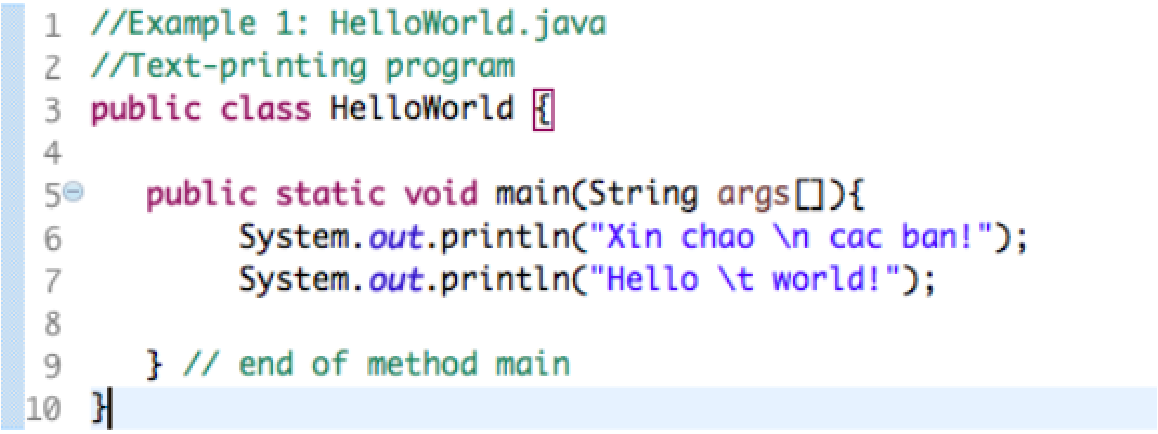
# LAB 1 REPORT
# OBJECT ORIENTED PROGRAMMING

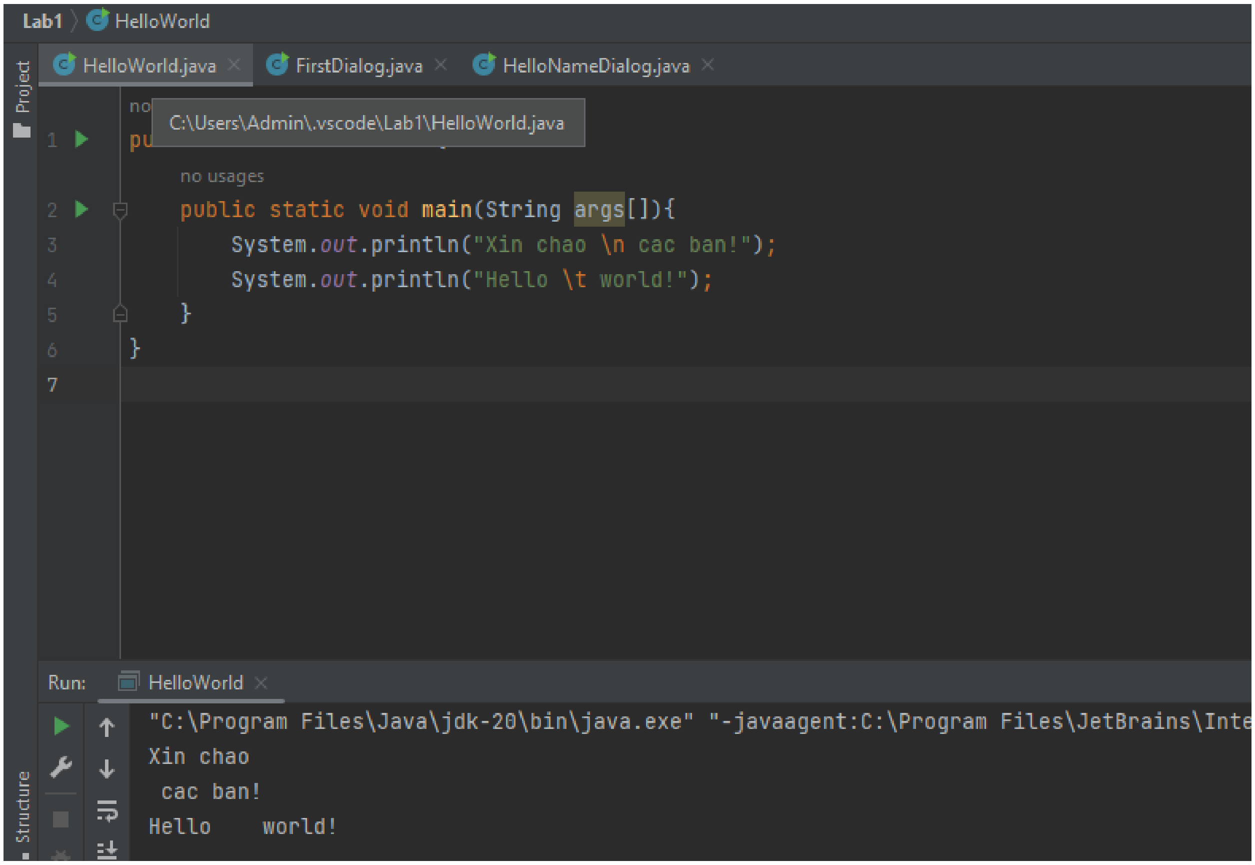
## The Very First Java Programs

### *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
}
```

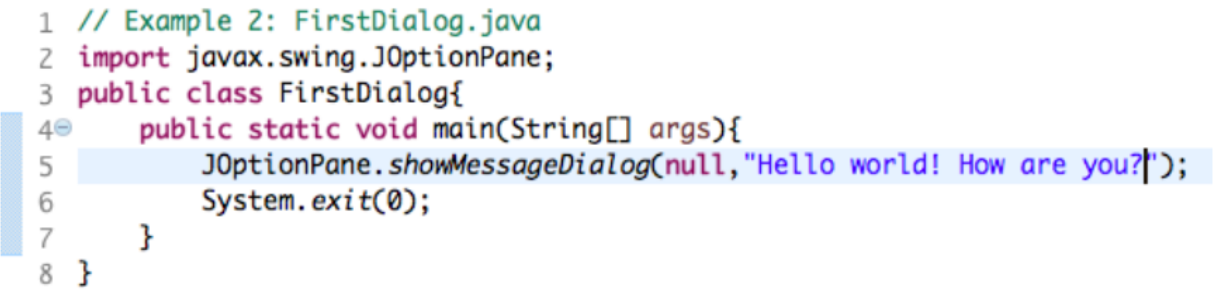
Result



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

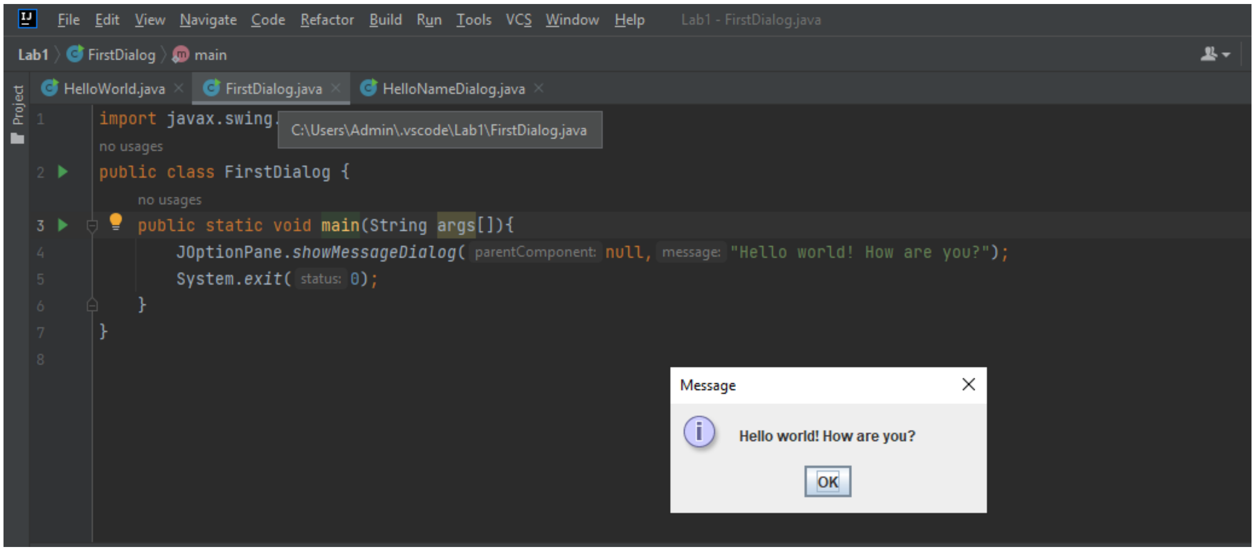
```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Inte
Xin chao
 cac ban!
Hello 	world!
```

## 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);
    }
}
```

Result



File Edit View Navigate Code Refactor Build Run Tools VCS Window Help
Lab1 - FirstDialog.java
Lab1 〉 FirstDialog 〉 main
HelloWorld.java
FirstDialog.java
HelloNameDialog.java
Project

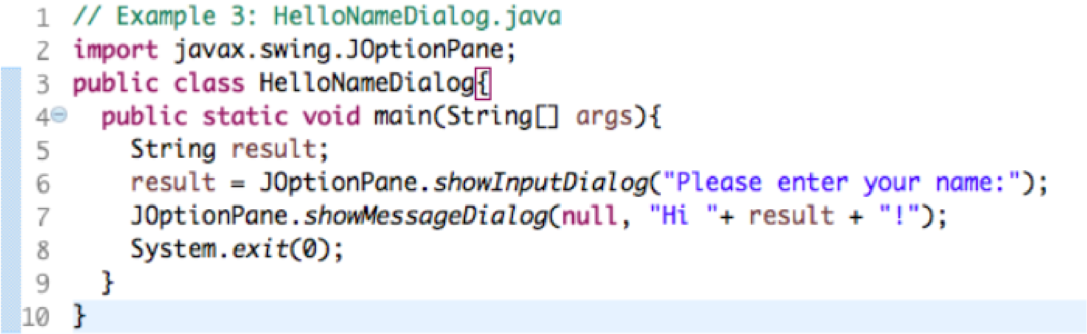
C:\Users\Admin\.vscode\Lab1\FirstDialog.java

```java
import javax.swing.
no usages
public class FirstDialog {
    no usages
    public static void main(String args[]){
        JOptionPane.showMessageDialog( parentComponent: null, message: "Hello world! How are you?");
        System.exit( status: 0);
    }
}
```

Message

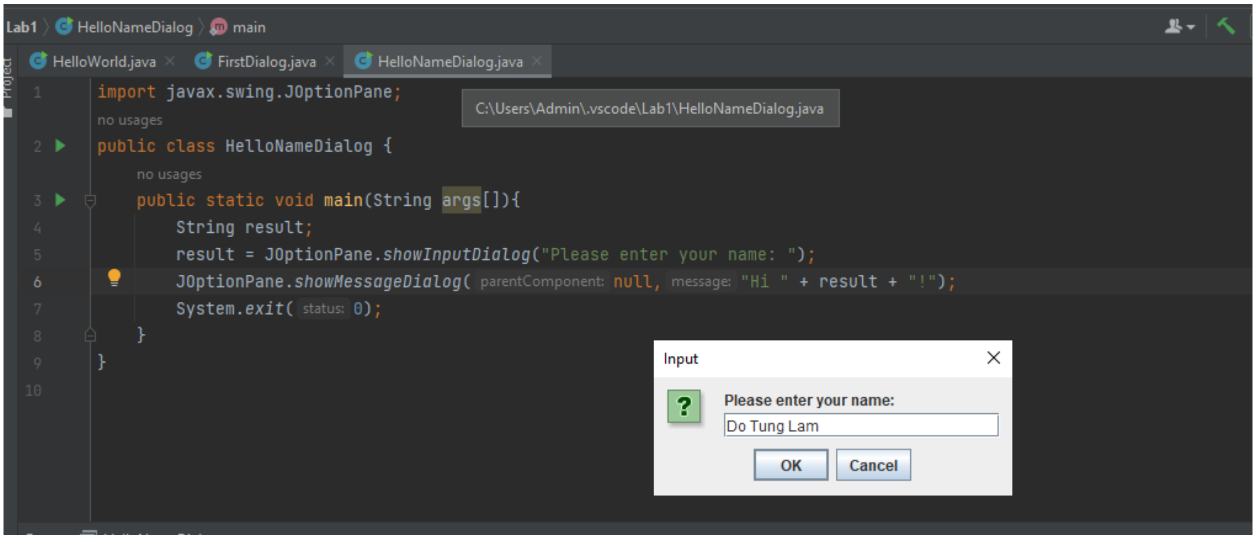
Hello world! How are you?

## 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);
  }
}
```

Result

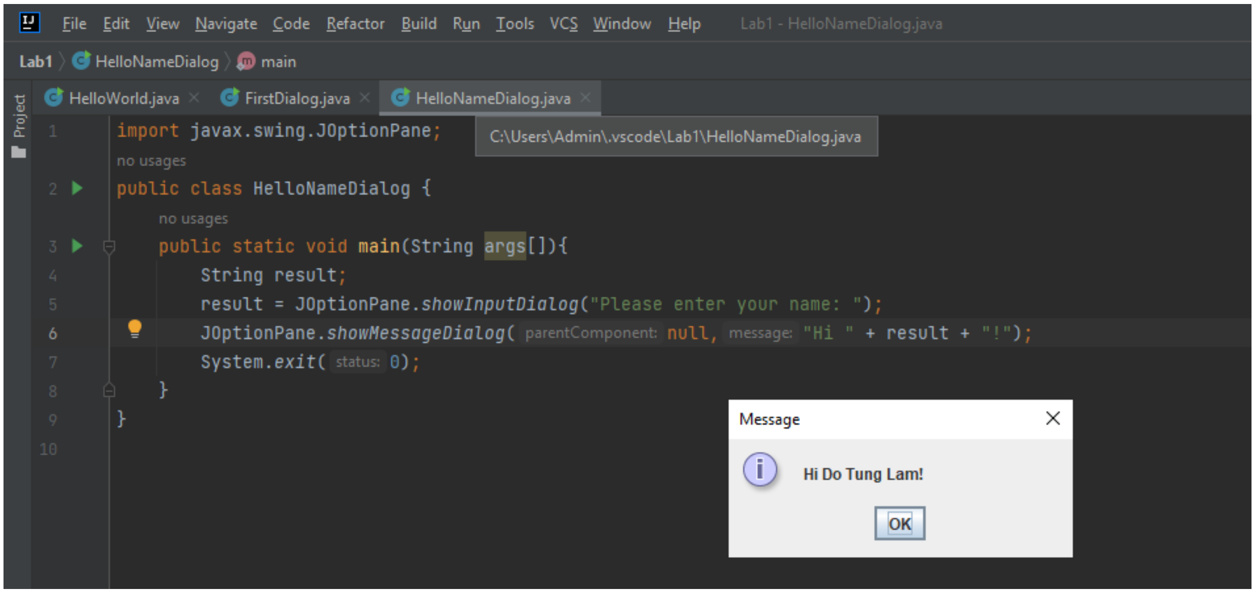


```
import javax.swing.JOptionPane;
no usages
public class HelloNameDialog {
    no usages
    public static void main(String args[]){
        String result;
        result = JOptionPane.showInputDialog("Please enter your name: ");
        JOptionPane.showMessageDialog( parentComponent: null, message: "Hi " + result + "!");
        System.exit( status: 0);
    }
}
```

Input

Please enter your name:

Do Tung Lam

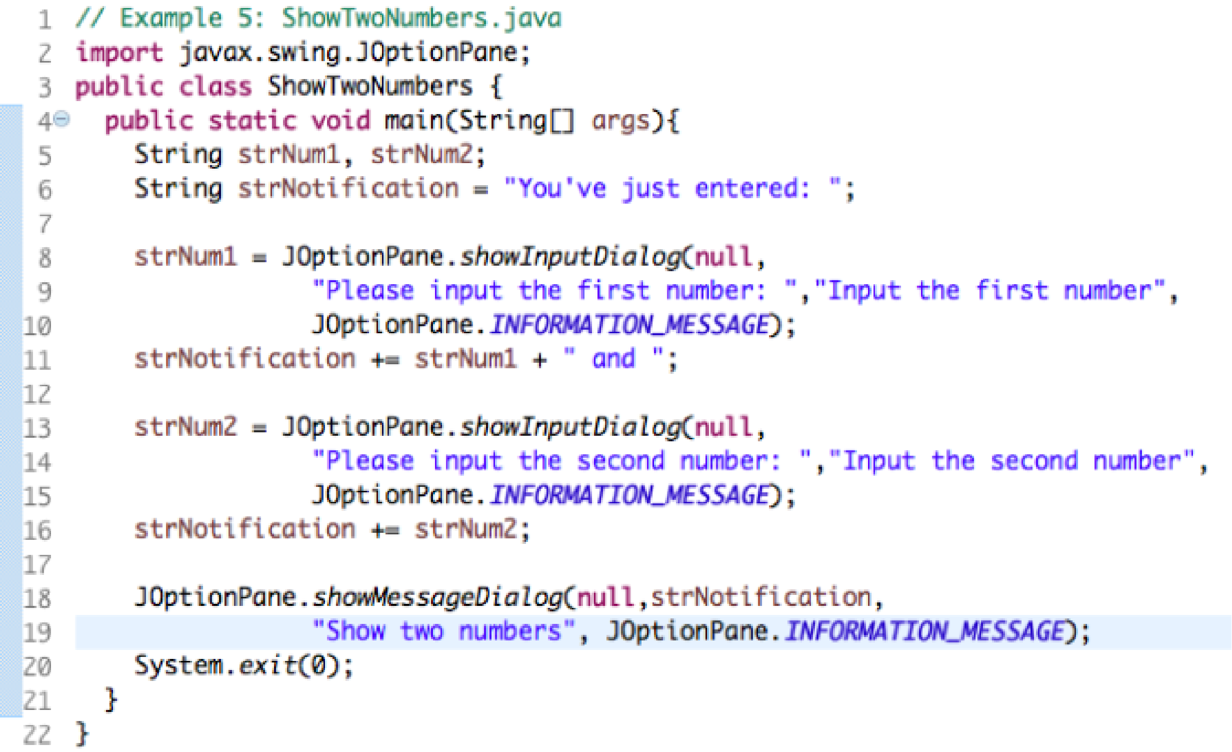


