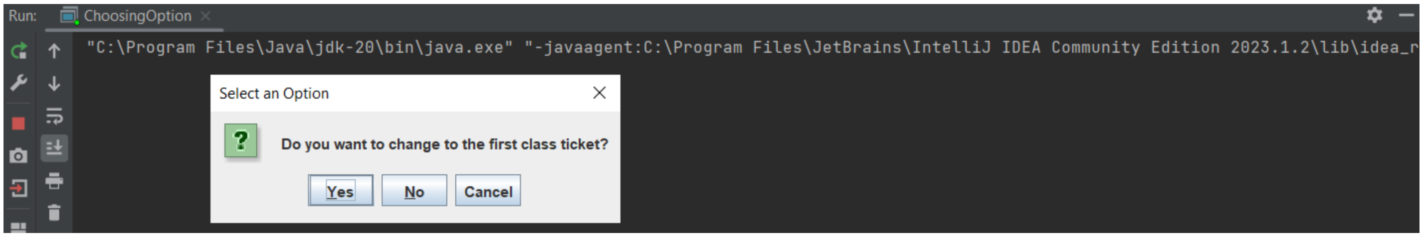
IF yes:



```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_r
```

Figure 18 6.1 result (3)

IF No:



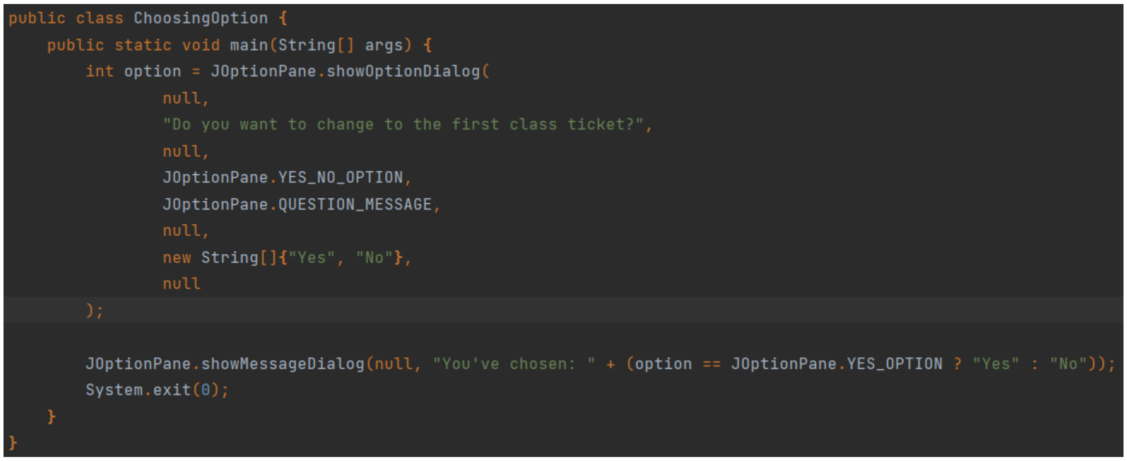
```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_r
```

Figure 19 6.1 result (4)

Questions:

- What happens if users choose “Cancel”? – Result is No
- How to customize the options to users, e.g. only two options: “Yes” and “No”, OR “I do” and “I don’t” (Suggestion: Use Javadocs or using Eclipse/Netbean IDE help).

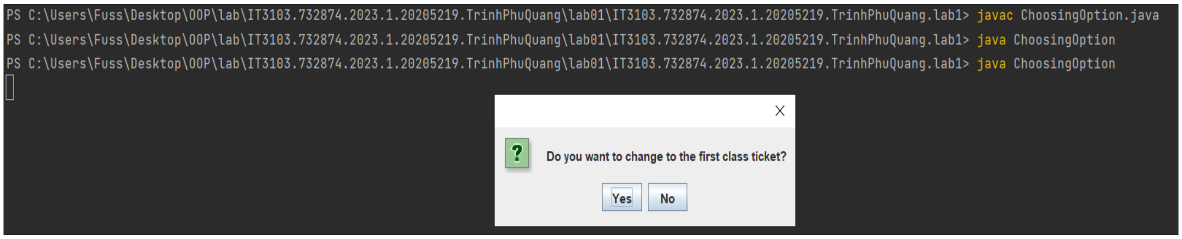
  Code can change to:



```java
public class ChoosingOption {
    public static void main(String[] args) {
        int option = JOptionPane.showOptionDialog(
                null,
                "Do you want to change to the first class ticket?",
                null,
                JOptionPane.YES_NO_OPTION,
                JOptionPane.QUESTION_MESSAGE,
                null,
                new String[]{"Yes", "No"},
                null
        );

        JOptionPane.showMessageDialog(null, "You've chosen: " + (option == JOptionPane.YES_OPTION ? "Yes" : "No"));
        System.exit(0);
    }
}
```

