ĐẠI HỌC BÁCH KHOA HÀ NỘI
TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

BÁO CÁO THỰC HÀNH
IT3103-744527-2024.1

BÀI THỰC HÀNH – LAB 1

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Hà Nội 9/2024

Mục lục

Danh mục hình ảnh

BÁO CÁO THỰC HÀNH LAB 1

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
}
```

Kết quả:

```java
//Dang Hong Minh - 20225740
//Example 1: HelloWorld.java
public class HelloWorld {
    Run | Debug
    public static void main (String[] args) {
        System.out.println(x:"Dang Hong Minh - 20225740");
        System.out.println(x:"Xin chao \n cac ban!");
        System.out.println(x:"Hello \t world");
    }
}
```

```
Dang Hong Minh - 20225740
Xin chao
 cac ban!
Hello    world
```

Hình 1: Mã nguồn và kết quả chạy chương trình VD1

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);
    }
}
```

Kết quả:

```java
//Dang Hong Minh - 20225740
//Example 2: FirstDialog.java
import javax.swing.JOptionPane;
public class FirstDialog {
    Run | Debug
    public static void main(String[] args) {
        JOptionPane.showMessageDialog(parentComponent:null, message:"Hello world! How are you?");
        System.exit(status:0);
    }
}
```

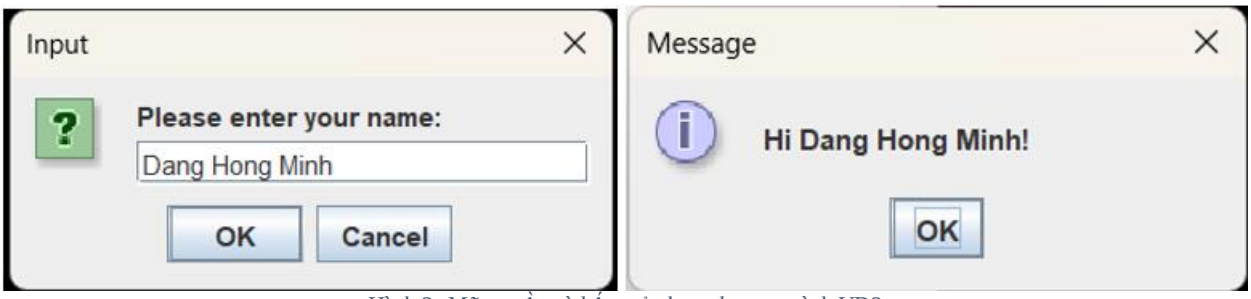
Hình 2: Mã nguồn và kết quả chạy chương trình VD2

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);
  }
}
```

Kết quả:

```java
//Dang Hong Minh - 20225740
//Example 3: HelloNameDialog.java
import javax.swing.JOptionPane;
public class HelloNameDialog {
    Run | Debug
    public static void main(String[] args) {
        String result;
        result = JOptionPane.showInputDialog(message:"Please enter your name:");
        JOptionPane.showMessageDialog(parentComponent:null, "Hi " + result + "!");
        System.exit(status:0);
    }
}
```



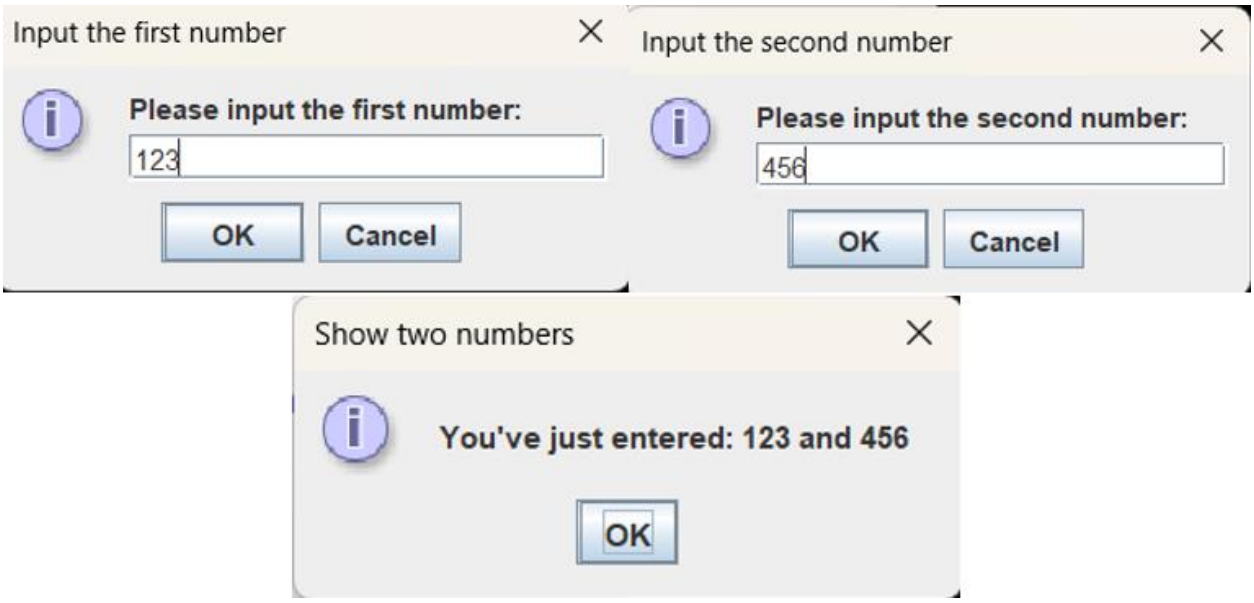
Hình 3: Mã nguồn và kết quả chạy chương trình VD3

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 }
```