```
import javax.swing.JOptionPane;
no usages
public class HelloNameDialog {
    no usages
    public static void main(String args[]){
        String result;
        result = JOptionPane.showInputDialog("Please enter your name: ");
        JOptionPane.showMessageDialog( parentComponent: null, message: "Hi " + result + "!");
        System.exit( status: 0);
    }
}
```

Message

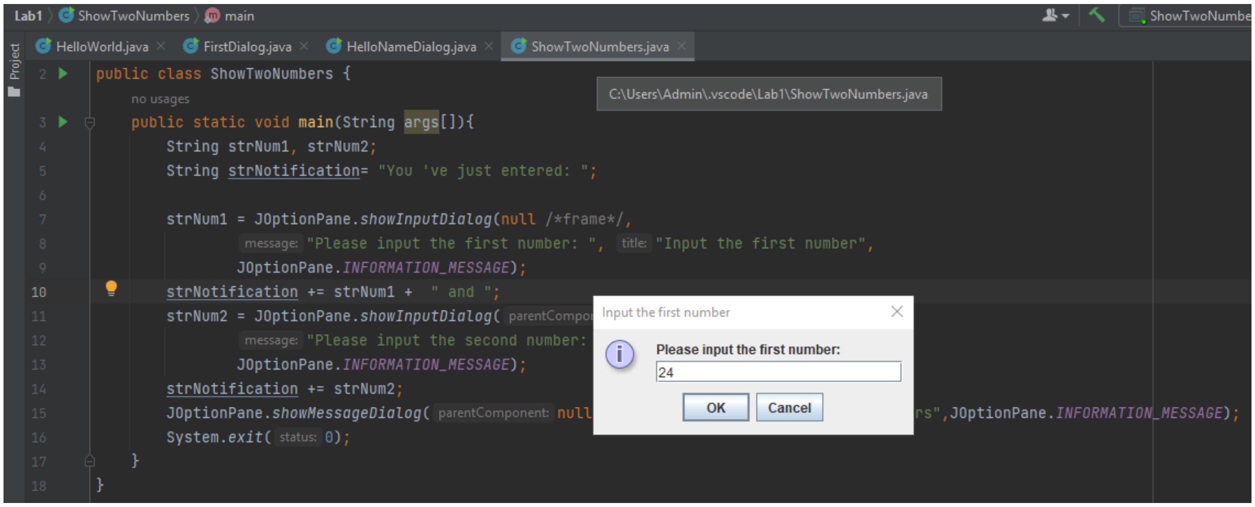
Hi Do Tung Lam!

## 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);
  }
}
```

Result

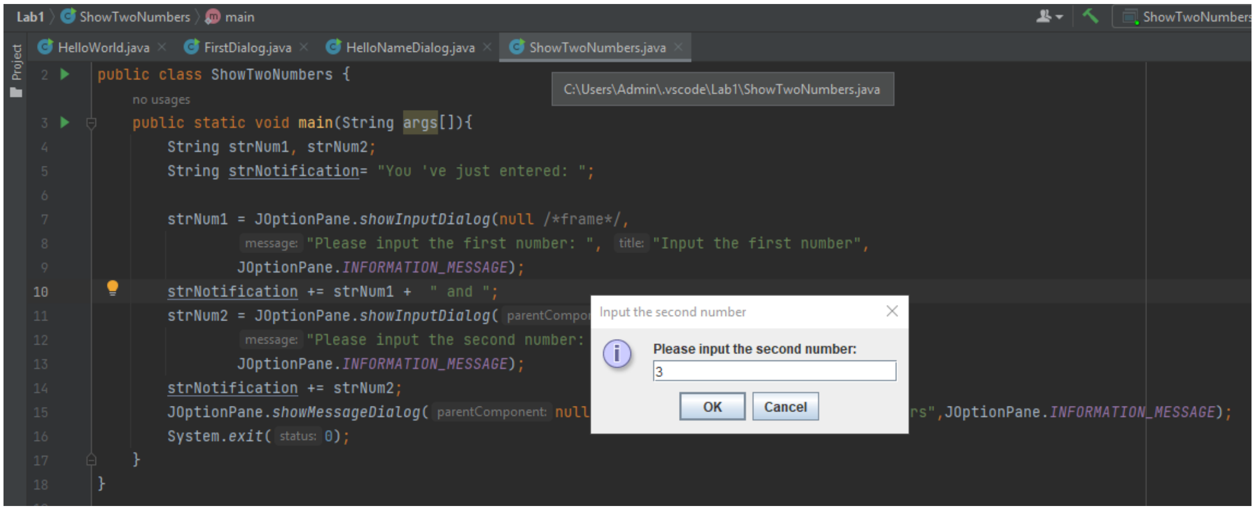


C:\Users\Admin\.vscode\Lab1\ShowTwoNumbers.java

```java
public class ShowTwoNumbers {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        String strNotification= "You 've just entered: ";

        strNum1 = JOptionPane.showInputDialog(null /*frame*/,
                message: "Please input the first number: ", title: "Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 +  " and ";
        strNum2 = JOptionPane.showInputDialog( parentCompo
                message: "Please input the second number:
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum2;
        JOptionPane.showMessageDialog( parentComponent: null                               rs",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

Input the first number

Please input the first number: 24



C:\Users\Admin\.vscode\Lab1\ShowTwoNumbers.java

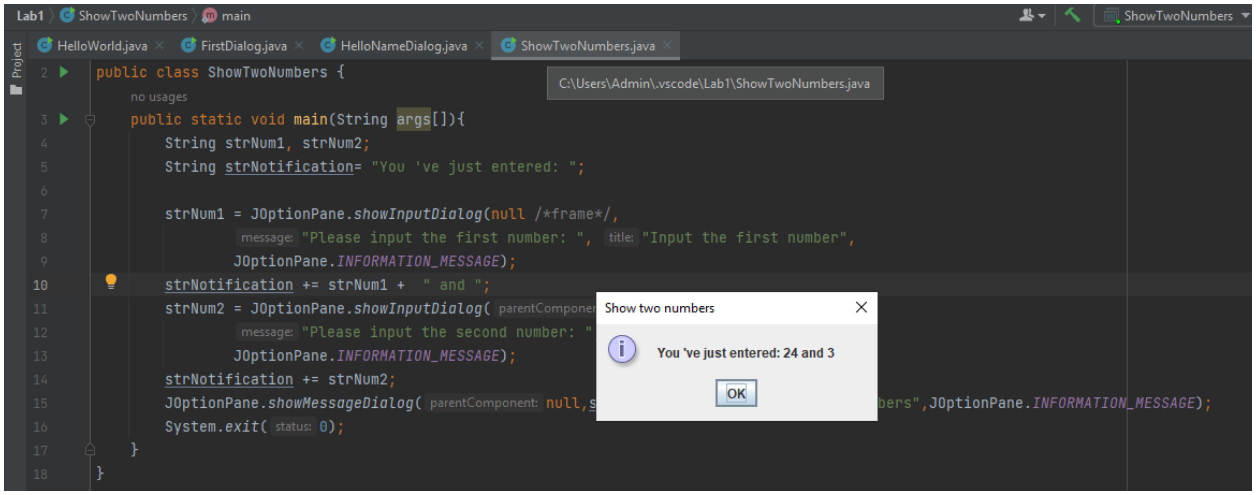
```
public class ShowTwoNumbers {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        String strNotification= "You 've just entered: ";

        strNum1 = JOptionPane.showInputDialog(null /*frame*/,
                message: "Please input the first number: ",  title: "Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 +  " and ";
        strNum2 = JOptionPane.showInputDialog( parentCompo
                message: "Please input the second number:
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum2;
        JOptionPane.showMessageDialog( parentComponent: null                    rs",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

Input the second number

Please input the second number:

3

OK  Cancel



C:\Users\Admin\.vscode\Lab1\ShowTwoNumbers.java

```
public class ShowTwoNumbers {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        String strNotification= "You 've just entered: ";

        strNum1 = JOptionPane.showInputDialog(null /*frame*/,
                message: "Please input the first number: ",  title: "Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 +  " and ";
        strNum2 = JOptionPane.showInputDialog( parentComponer
                message: "Please input the second number: "
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum2;
        JOptionPane.showMessageDialog( parentComponent: null,s                  bers",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

Show two numbers

You 've just entered: 24 and 3

OK

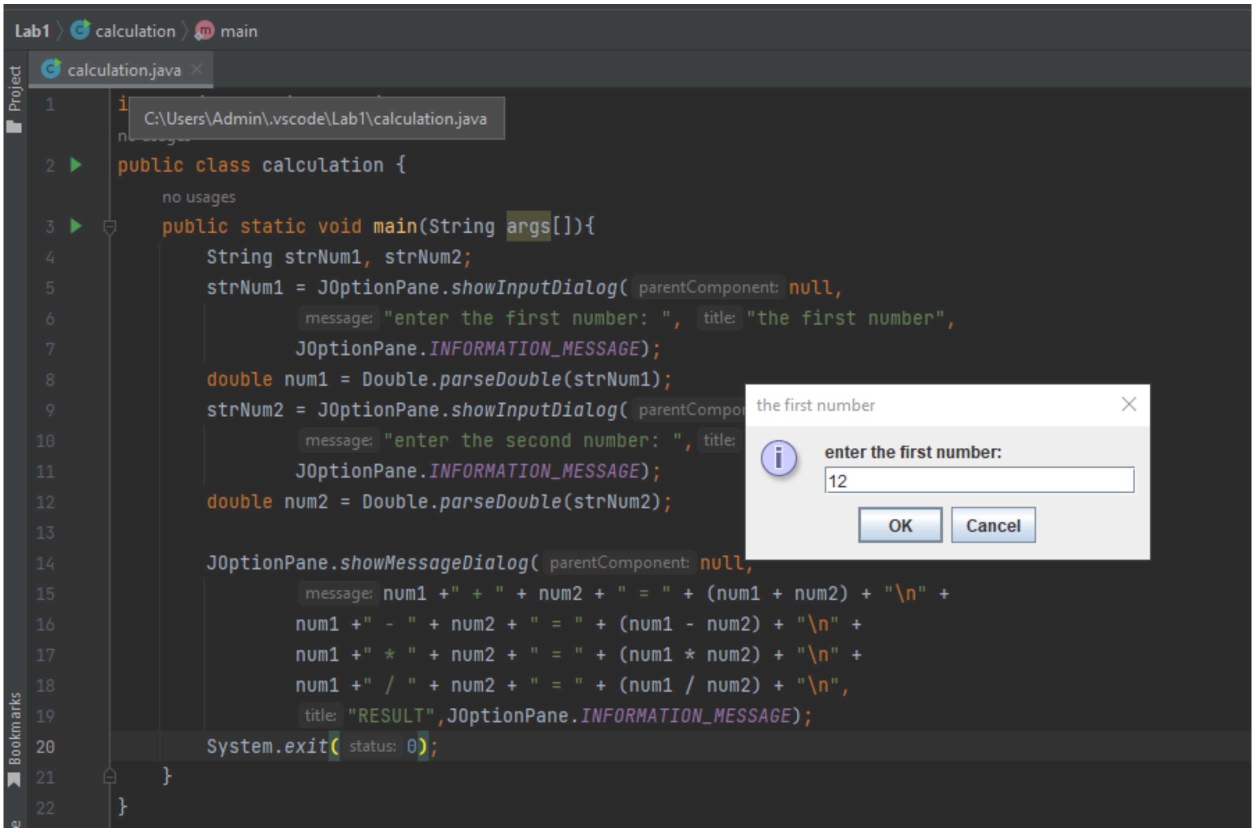
## 2.2.5 Write a program to calculate sum, difference, product, and quotient of 2 double numbers which are entered by users.

**Notes**

- To convert from String to double, you can use

  **`double num1 = Double.parseDouble(strNum1)`**
- Check the divisor of the division

Result



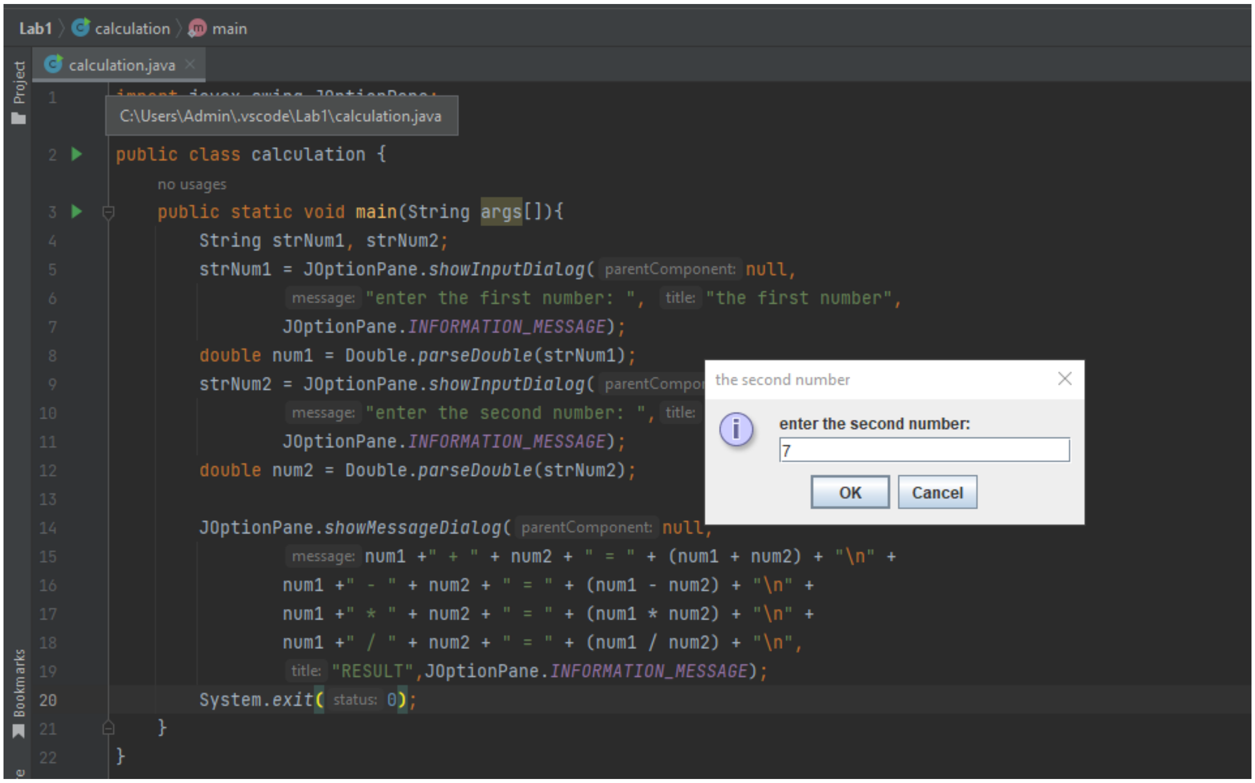
C:\Users\Admin\.vscode\Lab1\calculation.java

```
i
no usages
public class calculation {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        strNum1 = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter the first number: ", title: "the first number",
                JOptionPane.INFORMATION_MESSAGE);
        double num1 = Double.parseDouble(strNum1);
        strNum2 = JOptionPane.showInputDialog( parentCompo
                message: "enter the second number: ", title:
                JOptionPane.INFORMATION_MESSAGE);
        double num2 = Double.parseDouble(strNum2);

        JOptionPane.showMessageDialog( parentComponent: null,
                message: num1 +" + " + num2 + " = " + (num1 + num2) + "\n" +
                num1 +" - " + num2 + " = " + (num1 - num2) + "\n" +
                num1 +" * " + num2 + " = " + (num1 * num2) + "\n" +
                num1 +" / " + num2 + " = " + (num1 / num2) + "\n",
                title: "RESULT",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

the first number

enter the first number:

12



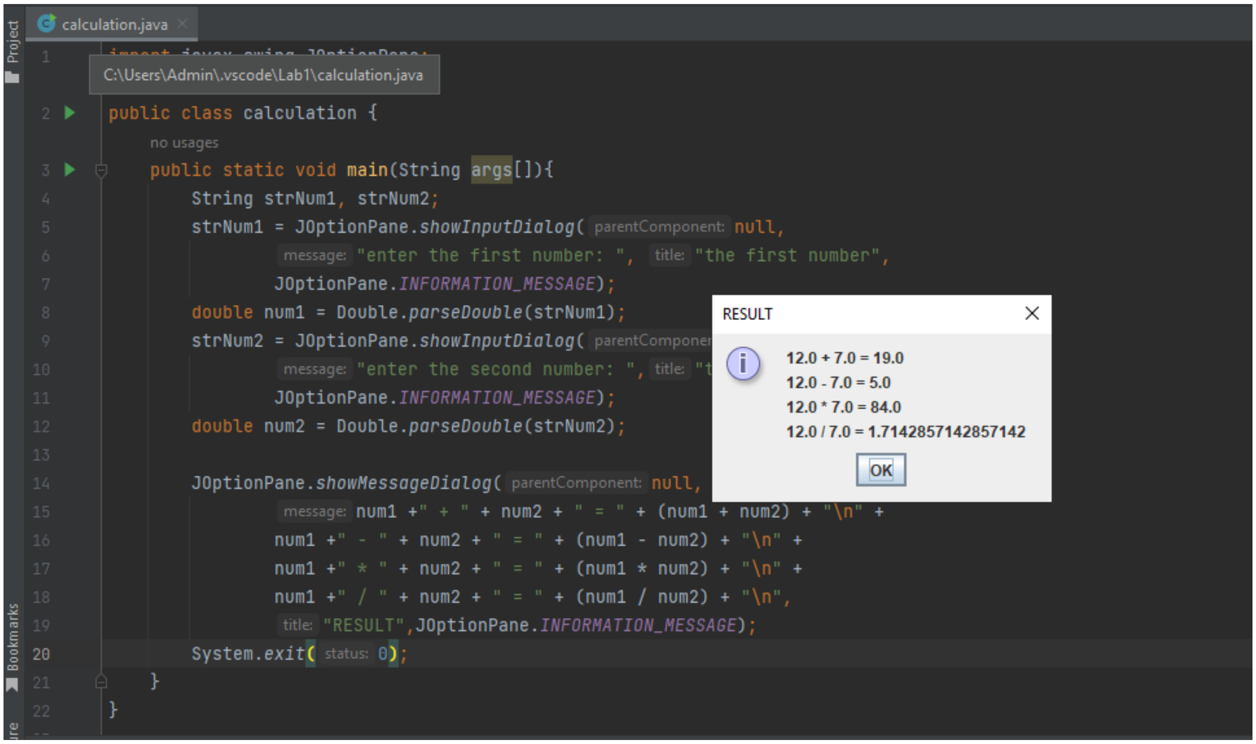
C:\Users\Admin\.vscode\Lab1\calculation.java

```
import javax.swing.JOptionPane;
public class calculation {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        strNum1 = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter the first number: ", title: "the first number",
                JOptionPane.INFORMATION_MESSAGE);
        double num1 = Double.parseDouble(strNum1);
        strNum2 = JOptionPane.showInputDialog( parentCompo
                message: "enter the second number: ", title:
                JOptionPane.INFORMATION_MESSAGE);
        double num2 = Double.parseDouble(strNum2);

        JOptionPane.showMessageDialog( parentComponent: null,
                message: num1 +" + " + num2 + " = " + (num1 + num2) + "\n" +
                num1 +" - " + num2 + " = " + (num1 - num2) + "\n" +
                num1 +" * " + num2 + " = " + (num1 * num2) + "\n" +
                num1 +" / " + num2 + " = " + (num1 / num2) + "\n",
                title: "RESULT",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

the second number

enter the second number:

7



C:\Users\Admin\.vscode\Lab1\calculation.java

```
import javax.swing.JOptionPane;
public class calculation {
    no usages
    public static void main(String args[]){
        String strNum1, strNum2;
        strNum1 = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter the first number: ", title: "the first number",
                JOptionPane.INFORMATION_MESSAGE);
        double num1 = Double.parseDouble(strNum1);
        strNum2 = JOptionPane.showInputDialog( parentComponen
                message: "enter the second number: ", title: "t
                JOptionPane.INFORMATION_MESSAGE);
        double num2 = Double.parseDouble(strNum2);

        JOptionPane.showMessageDialog( parentComponent: null,
                message: num1 +" + " + num2 + " = " + (num1 + num2) + "\n" +
                num1 +" - " + num2 + " = " + (num1 - num2) + "\n" +
                num1 +" * " + num2 + " = " + (num1 * num2) + "\n" +
                num1 +" / " + num2 + " = " + (num1 / num2) + "\n",
                title: "RESULT",JOptionPane.INFORMATION_MESSAGE);
        System.exit( status: 0);
    }
}
```

RESULT

```
12.0 + 7.0 = 19.0
12.0 - 7.0 = 5.0
12.0 * 7.0 = 84.0
12.0 / 7.0 = 1.7142857142857142
```

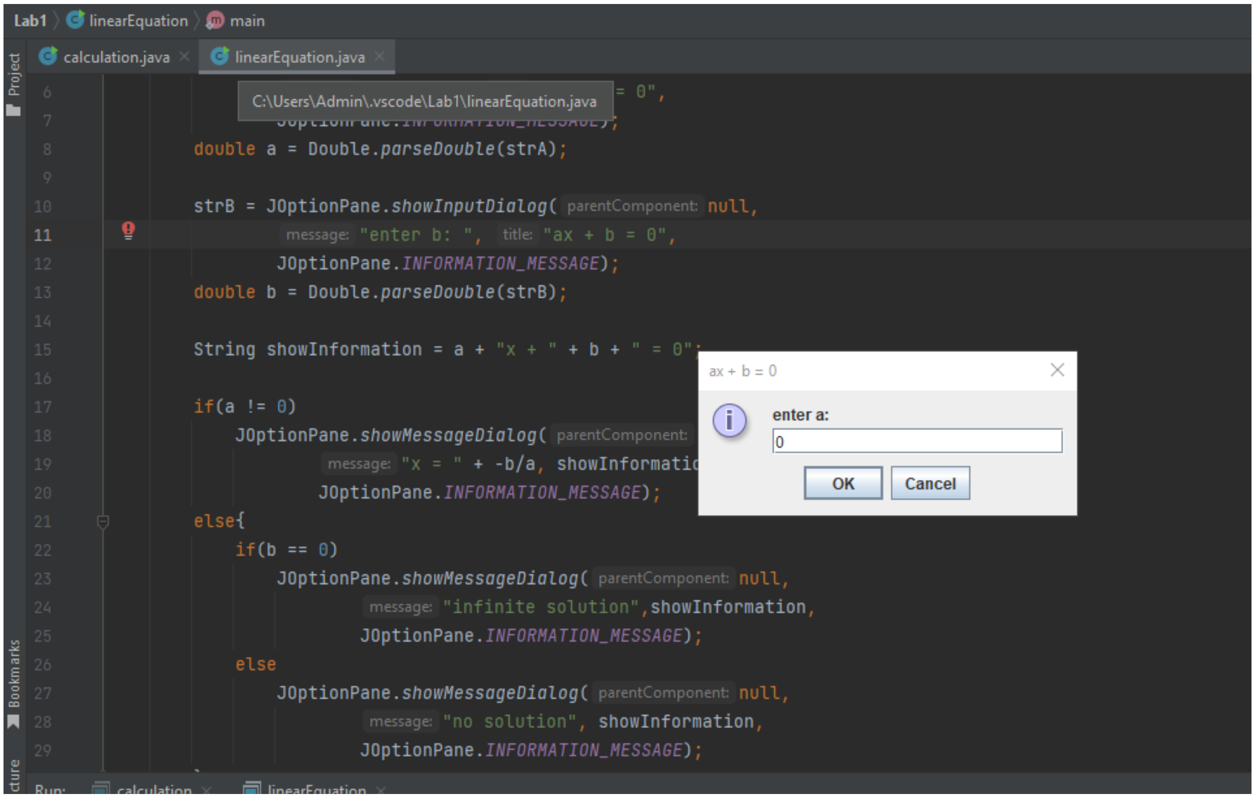
OK

## 2.2.6 Write a program to solve:

### The first-degree equation (linear equation) with one variable

Result

a = 0, b = 0

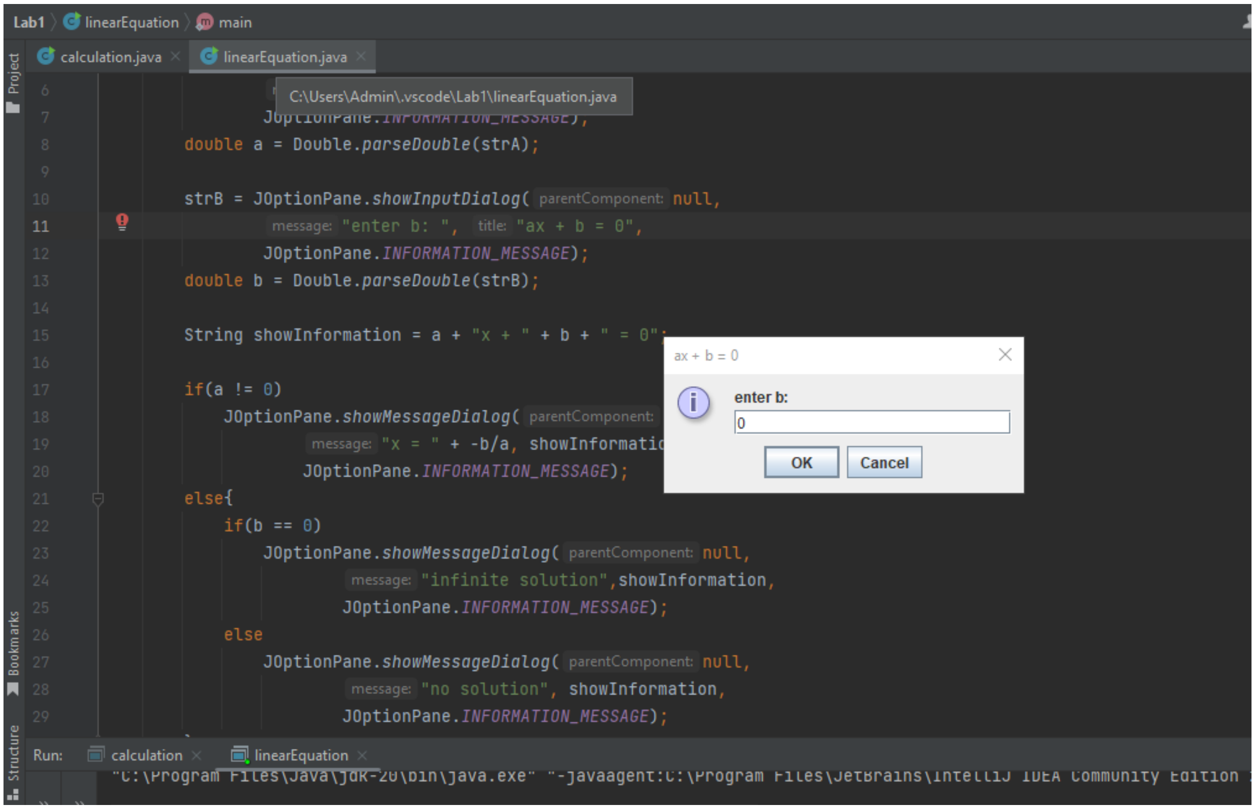

Lab1 〉 linearEquation 〉 main
calculation.java
linearEquation.java
C:\Users\Admin\.vscode\Lab1\linearEquation.java
Project
Bookmarks
Run: calculation linearEquation

```
                                                = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter b: ", title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                    message: "x = " + -b/a, showInformatic
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

ax + b = 0

enter a:

0


Lab1 〉 linearEquation 〉 main
calculation.java
linearEquation.java
C:\Users\Admin\.vscode\Lab1\linearEquation.java
Project
Bookmarks
Structure
Run: calculation linearEquation

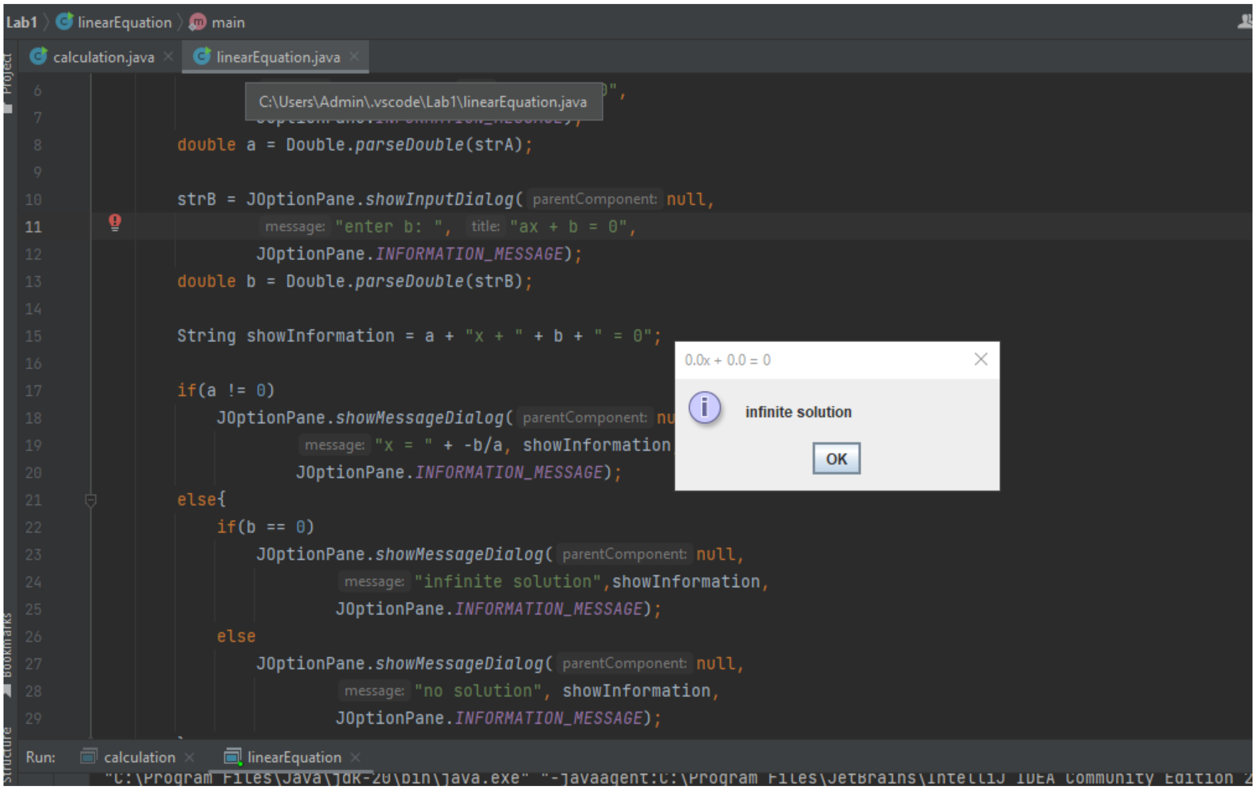
```
                JOptionPane.INFORMATION_MESSAGE);
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter b: ", title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                    message: "x = " + -b/a, showInformatic
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

ax + b = 0

enter b:

0

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



C:\Users\Admin\.vscode\Lab1\linearEquation.java

```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                 message: "enter b: ",  title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent: nu
                     message: "x = " + -b/a, showInformation
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

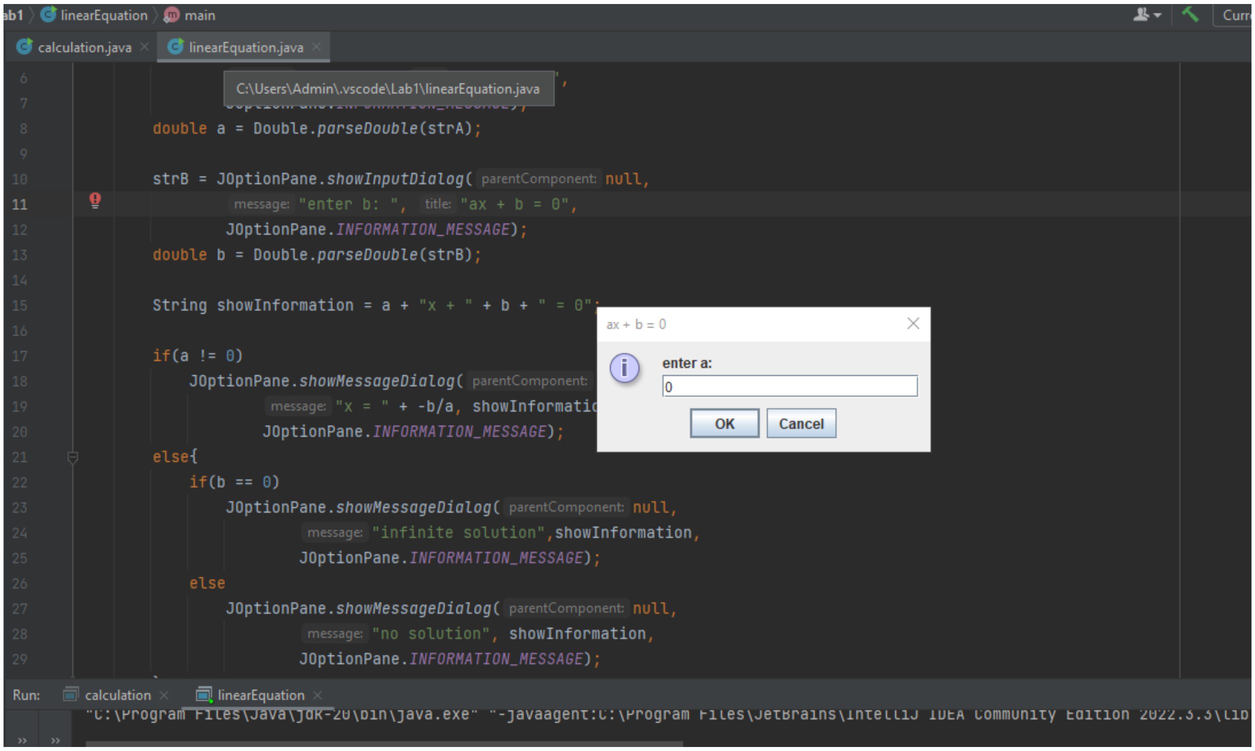
0.0x + 0.0 = 0

infinite solution

OK

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2
```

a = 0, b != 0



C:\Users\Admin\.vscode\Lab1\linearEquation.java

