

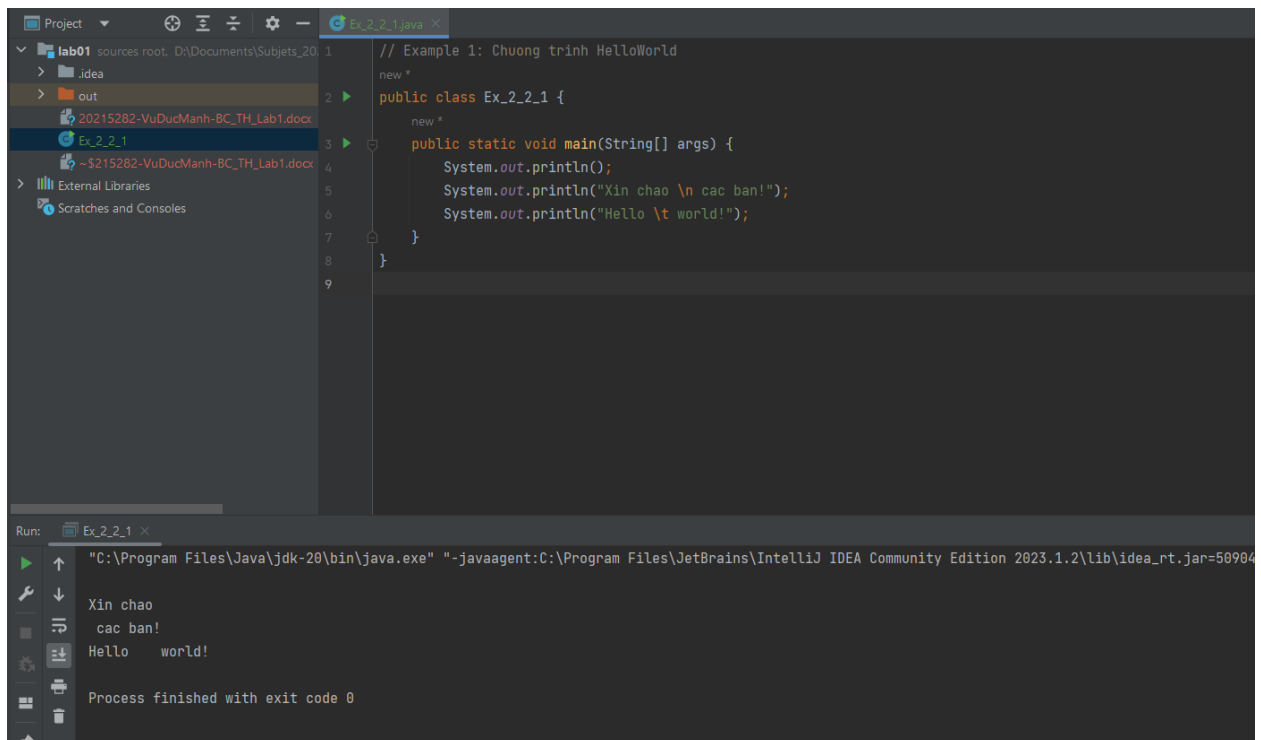
## BÁO CÁO THỰC HÀNH LẬP 1 LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