Kết quả:

```
1  //Dang Hong Minh - 20225740
2  //Example 4: ShowTwoNumbers.java
3  import javax.swing.JOptionPane;
4  public class ShowTwoNumbers {
       Run | Debug
5      public static void main(String[] args) {
6          String strNum1, strNum2;
7          String strNotification = "You've just entered: ";
8          strNum1 = JOptionPane.showInputDialog(parentComponent:null, message:"Please input the first number: ", title:"Input the first number",
9          JOptionPane.INFORMATION_MESSAGE);
10         strNotification += strNum1 + " and ";
11         strNum2 = JOptionPane.showInputDialog(parentComponent:null, message:"Please input the second number: ", title:"Input the second number",
12         JOptionPane.INFORMATION_MESSAGE);
13         strNotification += strNum2;
14         JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Show two numbers", JOptionPane.INFORMATION_MESSAGE);
15         System.exit(status:0);
16     }
17 }
```



Hình 4: Mã nguồn và kết quả chạy chương trình VD4

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

Notes

- To convert from String to double, you can use

  double num1 = Double.parseDouble(strNum1)

- Check the divisor of the division

Kết quả:

```
//Dang Hong Minh - 20225740
//Example 5: Calculator.java
import javax.swing.JOptionPane;
public class Calculator {
    Run | Debug
    public static void main(String[] args) {
        String strNum1, strNum2;
        String strNotification = "You've just entered: ";
        strNum1 = JOptionPane.showInputDialog(parentComponent:null, message:"Please input the first number: ", title:"Input the first number",
        JOptionPane.INFORMATION_MESSAGE);
        double num1 = Double.parseDouble(strNum1);
        strNotification += strNum1 + " and ";
        strNum2 = JOptionPane.showInputDialog(parentComponent:null, message:"Please input the second number: ", title:"Input the second number",
        JOptionPane.INFORMATION_MESSAGE);
        double num2 = Double.parseDouble(strNum2);
        strNotification += strNum2;
        double sum = num1 + num2;
        double difference = num1 - num2;
        double product = num1 * num2;
        double quotient;
        if (num2 != 0) {
            quotient = num1 / num2;
        } else {
            JOptionPane.showMessageDialog(parentComponent:null, message:"Error: Division by zero!", title:"Error!", JOptionPane.ERROR_MESSAGE);
            return;
        }
        String resultMessage = "Sum: " + sum +
        "\nDifference: " + difference +
        "\nProduct: " + product +
        "\nQuotient: " + quotient;
        JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Show two numbers", JOptionPane.INFORMATION_MESSAGE);
        JOptionPane.showMessageDialog(parentComponent:null, resultMessage, title:"Results", JOptionPane.INFORMATION_MESSAGE);
        System.exit(status:0);
    }
}
```

Hình 5: Mã nguồn và kết quả chạy chương trình VD5

2.2.6 Write a program to solve:

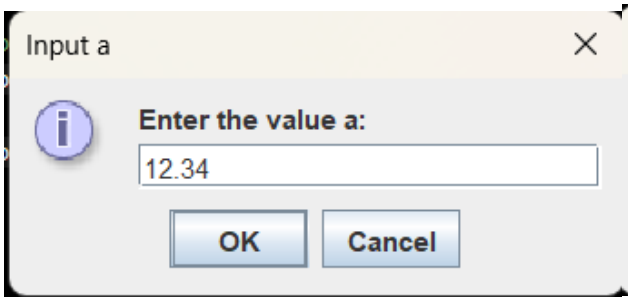
For simplicity, we only consider the real roots of the equations in this task.

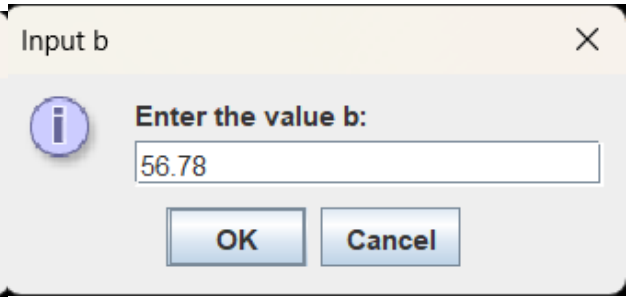
- **The first-degree equation (linear equation) with one variable**

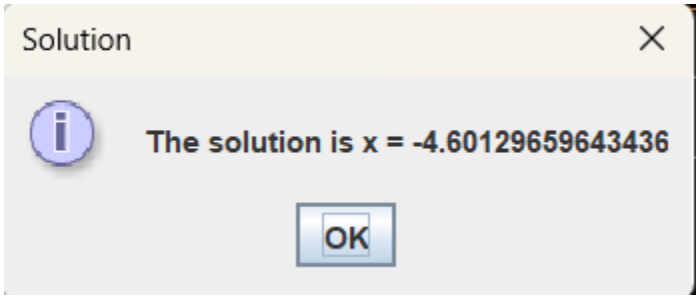
Note: A first-degree equation with one variable can have a form such as $ax + b = 0$ $(a \neq 0)$. You should handle the case where the user input value 0 for a.

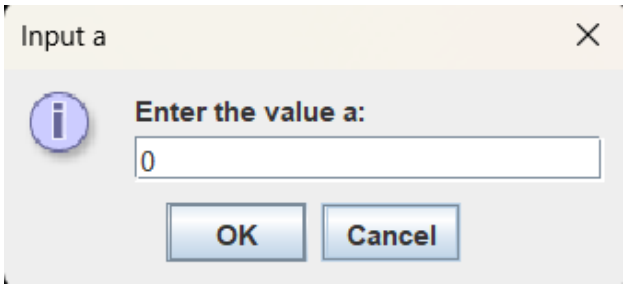
Kết quả:

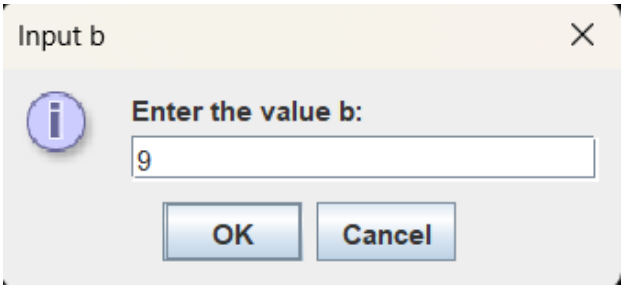
```java
import javax.swing.JOptionPane;
public class FirstDegreeEquation {
    Run | Debug
    public static void main(String[] args) {
        String strNotification = "The equation is: ";
        // Get value 'a' from the user
        String inputA = JOptionPane.showInputDialog(parentComponent:null, message:"Enter the value a:", title:"Input a",
        JOptionPane.INFORMATION_MESSAGE);
        double a = Double.parseDouble(inputA);
        strNotification += a + "x + ";
        // Get value 'b' from the user
        String inputB = JOptionPane.showInputDialog(parentComponent:null, message:"Enter the value b:", title:"Input b",
        JOptionPane.INFORMATION_MESSAGE);
        double b = Double.parseDouble(inputB);
        strNotification += b + " = 0";
        // Check if 'a' is zero
        if (a == 0) { // Special cases when a is zero
            if (b == 0) { // Special cases when b is zero
                JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
                JOptionPane.showMessageDialog(parentComponent:null, message:"The equation has infinite solutions.", title:"Infinite Solution!", JOptionPane.INFORMATION_MESSAGE);
            } else {
                JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
                JOptionPane.showMessageDialog(parentComponent:null, message:"The equation has no solution.", title:"No Solution!", JOptionPane.INFORMATION_MESSAGE);
            }
        } else {
            // Solve the equation
            double solution = -b / a;
            JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
            JOptionPane.showMessageDialog(parentComponent:null, "The solution is x = " + solution, title:"Solution", JOptionPane.INFORMATION_MESSAGE);
        }
    }
}
```

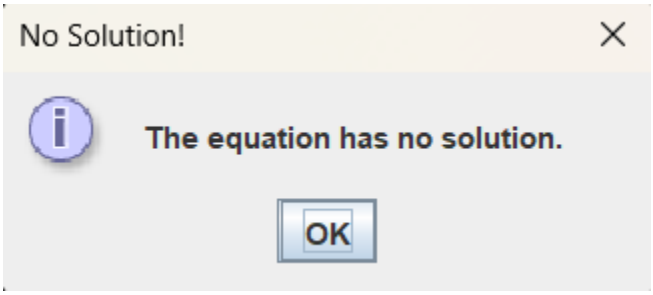


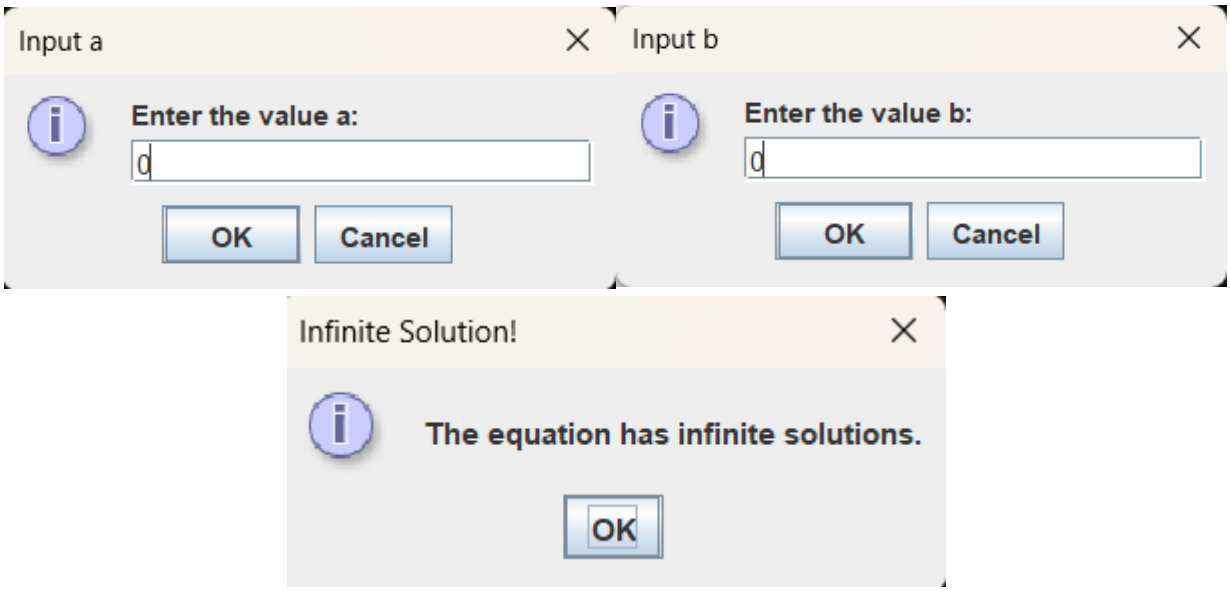












Hình 6: Mã nguồn và kết quả chạy chương trình VD6.1

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

Note: A system of first-degree equations with two variables x_1 and x_2 can be written as follows.

$$\begin{cases} a_{11}x_1 + a_{12}x_2 = b_1 \\ a_{21}x_1 + a_{22}x_2 = b_2 \end{cases}$$

You should handle the case where the values of the coefficients produce infinitely many solutions and the case where they produce no solution.