```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                 message: "enter b: ",  title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                     message: "x = " + -b/a, showInformatic
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

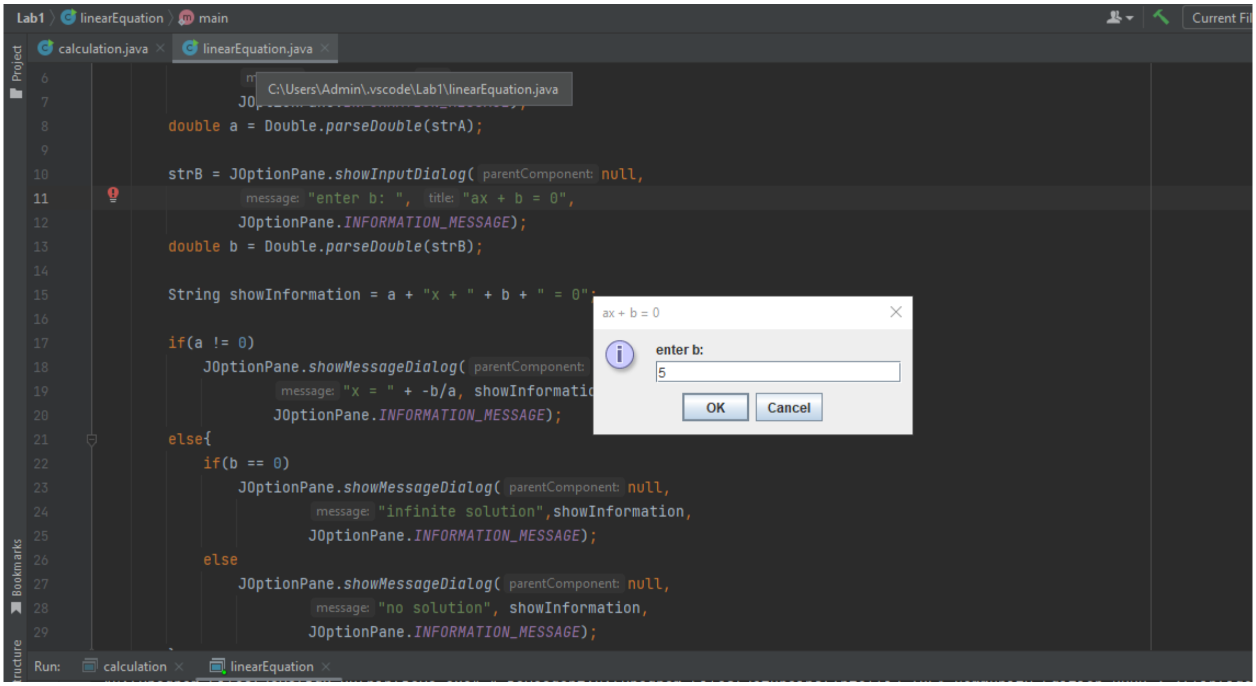
ax + b = 0

enter a:

0

OK Cancel

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.3.3\lib
```

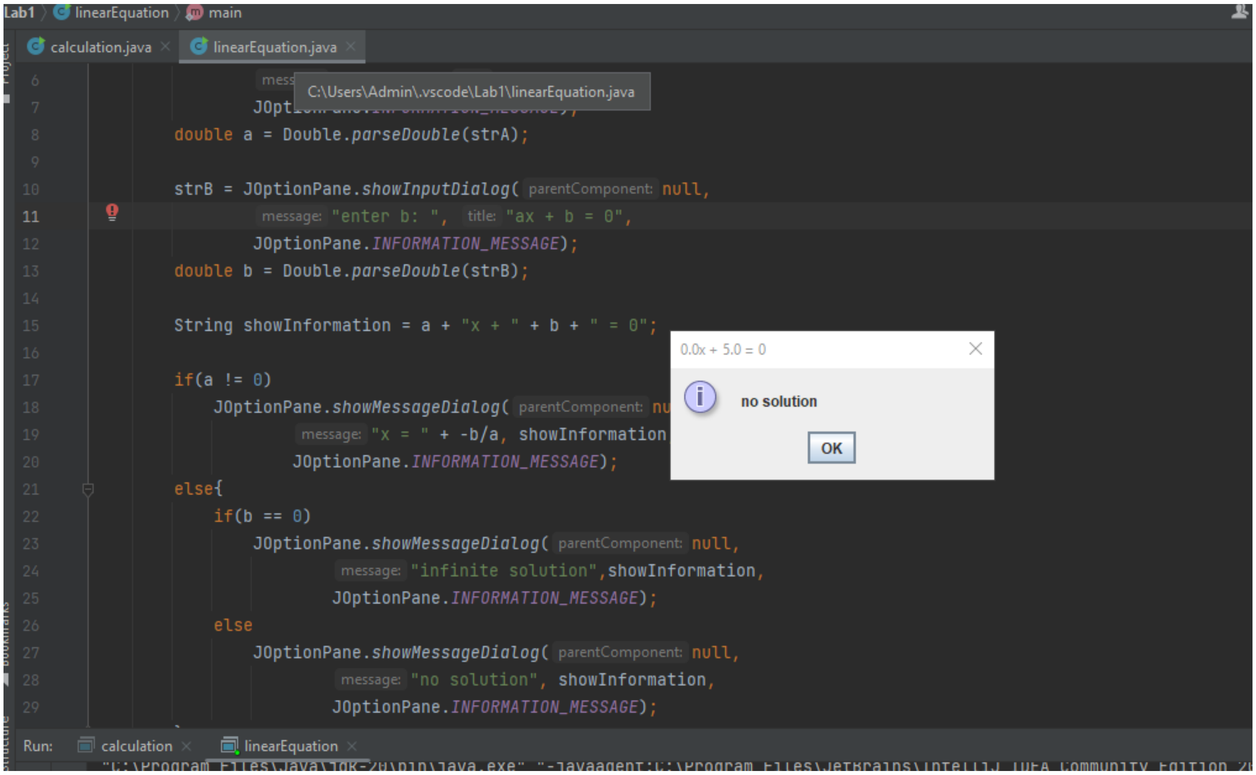


C:\Users\Admin\.vscode\Lab1\linearEquation.java

```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                 message: "enter b: ",  title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                     message: "x = " + -b/a, showInformati
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

enter b:

5



C:\Users\Admin\.vscode\Lab1\linearEquation.java

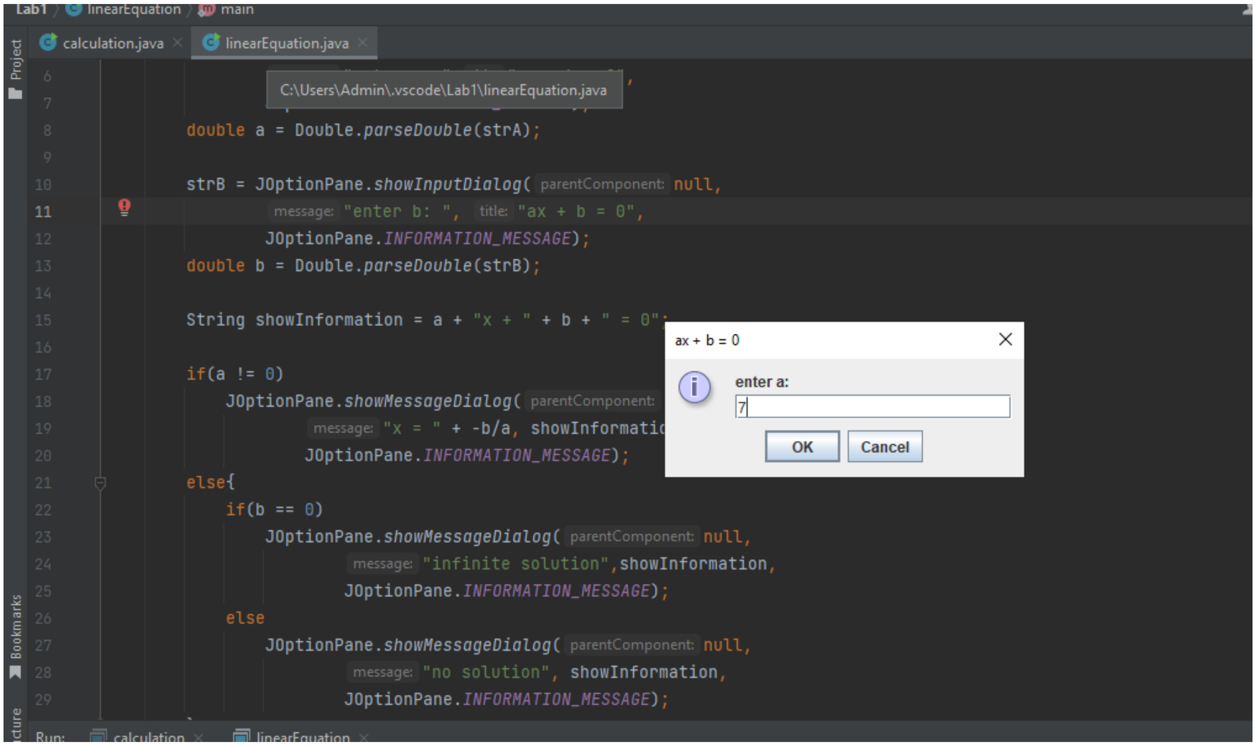
```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                 message: "enter b: ",  title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent: nu
                     message: "x = " + -b/a, showInformation
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

0.0x + 5.0 = 0

no solution

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

a != 0, b != 0



C:\Users\Admin\.vscode\Lab1\linearEquation.java

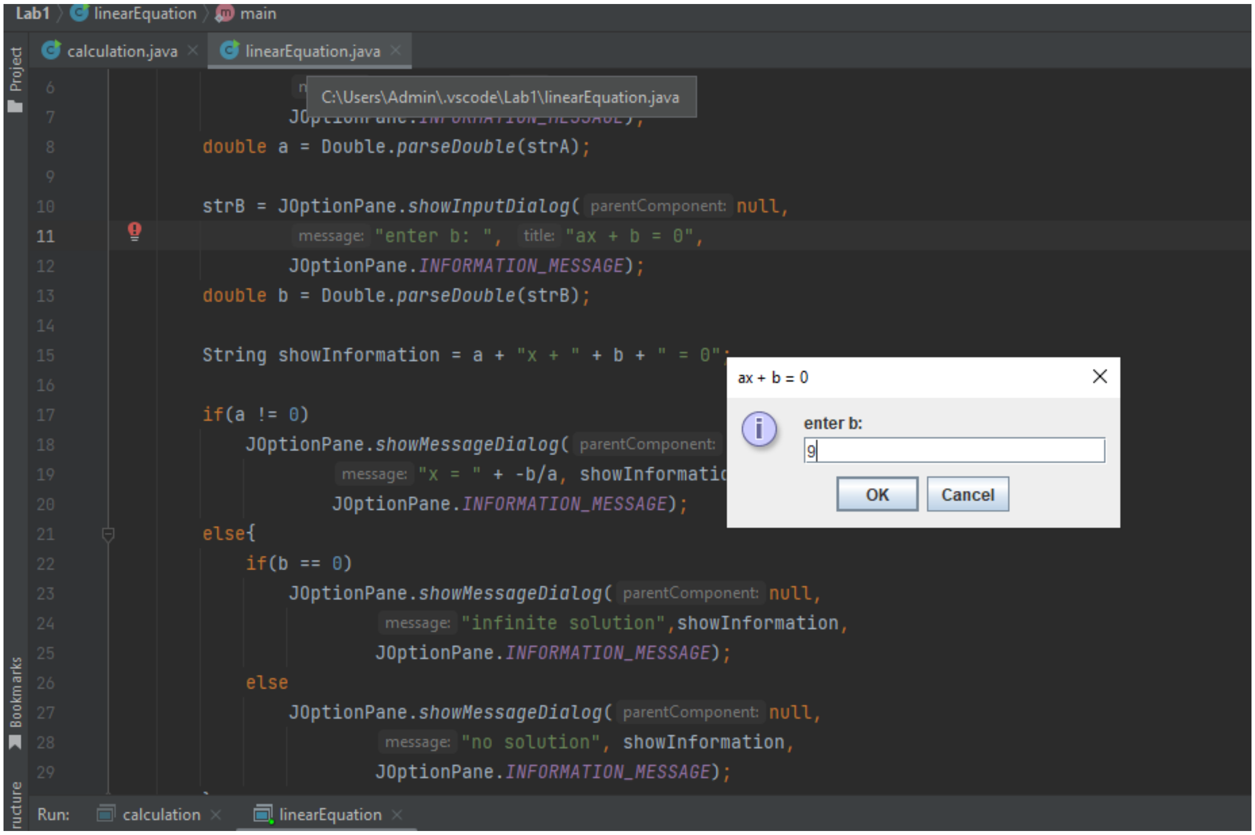
```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter b: ", title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                    message: "x = " + -b/a, showInformatic
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

ax + b = 0

enter a:

7

OK Cancel



C:\Users\Admin\.vscode\Lab1\linearEquation.java

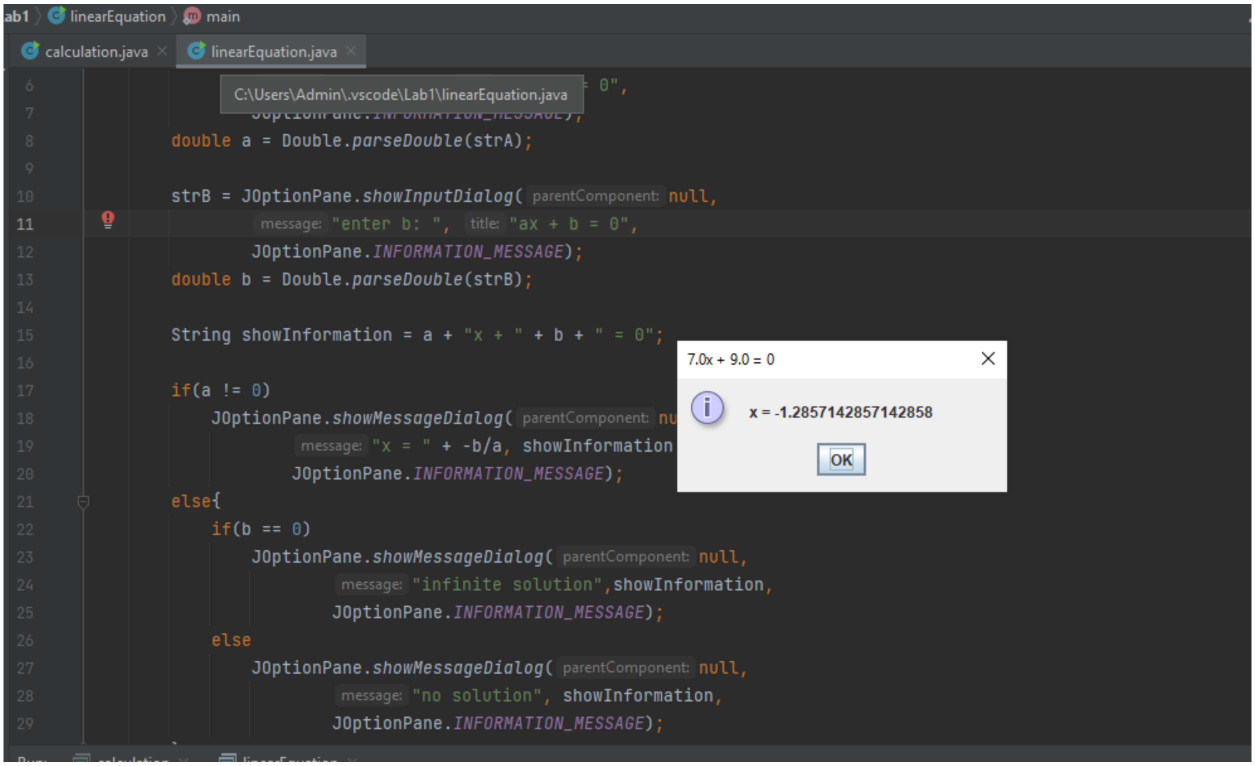
```
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                message: "enter b: ", title: "ax + b = 0",
                JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent:
                    message: "x = " + -b/a, showInformatic
                    JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "infinite solution",showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                        message: "no solution", showInformation,
                        JOptionPane.INFORMATION_MESSAGE);
```

ax + b = 0

enter b:

9

OK Cancel


ab1 〉 linearEquation 〉 main
calculation.java ×
linearEquation.java ×
C:\Users\Admin\.vscode\Lab1\linearEquation.java

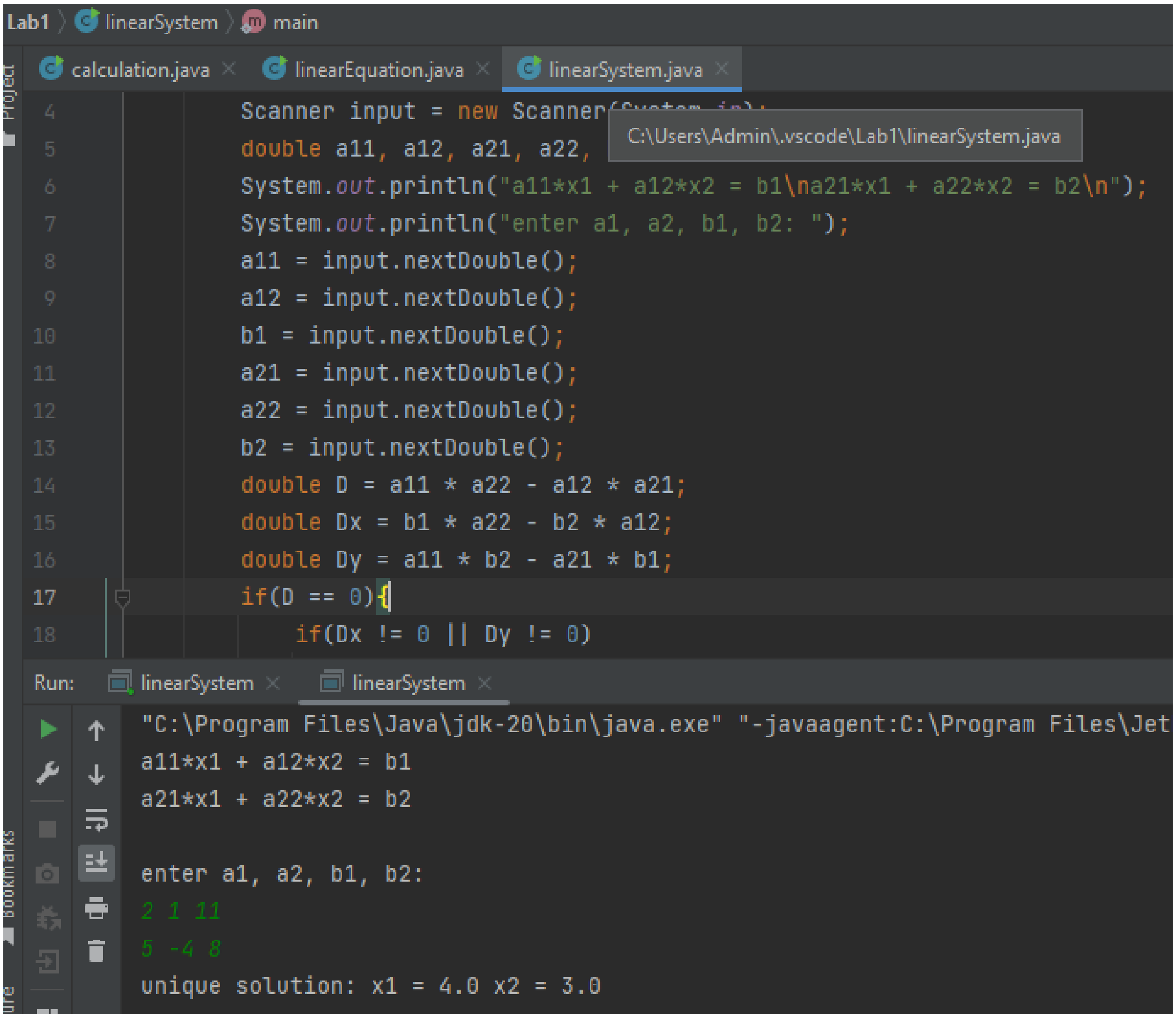
```
                                                  = 0",
                    JOptionPane.INFORMATION_MESSAGE);
        double a = Double.parseDouble(strA);

        strB = JOptionPane.showInputDialog( parentComponent: null,
                 message: "enter b: ",  title: "ax + b = 0",
                    JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(strB);

        String showInformation = a + "x + " + b + " = 0";

        if(a != 0)
            JOptionPane.showMessageDialog( parentComponent: nu
                     message: "x = " + -b/a, showInformation
                        JOptionPane.INFORMATION_MESSAGE);
        else{
            if(b == 0)
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "infinite solution",showInformation,
                            JOptionPane.INFORMATION_MESSAGE);
            else
                JOptionPane.showMessageDialog( parentComponent: null,
                         message: "no solution", showInformation,
                            JOptionPane.INFORMATION_MESSAGE);
```

7.0x + 9.0 = 0

x = -1.2857142857142858

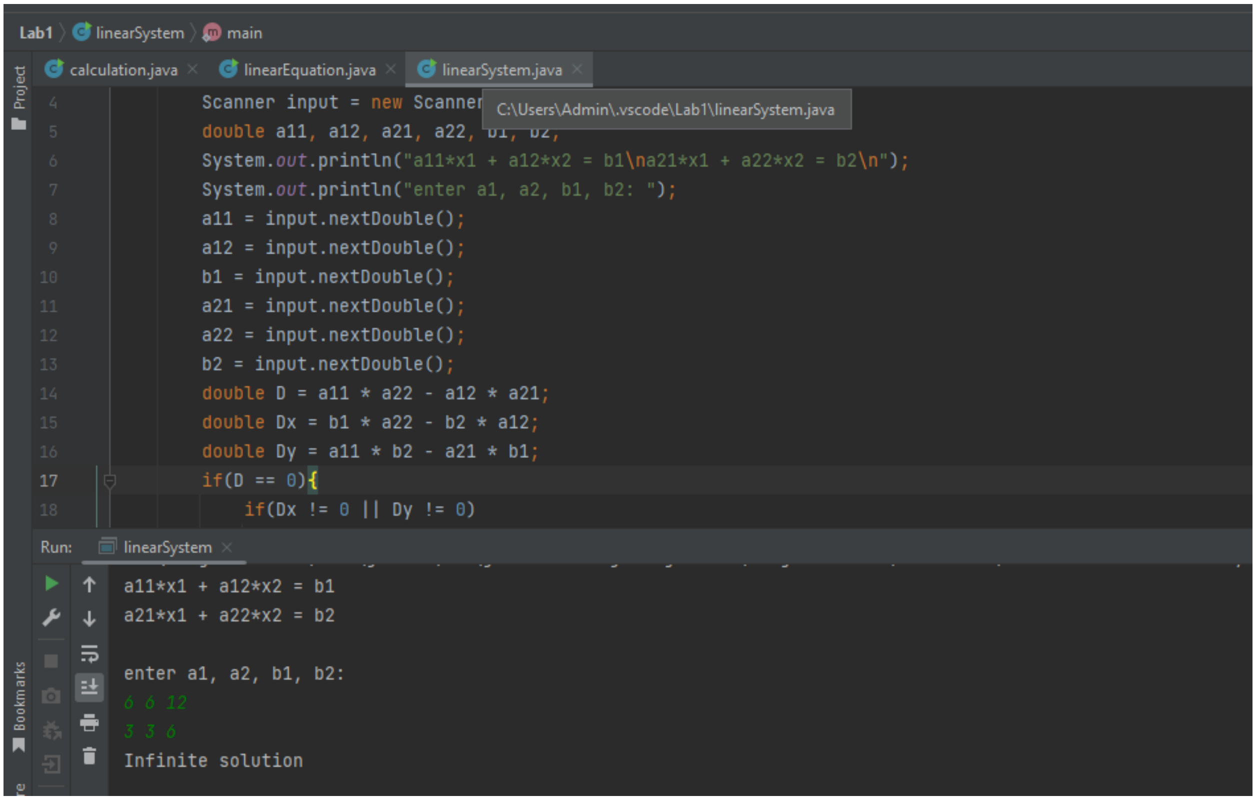
## The system of first-degree equations (linear system) with two variables

Result



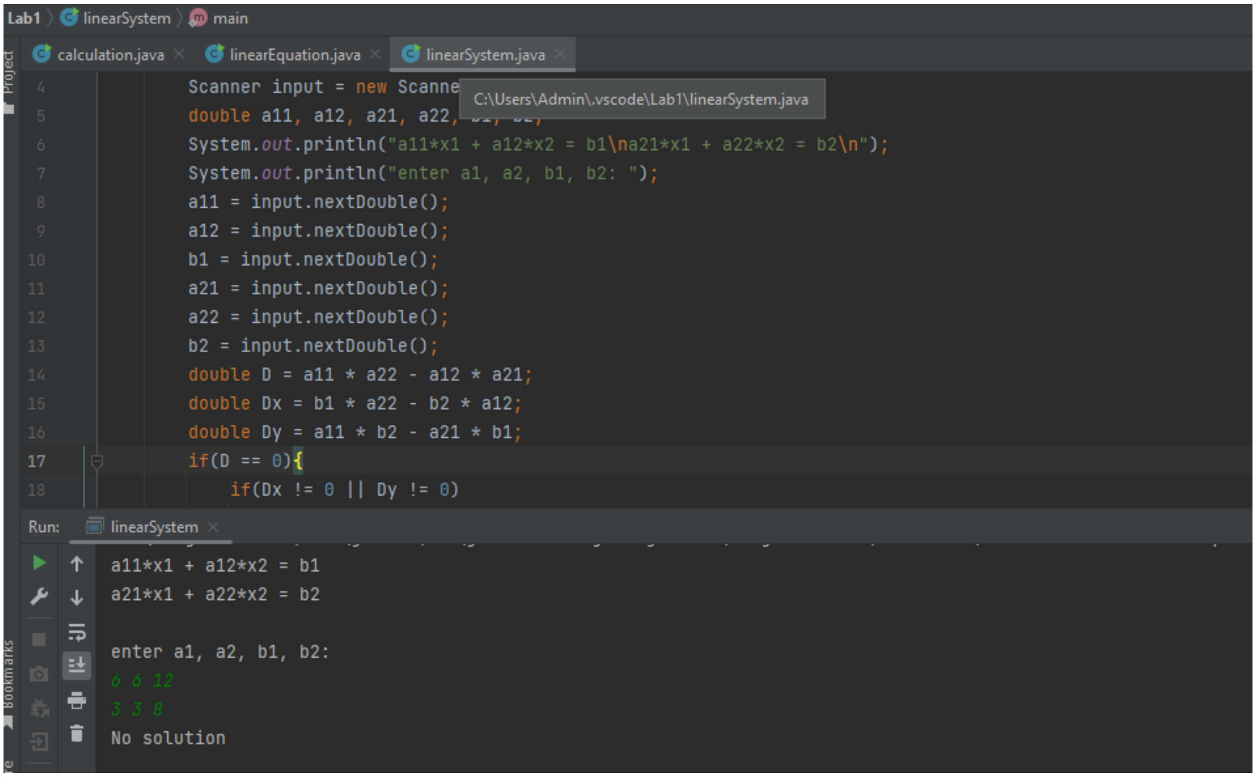
```java
        Scanner input = new Scanner(System.in);
        double a11, a12, a21, a22,
        System.out.println("a11*x1 + a12*x2 = b1\na21*x1 + a22*x2 = b2\n");
        System.out.println("enter a1, a2, b1, b2: ");
        a11 = input.nextDouble();
        a12 = input.nextDouble();
        b1 = input.nextDouble();
        a21 = input.nextDouble();
        a22 = input.nextDouble();
        b2 = input.nextDouble();
        double D = a11 * a22 - a12 * a21;
        double Dx = b1 * a22 - b2 * a12;
        double Dy = a11 * b2 - a21 * b1;
        if(D == 0){
            if(Dx != 0 || Dy != 0)
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\Jet
a11*x1 + a12*x2 = b1
a21*x1 + a22*x2 = b2

enter a1, a2, b1, b2:
2 1 11
5 -4 8
unique solution: x1 = 4.0 x2 = 3.0
```



```java
        Scanner input = new Scanner
        double a11, a12, a21, a22, b1, b2;
        System.out.println("a11*x1 + a12*x2 = b1\na21*x1 + a22*x2 = b2\n");
        System.out.println("enter a1, a2, b1, b2: ");
        a11 = input.nextDouble();
        a12 = input.nextDouble();
        b1 = input.nextDouble();
        a21 = input.nextDouble();
        a22 = input.nextDouble();
        b2 = input.nextDouble();
        double D = a11 * a22 - a12 * a21;
        double Dx = b1 * a22 - b2 * a12;
        double Dy = a11 * b2 - a21 * b1;
        if(D == 0){
            if(Dx != 0 || Dy != 0)
```

```
a11*x1 + a12*x2 = b1
a21*x1 + a22*x2 = b2

enter a1, a2, b1, b2: 
6 6 12
3 3 6
Infinite solution
```

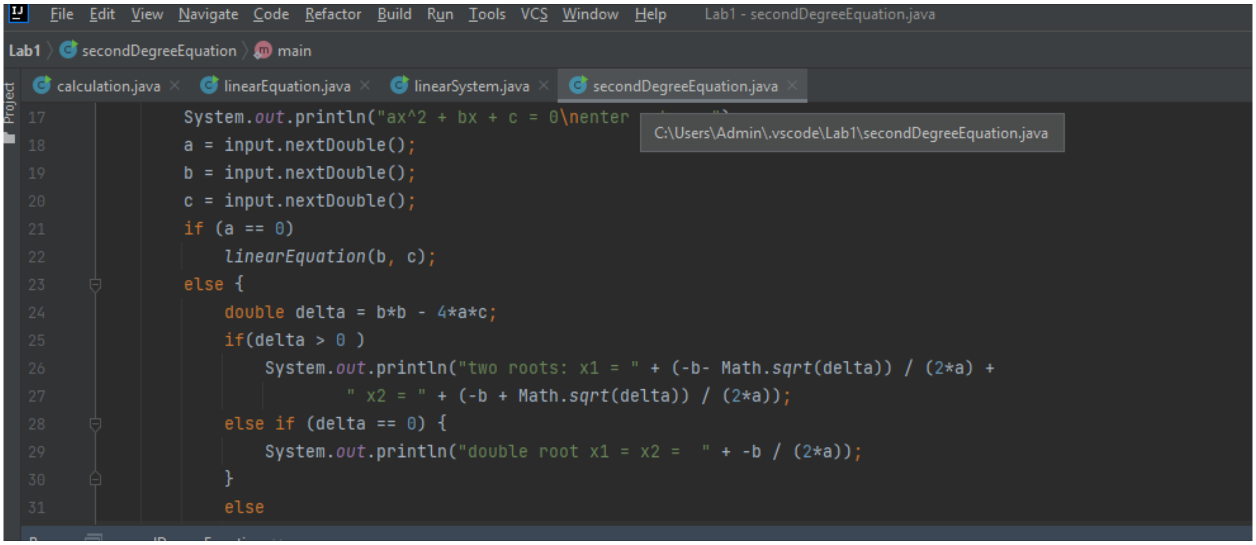


```java
        Scanner input = new Scanne
        double a11, a12, a21, a22, b1, b2;
        System.out.println("a11*x1 + a12*x2 = b1\na21*x1 + a22*x2 = b2\n");
        System.out.println("enter a1, a2, b1, b2: ");
        a11 = input.nextDouble();
        a12 = input.nextDouble();
        b1 = input.nextDouble();
        a21 = input.nextDouble();
        a22 = input.nextDouble();
        b2 = input.nextDouble();
        double D = a11 * a22 - a12 * a21;
        double Dx = b1 * a22 - b2 * a12;
        double Dy = a11 * b2 - a21 * b1;
        if(D == 0){
            if(Dx != 0 || Dy != 0)
```

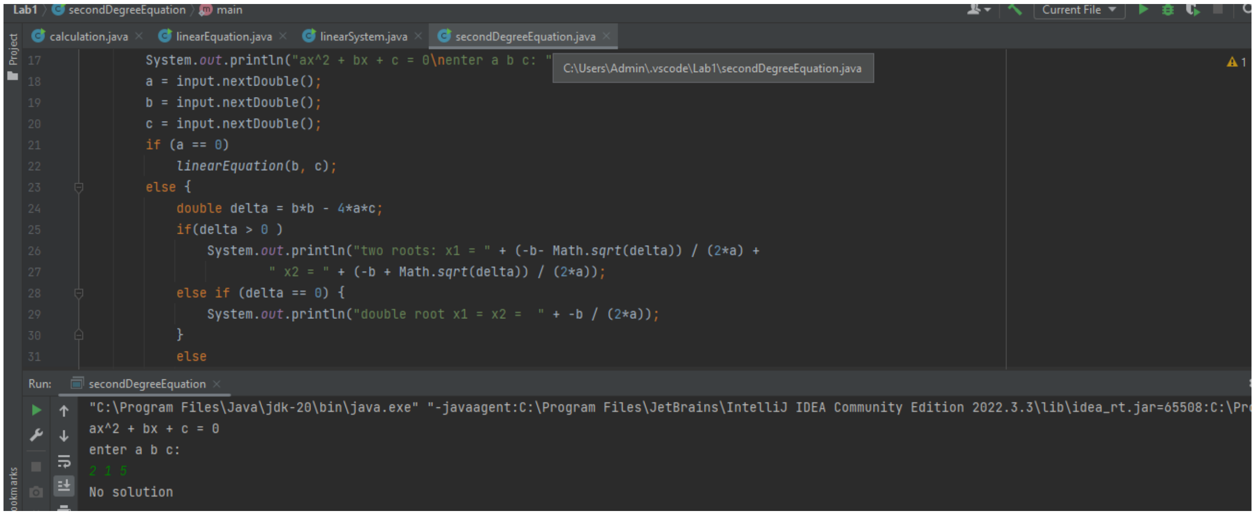
```
a11*x1 + a12*x2 = b1
a21*x1 + a22*x2 = b2

enter a1, a2, b1, b2: 
6 6 12
3 3 8
No solution
```