Figure 20 6.1 Question code

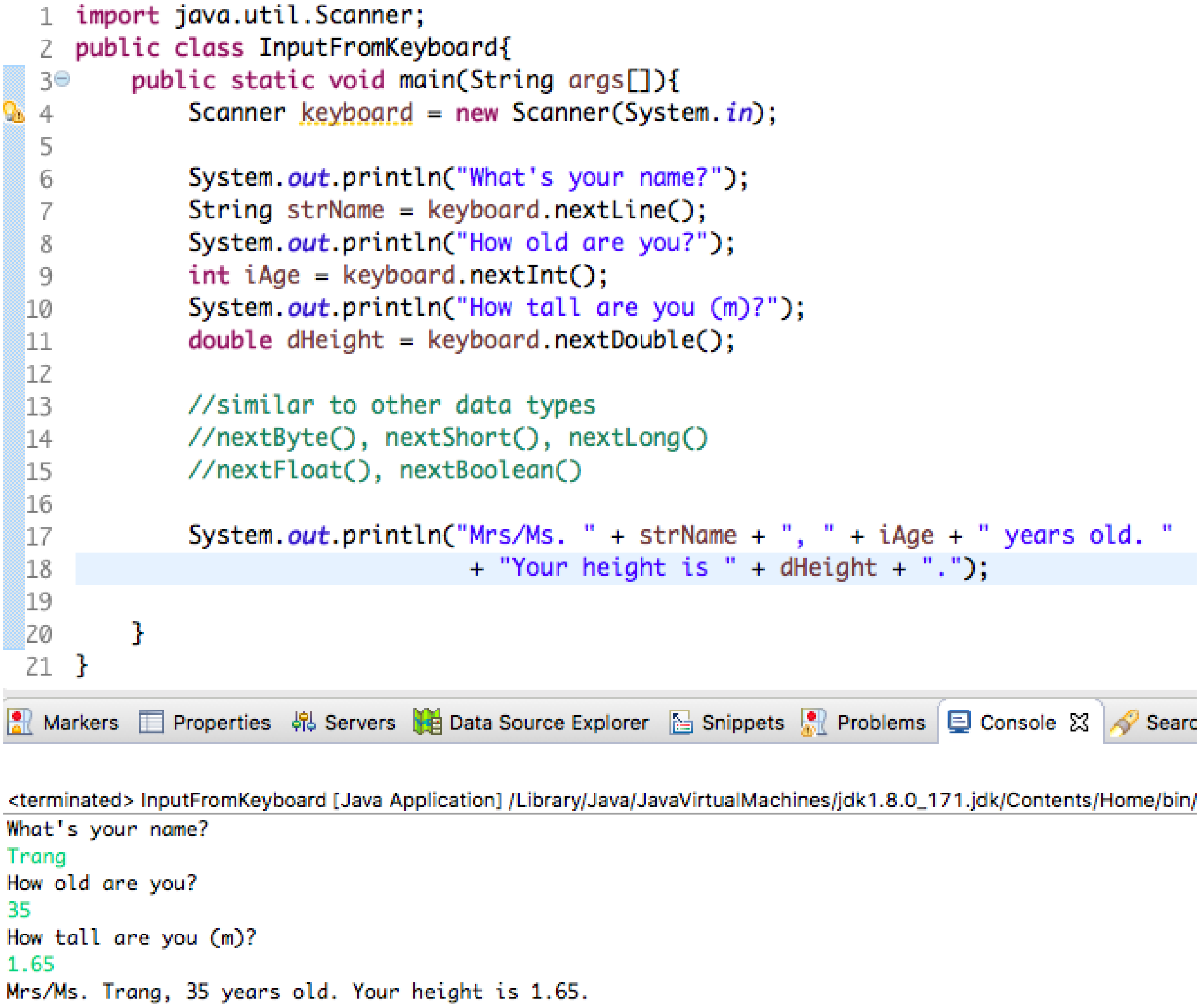
Result:



```
PS C:\Users\Fuss\Desktop\OOP\lab\IT3103.732874.2023.1.20205219.TrinhPhuQuang\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1> javac ChoosingOption.java
PS C:\Users\Fuss\Desktop\OOP\lab\IT3103.732874.2023.1.20205219.TrinhPhuQuang\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1> java ChoosingOption
PS C:\Users\Fuss\Desktop\OOP\lab\IT3103.732874.2023.1.20205219.TrinhPhuQuang\lab01\IT3103.732874.2023.1.20205219.TrinhPhuQuang.lab1> java ChoosingOption
```

Figure 21 6.1 Question result

6.2 Write a program for input/output from keyboard

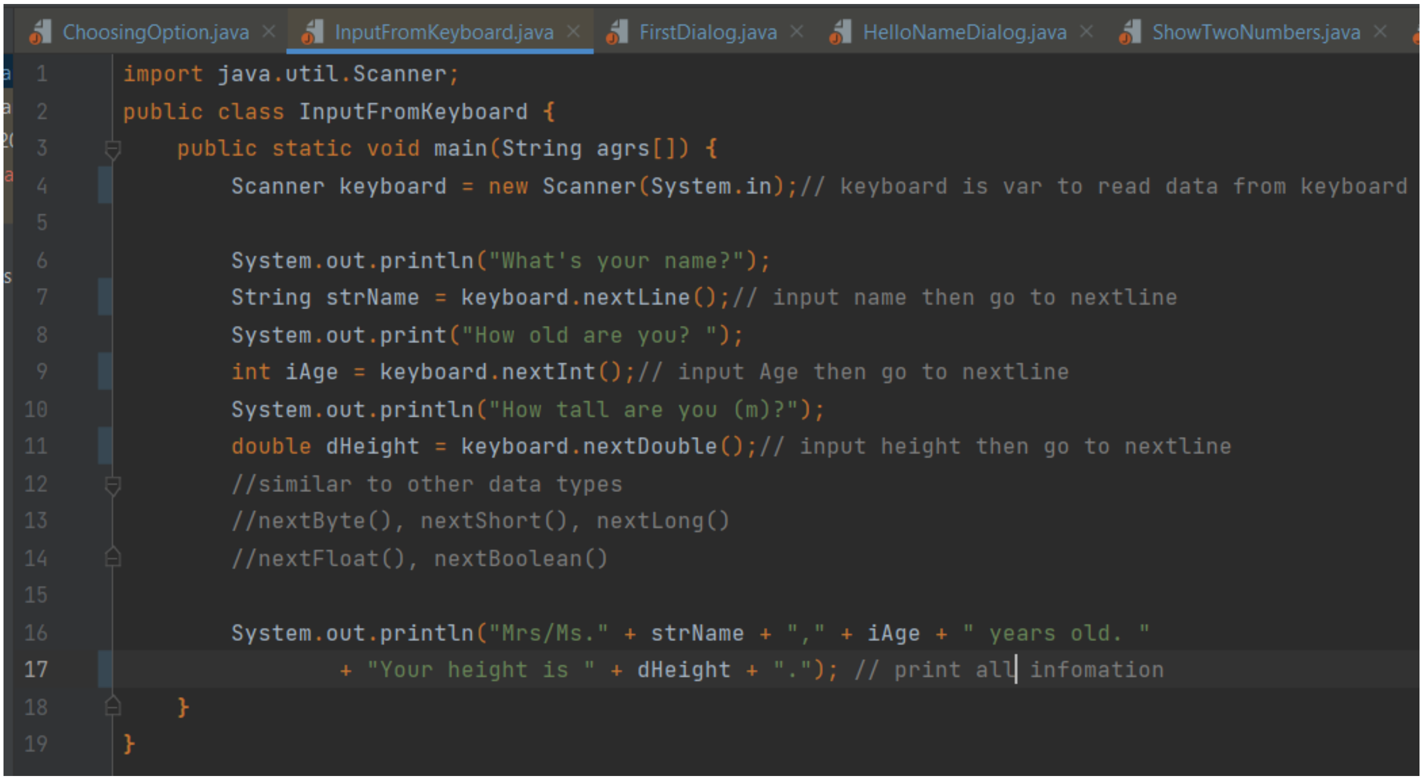


```
import java.util.Scanner;
public class InputFromKeyboard{
    public static void main(String args[]){
        Scanner keyboard = new Scanner(System.in);

        System.out.println("What's your name?");
        String strName = keyboard.nextLine();
        System.out.println("How old are you?");
        int iAge = keyboard.nextInt();
        System.out.println("How tall are you (m)?");
        double dHeight = keyboard.nextDouble();

        //similar to other data types
        //nextByte(), nextShort(), nextLong()
        //nextFloat(), nextBoolean()

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

    }
}
```

```
<terminated> InputFromKeyboard [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_171.jdk/Contents/Home/bin/
What's your name?
Trang
How old are you?
35
How tall are you (m)?
1.65
Mrs/Ms. Trang, 35 years old. Your height is 1.65.
```