Hint:

Use the following determinants:

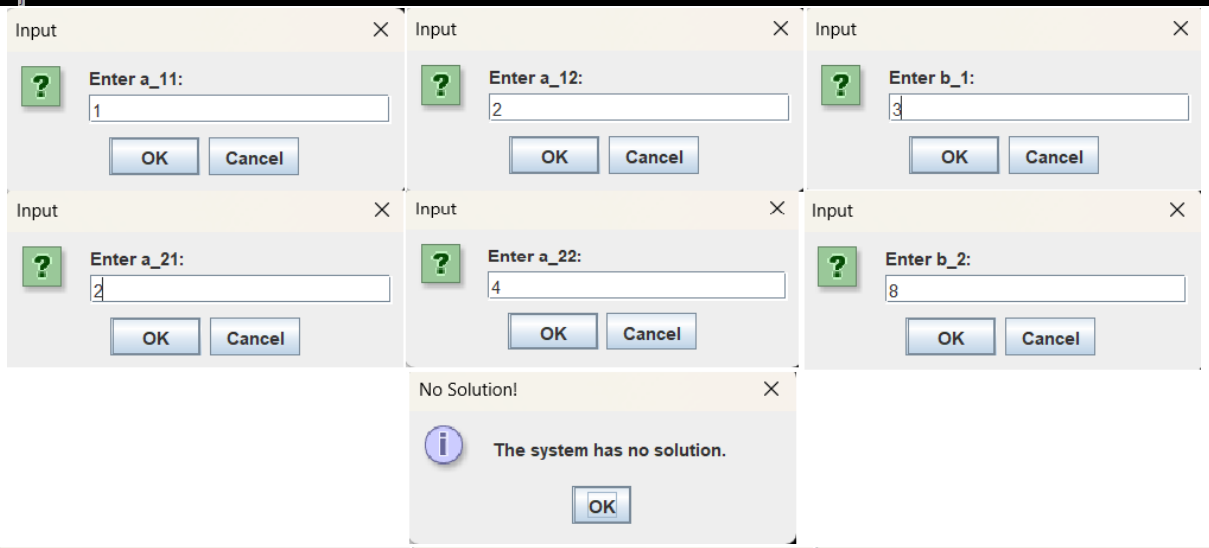
$$D = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{21}a_{12}$$

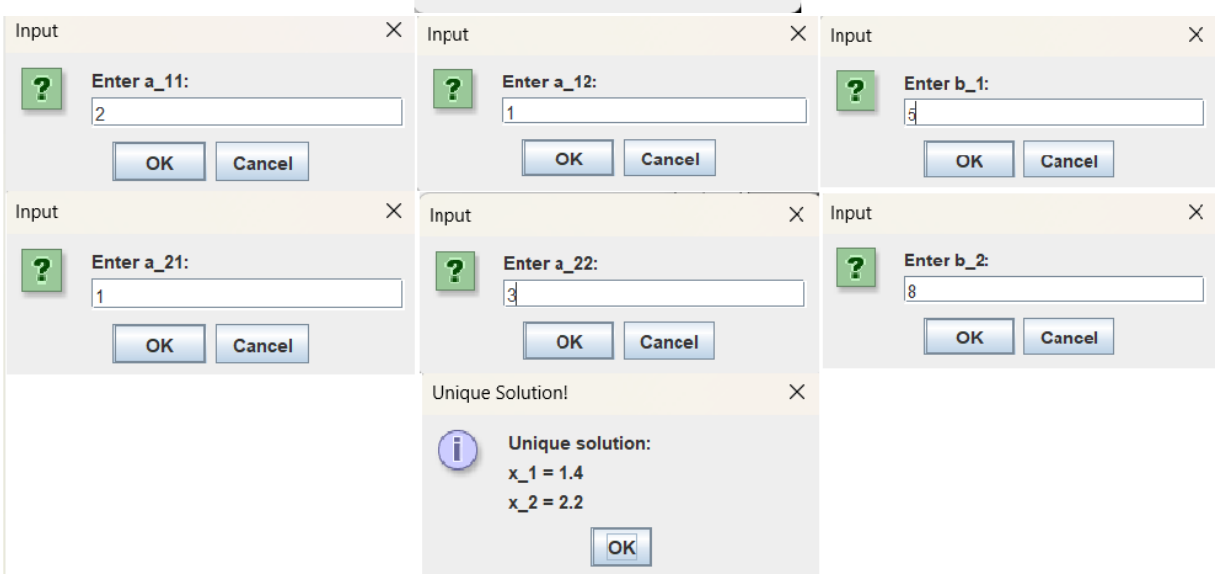
$$D_1 = \begin{vmatrix} b_1 & a_{12} \\ b_2 & a_{22} \end{vmatrix} = b_1a_{22} - b_2a_{12}$$

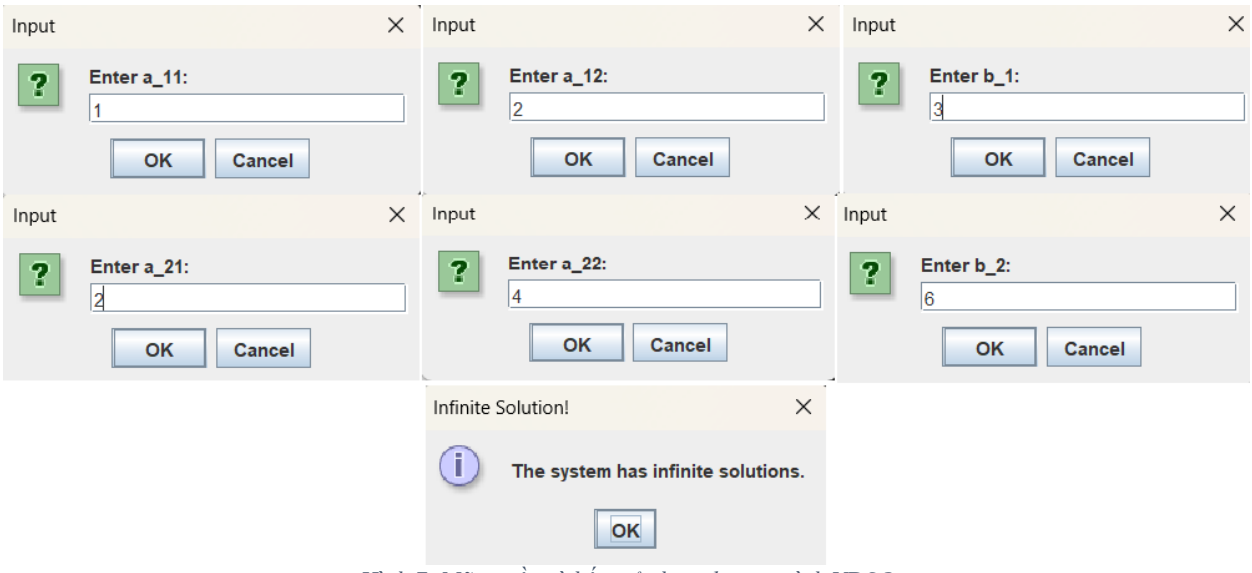
$$D_2 = \begin{vmatrix} a_{11} & b_1 \\ a_{21} & b_2 \end{vmatrix} = a_{11}b_2 - a_{21}b_1$$