## The second-degree equation with one variable

Result

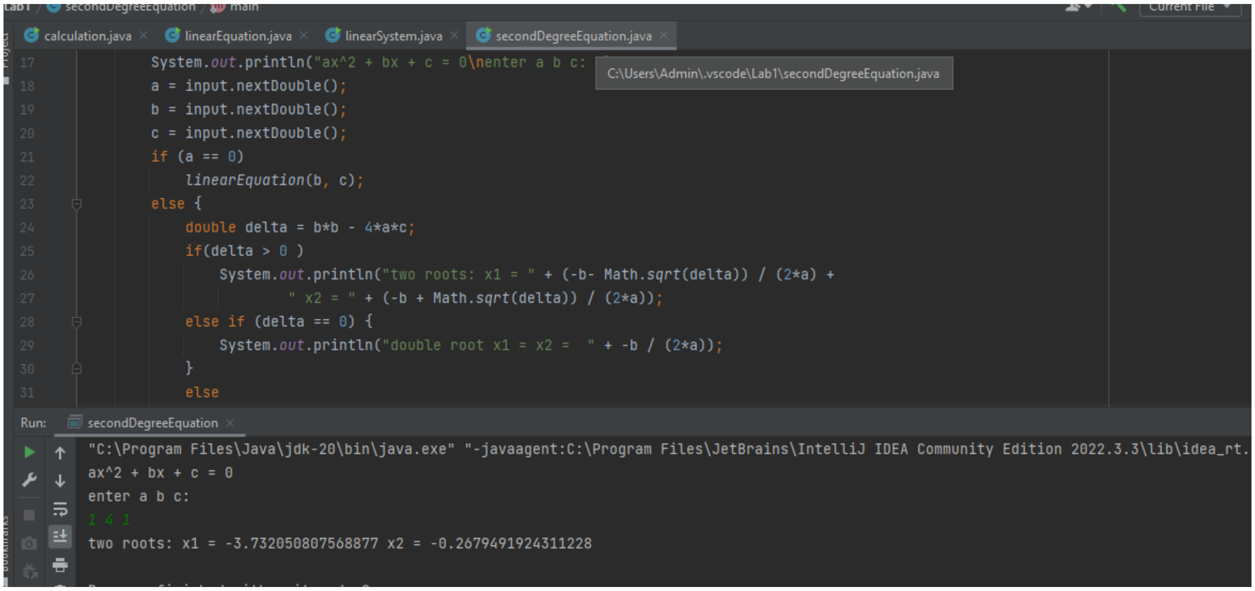

File Edit View Navigate Code Refactor Build Run Tools VCS Window Help
Lab1 - secondDegreeEquation.java
Lab1 secondDegreeEquation main
calculation.java
linearEquation.java
linearSystem.java
secondDegreeEquation.java
C:\Users\Admin\.vscode\Lab1\secondDegreeEquation.java
Project

```
        System.out.println("ax^2 + bx + c = 0\nenter
        a = input.nextDouble();
        b = input.nextDouble();
        c = input.nextDouble();
        if (a == 0)
            linearEquation(b, c);
        else {
            double delta = b*b - 4*a*c;
            if(delta > 0 )
                System.out.println("two roots: x1 = " + (-b- Math.sqrt(delta)) / (2*a) +
                        " x2 = " + (-b + Math.sqrt(delta)) / (2*a));
            else if (delta == 0) {
                System.out.println("double root x1 = x2 =  " + -b / (2*a));
            }
            else
```


Lab1 secondDegreeEquation main
Current File
calculation.java
linearEquation.java
linearSystem.java
secondDegreeEquation.java
C:\Users\Admin\.vscode\Lab1\secondDegreeEquation.java
Project
Run:
secondDegreeEquation
Bookmarks

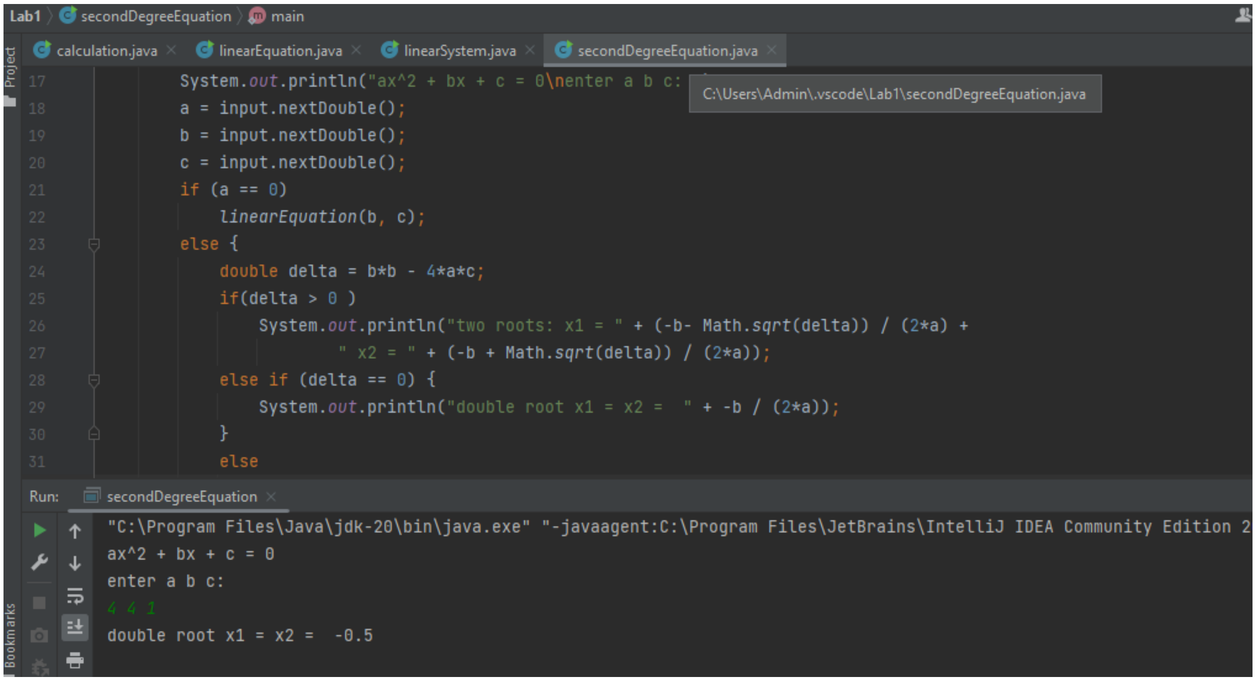
```
        System.out.println("ax^2 + bx + c = 0\nenter a b c: "
        a = input.nextDouble();
        b = input.nextDouble();
        c = input.nextDouble();
        if (a == 0)
            linearEquation(b, c);
        else {
            double delta = b*b - 4*a*c;
            if(delta > 0 )
                System.out.println("two roots: x1 = " + (-b- Math.sqrt(delta)) / (2*a) +
                        " x2 = " + (-b + Math.sqrt(delta)) / (2*a));
            else if (delta == 0) {
                System.out.println("double root x1 = x2 =  " + -b / (2*a));
            }
            else
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.3.3\lib\idea_rt.jar=65508:C:\Pr
ax^2 + bx + c = 0
enter a b c:
2 1 5
No solution
```


Lab1 secondDegreeEquation main
Current File
calculation.java
linearEquation.java
linearSystem.java
secondDegreeEquation.java
C:\Users\Admin\.vscode\Lab1\secondDegreeEquation.java
Project
Run:
secondDegreeEquation
Bookmarks

```
        System.out.println("ax^2 + bx + c = 0\nenter a b c:
        a = input.nextDouble();
        b = input.nextDouble();
        c = input.nextDouble();
        if (a == 0)
            linearEquation(b, c);
        else {
            double delta = b*b - 4*a*c;
            if(delta > 0 )
                System.out.println("two roots: x1 = " + (-b- Math.sqrt(delta)) / (2*a) +
                        " x2 = " + (-b + Math.sqrt(delta)) / (2*a));
            else if (delta == 0) {
                System.out.println("double root x1 = x2 =  " + -b / (2*a));
            }
            else
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.3.3\lib\idea_rt.
ax^2 + bx + c = 0
enter a b c:
1 4 1
two roots: x1 = -3.732050807568877 x2 = -0.2679491924311228
```

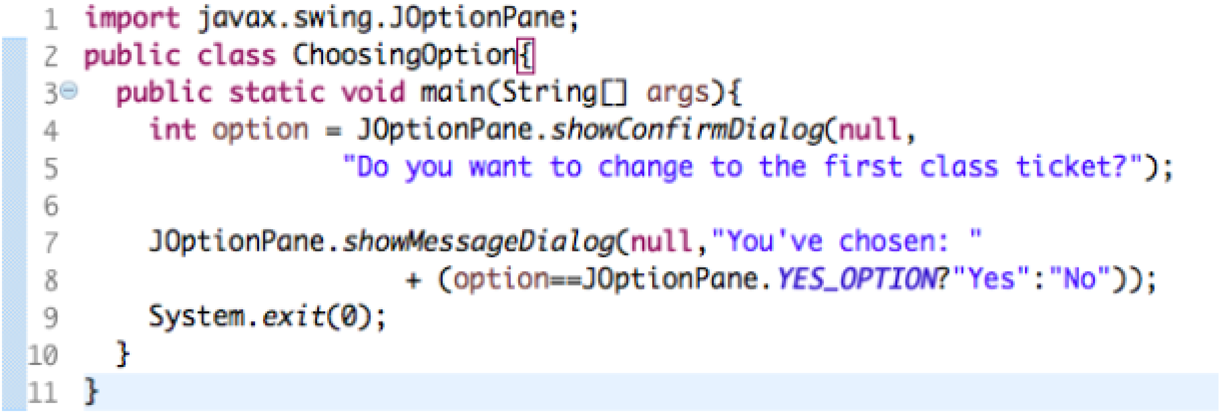


Lab1 〉 secondDegreeEquation 〉 main
calculation.java
linearEquation.java
linearSystem.java
secondDegreeEquation.java
Project
C:\Users\Admin\.vscode\Lab1\secondDegreeEquation.java
Run:
secondDegreeEquation
Bookmarks

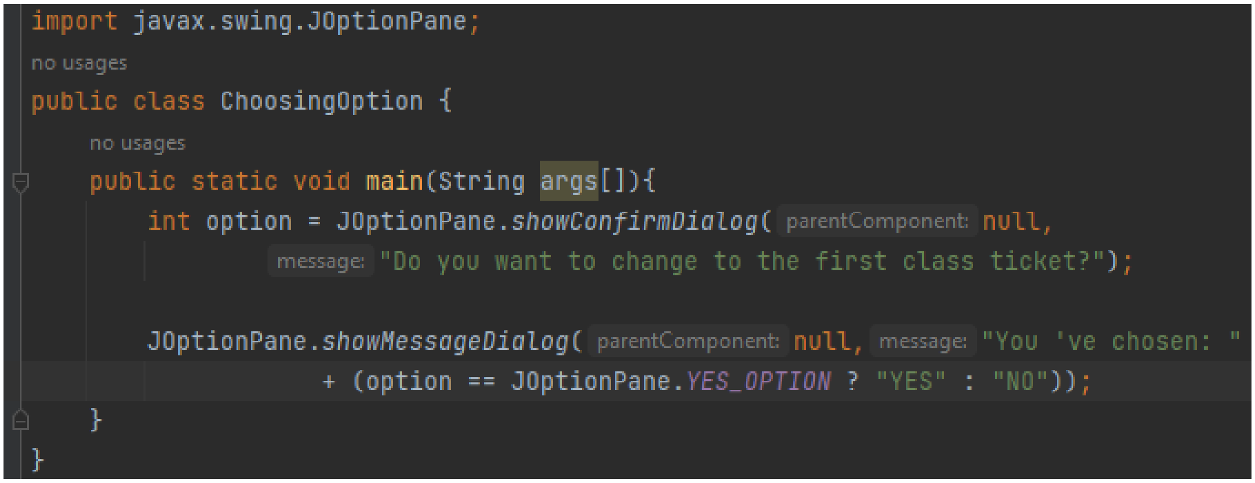
```java
        System.out.println("ax^2 + bx + c = 0\nenter a b c:
        a = input.nextDouble();
        b = input.nextDouble();
        c = input.nextDouble();
        if (a == 0)
            linearEquation(b, c);
        else {
            double delta = b*b - 4*a*c;
            if(delta > 0 )
                System.out.println("two roots: x1 = " + (-b- Math.sqrt(delta)) / (2*a) +
                        " x2 = " + (-b + Math.sqrt(delta)) / (2*a));
            else if (delta == 0) {
                System.out.println("double root x1 = x2 =  " + -b / (2*a));
            }
            else
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2
ax^2 + bx + c = 0
enter a b c:
4 4 1
double root x1 = x2 =  -0.5
```

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



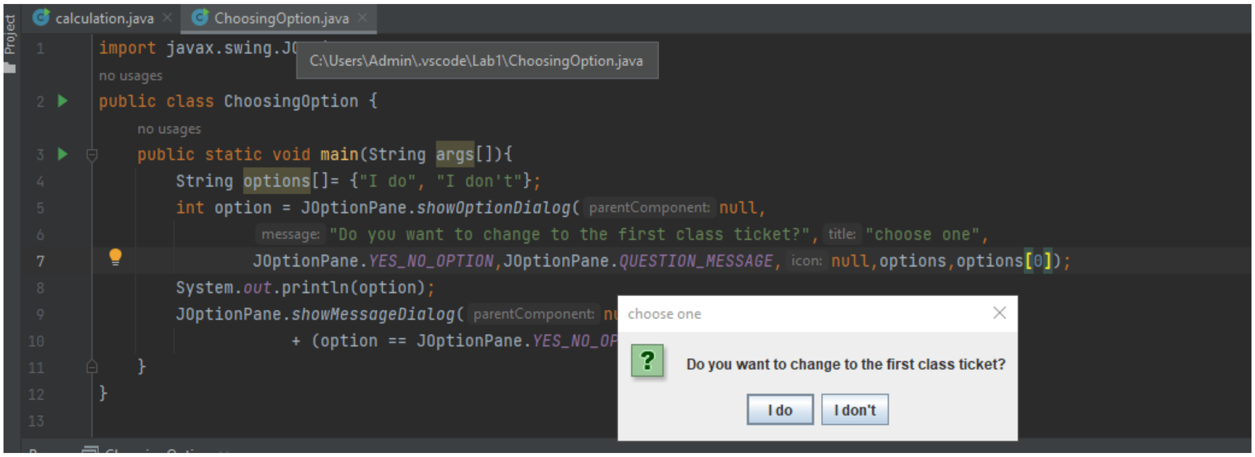
```java
import javax.swing.JOptionPane;
public class ChoosingOption{
  public static void main(String[] args){
    int option = JOptionPane.showConfirmDialog(null,
                    "Do you want to change to the first class ticket?");

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



```java
import javax.swing.JOptionPane;
no usages
public class ChoosingOption {
    no usages
    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"));
    }
}
```

If user choose “Cancel”, option is equal to 2 then the output is NO

How to customize the options to users, e.g. only two options: “Yes” and “No”, OR “I do” and “I don’t”

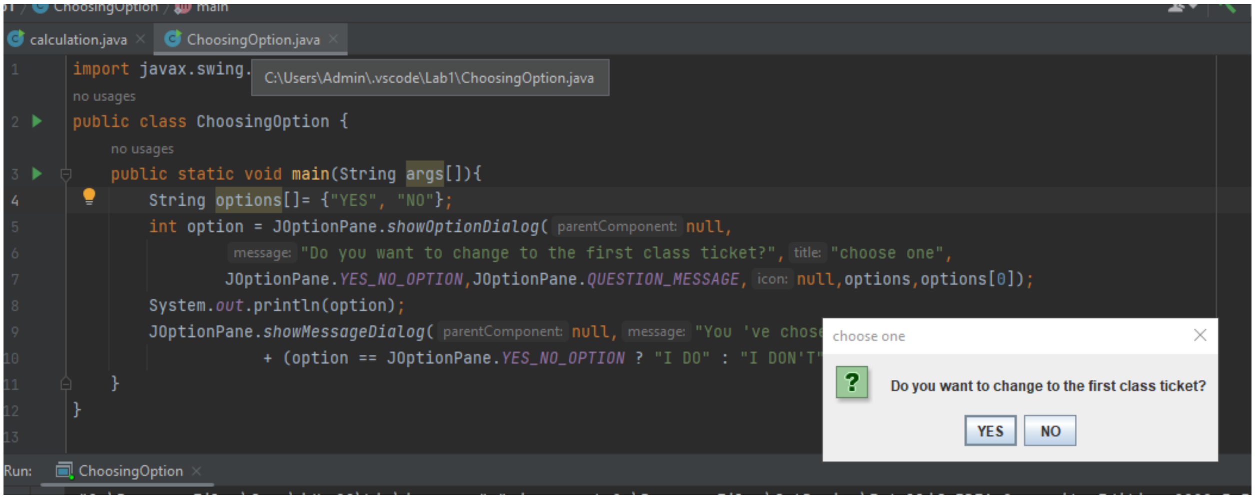


C:\Users\Admin\.vscode\Lab1\ChoosingOption.java