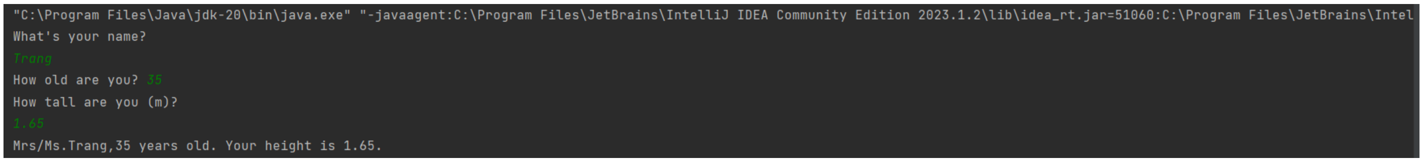
Figure 22 6.2 example

Kết quả:



```java
import java.util.Scanner;
public class InputFromKeyboard {
    public static void main(String agrs[]) {
        Scanner keyboard = new Scanner(System.in);// keyboard is var to read data from keyboard

        System.out.println("What's your name?");
        String strName = keyboard.nextLine();// input name then go to nextline
        System.out.print("How old are you? ");
        int iAge = keyboard.nextInt();// input Age then go to nextline
        System.out.println("How tall are you (m)?");
        double dHeight = keyboard.nextDouble();// input height then go to nextline
        //similar to other data types
        //nextByte(), nextShort(), nextLong()
        //nextFloat(), nextBoolean()

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

Figure 23 6.2 code

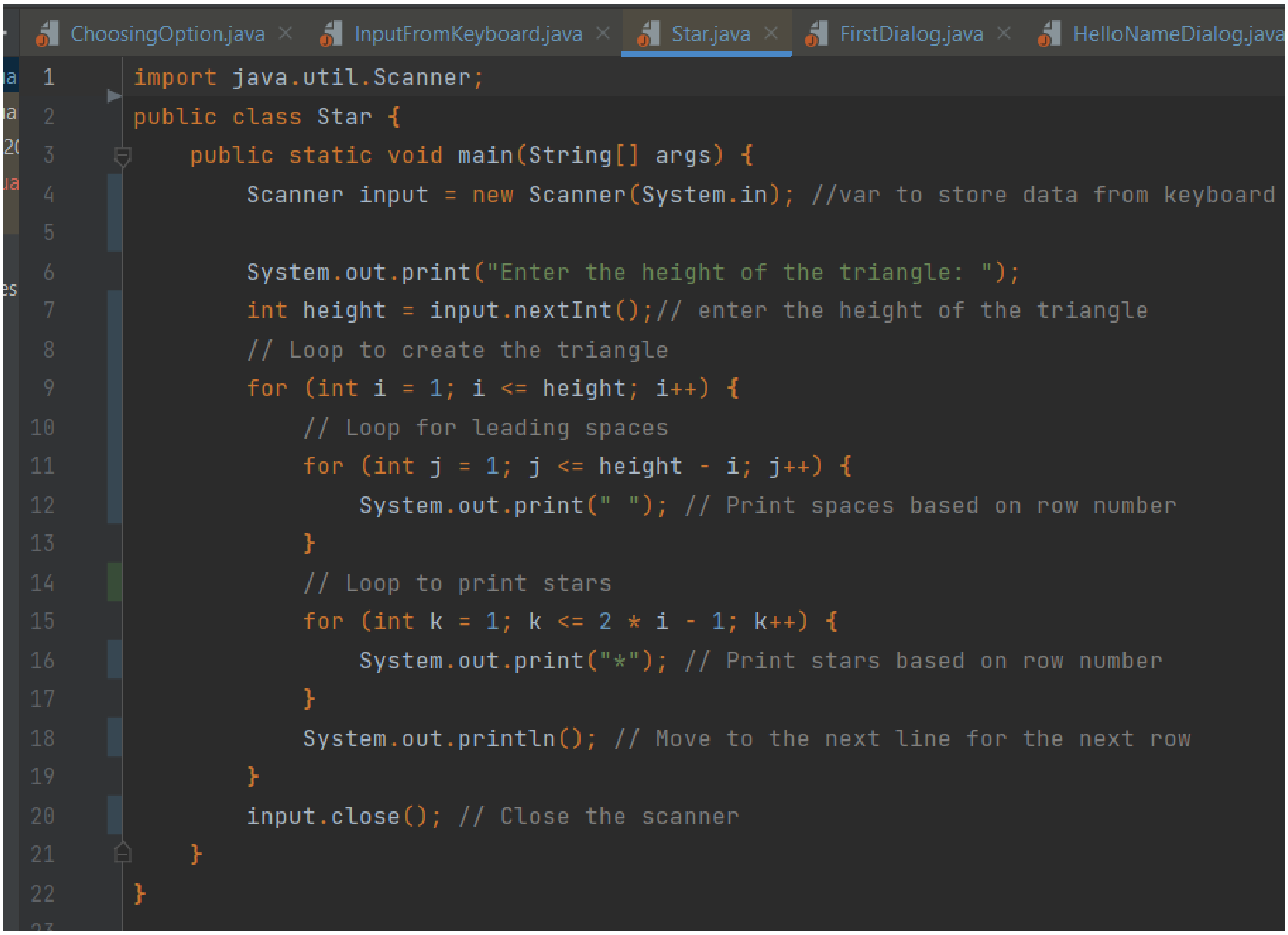