### Part I. The Very First Java Programs

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

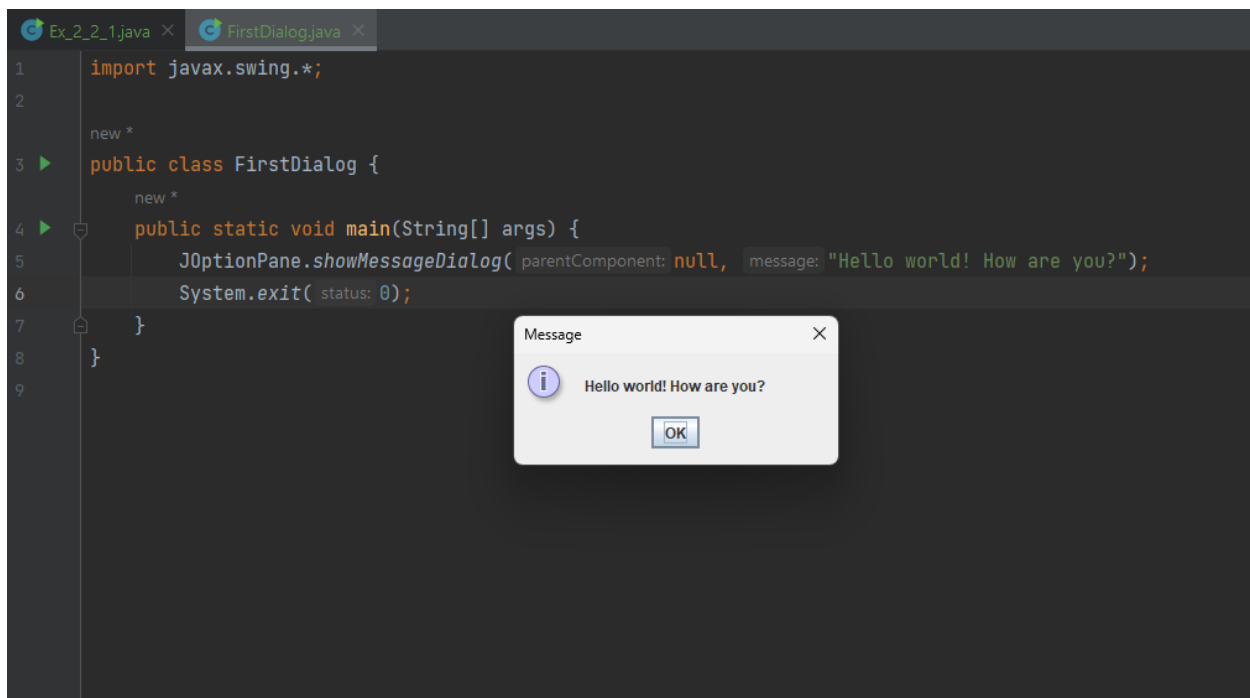
```
1 //Example 1: HelloWorld.java
2 //Text-printing program
3 public class HelloWorld {
4
5     public static void main(String args[]){
6         System.out.println("Xin chao \n cac ban!");
7         System.out.println("Hello \t world!");
8
9     } // end of method main
10 }
```

