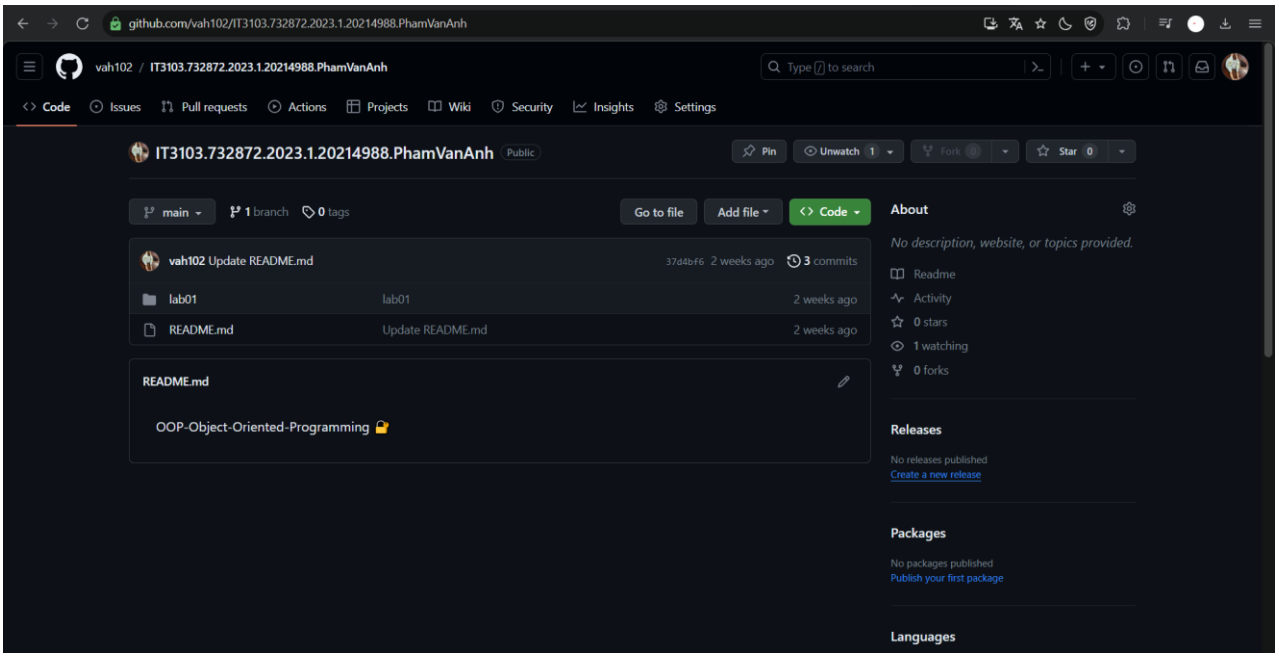
BÁO CÁO THỰC HÀNH LAB 01
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

Mục lục

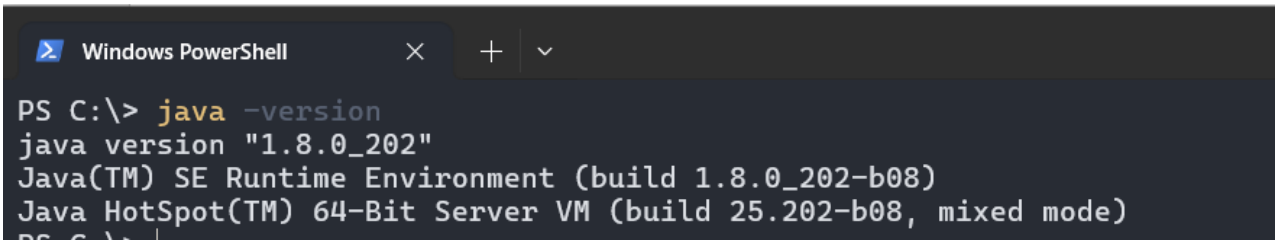
Làm việc với Github



Link:

https://github.com/vah102/IT3103.732872.2023.1.20214988.PhamVanAnh

Java Setup



The Very First Java Programs

2.2.1 Write, compile the first Java application:

HelloWorld.java

```java
//2.1: Java Programming Steps
//Author: Pham Van Anh 20214988

public class HelloWorld {

    public static void main(String[] args) {
        System.out.println("Pham Van Anh 20214988");
        System.out.println("Xin chao \n cac ban!");
        System.out.println("Hello \t world!");
    } //end of method main
}

```

Kết quả:

Run HelloWorld

```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Pham Van Anh 20214988
Xin chao
 cac ban!
Hello    world!

Process finished with exit code 0
```

2.2.2 Write, compile the first Java application:

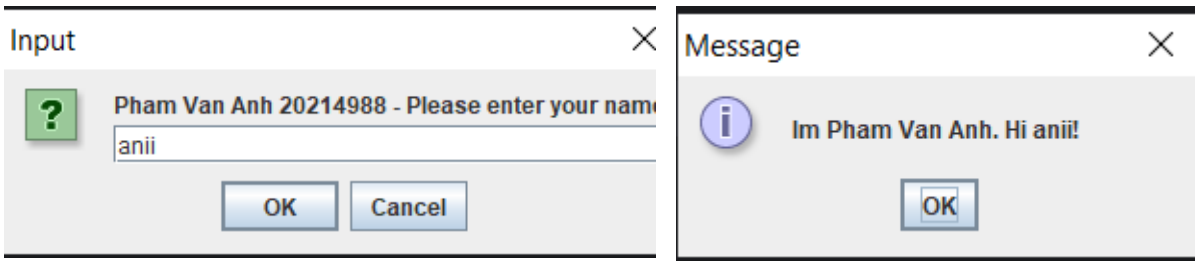
HelloWorld.java | FitstDialog.java | HelloNameDialog.java | ShowTwoNumbers.java

```java
//Ex2: FirstDialog.java
//Author: Pham Van Anh 20214988
//import Package javax.swing to use the dialog

import javax.swing.JOptionPane;

public class FitstDialog {

    public static void main(String[] args) {
        //use the method showDialog to print text to cmd
        JOptionPane.showMessageDialog(null, "Hello world! How are you?");

        //exits current program by terminating running Java virtual machine
        System.exit(0);
    }
}
```