Kết quả:

```java
//Dang Hong Minh - 20225740
import javax.swing.JOptionPane;
public class FirstDegreeSystem {
    Run | Debug
    public static void main(String[] args) {
        //Get values from the user
        String inputa11 = JOptionPane.showInputDialog(message:"Enter a_11:");
        double a11 = Double.parseDouble(inputa11);
        String inputa12 = JOptionPane.showInputDialog(message:"Enter a_12:");
        double a12 = Double.parseDouble(inputa12);
        String inputb1 = JOptionPane.showInputDialog(message:"Enter b_1:");
        double b1 = Double.parseDouble(inputb1);
        String inputa21 = JOptionPane.showInputDialog(message:"Enter a_21:");
        double a21 = Double.parseDouble(inputa21);
        String inputa22 = JOptionPane.showInputDialog(message:"Enter a_22:");
        double a22 = Double.parseDouble(inputa22);
        String inputb2 = JOptionPane.showInputDialog(message:"Enter b_2:");
        double b2 = Double.parseDouble(inputb2);
        //Calculate the determinants
        double D = a11 * a22 - a21 * a12;
        double D1 = b1 * a22 - b2 * a12;
        double D2 = a11 * b2 - a21 * b1;
        //Check for solution
        if (D != 0) { //Unique solution
            double x1 = D1 / D;
            double x2 = D2 / D;
            JOptionPane.showMessageDialog(parentComponent:null, "Unique solution:\nx_1 = " + x1 + "\nx_2 = " + x2, title:"Unique Solution!", JOptionPane.INFORMATION_MESSAGE);
        } else {
            if (D1 == 0 && D2 == 0) { //Infinitely many solutions
                JOptionPane.showMessageDialog(parentComponent:null, message:"The system has infinite solutions.", title:"Infinite Solution!", JOptionPane.INFORMATION_MESSAGE);
            } else { //No solution
                JOptionPane.showMessageDialog(parentComponent:null, message:"The system has no solution.", title:"No Solution!", JOptionPane.INFORMATION_MESSAGE);
            }
        }
    }
}
```







Hình 7: Mã nguồn và kết quả chạy chương trình VD6.2

- **The second-degree equation with one variable**

Note: A second-degree equation with one variable (i.e., quadratic equation) can have a form such as $ax^2 + bx + c = 0$, where x is the variable, and a, b, and c are coefficients ($a \neq 0$).

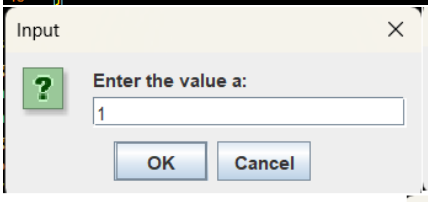
You should handle the case where the values of the coefficients produce a double root & the case where they produce no root. You should also handle the case where the user input value 0 for a.

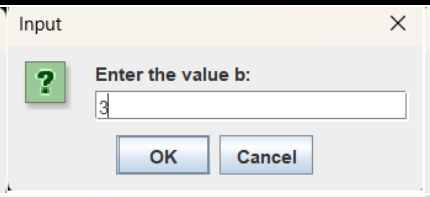
Hint:

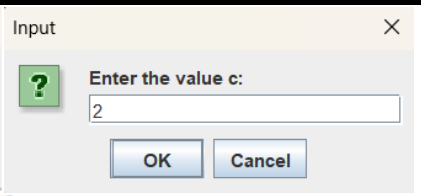
Use the discriminant $\Delta = b^2 - 4ac$

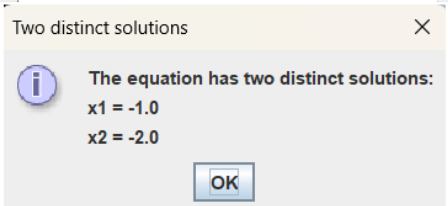
Kết quả:

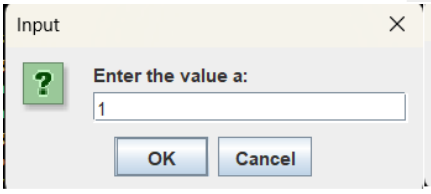
```java
//Dang Hong Minh - 20225740
import javax.swing.JOptionPane;
public class SecondDegreeEquation {
    Run | Debug
    public static void main(String[] args) {
        String strNotification = "The equation is: ";
        //Get value 'a' from the user
        String inputA = JOptionPane.showInputDialog(message:"Enter the value a:");
        double a = Double.parseDouble(inputA);
        if (a == 0) { //If a = 0, not a quadratic equation
            JOptionPane.showMessageDialog(parentComponent:null, message:"This is not a quadratic equation (a = 0).");
            return;
        }
        //Get value 'b' from the user
        String inputB = JOptionPane.showInputDialog(message:"Enter the value b:");
        double b = Double.parseDouble(inputB);
        //Get value 'c' from the user
        String inputC = JOptionPane.showInputDialog(message:"Enter the value c:");
        double c = Double.parseDouble(inputC);
        //Calculate delta = b^2 - 4ac
        double delta = b * b - 4 * a * c;
        //Check delta
        if (delta > 0) { //Two distinct solutions
            JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
            double x1 = (-b + Math.sqrt(delta)) / (2 * a);
            double x2 = (-b - Math.sqrt(delta)) / (2 * a);
            JOptionPane.showMessageDialog(parentComponent:null, "The equation has two distinct solutions:\nx1 = " + x1 + "\nx2 = " + x2,
            title:"Two distinct solutions", JOptionPane.INFORMATION_MESSAGE);
        } else if (delta == 0) { //One double solutions
            JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
            double x = -b / (2 * a);
            JOptionPane.showMessageDialog(parentComponent:null, "The equation has one double solutions:\nx = " + x,
            title:"One double solutions", JOptionPane.INFORMATION_MESSAGE);
        } else { //No real solutions
            JOptionPane.showMessageDialog(parentComponent:null, strNotification, title:"Your input", JOptionPane.INFORMATION_MESSAGE);
            JOptionPane.showMessageDialog(parentComponent:null, message:"The equation has no real solutions.",
            title:"No real solutions", JOptionPane.INFORMATION_MESSAGE);
        }
        System.exit(status:0);
    }
}
```