#### Kết quả



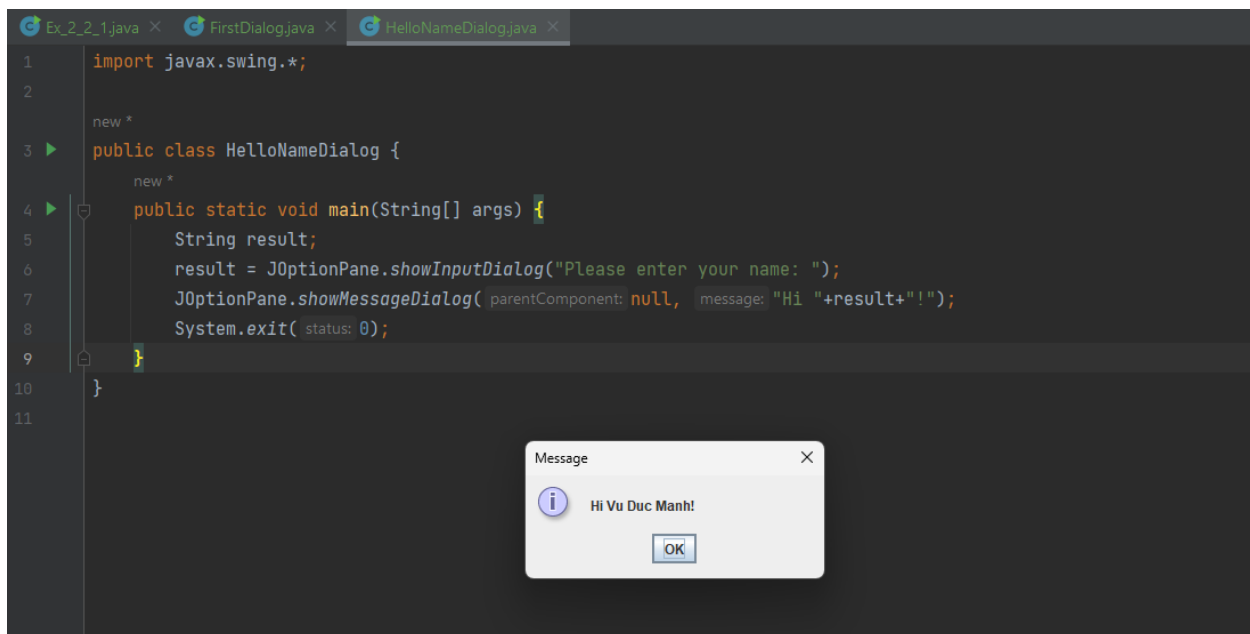
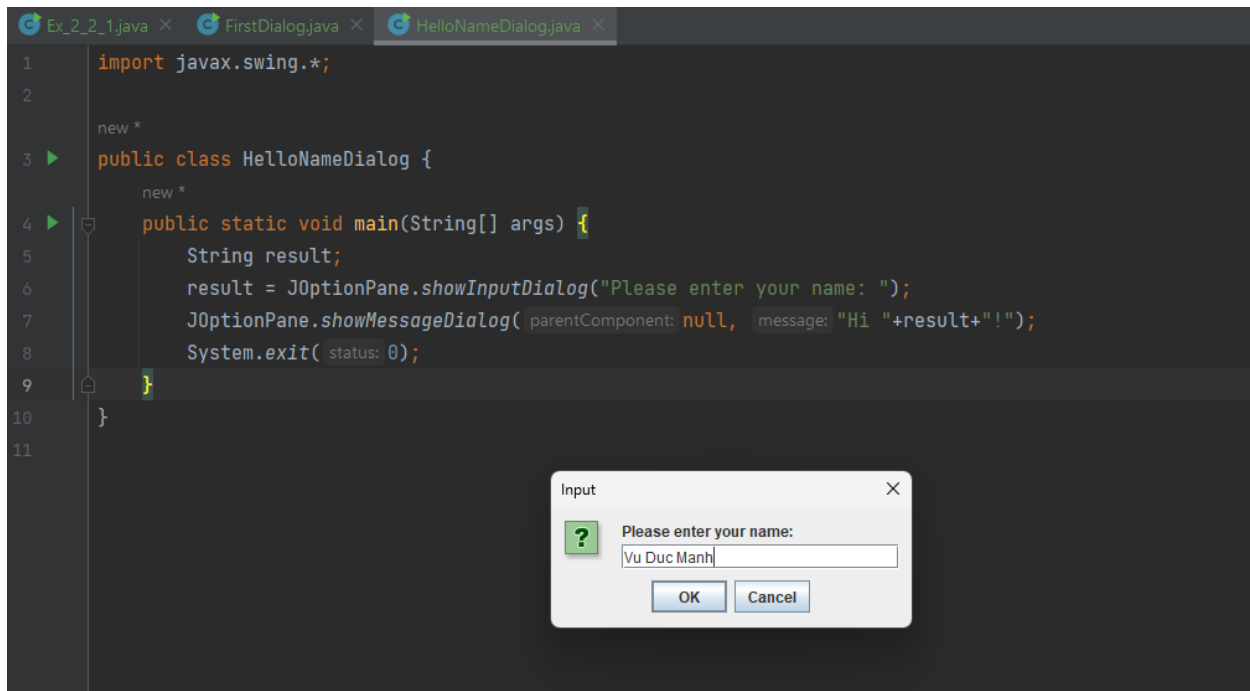
### 2.2.2 Write, compile the first dialog Java program

```
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 }
```