2.2.3 Write, compile the first input dialog Java application

HelloWorld.java | FitstDialog.java | HelloNameDialog.java | ShowTwoNumbers.java | SolveEquation.jav

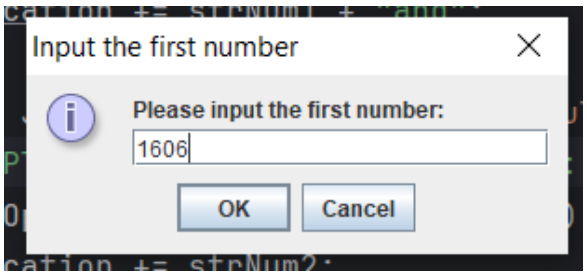
```java
//Ex3: HelloNamDialog.java
//Author: Pham Van Anh 20214988

import javax.swing.JOptionPane;
public class HelloNameDialog {
    public static void main(String[] args){
        String result;

        //use the method showInputDialog to get input from user
        result = JOptionPane.showInputDialog("Pham Van Anh 20214988 - Please enter your name");

        //use the method showInputDialog to print text to cmd
        JOptionPane.showMessageDialog(null, "Im Pham Van Anh. Hi " + result + "!");

        //exit program
        System.exit(0);
    }
}
```

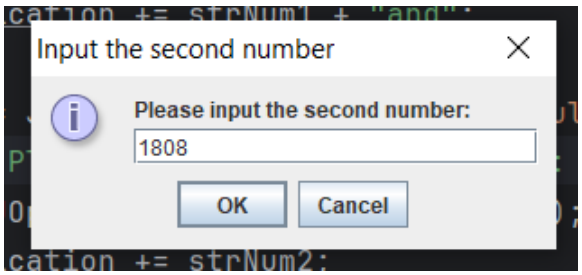


2.2.4 Write, compile, and run the following example:

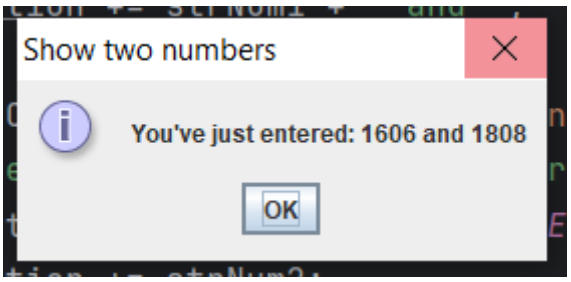
HelloWorld.java | FitstDialog.java | HelloNameDialog.java | ShowTwoNumbers.java

```java
//Ex4: ShowTwoNumbers.java
//Author: Pham Van Anh 20214988
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main(String[] args) {
        //declare two strings reference data variables
        String strNum1, strNum2;
        //declare a variable containing the message content
        String strNotification = "You've just entered: ";

        //use the method showInputDialog to get input from user
        strNum1 = JOptionPane.showInputDialog(null,
                "Please input the first number: ","Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        //perform a string concatenation of the previous message
        strNotification += strNum1 + " and ";

        //use the method showInputDialog to get input from user
        strNum2 = JOptionPane.showInputDialog(null,
                "Please input the second number: ","Input the second number",
                JOptionPane.INFORMATION_MESSAGE);
        //perform a string concatenation of the previous mesage
        strNotification += strNum2;

        JOptionPane.showMessageDialog(null, strNotification,
                "Show two numbers", JOptionPane.INFORMATION_MESSAGE);

        //exit the program
        System.exit(0);
    }
}
```





Kết quả:

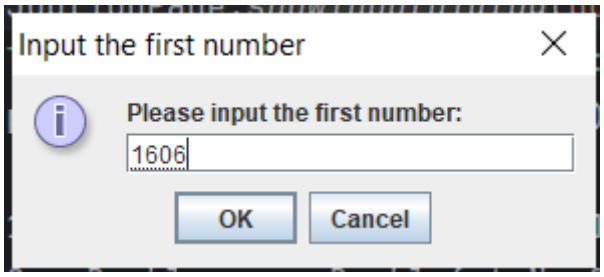


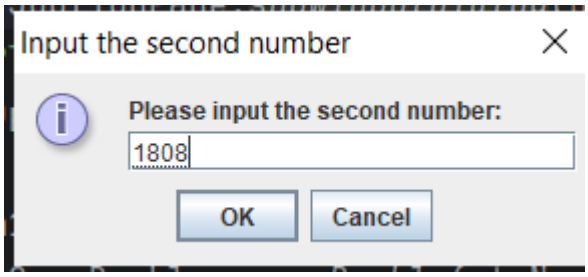
2.2.5 Write a program to calculate sum, difference, product, and quotient of 2 double numbers which are entered by users.

