

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:

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

Kết quả:

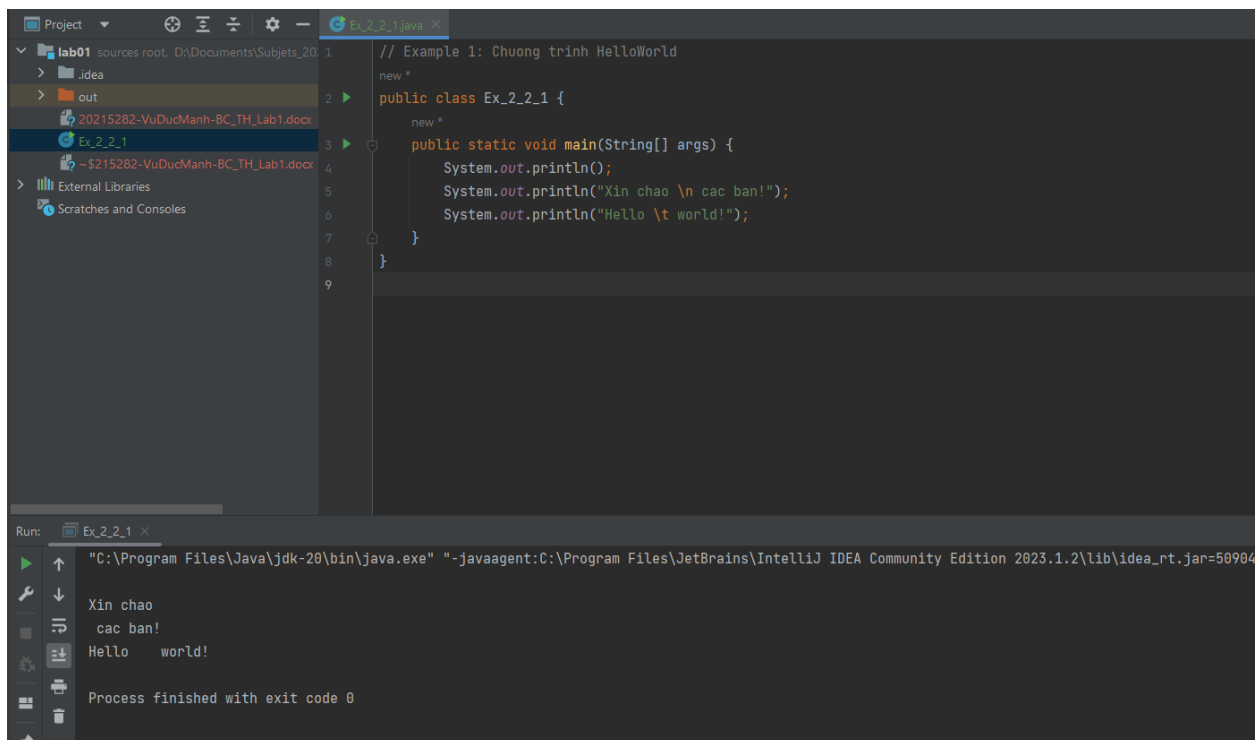


Figure 1: Chương trình đầu tiên HelloWorld

2.2.2 Write, compile the first dialog Java program

```
1 // Example 2: FirstDialog.java
2 import javax.swing.JOptionPane;
3 public class FirstDialog{
4     public static void main(String[] args){
5         JOptionPane.showMessageDialog(null,"Hello world! How are you?");
6         System.exit(0);
7     }
8 }
```

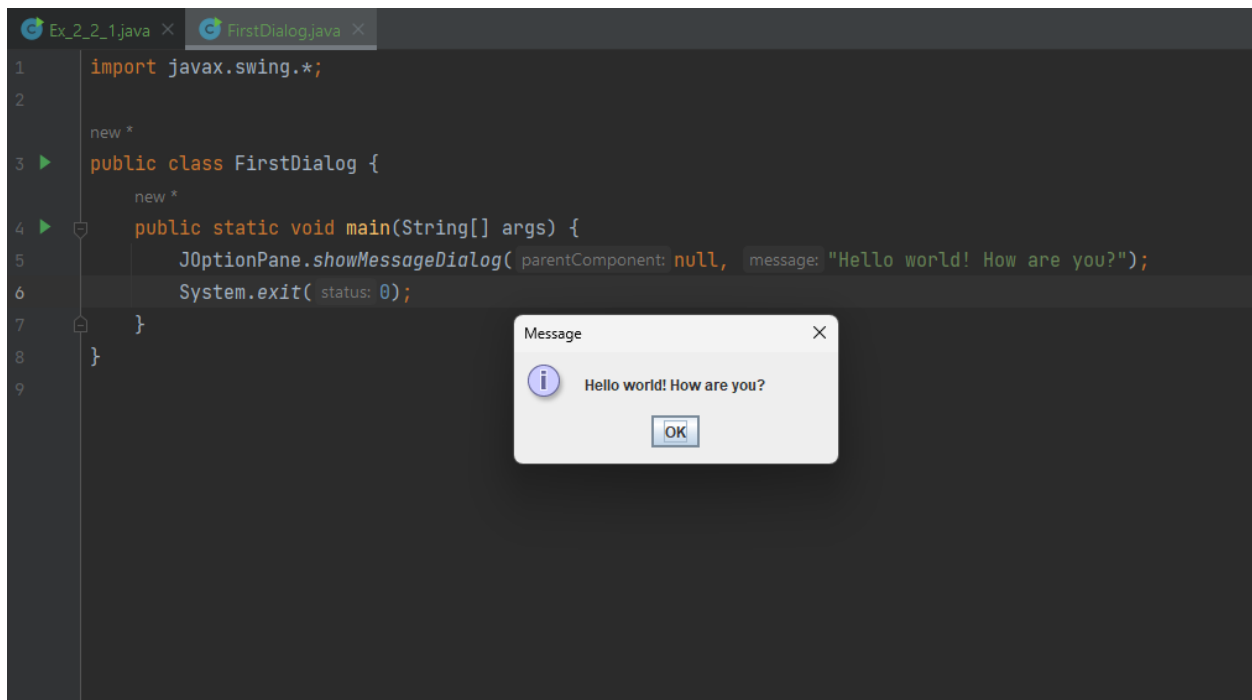


Figure 2: First dialog Java program

2.2.3 Write, compile the first input dialog Java application

```
1 // Example 3: HelloNameDialog.java
2 import javax.swing.JOptionPane;
3 public class HelloNameDialog{
4     public static void main(String[] args){
5         String result;
6         result = JOptionPane.showInputDialog("Please enter your name:");
7         JOptionPane.showMessageDialog(null, "Hi " + result + "!");
8         System.exit(0);
9     }
10 }
```