```java
import javax.swing.JO
public class ChoosingOption {
    public static void main(String args[]){
        String options[]= {"I do", "I don't"};
        int option = JOptionPane.showOptionDialog( null,
                "Do you want to change to the first class ticket?", "choose one",
                    JOptionPane.YES_NO_OPTION,JOptionPane.QUESTION_MESSAGE, null,options,options[0]);
        System.out.println(option);
        JOptionPane.showMessageDialog( nu
                + (option == JOptionPane.YES_NO_OP
    }
}
```

choose one

Do you want to change to the first class ticket?



C:\Users\Admin\.vscode\Lab1\ChoosingOption.java

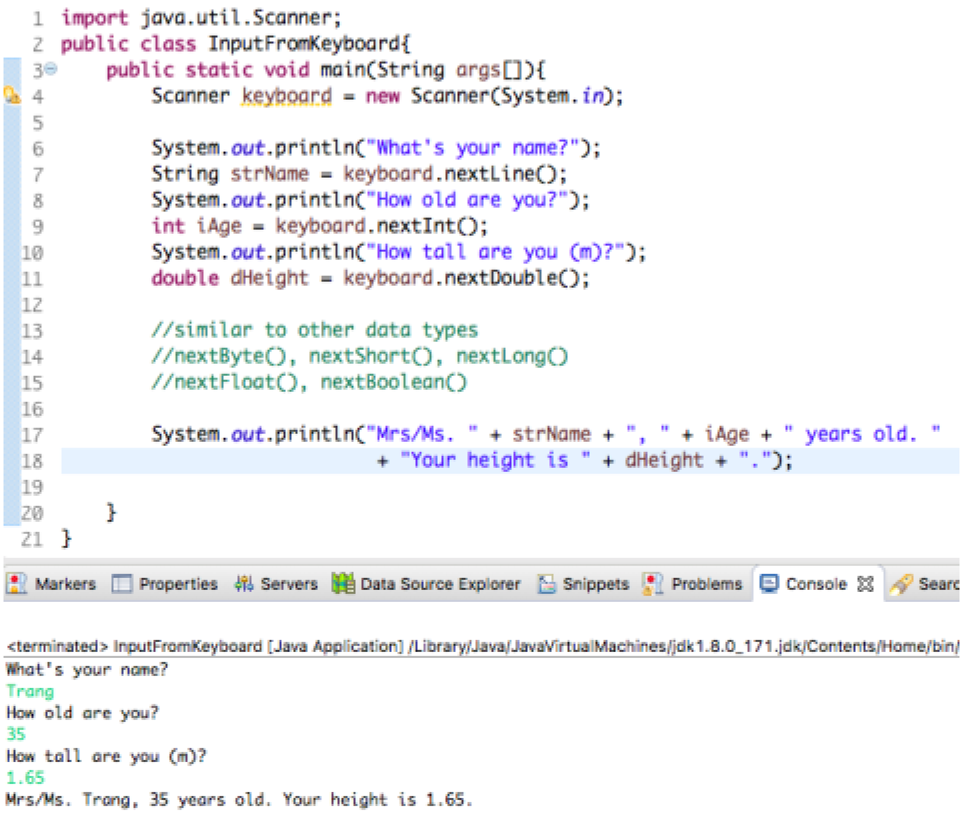
```java
import javax.swing.
public class ChoosingOption {
    public static void main(String args[]){
        String options[]= {"YES", "NO"};
        int option = JOptionPane.showOptionDialog( null,
                "Do you want to change to the first class ticket?", "choose one",
                    JOptionPane.YES_NO_OPTION,JOptionPane.QUESTION_MESSAGE, null,options,options[0]);
        System.out.println(option);
        JOptionPane.showMessageDialog( null, "You 've chose
                + (option == JOptionPane.YES_NO_OPTION ? "I DO" : "I DON'T"
    }
}
```

choose one

Do you want to change to the first class ticket?

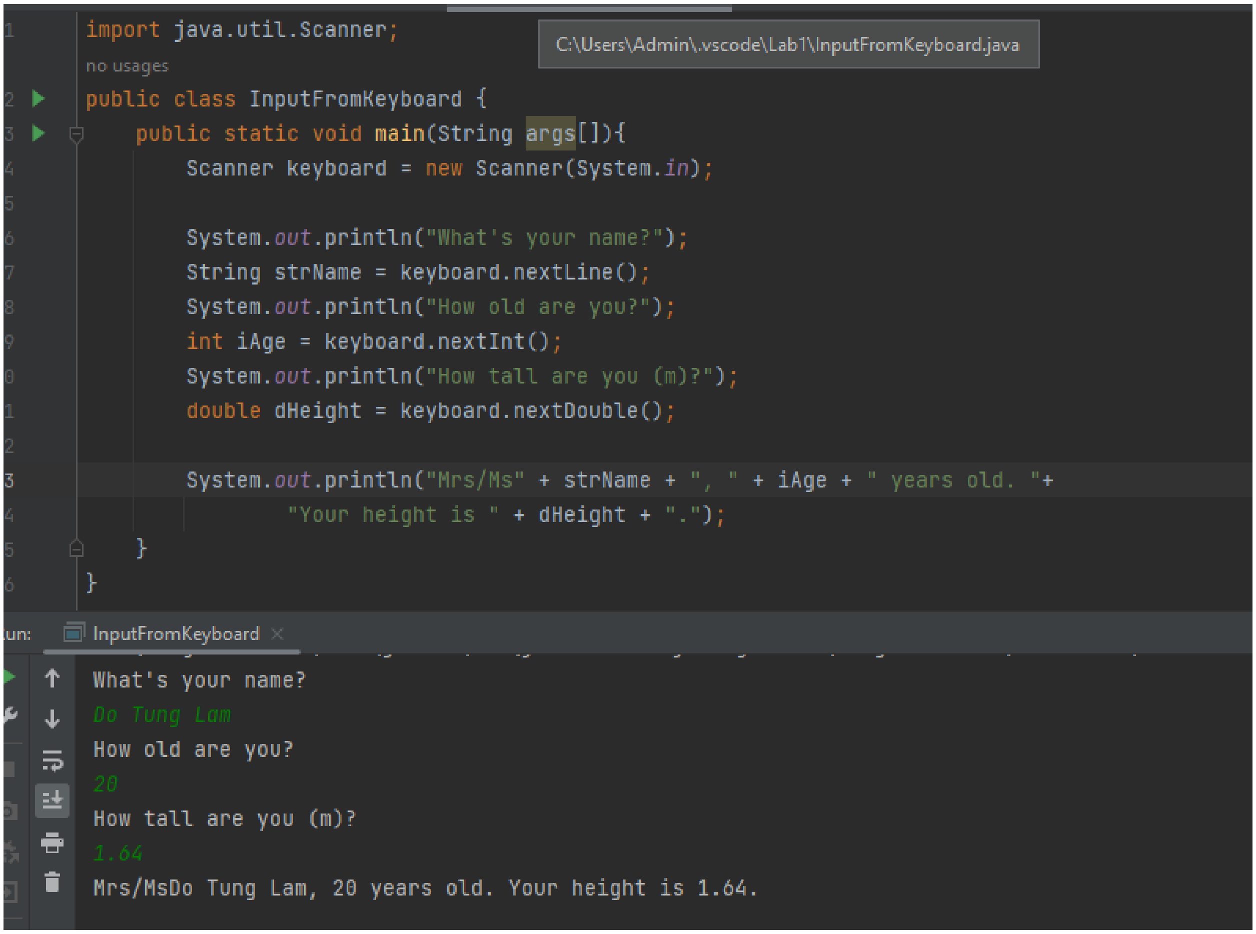
## 6.2 Write a program for input/output from keyboard

Figure 14. Run application (1)



```
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.
```

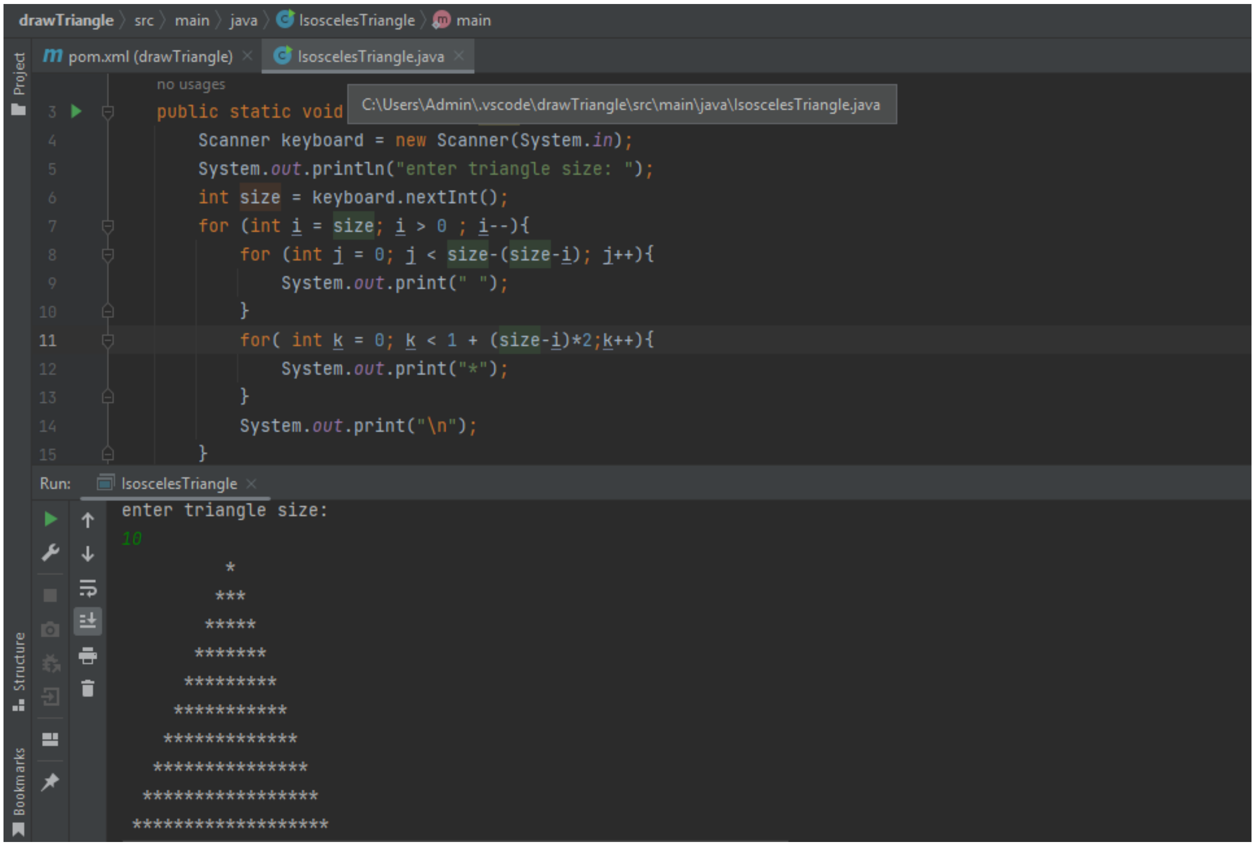


```java
import java.util.Scanner;
public class InputFromKeyboard {
    public static void main(String args[]){
        Scanner keyboard = new Scanner(System.in);

        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();

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

```
What's your name?
Do Tung Lam
How old are you?
20
How tall are you (m)?
1.64
Mrs/MsDo Tung Lam, 20 years old. Your height is 1.64.
```

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

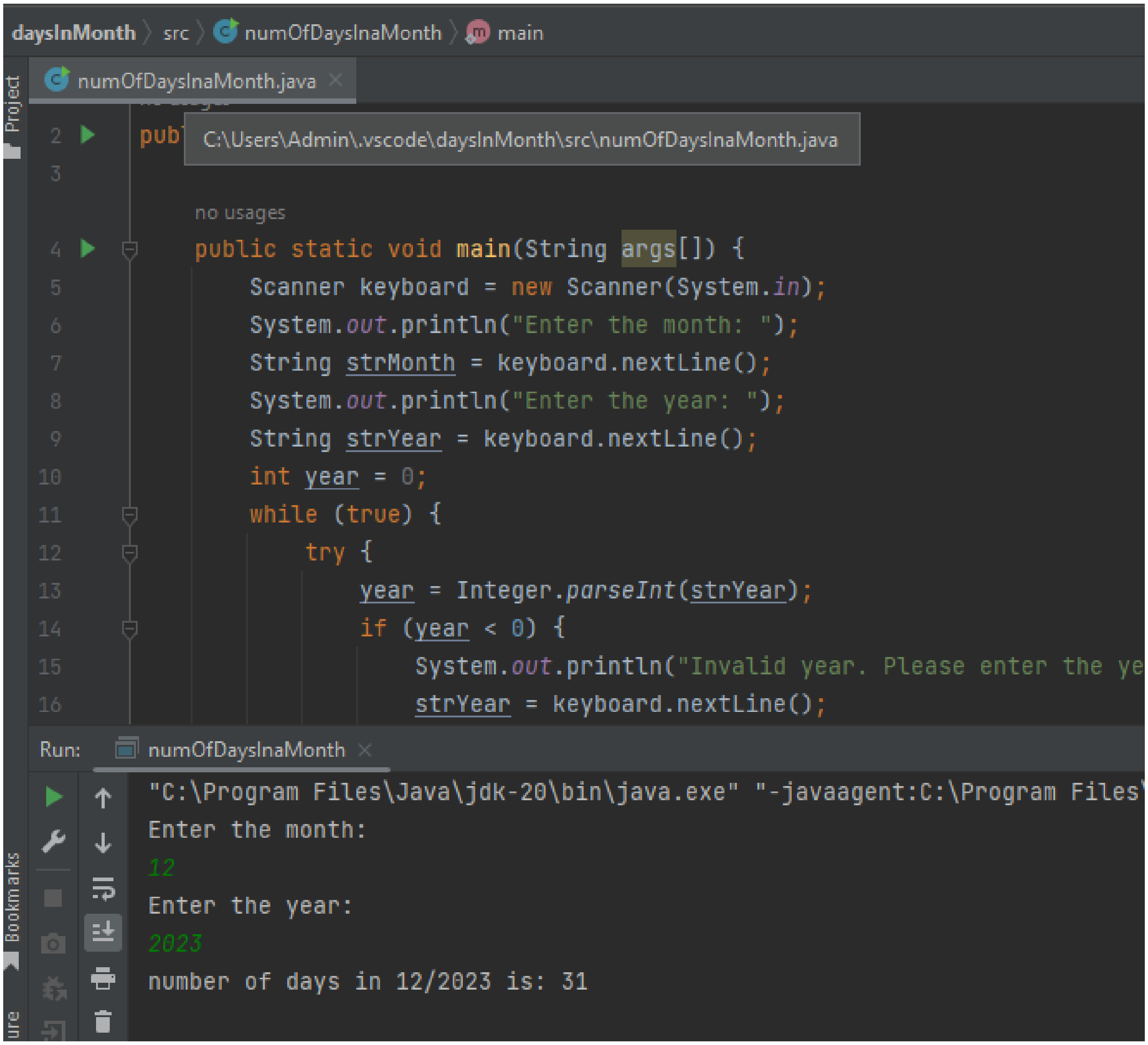
### Result


drawTriangle 〉 src 〉 main 〉 java 〉 IsoscelesTriangle 〉 main
pom.xml (drawTriangle)
IsoscelesTriangle.java
Project
Structure
Bookmarks
Run:
IsoscelesTriangle
C:\Users\Admin\.vscode\drawTriangle\src\main\java\IsoscelesTriangle.java

```
    no usages
    public static void
        Scanner keyboard = new Scanner(System.in);
        System.out.println("enter triangle size: ");
        int size = keyboard.nextInt();
        for (int i = size; i > 0 ; i--){
            for (int j = 0; j < size-(size-i); j++){
                System.out.print(" ");
            }
            for( int k = 0; k < 1 + (size-i)*2;k++){
                System.out.print("*");
            }
            System.out.print("\n");
        }
```