```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=51060:C:\Program Files\JetBrains\Intel
What's your name?
Trang
How old are you? 35
How tall are you (m)?
1.65
Mrs/Ms.Trang,35 years old. Your height is 1.65.
```

Figure 24 6.2 result

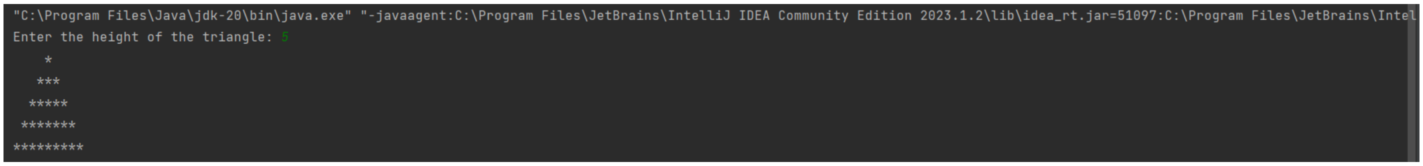
6.3 Write a program to display a triangle with a height of n stars (*), n is entered by users

Kết quả:



```java
import java.util.Scanner;
public class Star {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in); //var to store data from keyboard

        System.out.print("Enter the height of the triangle: ");
        int height = input.nextInt();// enter the height of the triangle
        // Loop to create the triangle
        for (int i = 1; i <= height; i++) {
            // Loop for leading spaces
            for (int j = 1; j <= height - i; j++) {
                System.out.print(" "); // Print spaces based on row number
            }
            // Loop to print stars
            for (int k = 1; k <= 2 * i - 1; k++) {
                System.out.print("*"); // Print stars based on row number
            }
            System.out.println(); // Move to the next line for the next row
        }
        input.close(); // Close the scanner
    }
}
```

Figure 25 6.3 code



```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=51097:C:\Program Files\JetBrains\Intel
Enter the height of the triangle: 5
    *
   ***
  *****
 *******
*********
```

Figure 26 6.3 result

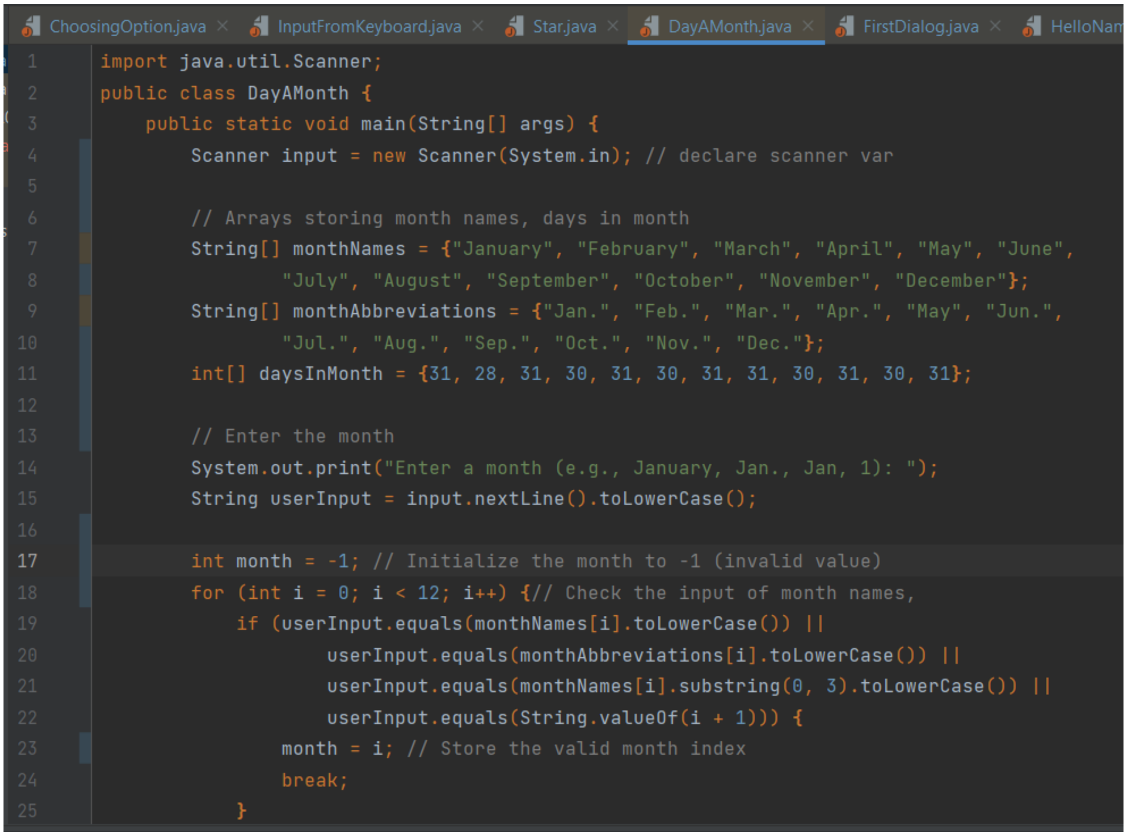
6.4 Write a program to display the number of days of a month, which is entered by users (both month and year).

You must create a new Java project for this exercise.

- The user can either enter a month in its full name, abbreviation, in 3 letters, or in number. To illustrate, the valid inputs of *January* are January, Jan., Jan, and 1.

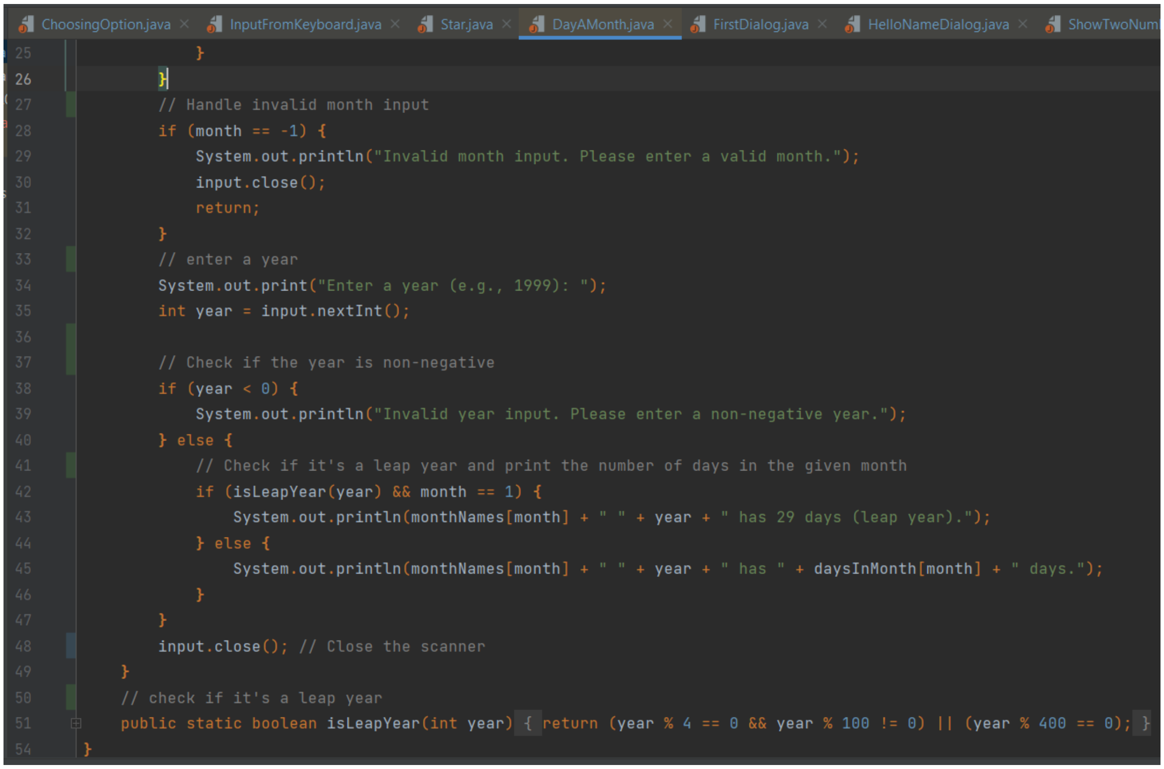
- The user must enter a year in a non-negative number and enter all the digits. For instance, the valid inputs of year *1999* is only 1999, but not 99, “one thousand nine hundred ninety-nine”, or anything else.
- A year is either a common year of 365 days or a leap year of 366 days. Every year that is divisible by 4 is a leap year, except for years that are divisible by 100, but not by 400. For instance, year 1800 is not a leap year, yet year 2000 is a leap year. In a year, there are twelve months, which are listed in order as follows.

Result:



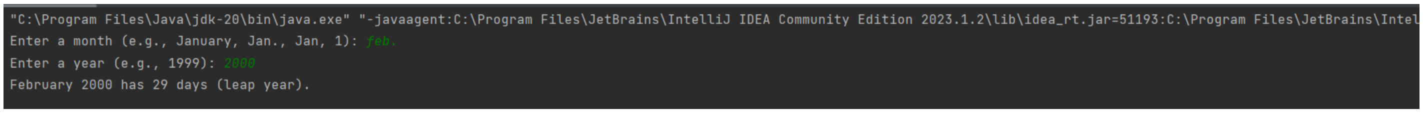
```java
import java.util.Scanner;
public class DayAMonth {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in); // declare scanner var