HelloWorld.java | FitstDialog.java | HelloNameDialog.java | ShowTwoNumbers.java | SolveEquation.java

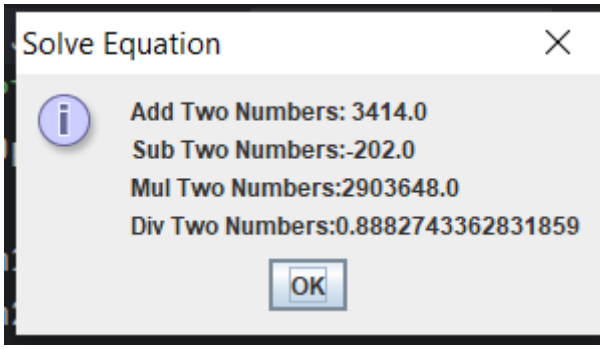
```java
//Ex5: SolveEquation.java
////Author: Pham Van Anh 20214988

import javax.swing.JOptionPane;
public class SolveEquation {
    public static void main(String[] args) {
        ////declare two strings reference data variables
        String strNum1, strNum2;

        //use method showInputDialog to get input from user
        strNum1 = JOptionPane.showInputDialog(null,
                "Please input the first number: ","Input the first number",
                JOptionPane.INFORMATION_MESSAGE);

        //use method showInputDialog to get input from user
        strNum2 = JOptionPane.showInputDialog(null,
                "Please input the second number: ","Input the second number",
                JOptionPane.INFORMATION_MESSAGE);

        //to convert from string to double
        double num1 = Double.parseDouble(strNum1);
        double num2 = Double.parseDouble(strNum2);

        //sumsubmuldiv
        String noti = "Add Two Numbers: ";
        noti += (num1 + num2);
        noti += "\nSub Two Numbers:" + (num1 - num2);
        noti += "\nMul Two Numbers:" + (num1 * num2);
        noti += "\nDiv Two Numbers:" + (num1 / num2);

```

```
31          JOptionPane.showMessageDialog(null, noti,
                    "Solve Equation", JOptionPane.INFORMATION_MESSAGE);
33
34          //exit the program
35          System.exit(0);
36      }
37  }
```





Kết quả:



2.2.6 Write a program to solve: For simplicity, we only consider the real roots of the equation in this task.

```
oWorld.java  FitstDialog.java  HelloNameDialog.java  ShowTwoNumbers.java  SolveEquation.java  DegreeEquation.java
1   //Ex6: DegreeEquation.java
2   //Author: Pham Van Anh 20214988
3
4   import javax.swing.JOptionPane;
5   import java.util.Scanner;
6   public class DegreeEquation {
7       public static void main(String[] args) {
8           //key is a number to choose one of tools
9           int key;
10          System.out.println("List of tools:");
11          System.out.println("1. Solve first-order equations\t ax+b=0");
12          System.out.println("2. Solve a system of first-order equations\n\t a11x1+a12x2=b1\n\t a21x1+a22x2=b2");
13          System.out.println("3. Solve third-order equations\t ax^2+bx+c=0");
14          System.out.print("Choose a tool to solve: ");
15          Scanner scanner = new Scanner(System.in);
16          key = scanner.nextInt();
17
```

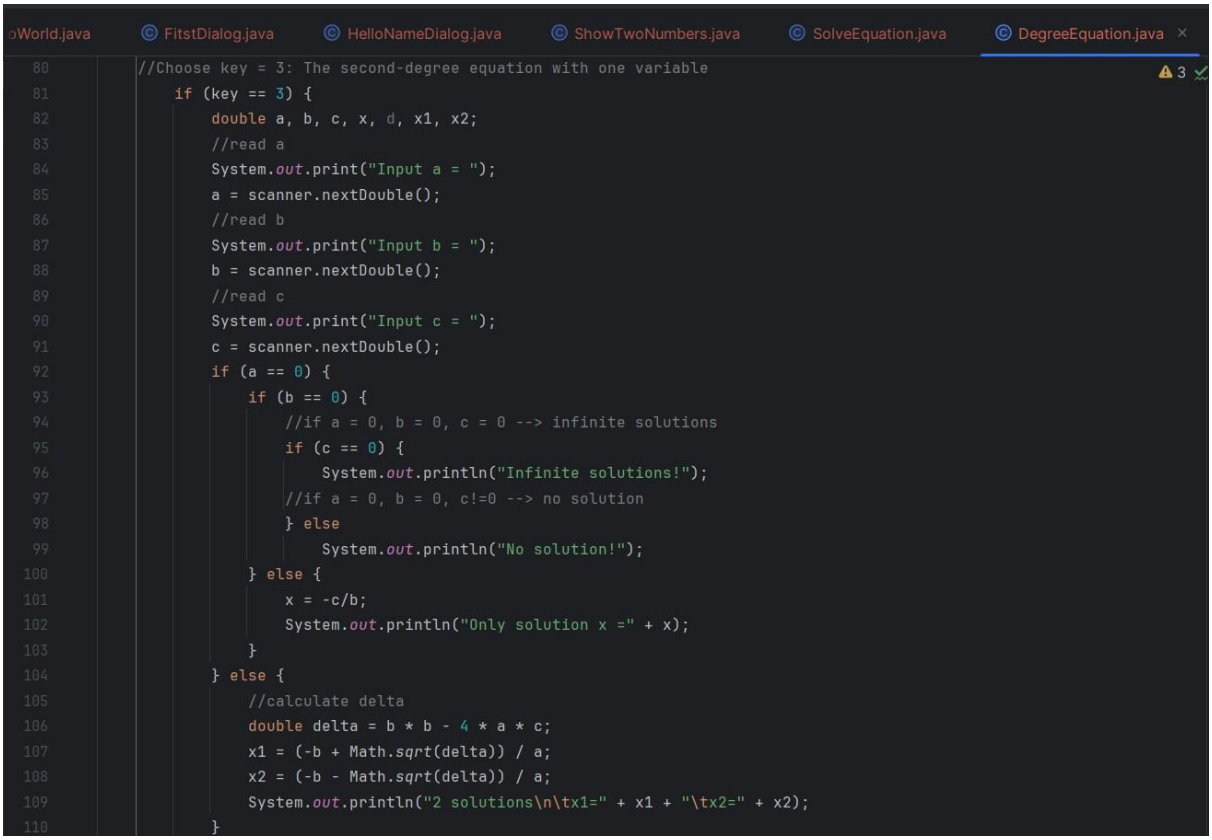
key = 1

```java
//Choose 1: The first-degree equation (linear equation) with one variable ax + b = 0
    if (key == 1) {
        //get input from user
        double a, b;
        System.out.print("Input a= ");
        a = scanner.nextDouble();
        System.out.print("Input b= ");
        b = scanner.nextDouble();

        //if a = 0, b = 0 --> infinite solutions
        if (a == 0 && b == 0) {
            System.out.println("Infinite solutions!");

        //if a= 0, b != 0 --> no solution
        } else if (a == 0 && b != 0) {
            System.out.println("No solution!");

        //if a != 0, b != 0 --> have a solution
        } else {
            double x = -b / a;
            System.out.println("Equation has one solution x= " + x);
        }
    }