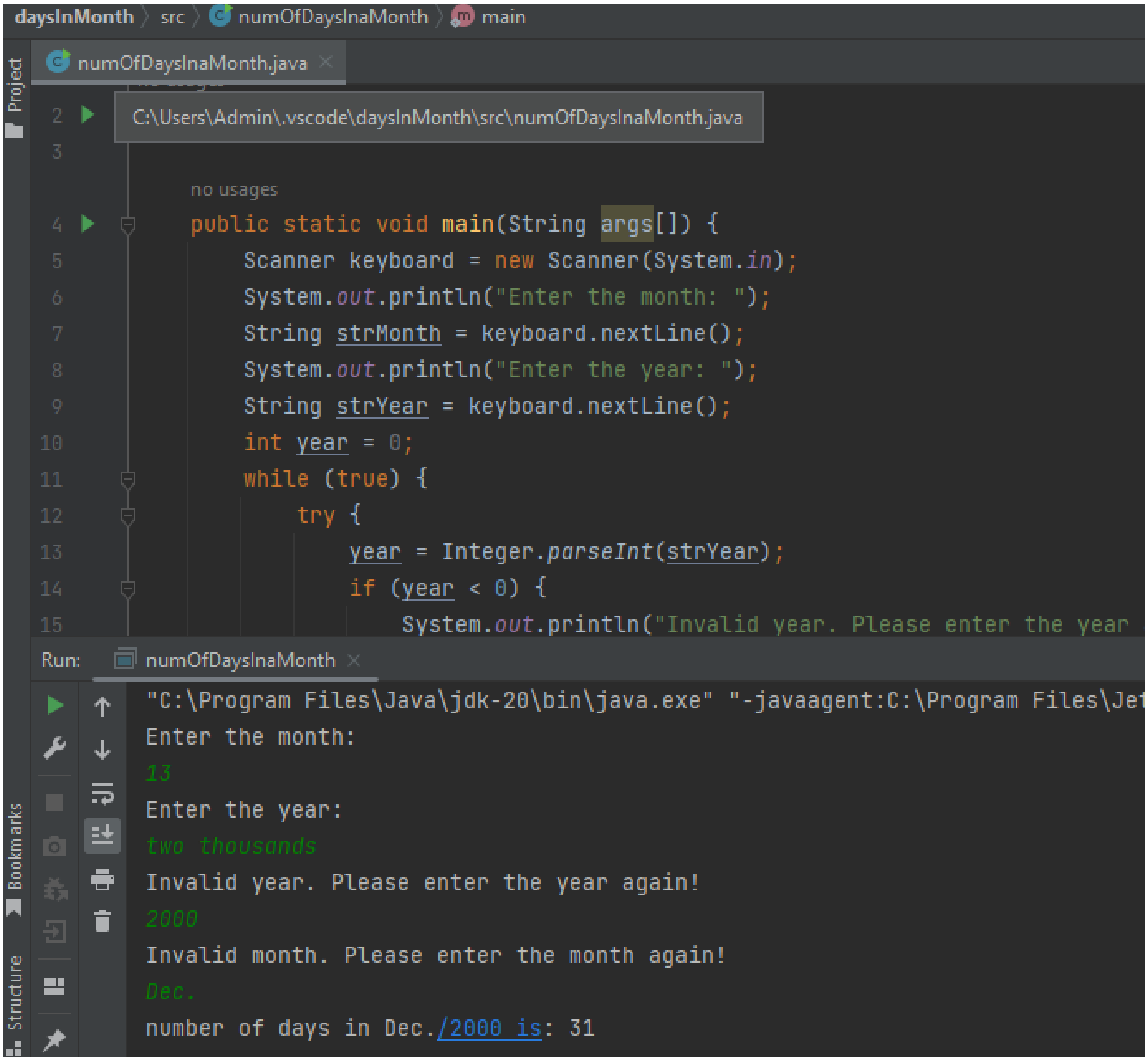
```
enter triangle size: 
10
          *
         ***
        *****
       *******
      *********
     ***********
    *************
   ***************
  *****************
 *******************
```

### 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.



```
pub

    no usages
    public static void main(String args[]) {
        Scanner keyboard = new Scanner(System.in);
        System.out.println("Enter the month: ");
        String strMonth = keyboard.nextLine();
        System.out.println("Enter the year: ");
        String strYear = keyboard.nextLine();
        int year = 0;
        while (true) {
            try {
                year = Integer.parseInt(strYear);
                if (year < 0) {
                    System.out.println("Invalid year. Please enter the ye
                    strYear = keyboard.nextLine();
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files
Enter the month:
12
Enter the year:
2023
number of days in 12/2023 is: 31
```

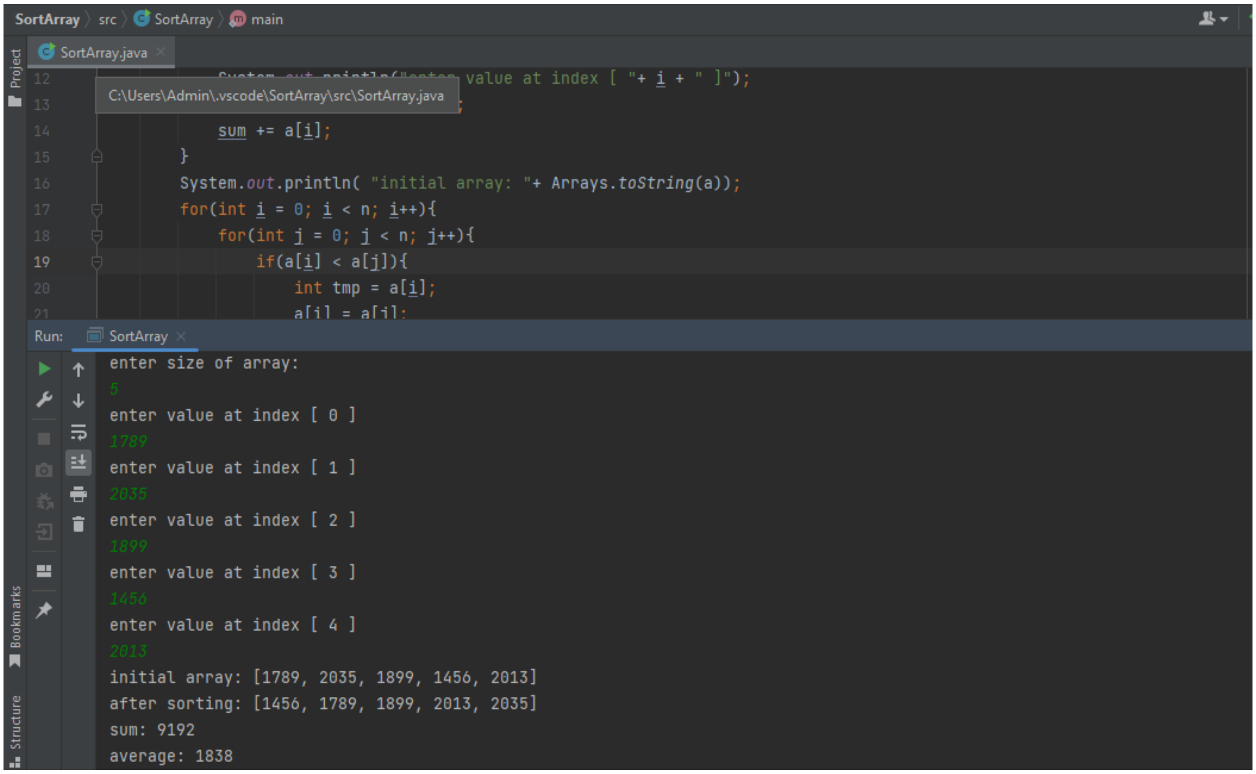


C:\Users\Admin\.vscode\daysInMonth\src\numOfDaysInaMonth.java

```java
    no usages
    public static void main(String args[]) {
        Scanner keyboard = new Scanner(System.in);
        System.out.println("Enter the month: ");
        String strMonth = keyboard.nextLine();
        System.out.println("Enter the year: ");
        String strYear = keyboard.nextLine();
        int year = 0;
        while (true) {
            try {
                year = Integer.parseInt(strYear);
                if (year < 0) {
                    System.out.println("Invalid year. Please enter the year
```

```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\Jet
Enter the month:
13
Enter the year:
two thousands
Invalid year. Please enter the year again!
2000
Invalid month. Please enter the month again!
Dec.
number of days in Dec./2000 is: 31
```

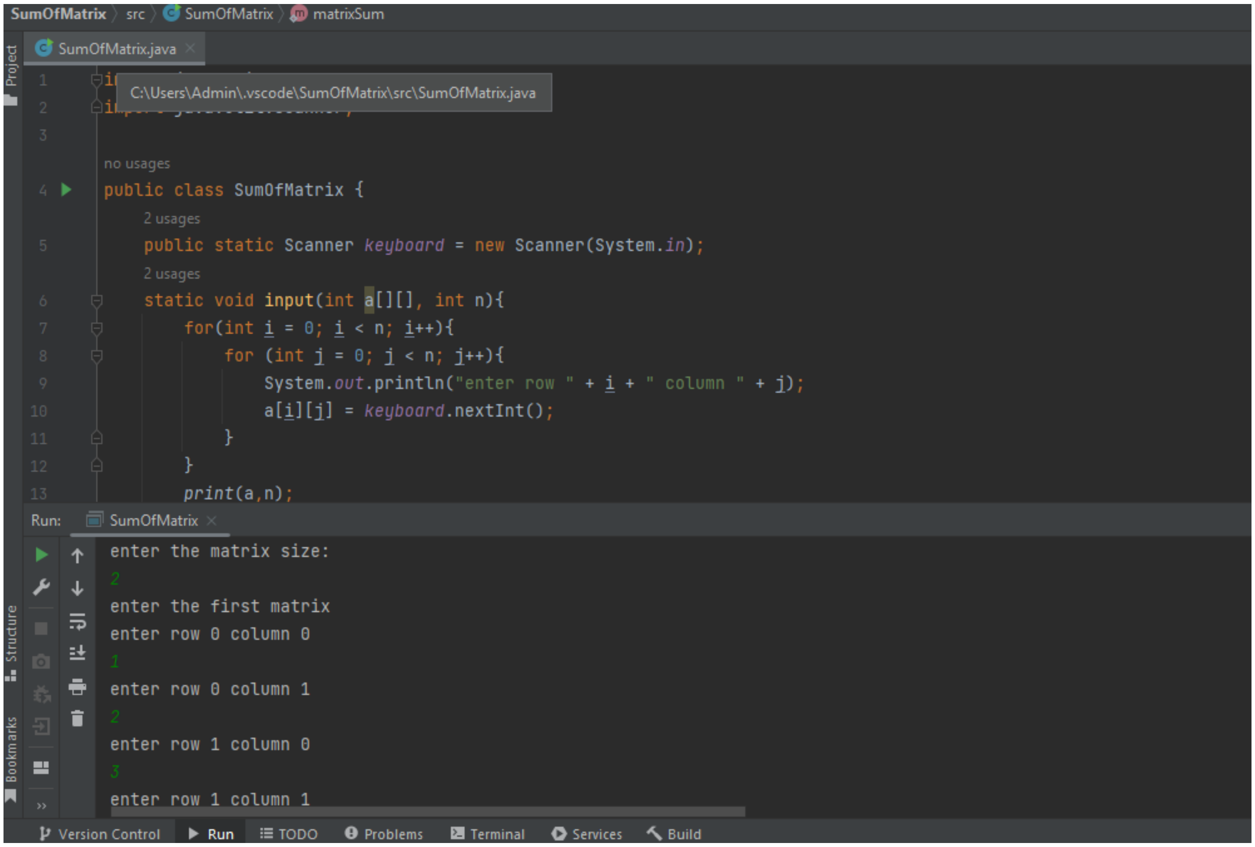
### 6.5 Write a Java program to sort a numeric array, and calculate the sum and average value of array elements.


SortArray 〉 src 〉 SortArray 〉 main
SortArray.java
C:\Users\Admin\.vscode\SortArray\src\SortArray.java
Project
Run:
SortArray
Bookmarks
Structure

```java
                System.out.println("enter value at index [ "+ i + " ]");
                                                                   ;
                sum += a[i];
            }
            System.out.println( "initial array: "+ Arrays.toString(a));
            for(int i = 0; i < n; i++){
                for(int j = 0; j < n; j++){
                    if(a[i] < a[j]){
                        int tmp = a[i];
                        a[i] = a[j];
```

```
enter size of array:
5
enter value at index [ 0 ]
1789
enter value at index [ 1 ]
2035
enter value at index [ 2 ]
1899
enter value at index [ 3 ]
1456
enter value at index [ 4 ]
2013
initial array: [1789, 2035, 1899, 1456, 2013]
after sorting: [1456, 1789, 1899, 2013, 2035]
sum: 9192
average: 1838
```

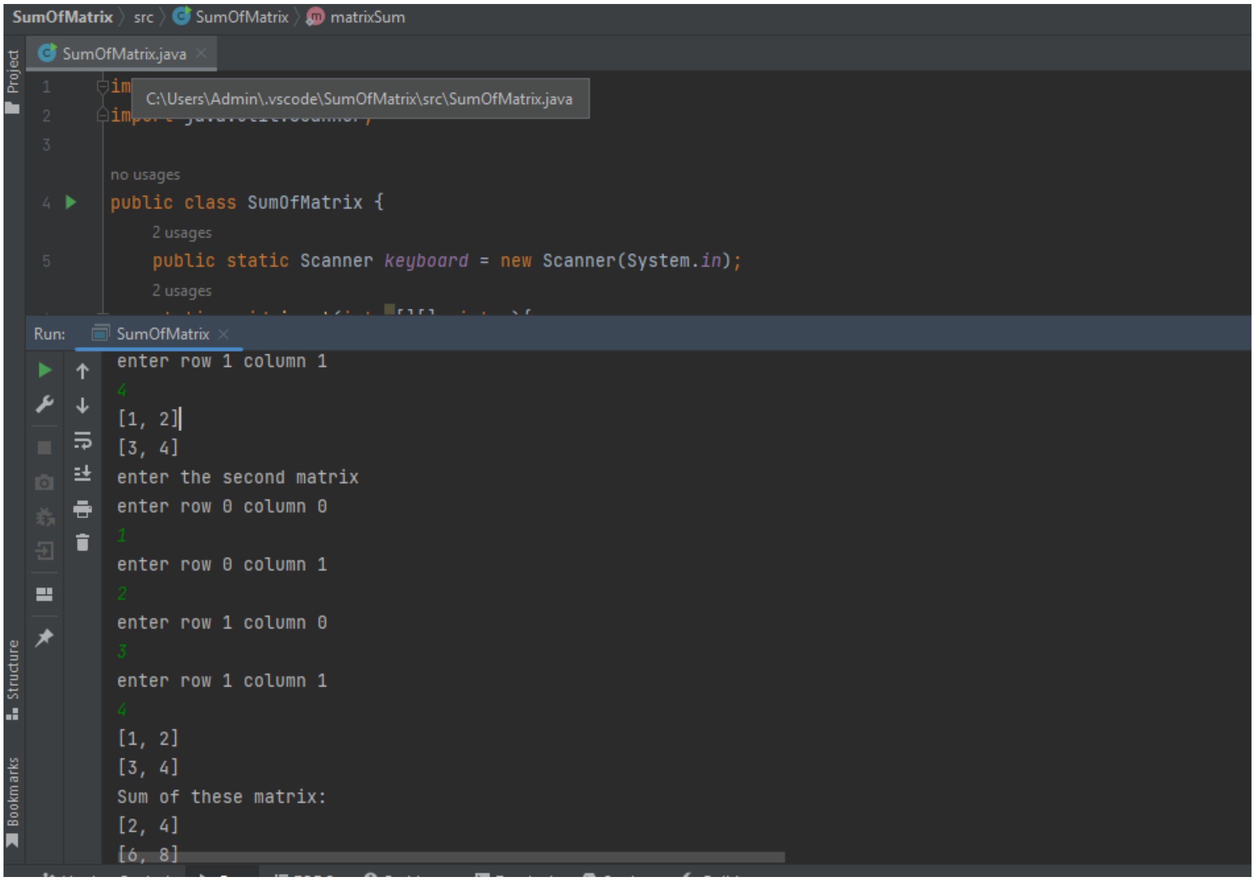
## 6.6 Write a Java program to add two matrices of the same size



C:\Users\Admin\.vscode\SumOfMatrix\src\SumOfMatrix.java

```
i
import java.util.Scanner;

no usages
public class SumOfMatrix {
    2 usages
    public static Scanner keyboard = new Scanner(System.in);
    2 usages
    static void input(int a[][], int n){
        for(int i = 0; i < n; i++){
            for (int j = 0; j < n; j++){
                System.out.println("enter row " + i + " column " + j);
                a[i][j] = keyboard.nextInt();
            }
        }
        print(a,n);
```

```
enter the matrix size:
2
enter the first matrix
enter row 0 column 0
1
enter row 0 column 1
2
enter row 1 column 0
3
enter row 1 column 1
```


SumOfMatrix 〉 src 〉 SumOfMatrix 〉 matrixSum
SumOfMatrix.java
C:\Users\Admin\.vscode\SumOfMatrix\src\SumOfMatrix.java
Project
Run:
SumOfMatrix
Structure
Bookmarks

```
im
import java.util.Scanner;

no usages
public class SumOfMatrix {
    2 usages
    public static Scanner keyboard = new Scanner(System.in);
    2 usages
```

```
enter row 1 column 1
4
[1, 2]
[3, 4]
enter the second matrix
enter row 0 column 0
1
enter row 0 column 1
2
enter row 1 column 0
3
enter row 1 column 1
4
[1, 2]
[3, 4]
Sum of these matrix:
[2, 4]
[6, 8]
```