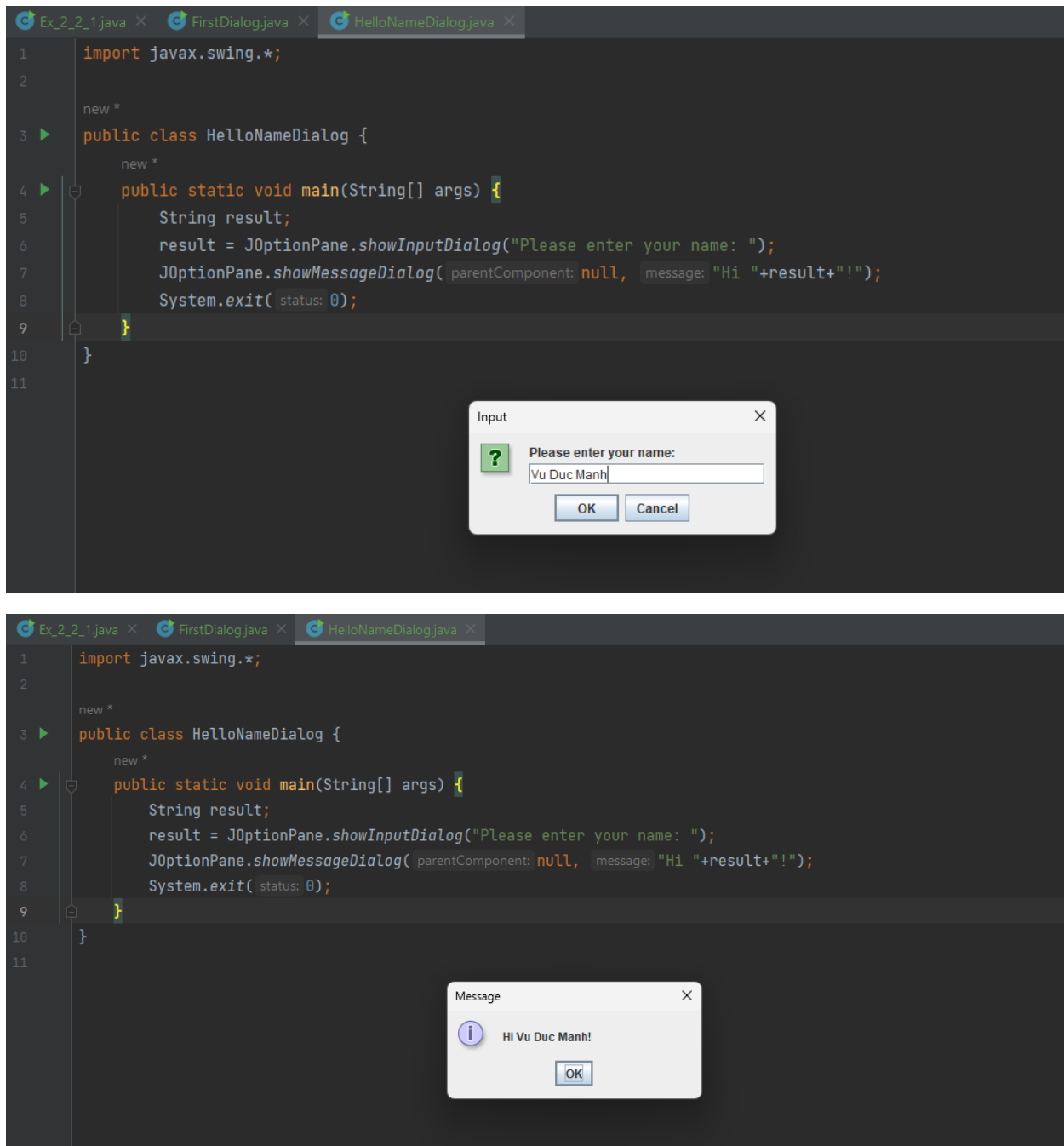


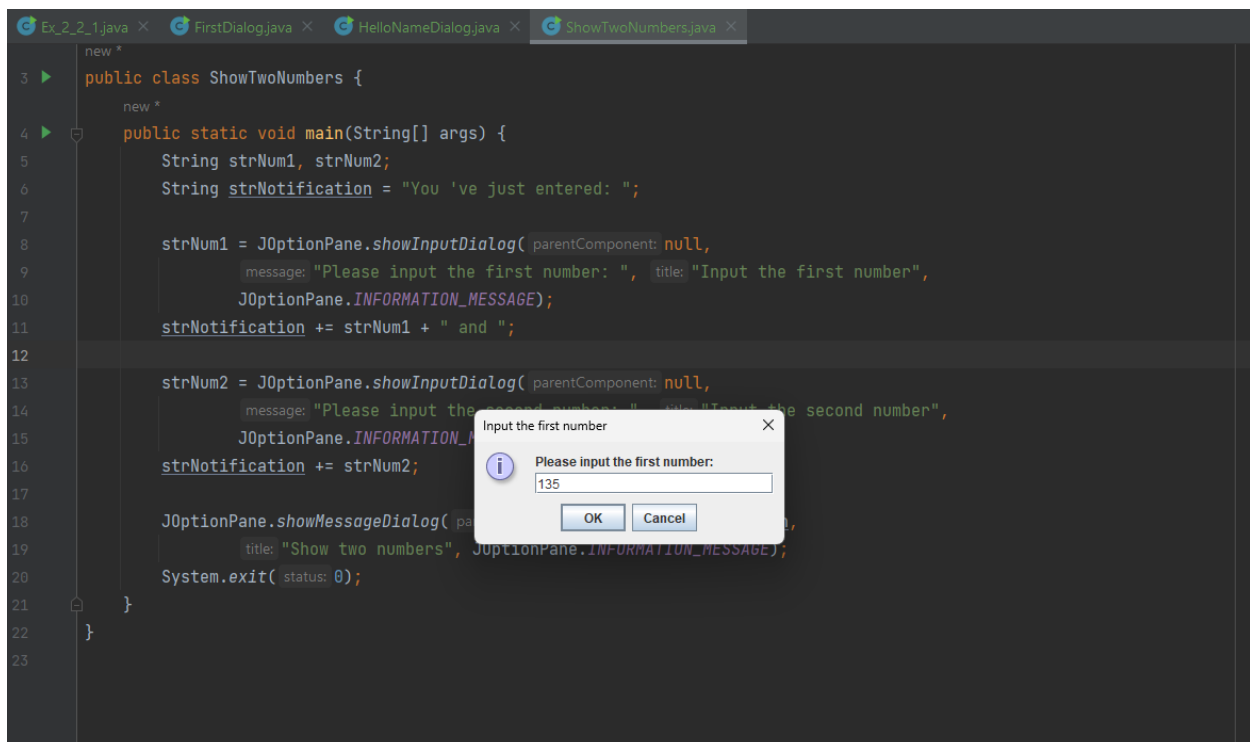
Figure 3: First input dialog Java application