```

key = 2

```java
//Choose 2: The system of first-degree equations (linear system) with two variable a11x1+a12x2=b1 a21x1+a22x2=b
    if (key == 2) {
        //get input from user
        double a11, a12, a21, a22, b1, b2, d, d1, d2, x1, x2;
        System.out.print("Input a11 = ");
        a11 = scanner.nextDouble();
        System.out.print("Input a12 = ");
        a12 = scanner.nextDouble();
        System.out.print("Input a21 = ");
        a21 = scanner.nextDouble();
        System.out.print("Input a22 = ");
        a22 = scanner.nextDouble();
        System.out.print("Input b1 = ");
        b1 = scanner.nextDouble();
        System.out.print("Input b2 = ");
        b2 = scanner.nextDouble();

        //calculate determinant
        d = a11 * a22 - a21 * a12;
        d1 = b1 * a22 - a12 * b2;
        d2 = a11 * b2 - a21 * b1;
        if (d == 0 && d1 == 0 && d2 == 0) {
            System.out.println("Infinite solutions!");
        } else if (d != 0) {
            x1 = d1 / d;
            x2 = d2 / d;
            System.out.println("The system equation has only solution\n\t x1=" + x1 + "\n\tx2=" + x2);
        } else {
            System.out.println("No solution!");
        }
    }
```

key = 3

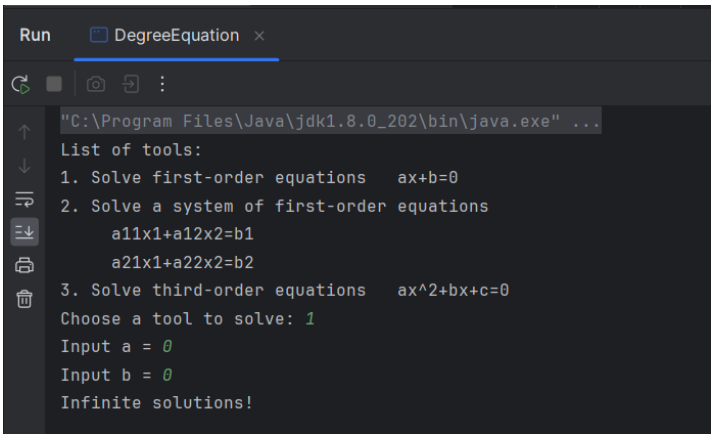


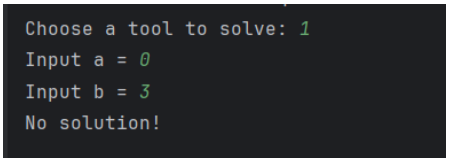
```
//Choose key = 3: The second-degree equation with one variable
    if (key == 3) {
        double a, b, c, x, d, x1, x2;
        //read a
        System.out.print("Input a = ");
        a = scanner.nextDouble();
        //read b
        System.out.print("Input b = ");
        b = scanner.nextDouble();
        //read c
        System.out.print("Input c = ");
        c = scanner.nextDouble();
        if (a == 0) {
            if (b == 0) {
                //if a = 0, b = 0, c = 0 --> infinite solutions
                if (c == 0) {
                    System.out.println("Infinite solutions!");
                //if a = 0, b = 0, c!=0 --> no solution
                } else
                    System.out.println("No solution!");
            } else {
                x = -c/b;
                System.out.println("Only solution x =" + x);
            }
        } else {
            //calculate delta
            double delta = b * b - 4 * a * c;
            x1 = (-b + Math.sqrt(delta)) / a;
            x2 = (-b - Math.sqrt(delta)) / a;
            System.out.println("2 solutions\n\tx1=" + x1 + "\tx2=" + x2);
        }
```

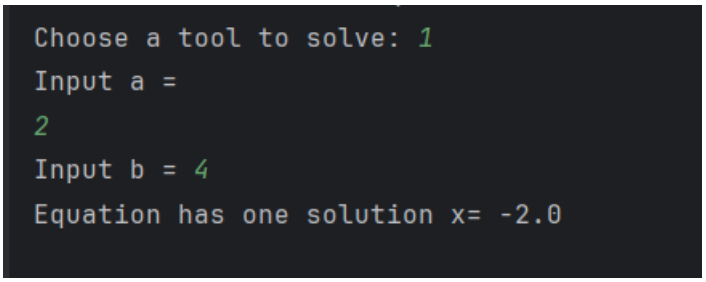
```
        }
    }
}
```

Kết quả:

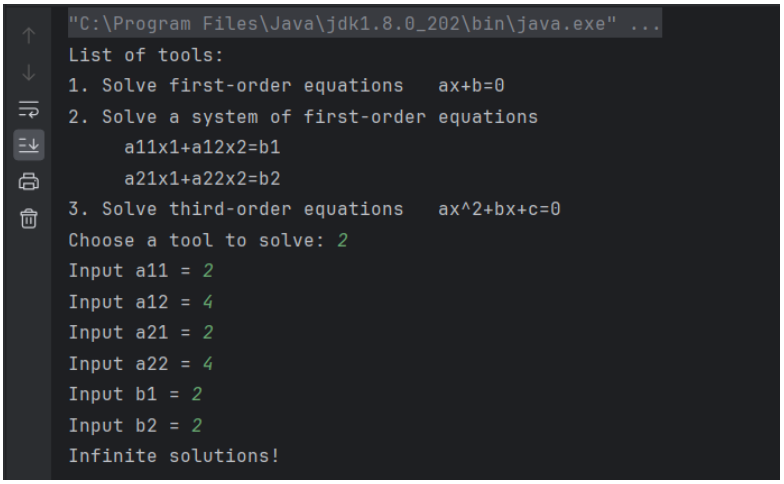
- key = 1 → first degree

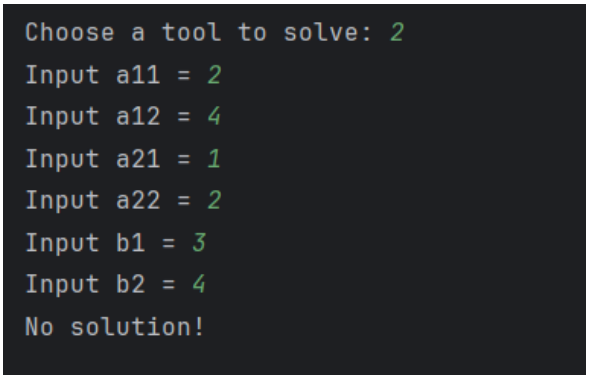


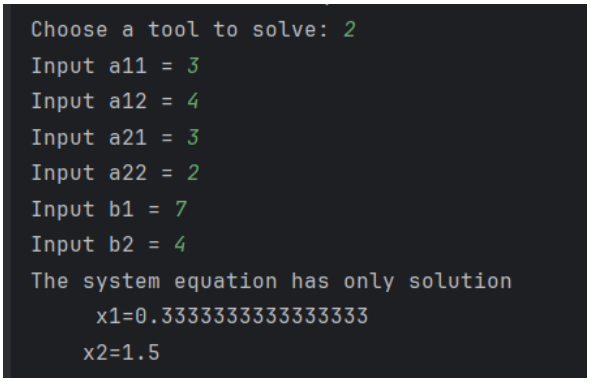




- key = 2 → The system of first - degree equations (linear system) with two variables







- key = 3 → The second-degree equation with one variable

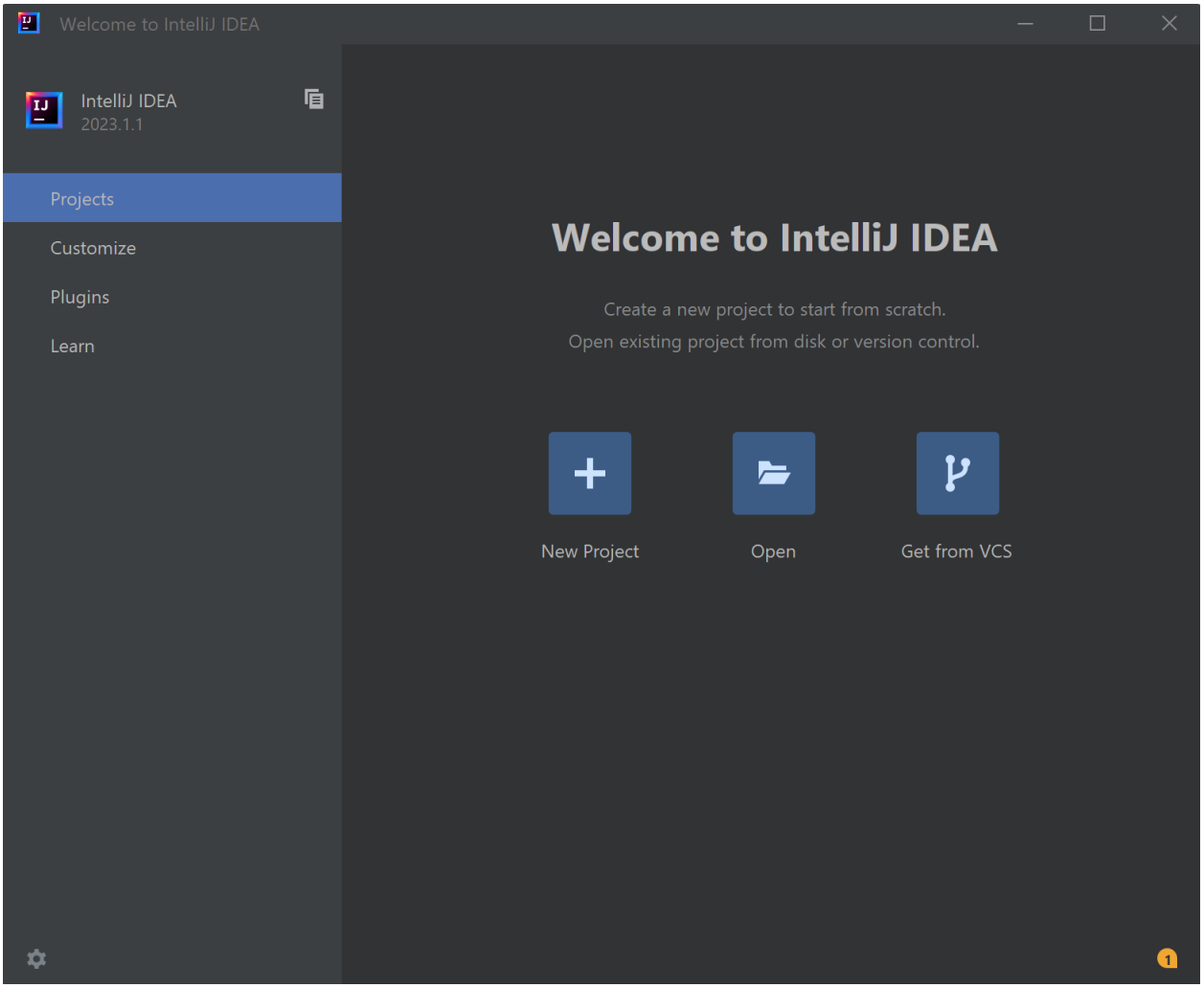
```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
List of tools:
1. Solve first-order equations   ax+b=0
2. Solve a system of first-order equations
     a11x1+a12x2=b1
     a21x1+a22x2=b2
3. Solve third-order equations   ax^2+bx+c=0
Choose a tool to solve: 3
Input a = 0
Input b = 0
Input c = 0
Infinite solutions!
```

```
Choose a tool to solve: 3
Input a = 0
Input b = 0
Input c = 2
No solution!
```

```
Choose a tool to solve: 3
Input a = 0
Input b = 2
Input c = 4
Only solution x =-2.0
```