        // Arrays storing month names, days in month
        String[] monthNames = {"January", "February", "March", "April", "May", "June",
                "July", "August", "September", "October", "November", "December"};
        String[] monthAbbreviations = {"Jan.", "Feb.", "Mar.", "Apr.", "May", "Jun.",
                "Jul.", "Aug.", "Sep.", "Oct.", "Nov.", "Dec."};
        int[] daysInMonth = {31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};

        // Enter the month
        System.out.print("Enter a month (e.g., January, Jan., Jan, 1): ");
        String userInput = input.nextLine().toLowerCase();

        int month = -1; // Initialize the month to -1 (invalid value)
        for (int i = 0; i < 12; i++) {// Check the input of month names,
            if (userInput.equals(monthNames[i].toLowerCase()) ||
                    userInput.equals(monthAbbreviations[i].toLowerCase()) ||
                    userInput.equals(monthNames[i].substring(0, 3).toLowerCase()) ||
                    userInput.equals(String.valueOf(i + 1))) {
                month = i; // Store the valid month index
                break;
            }
```

Figure 27 6.4 code (1)



```java
            }
        }
        // Handle invalid month input
        if (month == -1) {
            System.out.println("Invalid month input. Please enter a valid month.");
            input.close();
            return;
        }
        // enter a year
        System.out.print("Enter a year (e.g., 1999): ");
        int year = input.nextInt();