2.2.4 Write, compile, and run the following example:

```

1 // Example 5: ShowTwoNumbers.java
2 import javax.swing.JOptionPane;
3 public class ShowTwoNumbers {
4     public static void main(String[] args){
5         String strNum1, strNum2;
6         String strNotification = "You've just entered: ";
7
8         strNum1 = JOptionPane.showInputDialog(null,
9             "Please input the first number: ", "Input the first number",
10             JOptionPane.INFORMATION_MESSAGE);
11         strNotification += strNum1 + " and ";
12
13         strNum2 = JOptionPane.showInputDialog(null,
14             "Please input the second number: ", "Input the second number",
15             JOptionPane.INFORMATION_MESSAGE);
16         strNotification += strNum2;
17
18         JOptionPane.showMessageDialog(null, strNotification,
19             "Show two numbers", JOptionPane.INFORMATION_MESSAGE);
20         System.exit(0);
21     }
22 }

```



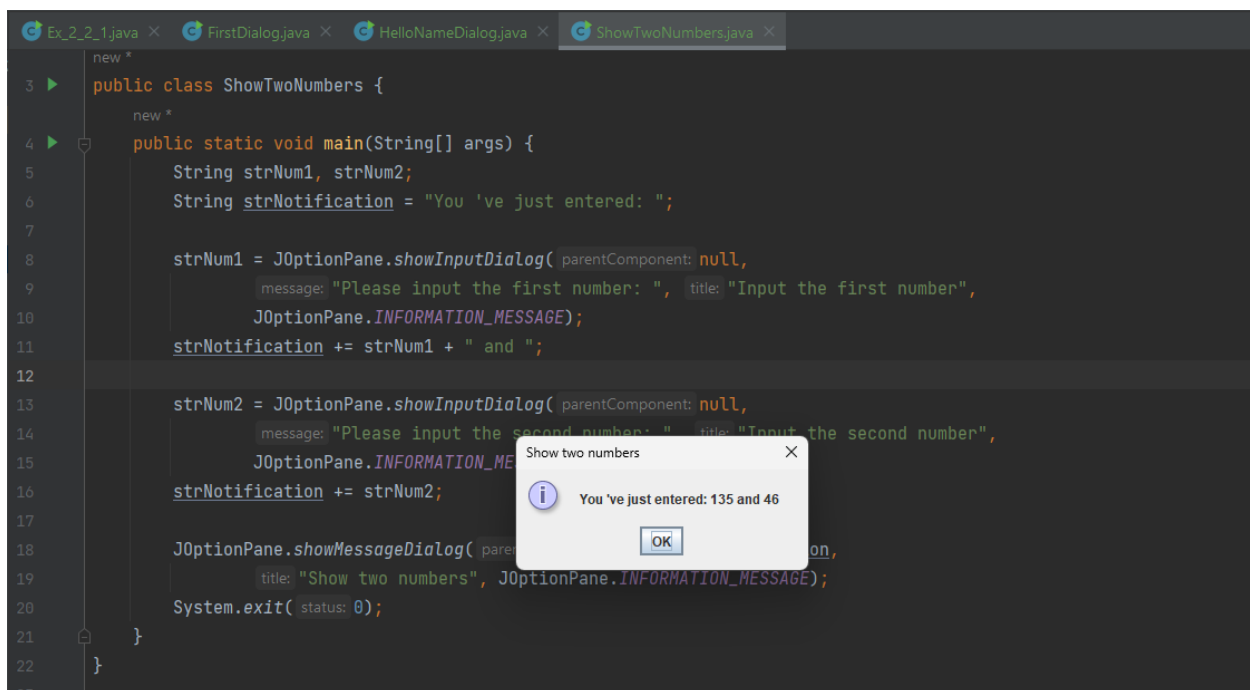
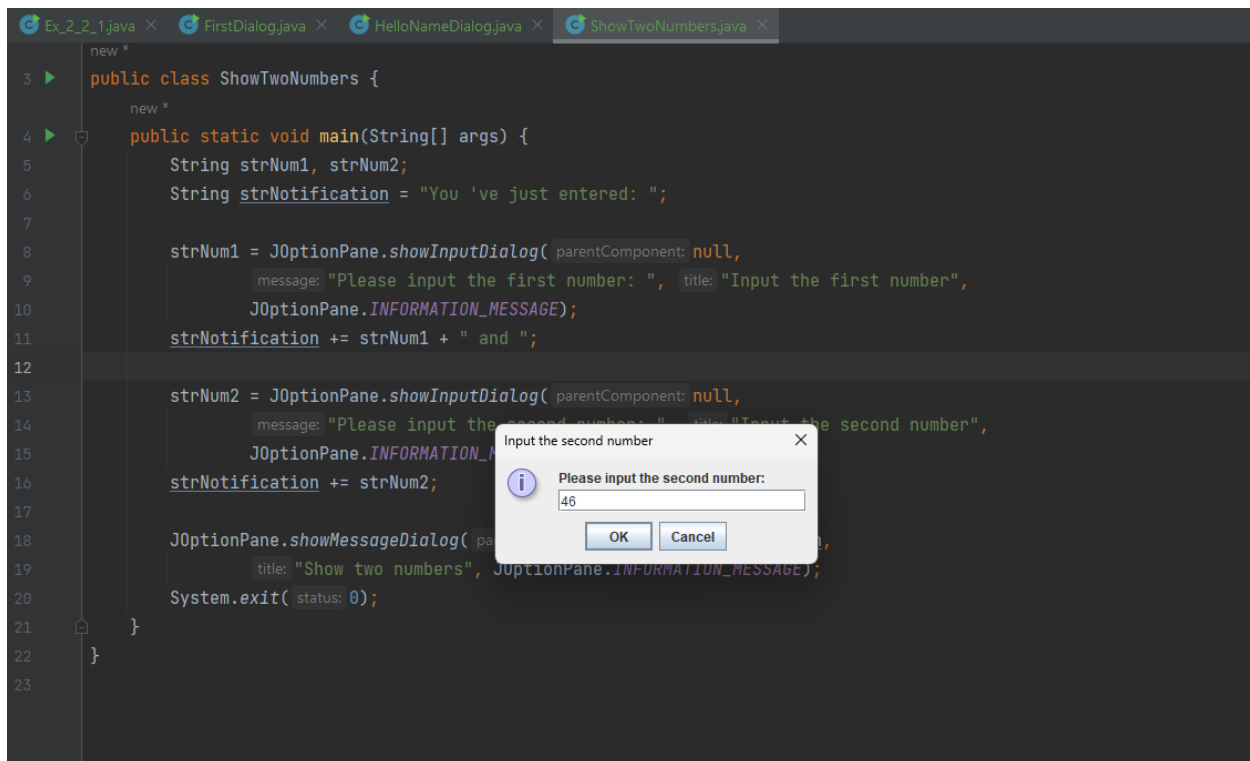