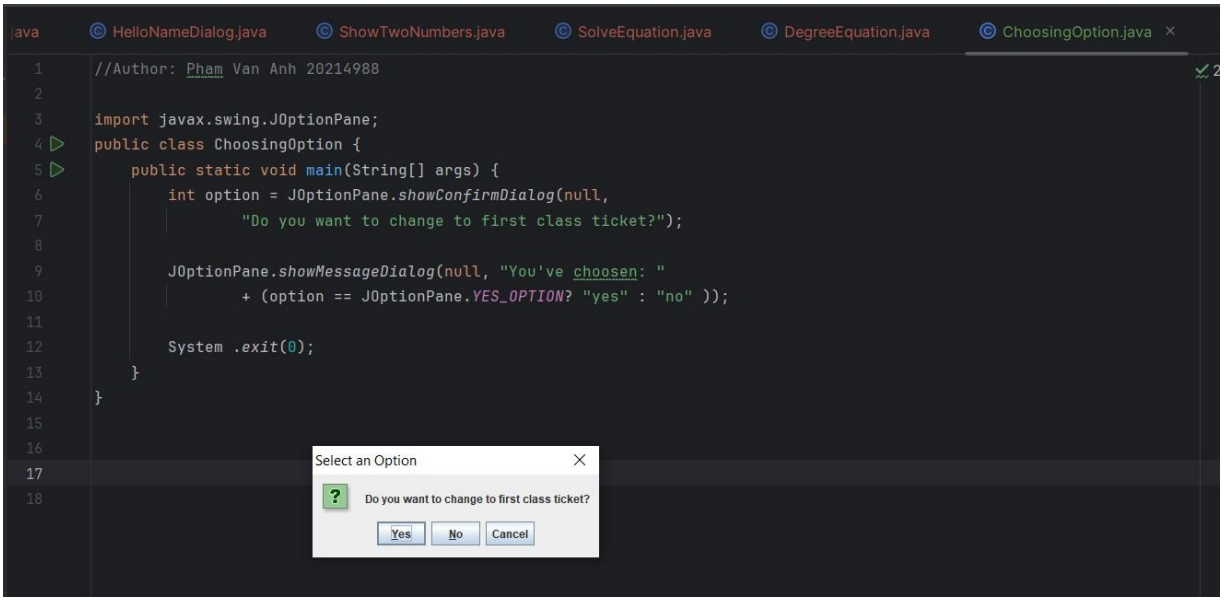
```
Choose a tool to solve: 3
Input a = 1
Input b = 5
Input c = 6
2 solutions
    x1=-4.0 x2=-6.0
```

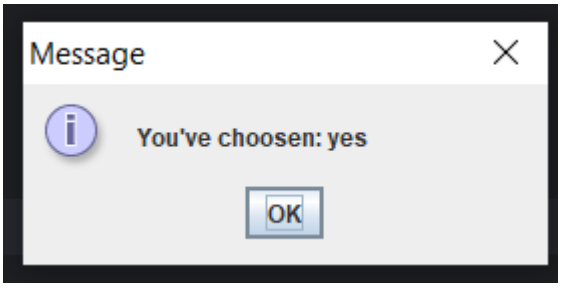
IntelliJ

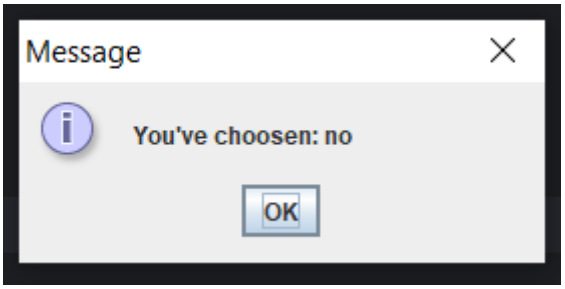

Welcome to IntelliJ IDEA
IntelliJ IDEA
2023.1.1
Projects
Customize
Plugins
Learn
Welcome to IntelliJ IDEA
Create a new project to start from scratch.
Open existing project from disk or version control.
New Project
Open
Get from VCS

Excercises

6.1 Write and run the the Choosing Option program:







- Trong Eclipse IDE cho Java, nếu người dùng chọn "Cancel" khi được nhắc lưu tài nguyên trước khi khởi chạy, điều đó có nghĩa là những thay đổi được thực hiện đối với dự án hoặc tệp sẽ không được lưu và thao tác khởi chạy sẽ bị hủy. Về cơ bản, nó ngăn quá trình xây dựng hoặc chạy diễn ra mà không lưu bất kỳ thay đổi nào chưa được lưu vào dự án hoặc tệp của bạn.