        // Check if the year is non-negative
        if (year < 0) {
            System.out.println("Invalid year input. Please enter a non-negative year.");
        } else {
            // Check if it's a leap year and print the number of days in the given month
            if (isLeapYear(year) && month == 1) {
                System.out.println(monthNames[month] + " " + year + " has 29 days (leap year).");
            } else {
                System.out.println(monthNames[month] + " " + year + " has " + daysInMonth[month] + " days.");
            }
        }
        input.close(); // Close the scanner
    }
    // check if it's a leap year
    public static boolean isLeapYear(int year) { return (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0); }
}
```

Figure 28 6.4 code (2)

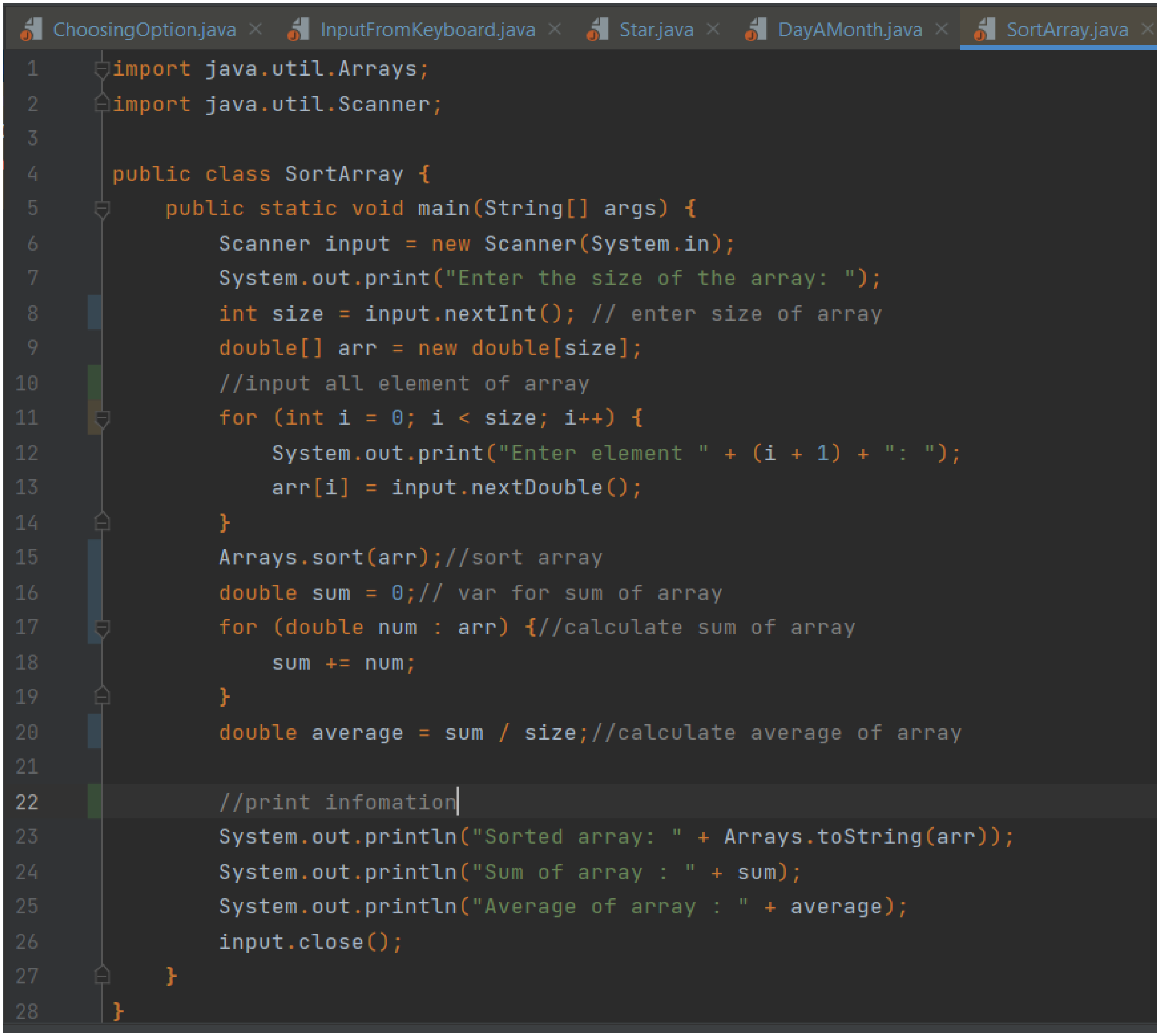


```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=51193:C:\Program Files\JetBrains\Intel
Enter a month (e.g., January, Jan., Jan, 1): feb.
Enter a year (e.g., 1999): 2000
February 2000 has 29 days (leap year).
```

Figure 29 6.4 result

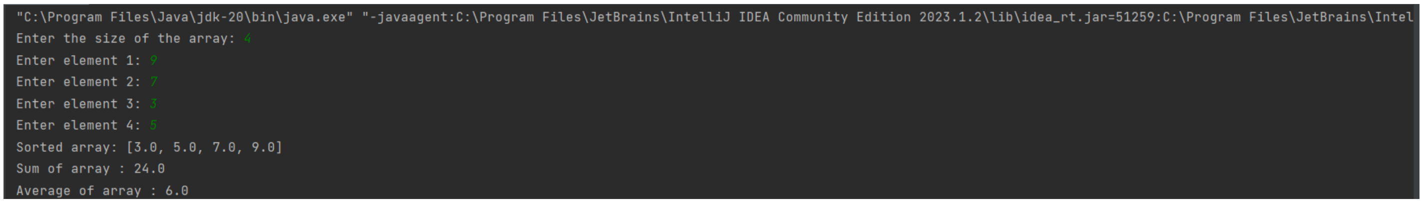
6.5 Write a Java program to sort a numeric array, and calculate the sum and average value of array elements.

Result:



```java
import java.util.Arrays;
import java.util.Scanner;

public class SortArray {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the size of the array: ");
        int size = input.nextInt(); // enter size of array
        double[] arr = new double[size];
        //input all element of array
        for (int i = 0; i < size; i++) {
            System.out.print("Enter element " + (i + 1) + ": ");
            arr[i] = input.nextDouble();
        }
        Arrays.sort(arr);//sort array
        double sum = 0;// var for sum of array
        for (double num : arr) {//calculate sum of array
            sum += num;
        }
        double average = sum / size;//calculate average of array