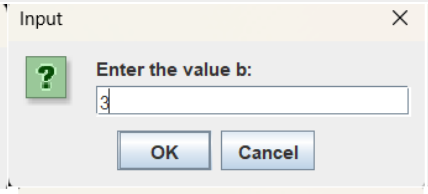


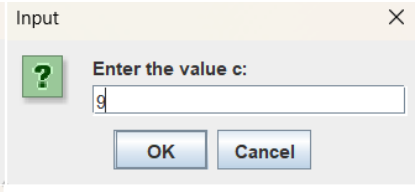


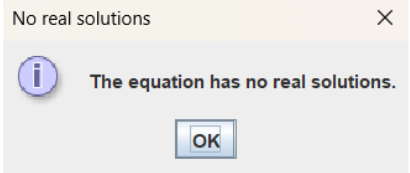


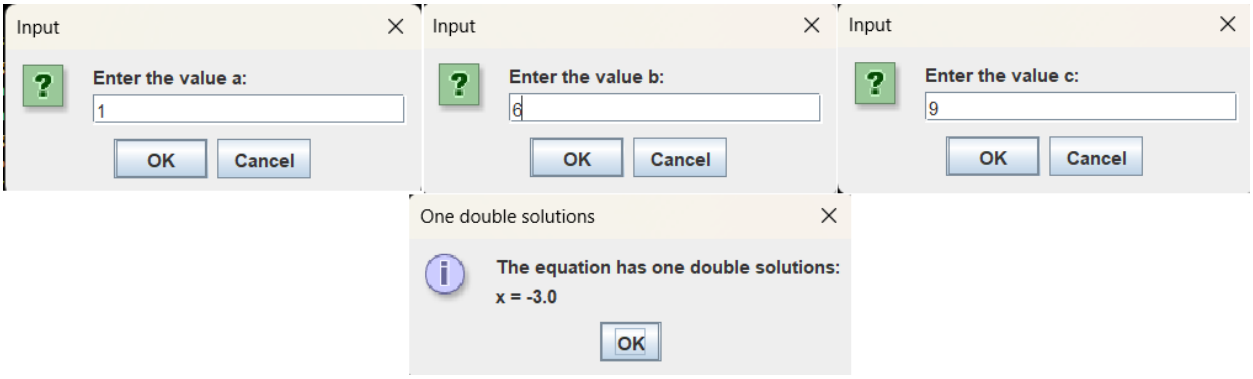












Hình 8: Mã nguồn và kết quả chạy chương trình VD6.3

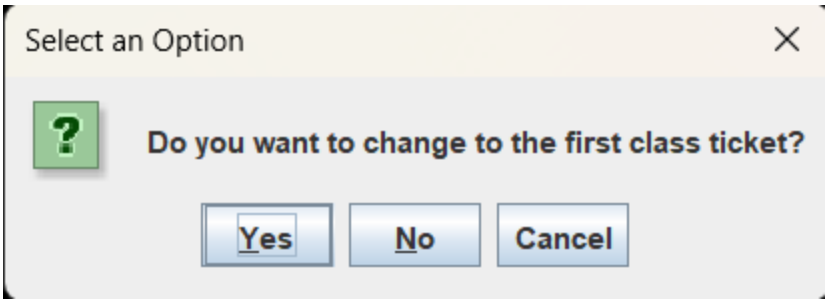
BÀI TẬP

6.1 Write, compile and run the ChoosingOption program:

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

Kết quả:

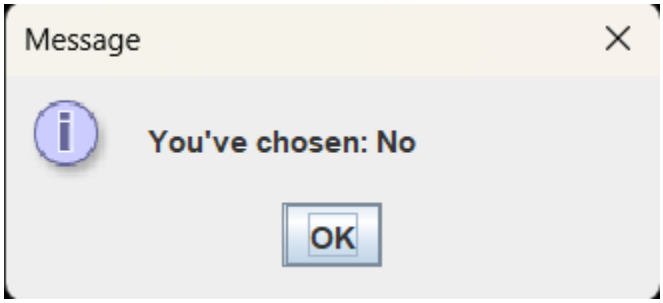
```
1  //Dang Hong Minh - 20225740
2  import javax.swing.JOptionPane;
3  public class ChoosingOption {
       Run | Debug
4      public static void main(String[] args) {
5          int option = JOptionPane.showConfirmDialog(parentComponent:null,
6          message:"Do you want to change to the first class ticket?");
7          JOptionPane.showMessageDialog(parentComponent:null, "You've chosen: "
8          + (option == JOptionPane.YES_OPTION ? "Yes" : "No"));
9          System.exit(status:0);
10     }
11 }
```



Hình 9: Mã nguồn và kết quả chạy chương trình BT1

Câu hỏi:

- Điều gì sẽ xảy ra khi người dùng chọn “Cancel”?
  - ⇨ Khi người dùng chọn "Cancel" trong hộp thoại *JOptionPane.showConfirmDialog*, phương thức sẽ trả về giá trị *JOptionPane.CANCEL_OPTION*. Tuy nhiên, trong đoạn code này, chỉ có hai lựa chọn được xử lý là *JOptionPane.YES_OPTION* và *JOptionPane.NO_OPTION*. Điều này có nghĩa là khi người dùng chọn "Cancel", chương trình sẽ vẫn hiển thị kết quả "No" do cách so sánh chỉ dựa vào giá trị *JOptionPane.YES_OPTION*.