Figure 4: Show Two Numbers

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

```

1 package src;
2 import java.util.Scanner;
3
4 public class Calculate_2Numbers {
5     new *
6     public static void main(String[] args) {
7         Scanner scanner = new Scanner(System.in);
8
9         System.out.print("Enter first number: ");
10        String strNum1 = scanner.nextLine();
11        double num1 = Double.parseDouble(strNum1);
12
13        System.out.print("Enter second number: ");
14        String strNum2 = scanner.nextLine();
15        double num2 = Double.parseDouble(strNum2);
16
17        double sum = num1 + num2;
18        double difference = num1 - num2;
19        double product = num1 * num2;
20        double quotient = 0.0;
21
22        System.out.println("Sum: " + sum);
23    }
24 }
  
```

Run: Calculate_2Numbers

```

"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=5
Enter first number: 5
Enter second number: 4
Sum: 9.0
Difference: 1.0
Product: 20.0
Quotient: 1.25
  
```

Figure 5: Caculate 2 numbers program

```

Calculate_2Numbers x
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\
Enter first number: 5
Enter second number: 4
Sum: 9.0
Difference: 1.0
Product: 20.0
Quotient: 1.25

Process finished with exit code 0
  
```


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

```

1  package src;
2  import java.util.Scanner;
3
4  new *
5  ▶ public class Ex_2_2_6 {
6      new *
7      ▶ public static void main(String[] args) {
8          System.out.println("-----Menu-----\n" +
9              "1. The first-degree equation with one variable\n" +
10             "2. The system of first-degree equations with two variables\n" +
11             "3. The second-degree equation with one variable");
12             Scanner sc = new Scanner(System.in);
13
14             while(true){
15                 System.out.print("Enter your choice: ");
16                 int cmd = sc.nextInt();
17                 if (cmd == 1) {
18                     solveFirstDegreeEquation();
19                 } else if (cmd == 2) {
20                     solveSystemOfFirstDegreeEquations();
21                 } else if (cmd == 3) {
22                     solveSecondDegreeEquation();
23                 } else {
24                     System.out.println("Invalid choice. Finished!");
25                 }
26             }
27         }
28     }
29 }

```

```

1  public static void solveFirstDegreeEquation() {
2      Scanner sc = new Scanner(System.in);
3      System.out.print("Enter the value of a: ");
4      double a = sc.nextDouble();
5      System.out.print("Enter the value of b: ");
6      double b = sc.nextDouble();
7
8      if (a == 0) {
9          System.out.println("The equation is not of the first degree.");
10     } else {
11         double x = -b / a;
12         System.out.println("The solution is x = " + x);
13     }
14 }

```

Figure 6: The first-degree equation with one variable

```

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