        //print infomation
        System.out.println("Sorted array: " + Arrays.toString(arr));
        System.out.println("Sum of array : " + sum);
        System.out.println("Average of array : " + average);
        input.close();
    }
}
```

Figure 30 6.5 code



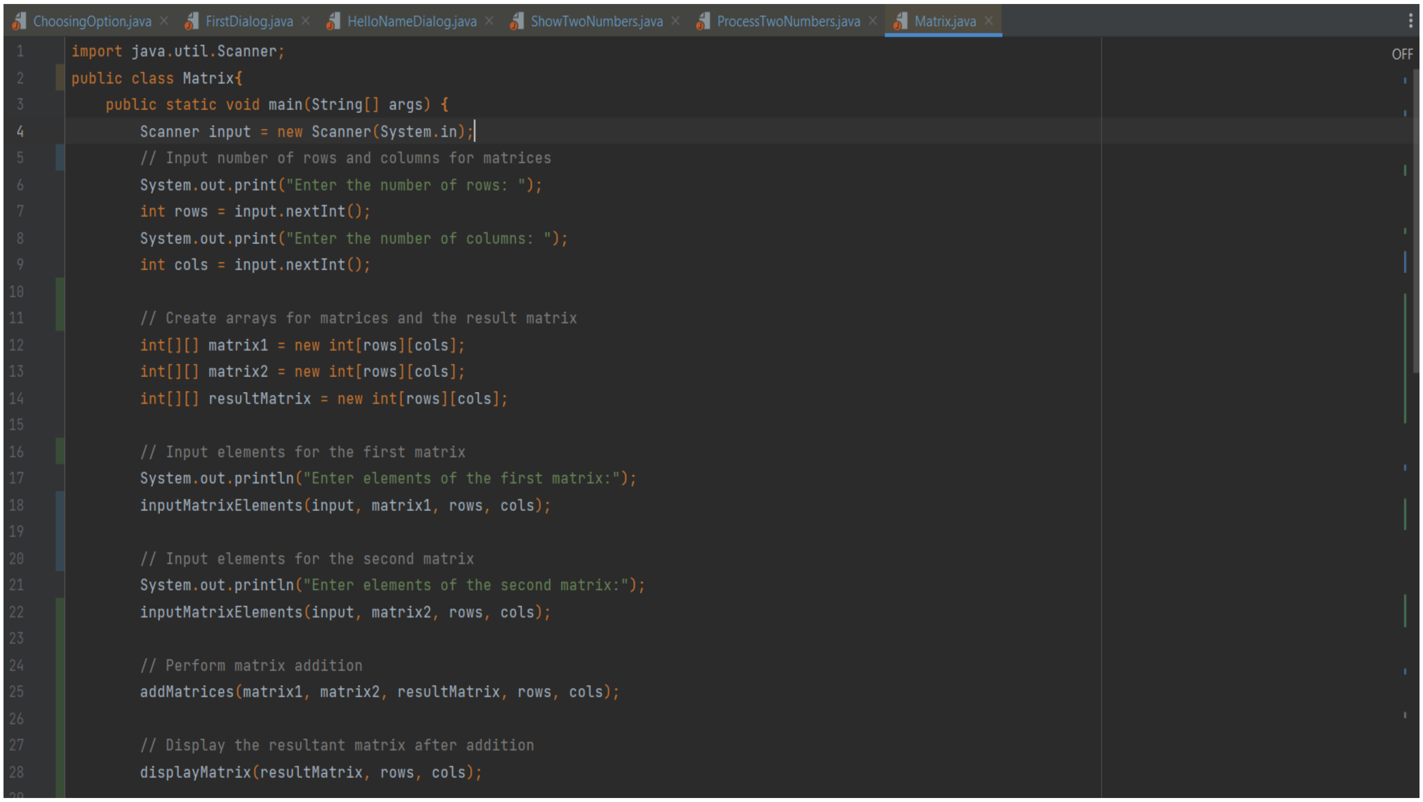
```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=51259:C:\Program Files\JetBrains\Intel
Enter the size of the array: 4
Enter element 1: 9
Enter element 2: 7
Enter element 3: 3
Enter element 4: 5
Sorted array: [3.0, 5.0, 7.0, 9.0]
Sum of array : 24.0
Average of array : 6.0
```

Figure 31 6.5 result

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

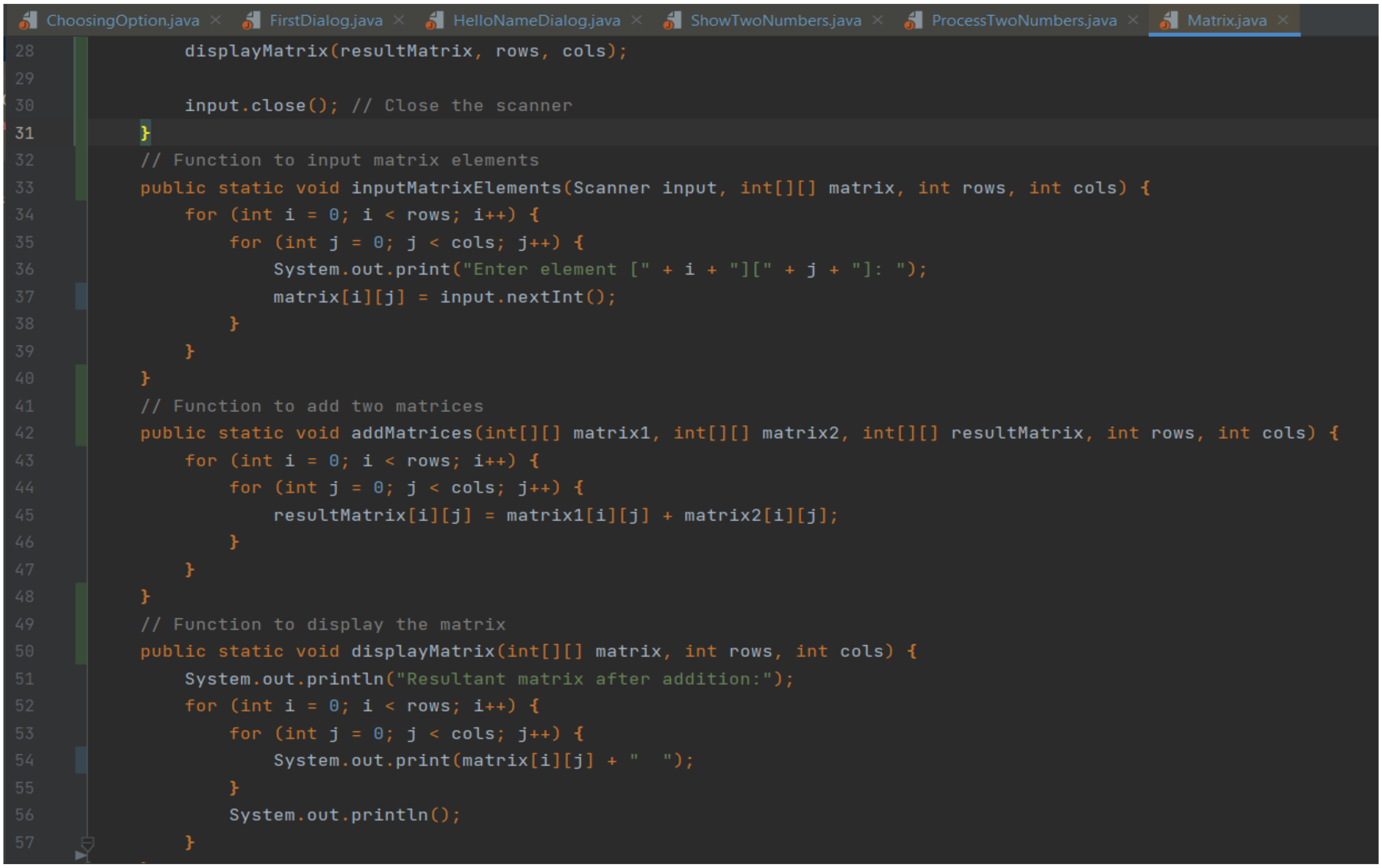
- The matrices can be entered by the user or constants.

Result:



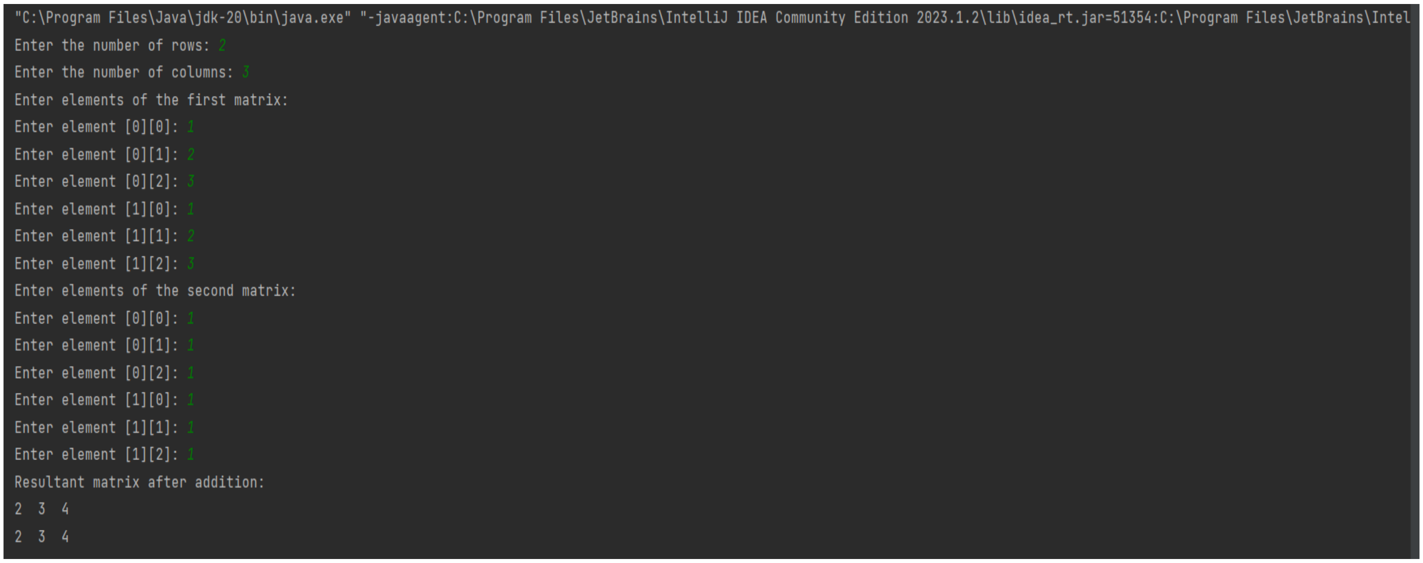
```java
import java.util.Scanner;
public class Matrix{
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        // Input number of rows and columns for matrices
        System.out.print("Enter the number of rows: ");
        int rows = input.nextInt();
        System.out.print("Enter the number of columns: ");
        int cols = input.nextInt();