- Để customize như yêu cầu cần sử dụng nhiều tham số đầu vào của method showOptionDialog hơn, các text lựa chọn sẽ được lưu vào mảng xâu, về bản chất vẫn là câu hỏi yes/no, cụ thể như sau:

```
import javax.swing.JOptionPane;

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?",
                "Confirmation", // Dialog title
                JOptionPane.YES_NO_OPTION, // Option type
                JOptionPane.QUESTION_MESSAGE, // Message type
                null, // Icon (null for default)
                options, // Custom button text
                options[0]); // Default selected option

        if (option == JOptionPane.YES_OPTION) {
            JOptionPane.showMessageDialog(null, "You've chosen: I do");
        } else if (option == JOptionPane.NO_OPTION) {
            JOptionPane.showMessageDialog(null, "You've chosen: I don't");
        }

        System.exit(0);
    }
}
```

6.2 Write a program for input/output from keyboard

```
//author: Pham Van Anh

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

        System.out.println("Im Van Anh. 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 + ".");
    }
}
```

```
Run  InputFromKeyboard
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Im Van Anh. What's your name?
va
How old are you?
19
How tall are you (m)?
152
Mrs/Ms. va, 19 years old. Your height is 152.0.
```

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

veEquation.java | DegreeEquation.java | ChoosingOption.java | InputFromKeyboard.java | StarLine.java | TriangleStar.java

```java
//author: Pham Van Anh 20214988
//6.3: create prj to draw triangle

import java.util.Scanner;

public class StarLine {
    public static void main(String[] args){
        Scanner scanner = new Scanner(System.in);
        //read from user input
        System.out.print("Input n: ");
        int n = scanner.nextInt();
        for (int i = 1; i <=n ; i++ ){
            for (int j = i; j < n ; j++)
                System.out.print(" ");
            for (int j = 1; j <= (2 *i - 1 ); j++){
                System.out.print("*");
            }
            System.out.print("\n");
        }
        scanner.close();
        System.exit(0);
    }
}
```

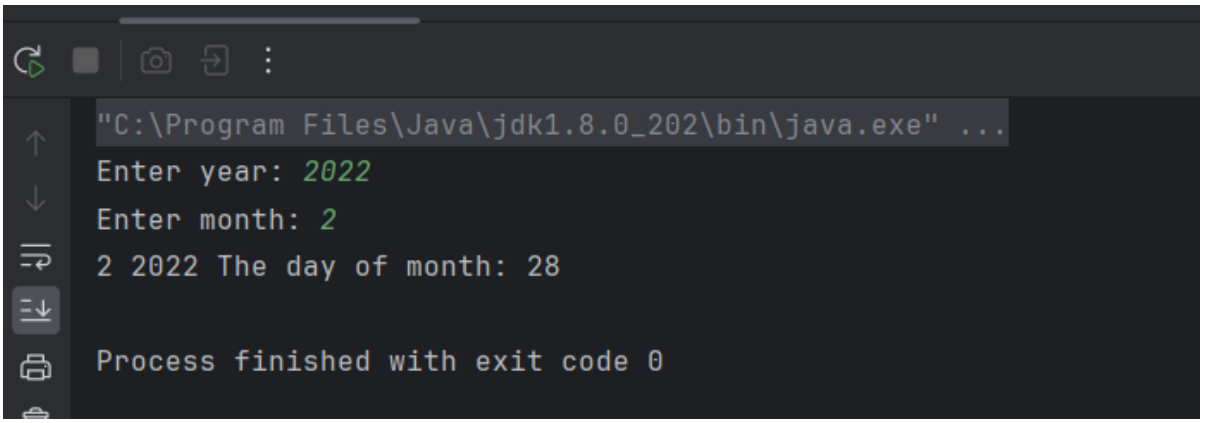
```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Input n: 5
    *
   ***
  *****
 *******
*********

Process finished with exit code 0
```

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.

```java
//author: Pham Van Anh 20214988
//

import java.util.Scanner;

public class DayofMonth {
    public static void main(String[] args) {
        String[] Month_31 = {"January", "Jan.", "Jan", "1",
                "March", "Mar.", "Mar", "3",
                "May", "5",
                "July", "Jul", "7",
                "August", "Aug.", "Aug", "8",
                "October", "Oct.", "Oct", "10",
                "December", "Dec.", "Dec", "12"};
        String[] Month_30 = {"April", "Apr.", "Apr", "4",
                "June", "Jun", "6",
                "September", "Sept.", "Sep", "9",
                "November", "Nov.", "Nov", "11"};
        String[] Month_2 = {"February", "Feb.", "Feb", "2"};
        while(true) {
            int Year;
            while(true){
                System.out.print("Enter year: ");
                Scanner year = new Scanner(System.in);
                Year = year.nextInt();
                if(Year >= 0){
                    break;
                }else {
                    continue;
                }
            }
        }
        System.out.print("Enter month: ");
        Scanner month = new Scanner(System.in);
        String strMonth = month.nextLine();
        for(String s : Month_31) {
            if(s.equals(strMonth)) {
                System.out.println( s+ " " + Year + " The day of month: 31");
                System.exit(0);
            }
        }
```

```
41
42              for(String s : Month_30) {
43                  if(s.equals(strMonth)) {
44                      System.out.println(s + " "+ Year + " The day of month: 30");
45                      System.exit(0);
46                  }
47              }
48
49              for(String s : Month_2) {
50                  if(s.equals(strMonth)) {
51                      if(Year%4 == 0 && Year%100 != 0||Year%400==0) {
52                          System.out.println(s+" "+ Year + " The day of month: 29");
53                          System.exit(0);
54                      }
55                      else {
56                          System.out.println( s+" " +Year + " The day of month: 28");
57                          System.exit(0);
58                      }
59                  }
60              }
61              System.out.println("Error!!Enter again:\n");
62          }
63      }
64  }
65
```