```

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.");
    }
}

```

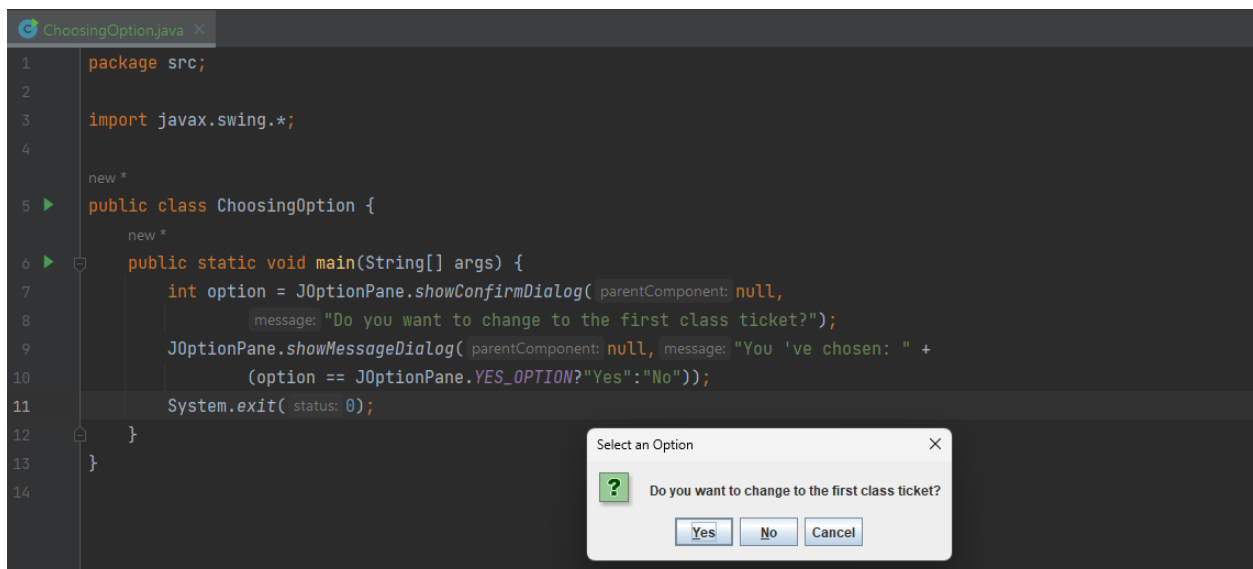
Figure 8: The second-degree equation with one variable

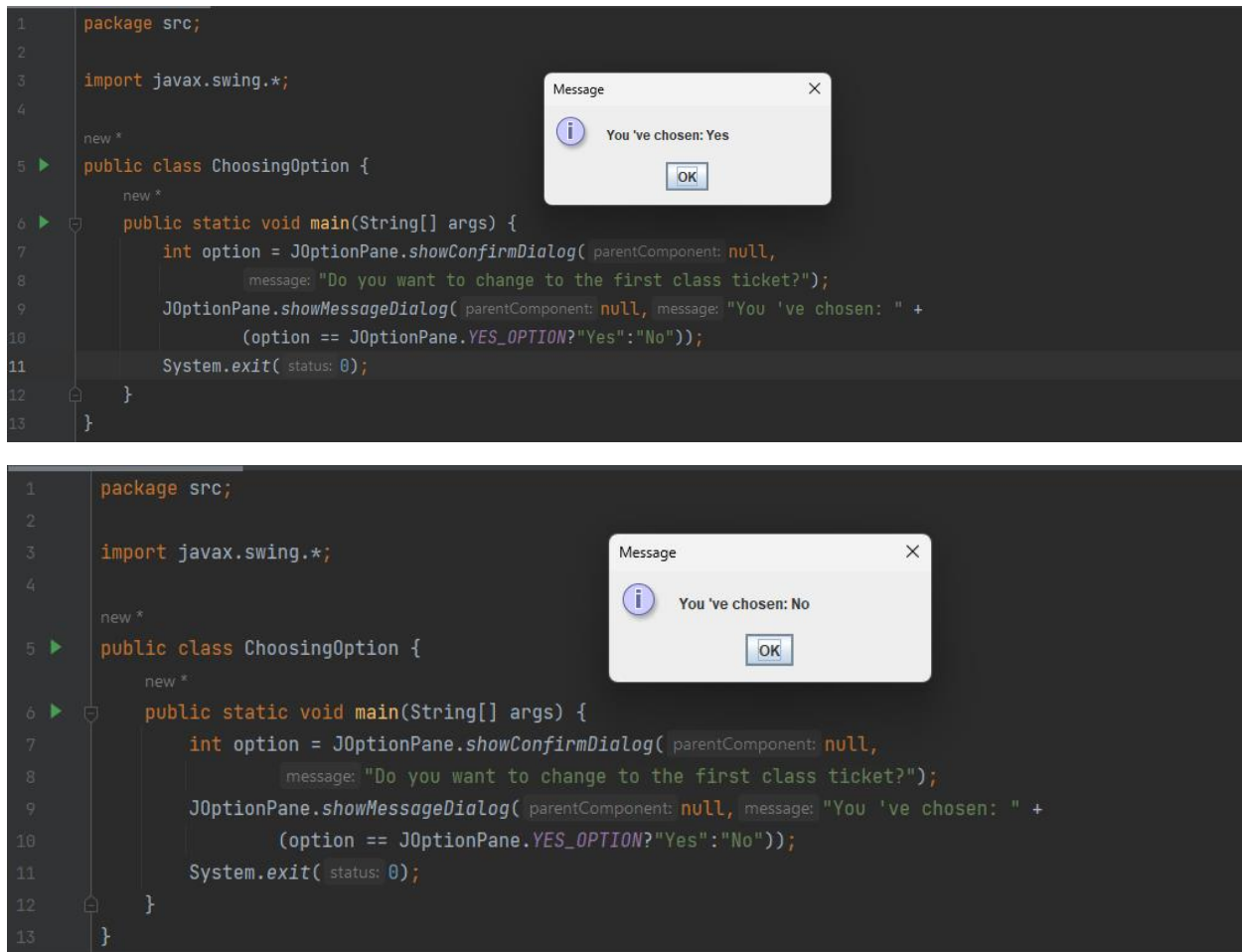
Part II: 6. Exercises:

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

```
ChoosingOption.java x
1 package src;
2
3 import javax.swing.*;
4
5 new *
6 public class ChoosingOption {
7     new *
8     public static void main(String[] args) {
9         int option = JOptionPane.showConfirmDialog( parentComponent: null,
10             message: "Do you want to change to the first class ticket?");
11         JOptionPane.showMessageDialog( parentComponent: null, message: "You 've chosen: " +
12             (option == JOptionPane.YES_OPTION?"Yes":"No"));
13         System.exit( status: 0);
14     }
15 }
```

Figure 9: Choosing Option program_ver1.0



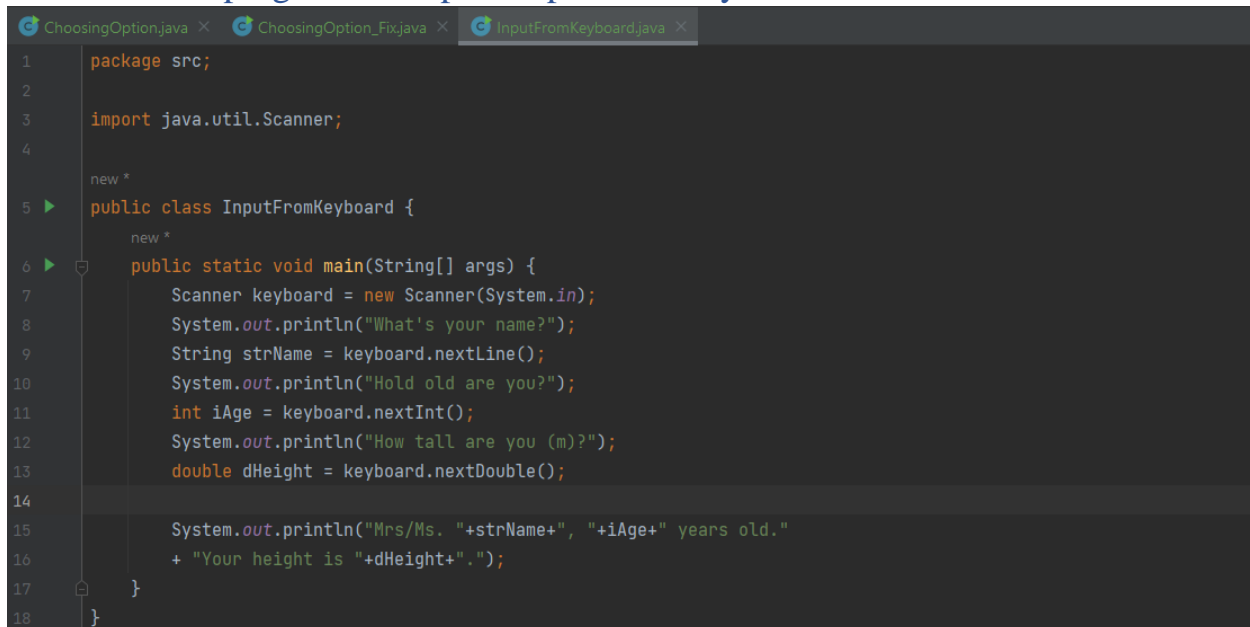


- Nếu người dùng chọn "Cancel", thì biến **option** sẽ nhận giá trị **JOptionPane.CANCEL_OPTION**. Sau đó, thông điệp "You've chosen: No" sẽ được hiển thị
- Sửa với 4 options: "Yes", "No", "I do", "I don't".