- Cách tùy chỉnh các tùy chọn cho người dùng, ví dụ: chỉ có hai tùy chọn: “Yes” and “No”, HOẶC “I do” and “I don’t" (Gợi ý: Sử dụng Javadocs hoặc sử dụng trợ giúp Eclipse/Netbean IDE).
  - ⇨ Để tùy chỉnh các tùy chọn được trình bày cho người dùng trong *JOptionPane*, có thể sử dụng phương thức *showOptionDialog* thay vì *showConfirmDialog*. Phương thức này cho phép tùy chỉnh các tùy chọn hiển thị với người dùng.

6.2 Write a program for input/output from keyboard

```
1  import java.util.Scanner;
2  public class InputFromKeyboard{
3      public static void main(String args[]){
4          Scanner keyboard = new Scanner(System.in);
5
6          System.out.println("What's your name?");
7          String strName = keyboard.nextLine();
8          System.out.println("How old are you?");
9          int iAge = keyboard.nextInt();
10         System.out.println("How tall are you (m)?");
11         double dHeight = keyboard.nextDouble();
12
13         //similar to other data types
14         //nextByte(), nextShort(), nextLong()
15         //nextFloat(), nextBoolean()
16
17         System.out.println("Mrs/Ms. " + strName + ", " + iAge + " years old. "
18                                 + "Your height is " + dHeight + ".");
19
20     }
21 }
```

Markers | Properties | Servers | Data Source Explorer | Snippets | Problems | Console | Searc

```
<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.
```

Kết quả:

```java
import java.util.Scanner;
public class InputFromKeyboard {
    Run | Debug
    public static void main(String[] args) {
        try (Scanner keyboard = new Scanner(System.in)) {
            System.out.println(x:"What's your name?");
            String strName = keyboard.nextLine();
            System.out.println(x:"How old are you?");
            int iAge = keyboard.nextInt();
            System.out.println(x:"How tall are you (m)?");
            double dHeight = keyboard.nextDouble();
            //similar to other data types:
            //nextByte(), nextShort(), nextLong(), nextFloat(), nextBoolean()
            System.out.println("Mr./Mrs./Ms. " + strName + ", " + iAge + " years old. "
            + "Your height is " + dHeight + ".");
        }
    }
}
```

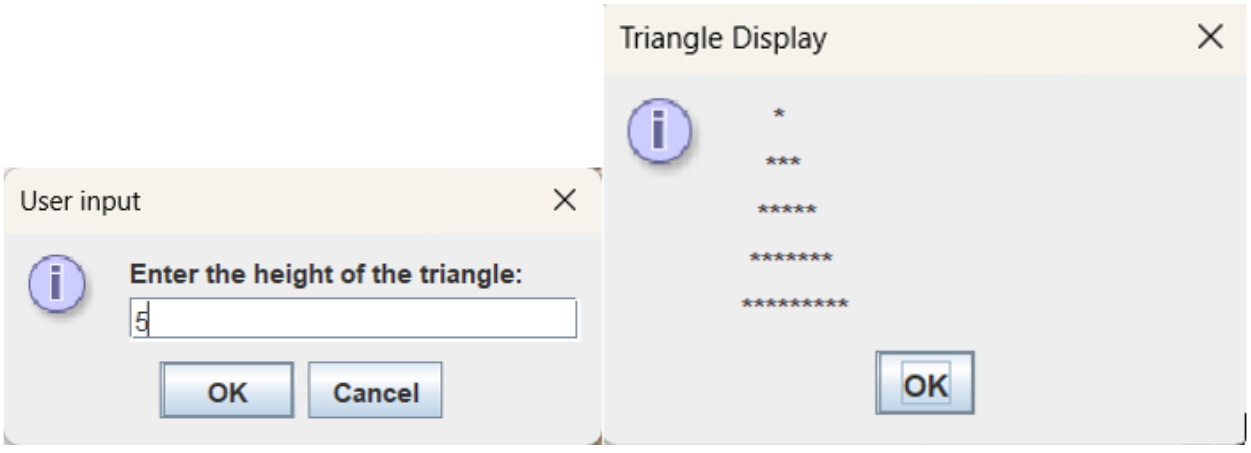
```
What's your name?
Minh
How old are you?
20
How tall are you (m)?
1.79
Mr./Mrs./Ms. Minh, 20 years old. Your height is 1.79.
```

Hình 10: Mã nguồn và kết quả chạy chương trình BT2

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

Note: You must create a new Java project for this exercise.

Kết quả:



```java
//Dang Hong Minh - 20225740
import javax.swing.JOptionPane;
public class TriangleDisplay {
    Run | Debug
    public static void main(String[] args) {
        //Prompt the user to enter the height of the triangle
        String input = JOptionPane.showInputDialog(parentComponent:null, message:"Enter the height of the triangle:",
        title:"User input", JOptionPane.INFORMATION_MESSAGE);
        int n = Integer.parseInt(input);
        //Build and display the triangle
        StringBuilder triangle = new StringBuilder();
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n - i; j++) {
                triangle.append(str:" ");
            }
            for (int k = 1; k <= (2 * i - 1); k++) {
                triangle.append(str:"*");
            }
            triangle.append(str:"\n");
        }
        // Show the triangle in a message dialog
        JOptionPane.showMessageDialog(parentComponent:null, triangle.toString(),
        title:"Triangle Display", JOptionPane.INFORMATION_MESSAGE);
        System.exit(status:0);
    }
}
```

Hình 11: Mã nguồn và kết quả chạy chương trình BT3

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.