### 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 }
```

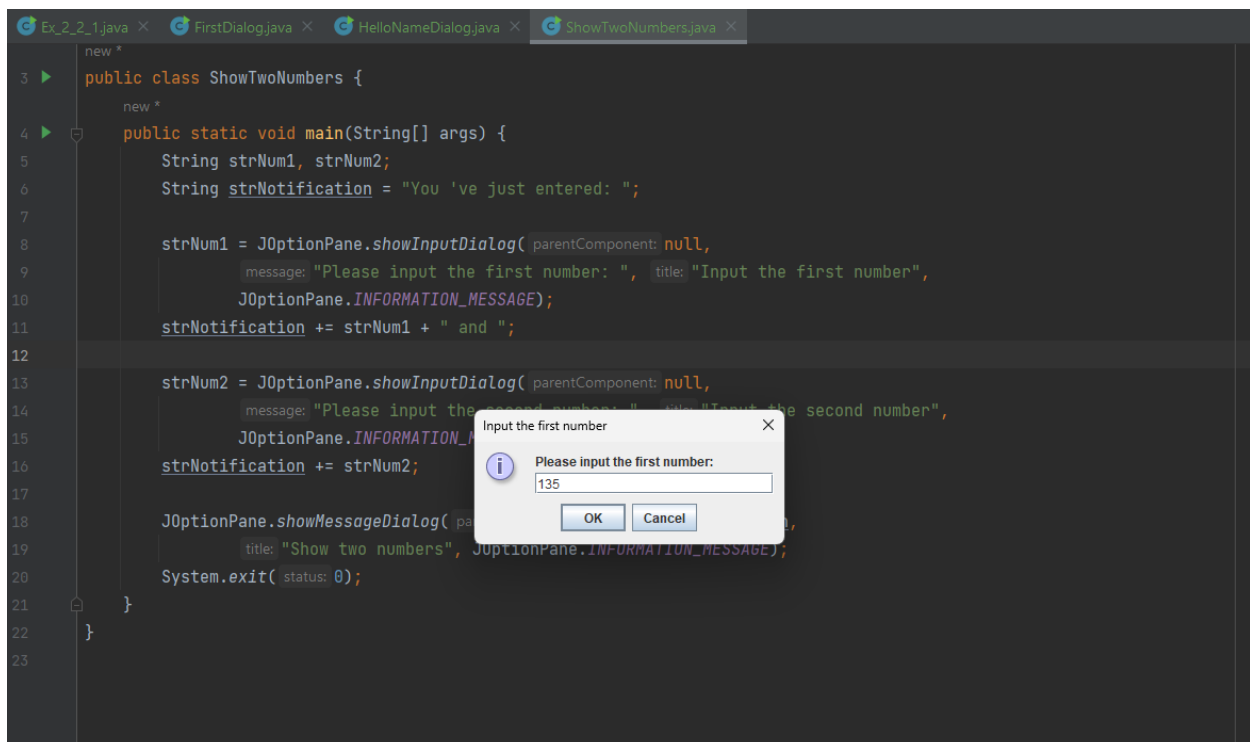


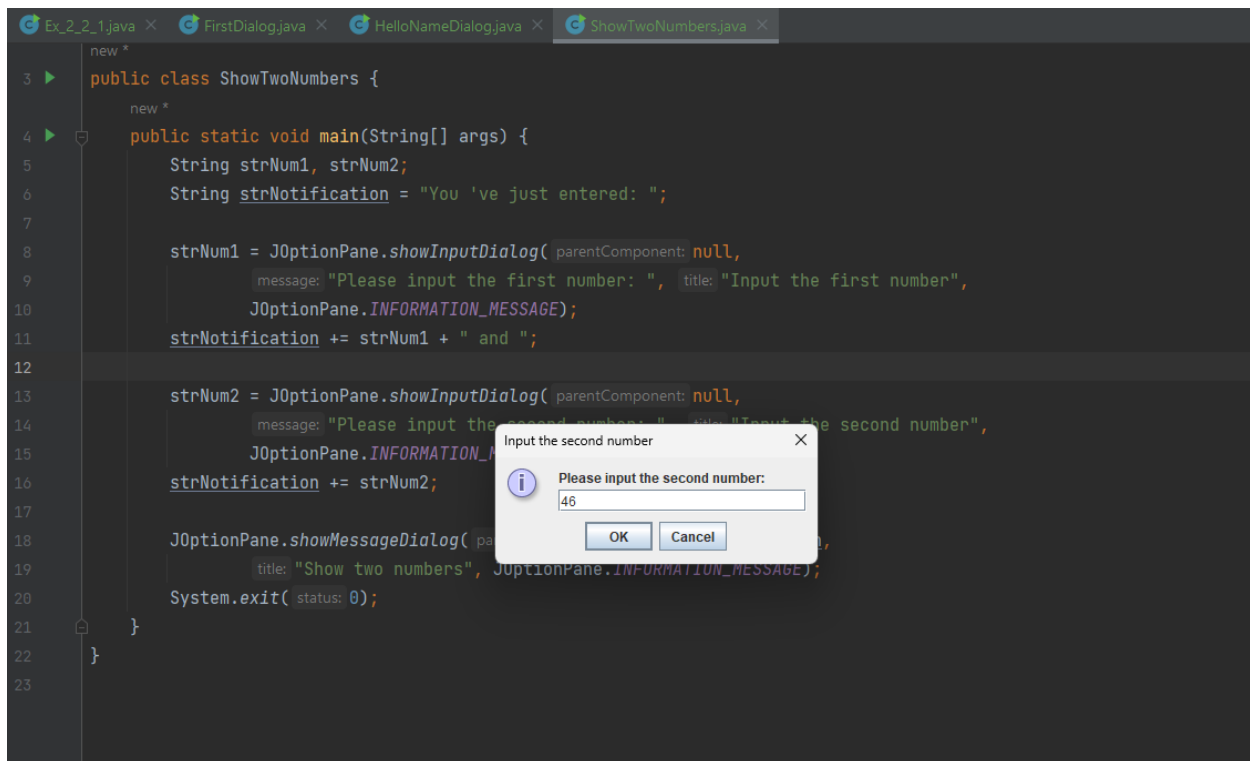
## 2.2.4 Write, compile, and run the following example:

```

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 }

```

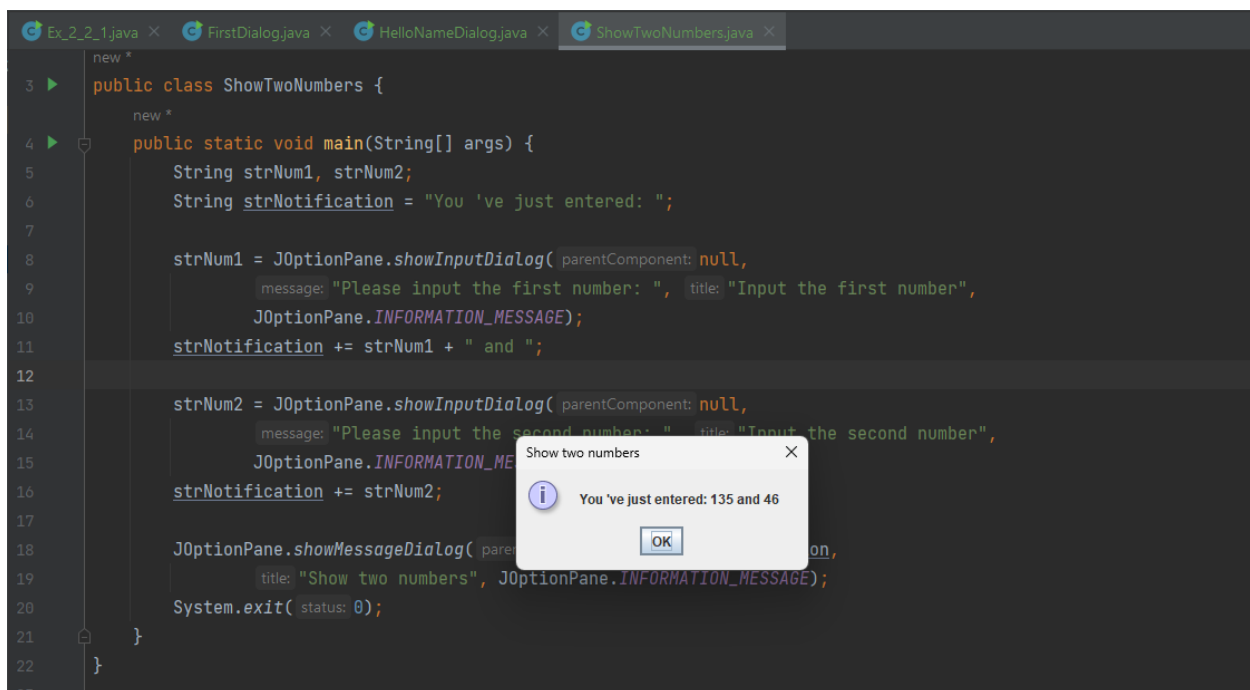




The screenshot shows an IDE with four tabs: Ex\_2\_2\_1.java, FirstDialog.java, HelloNameDialog.java, and ShowTwoNumbers.java. The ShowTwoNumbers.java file is active, displaying the following code:

```
new *
3 ▶ public class ShowTwoNumbers {
    new *
4 ▶ public static void main(String[] args) {
5     String strNum1, strNum2;
6     String strNotification = "You 've just entered: ";
7
8     strNum1 = JOptionPane.showInputDialog( parentComponent: null,
9     message: "Please input the first number: ", title: "Input the first number",
10    JOptionPane.INFORMATION_MESSAGE);
11    strNotification += strNum1 + " and ";
12
13    strNum2 = JOptionPane.showInputDialog( parentComponent: null,
14    message: "Please input the second number: ", title: "Input the second number",
15    JOptionPane.INFORMATION_MESSAGE);
16    strNotification += strNum2;
17
18    JOptionPane.showMessageDialog( parentComponent: null,
19    message: strNotification, title: "Show two numbers", JOptionPane.INFORMATION_MESSAGE);
20    System.exit( status: 0);
21 }
22 }
23
```

A dialog box titled "Input the second number" is displayed over the code. It contains the text "Please input the second number:" and a text field with the value "46". There are "OK" and "Cancel" buttons at the bottom.



The screenshot shows the same IDE with the ShowTwoNumbers.java file active. The code is identical to the previous screenshot. A message dialog box titled "Show two numbers" is displayed over the code. It contains the text "You 've just entered: 135 and 46" and an "OK" button at the bottom.

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

The screenshot shows the IntelliJ IDEA IDE with the project 'lab01' open. The file 'Calculate\_2Numbers.java' is selected in the Project view. The code in the editor is as follows:

```

package src;
import java.util.Scanner;

public class Calculate_2Numbers {
    new *
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter first number: ");
        String strNum1 = scanner.nextLine();
        double num1 = Double.parseDouble(strNum1);

        System.out.print("Enter second number: ");
        String strNum2 = scanner.nextLine();
        double num2 = Double.parseDouble(strNum2);

        double sum = num1 + num2;
        double difference = num1 - num2;
        double product = num1 * num2;
        double quotient = 0.0;

        System.out.println("Sum: " + sum);
    }
}

```

The Run window at the bottom shows the execution output:

```

"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

```

The screenshot shows the Run window for the 'Calculate\_2Numbers' program. The output is as follows:

```

"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 public static void solveFirstDegreeEquation() {
30     Scanner sc = new Scanner(System.in);
31     System.out.print("Enter the value of a: ");
32     double a = sc.nextDouble();
33     System.out.print("Enter the value of b: ");
34     double b = sc.nextDouble();
35
36     if (a == 0) {
37         System.out.println("The equation is not of the first degree.");
38     } else {
39         double x = -b / a;
40         System.out.println("The solution is x = " + x);
41     }
42 }

```

```
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.");
        }
    }
}
```

```
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.");
    }
}
```

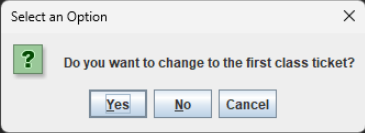


## Part II: 6. Exercises:

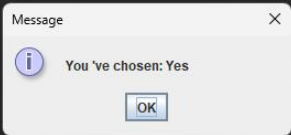
### 6.1. Write, compile, and run the Choosing Option program:

```
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 }
```

```
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 }
```



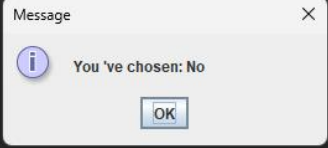
```
1 package src;
2
3 import javax.swing.*;
4
5 new *
6 ▶ public class ChoosingOption {
7     new *
8     public static void main(String[] args) {
9         int option = JOptionPane.showConfirmDialog( parentComponent: null,
10             message: "Do you want to change to the first class ticket?");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



```

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 }

```



- 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);
}

```

## 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 }