```
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

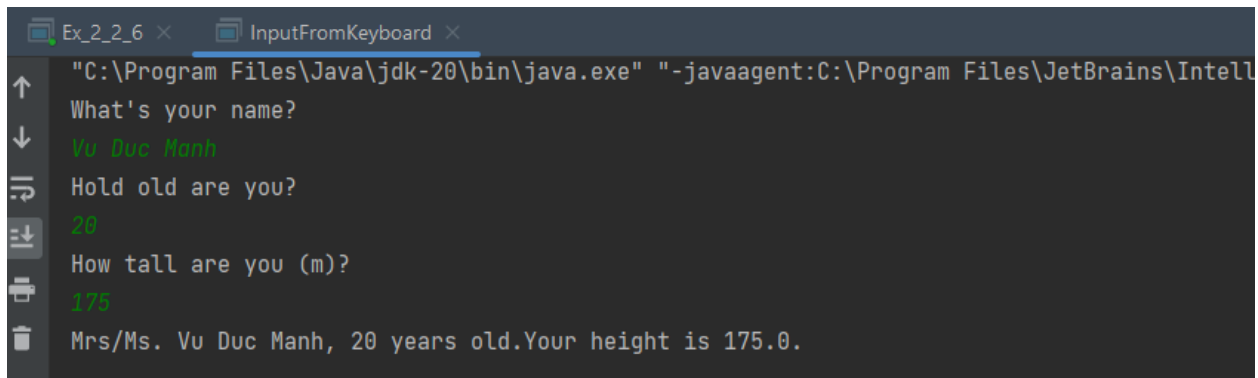


```

1 package src;
2
3 import java.util.Scanner;
4
5 new *
6 public class InputFromKeyboard {
7     new *
8     public static void main(String[] args) {
9         Scanner keyboard = new Scanner(System.in);
10        System.out.println("What's your name?");
11        String strName = keyboard.nextLine();
12        System.out.println("How old are you?");
13        int iAge = keyboard.nextInt();
14        System.out.println("How tall are you (m)?");
15        double dHeight = keyboard.nextDouble();
16
17        System.out.println("Mrs/Ms. "+strName+", "+iAge+" years old."
18        + "Your height is "+dHeight+".");
19    }
20 }

```

Figure 11: Program for input/output from keyboard

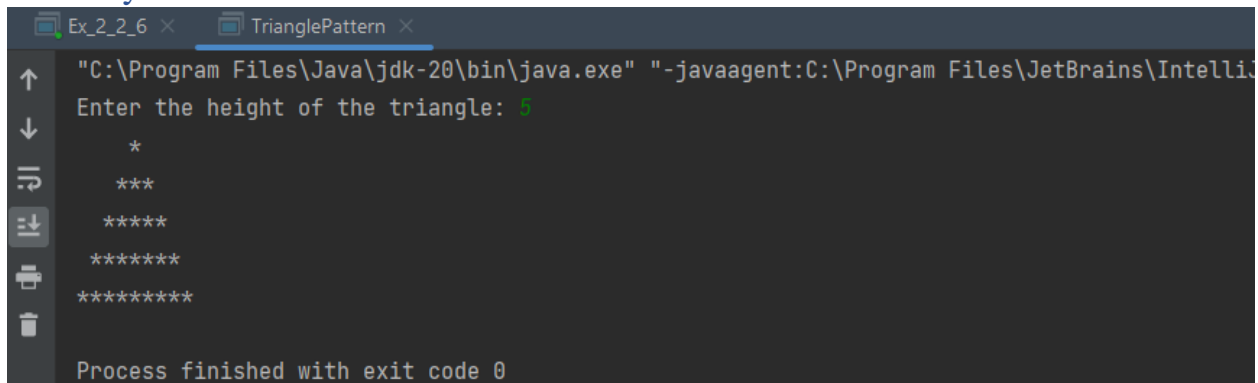


```

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

```

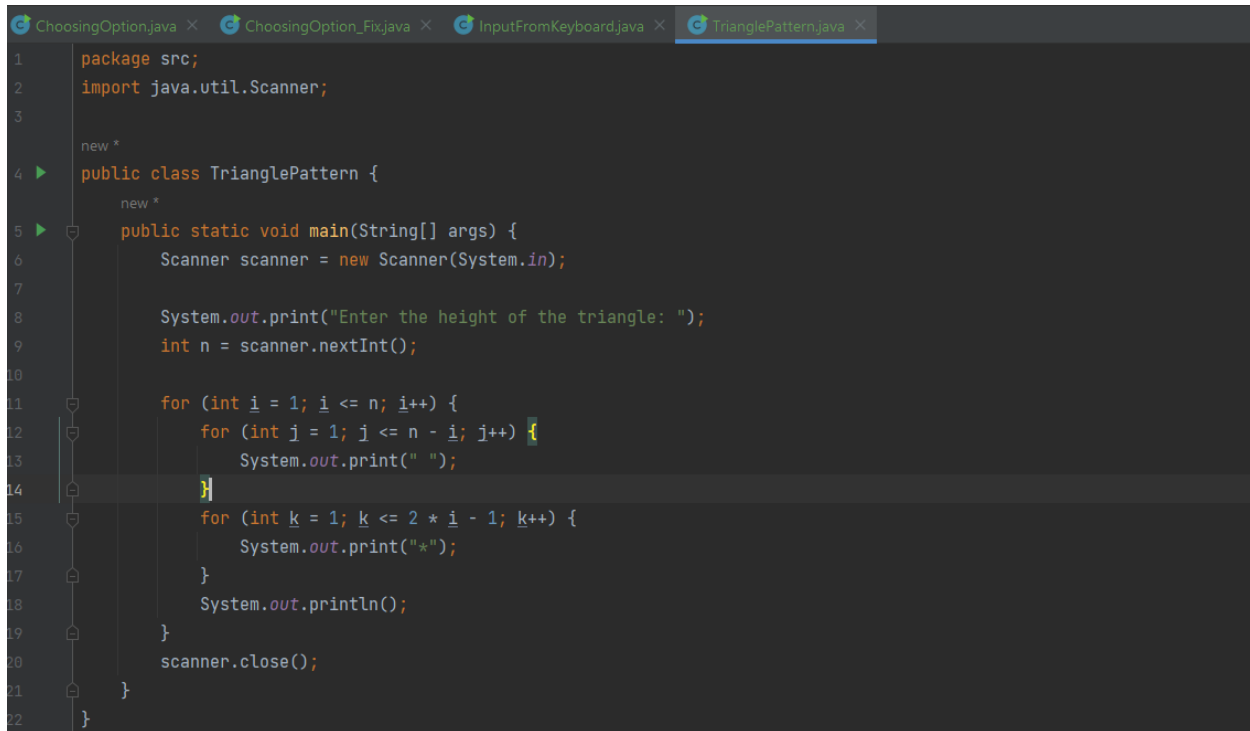
6.3. Write a program to display a triangle with a height of n stars (*), n is entered by users.



```

"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ
Enter the height of the triangle: 5
*
***
*****
*****
*****
*****
*****
Process finished with exit code 0