        // Create arrays for matrices and the result matrix
        int[][] matrix1 = new int[rows][cols];
        int[][] matrix2 = new int[rows][cols];
        int[][] resultMatrix = new int[rows][cols];

        // Input elements for the first matrix
        System.out.println("Enter elements of the first matrix:");
        inputMatrixElements(input, matrix1, rows, cols);

        // Input elements for the second matrix
        System.out.println("Enter elements of the second matrix:");
        inputMatrixElements(input, matrix2, rows, cols);

        // Perform matrix addition
        addMatrices(matrix1, matrix2, resultMatrix, rows, cols);

        // Display the resultant matrix after addition
        displayMatrix(resultMatrix, rows, cols);
```

Figure 32 6.6 code (1)



```java
        displayMatrix(resultMatrix, rows, cols);

        input.close(); // Close the scanner
    }
    // Function to input matrix elements
    public static void inputMatrixElements(Scanner input, int[][] matrix, int rows, int cols) {
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print("Enter element [" + i + "][" + j + "]: ");
                matrix[i][j] = input.nextInt();
            }
        }
    }
    // Function to add two matrices
    public static void addMatrices(int[][] matrix1, int[][] matrix2, int[][] resultMatrix, int rows, int cols) {
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                resultMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
            }
        }
    }
    // Function to display the matrix
    public static void displayMatrix(int[][] matrix, int rows, int cols) {
        System.out.println("Resultant matrix after addition:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(matrix[i][j] + "  ");
            }
            System.out.println();
        }
```

Figure 33 6.6 code (2)



```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\lib\idea_rt.jar=51354:C:\Program Files\JetBrains\Intel
Enter the number of rows: 2
Enter the number of columns: 3
Enter elements of the first matrix:
Enter element [0][0]: 1
Enter element [0][1]: 2
Enter element [0][2]: 3
Enter element [1][0]: 1
Enter element [1][1]: 2
Enter element [1][2]: 3
Enter elements of the second matrix:
Enter element [0][0]: 1
Enter element [0][1]: 1
Enter element [0][2]: 1
Enter element [1][0]: 1
Enter element [1][1]: 1
Enter element [1][2]: 1
Resultant matrix after addition:
2  3  4
2  3  4
```

Figure 34 6.6 result