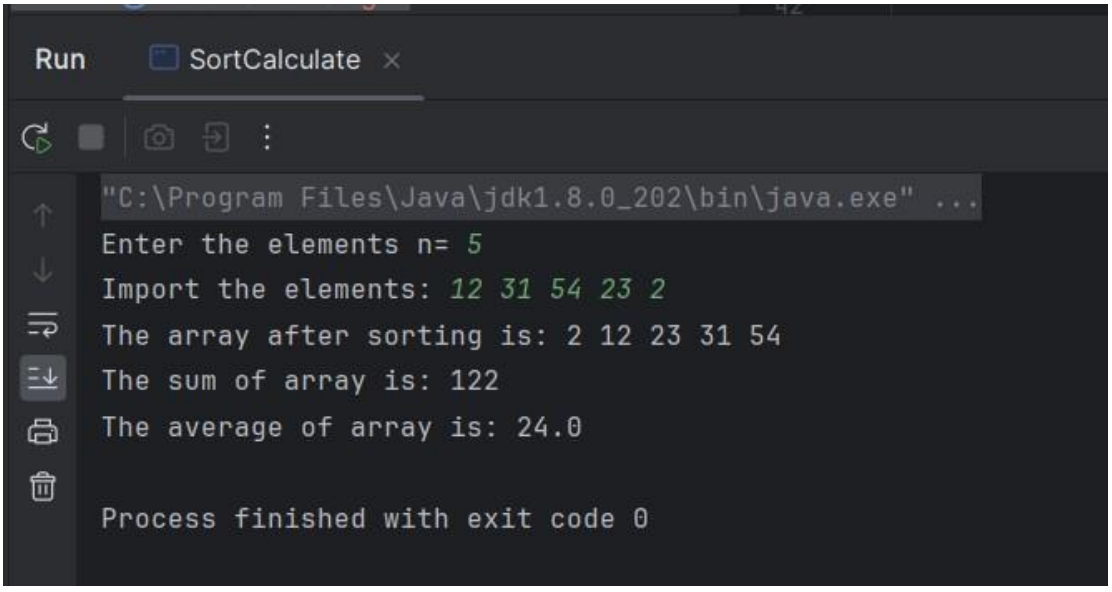
- Kết quả:



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

```java
//author: Pham Van Anh 20214988
//Write a Java program to sort a numeric array, and calculate the sum and average value of array elements.

import java.util.Scanner;

public class SortCalculate {
    public static void main(String[] args) {
        System.out.print("Enter the elements n= ");
        Scanner scanner = new Scanner(System.in);
        int n = scanner.nextInt();
        int Arr[] = new int[n];
        int S=0;
        double m=0;
        System.out.print("Import the elements: ");
        for(int i = 0; i < n; i++) {
            Arr[i] = scanner.nextInt();
            S=S+Arr[i];
        }
        m=S/n;
        for(int i =0; i< n; i++) {
            for(int j = 1; j < n; j++ ) {
                if(Arr[j-1] > Arr[j]) {
                    int tmp = Arr[j-1];
                    Arr[j-1] = Arr[j];
                    Arr[j] = tmp;
                }
            }
        }
        System.out.print("The array after sorting is: ");
        for(int i=0; i< n; i++) {
            System.out.print(Arr[i] + " ");
        }
        System.out.println("\nThe sum of array is: "+S);
        System.out.println("The average of array is: "+m);
        scanner.close();
        System.exit(0);
    }
}
```

- Kết quả:



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

```java
//author: Pham Van Anh 20214988
//Write a Java program to add two matrices of the same size.

import java.util.Scanner;

public class AddTwoMatrix {
    public static Scanner scanner = new Scanner(System.in);
    public static void show(int[][] mat) {
        for (int i = 0; i < mat.length; i++) {
            for (int j = 0; j < mat[i].length; j++) {
                System.out.print(mat[i][j] + " ");
            }
            System.out.println();
        }
    }
    public static void main(String[] args) {
        System.out.print("Enter the number of rows: ");
        int n = scanner.nextInt();
        System.out.print("Enter the number of columns: ");
        int m = scanner.nextInt();
        int[][] mat_1 = new int[n][m];
        System.out.print("Enter the first matrix: \n");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < m; j++) {
                System.out.printf("a[%d][%d] = ",i,j);
                mat_1[i][j] = scanner.nextInt();
            }
        }
        int[][] mat_2 = new int[n][m];
        System.out.print("Enter the second matrix: \n");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < m; j++) {
                System.out.printf("b[%d][%d] = ",i,j);
                mat_2[i][j] = scanner.nextInt();
            }
        }
        int[][] mat_3= new int[n][m];
        for(int i = 0; i<n;i++) {
            for (int j= 0; j<m;j++) {
                mat_3[i][j]=mat_1[i][j] +mat_2[i][j];
            }
        }

        System.out.println("The first matrix: ");
        show(mat_1);
        System.out.println("The second matrix: ");
        show(mat_2);
        System.out.println("Sum of two matrix: ");
        show(mat_3);

    }
}
```

- Kết quả:

```
"C:\Program Files\Java\jdk1.8.0_202\bin\java.exe" ...
Enter the number of rows: 2
Enter the number of columns: 3
Enter the first matrix:
a[0][0] = 1
a[0][1] = 3
a[0][2] = 4
a[1][0] = 2
a[1][1] = 1
a[1][2] = 5
Enter the second matrix:
b[0][0] = 7
b[0][1] = 2
b[0][2] = 4
b[1][0] = 2
b[1][1] = 3
b[1][2] = 5
```

```
The first matrix:
1 3 4
2 1 5
The second matrix:
7 2 4
2 3 5
Sum of two matrix:
8 5 8
4 4 10
```