```



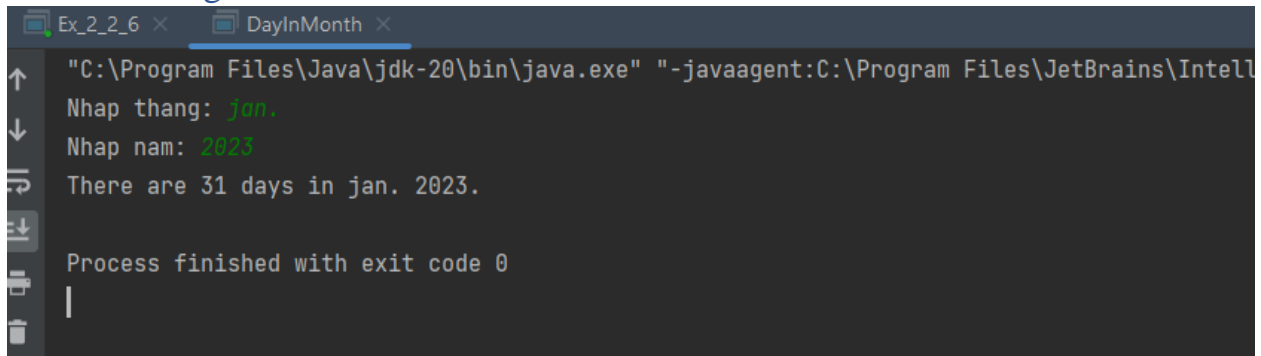
```

1  package src;
2  import java.util.Scanner;
3
4  new *
5  public class TrianglePattern {
6      new *
7      public static void main(String[] args) {
8          Scanner scanner = new Scanner(System.in);
9
10         System.out.print("Enter the height of the triangle: ");
11         int n = scanner.nextInt();
12
13         for (int i = 1; i <= n; i++) {
14             for (int j = 1; j <= n - i; j++) {
15                 System.out.print(" ");
16             }
17             for (int k = 1; k <= 2 * i - 1; k++) {
18                 System.out.print("*");
19             }
20             System.out.println();
21         }
22         scanner.close();
23     }
24 }

```

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.

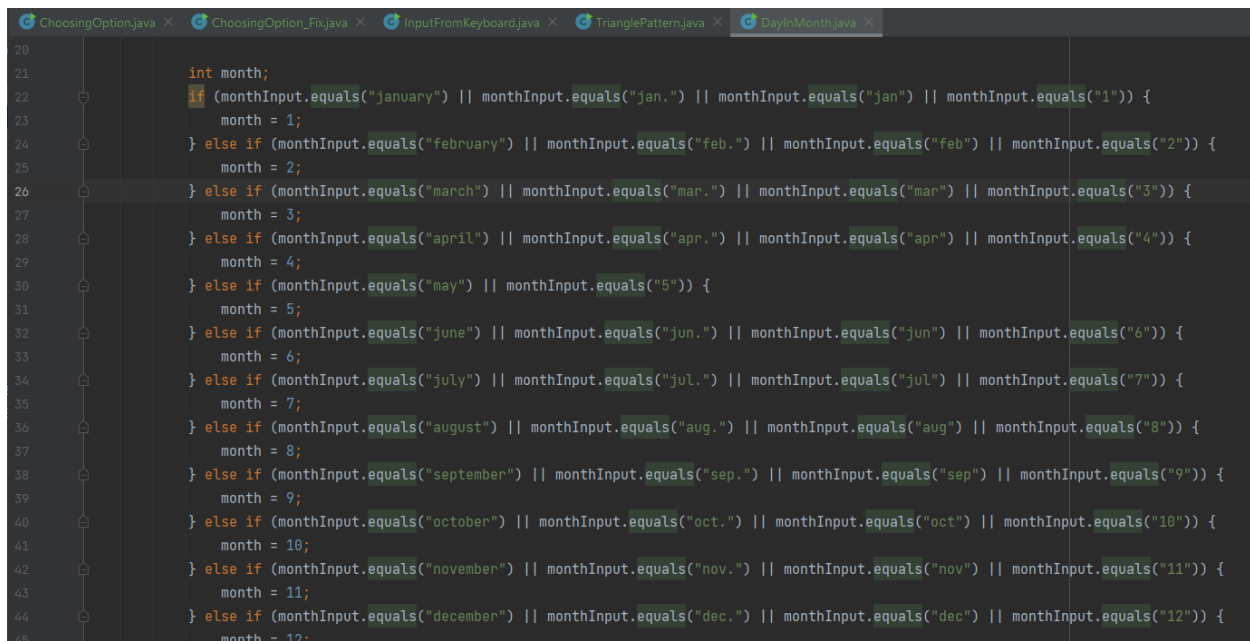


```

"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA\lib\idea_rt.jar"
Nhập tháng: jan.
Nhập năm: 2023
There are 31 days in jan. 2023.

Process finished with exit code 0