```

```

Ex_2_2_6 x InputFromKeyboard x
"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.

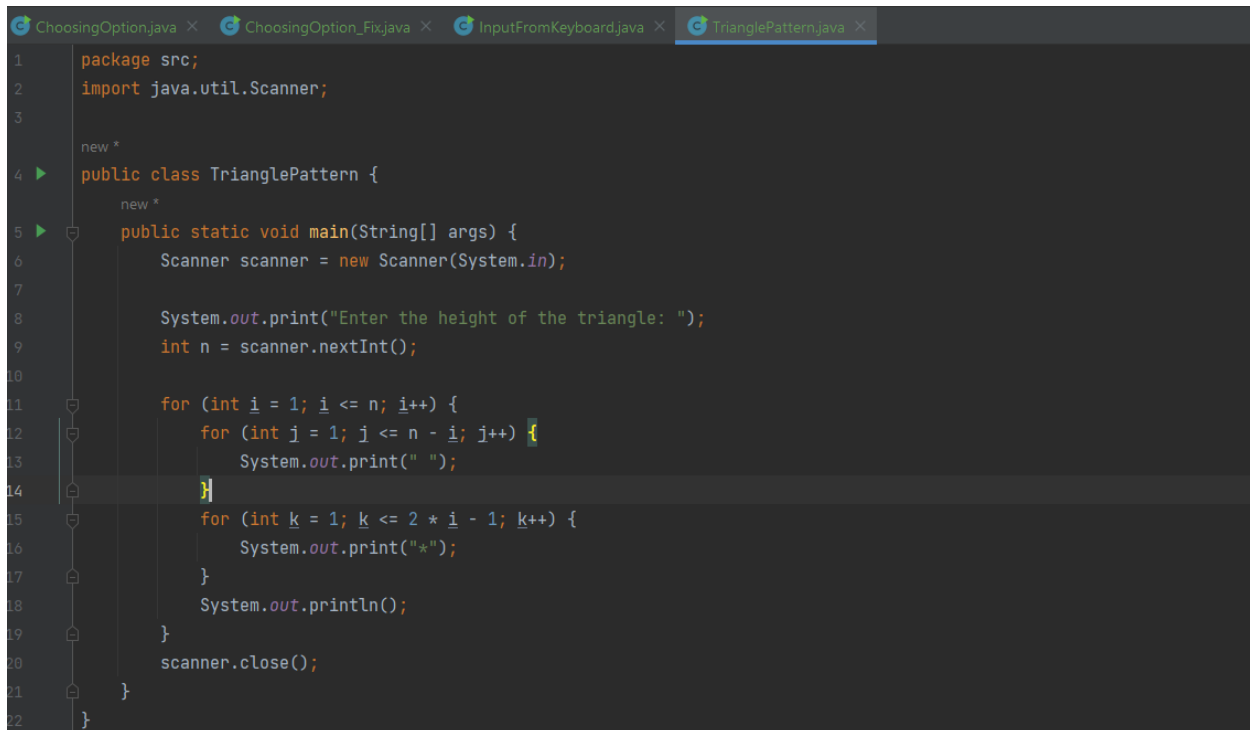
```

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

```

Ex_2_2_6 x TrianglePattern x
"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

```

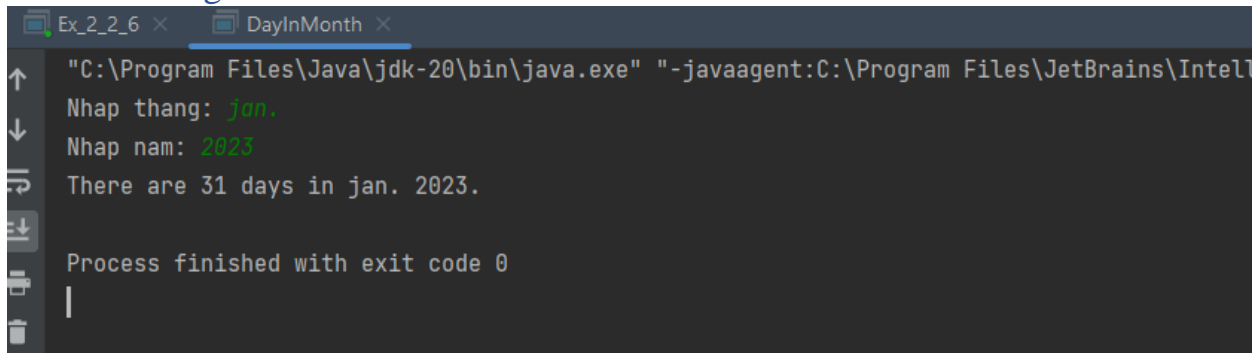


```

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 }

```

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\bin\idea-agent.jar" -Didea.config.path=C:\Program Files\JetBrains\IntelliJ IDEA\config -Didea.copyright.path=C:\Program Files\JetBrains\IntelliJ IDEA\copyright -jar C:\Program Files\JetBrains\IntelliJ IDEA\bin\idea.jar
Nhập tháng: Jun.
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;

```

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 2 3 4 5
Sorted Array:
1.0 2.0 3.0 4.0 5.0
Sum of Array Elements: 20.0
Average of Array Elements: 4.0

```

```

12
13
14     if (choice.equalsIgnoreCase("Y")) {
15         System.out.print("Nhập số phần tử của mảng: ");
16         int n = scanner.nextInt();
17         numbers = new double[n];
18         System.out.print("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

```