```



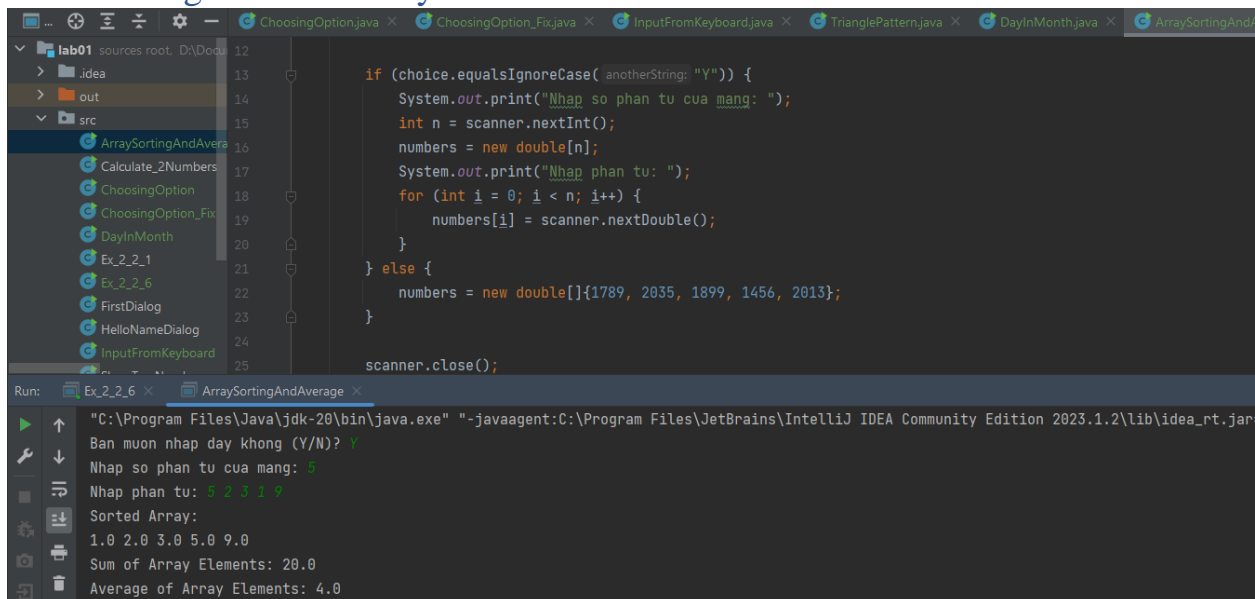
```

20
21     int month;
22     if (monthInput.equals("january") || monthInput.equals("jan.") || monthInput.equals("jan") || monthInput.equals("1")) {
23         month = 1;
24     } else if (monthInput.equals("february") || monthInput.equals("feb.") || monthInput.equals("feb") || monthInput.equals("2")) {
25         month = 2;
26     } else if (monthInput.equals("march") || monthInput.equals("mar.") || monthInput.equals("mar") || monthInput.equals("3")) {
27         month = 3;
28     } else if (monthInput.equals("april") || monthInput.equals("apr.") || monthInput.equals("apr") || monthInput.equals("4")) {
29         month = 4;
30     } else if (monthInput.equals("may") || monthInput.equals("5")) {
31         month = 5;
32     } else if (monthInput.equals("june") || monthInput.equals("jun.") || monthInput.equals("jun") || monthInput.equals("6")) {
33         month = 6;
34     } else if (monthInput.equals("july") || monthInput.equals("jul.") || monthInput.equals("jul") || monthInput.equals("7")) {
35         month = 7;
36     } else if (monthInput.equals("august") || monthInput.equals("aug.") || monthInput.equals("aug") || monthInput.equals("8")) {
37         month = 8;
38     } else if (monthInput.equals("september") || monthInput.equals("sep.") || monthInput.equals("sep") || monthInput.equals("9")) {
39         month = 9;
40     } else if (monthInput.equals("october") || monthInput.equals("oct.") || monthInput.equals("oct") || monthInput.equals("10")) {
41         month = 10;
42     } else if (monthInput.equals("november") || monthInput.equals("nov.") || monthInput.equals("nov") || monthInput.equals("11")) {
43         month = 11;
44     } else if (monthInput.equals("december") || monthInput.equals("dec.") || monthInput.equals("dec") || monthInput.equals("12")) {
45         month = 12;

```

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.



```

12
13     if (choice.equalsIgnoreCase("Y")) {
14         System.out.print("Nhap so phan tu cua mang: ");
15         int n = scanner.nextInt();
16         numbers = new double[n];
17         System.out.print("Nhap phan tu: ");
18         for (int i = 0; i < n; i++) {
19             numbers[i] = scanner.nextDouble();
20         }
21     } else {
22         numbers = new double[]{1789, 2035, 1899, 1456, 2013};
23     }
24
25     scanner.close();

```

Run: Ex_2_2_6 × ArraySortingAndAverage ×

```

"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
Ban muon nhap day khong (Y/N)? Y
Nhap so phan tu cua mang: 5
Nhap phan tu: 1.0 2.0 3.0 5.0 9.0
Sorted Array:
1.0 2.0 3.0 5.0 9.0
Sum of Array Elements: 20.0
Average of Array Elements: 4.0

```

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

```

12
13
14     if (choice.equalsIgnoreCase("Y")) {
15         System.out.println("Nhập số phần tử của mảng: ");
16         int n = scanner.nextInt();
17         numbers = new double[n];
18         System.out.println("Nhập phần tử: ");
19         for (int i = 0; i < n; i++) {
20             numbers[i] = scanner.nextDouble();
21         }
22     } else {
23         numbers = new double[]{1789, 2035, 1899, 1456, 2013};
24     }
25     scanner.close();

```

Run: Ex_2_2_6 x ArraySortingAndAverage x

```

"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.1.2\
Ban muon nhap day khong (Y/N)? Y
Sorted Array:
1456.0 1789.0 1899.0 2013.0 2035.0
Sum of Array Elements: 9192.0
Average of Array Elements: 1838.4
Process finished with exit code 0

```

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.

```

23
24 @ 2 usages new *
25 public static int[][] inputMatrix(Scanner scanner, int numRows, int numCols, String matrixName) {
26     System.out.println("Enter elements for the " + matrixName + " matrix:");
27     int[][] matrix = new int[numRows][numCols];
28     for (int i = 0; i < numRows; i++) {
29         for (int j = 0; j < numCols; j++) {
30             matrix[i][j] = scanner.nextInt();
31         }
32     }
33     return matrix;
34 }
35

```

Run: Ex_2_2_6 x MatrixAddition x

```

"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=55259:C:\Program F
Enter the number of rows for the matrices: 3
Enter the number of columns for the matrices: 3
Enter elements for the first matrix:
1 3 3
2 2 3
1 1 3
Enter elements for the second matrix:
1 2 3
4 3 3
2 3 4
Resultant Matrix (Matrix1 + Matrix2):
4 4 4
6 5 5
3 4 7

```

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