Note: You must create a new Java project for this exercise.

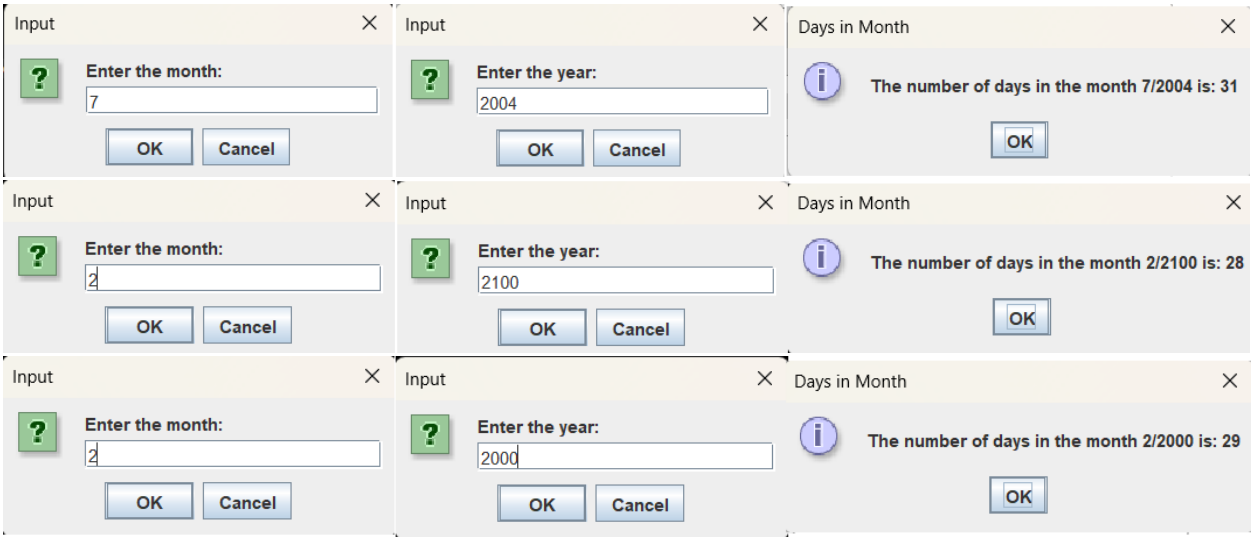
- The user can either enter a month in its full name, abbreviation, in 3 letters, or in number. To illustrate, the valid inputs of *January* are January, Jan., Jan, and 1.
- The user must enter a year in a non-negative number and enter all the digits. For instance, the valid inputs of year *1999* is only 1999, but not 99, “one thousand nine hundred ninety-nine”, or anything else.
- A year is either a common year of 365 days or a leap year of 366 days. Every year that is divisible by 4 is a leap year, except for years that are divisible by 100, but not by 400. For instance, year 1800 is not a leap year, yet year 2000 is a leap year. In a year, there are twelve months, which are listed in order as follows.

Month	January	February	March	April	May	June	July	August	September	October	November	December
Abbreviation	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
In 3 letters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
In Number	1	2	3	4	5	6	7	8	9	10	11	12
Days of Month in Common Year	31	28	31	30	31	30	31	31	30	31	30	31
Days of Month in Leap Year	31	**29**	31	30	31	30	31	31	30	31	30	31

Kết quả:

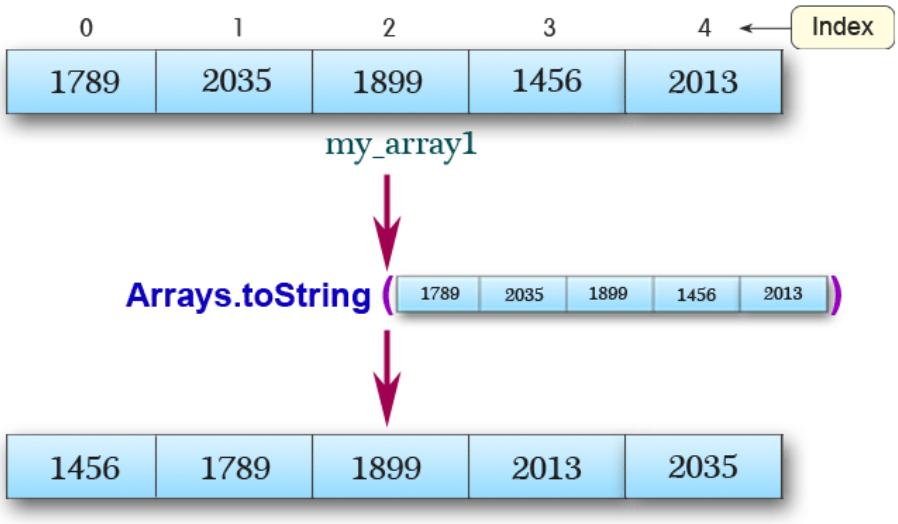
```java
import javax.swing.JOptionPane;
public class DaysInMonth {
    Run | Debug
    public static void main(String[] args) {
        while (true) {
            String monthInput = JOptionPane.showInputDialog(message:"Enter the month:");
            String yearInput = JOptionPane.showInputDialog(message:"Enter the year:");
            //Validate year input
            int year = 0;
            if (!isValidYear(yearInput)) {
                JOptionPane.showMessageDialog(parentComponent:null, message:"Invalid year.",
                title:"Error", JOptionPane.ERROR_MESSAGE);
                continue;
            } else {
                year = Integer.parseInt(yearInput);
            }
            //Validate month input
            int month = getMonth(monthInput);
            if (month == -1) {
                JOptionPane.showMessageDialog(parentComponent:null, message:"Invalid month.",
                title:"Error", JOptionPane.ERROR_MESSAGE);
                continue;
            }
            //Get the number of days in the month
            int days = getDaysInMonth(month, year);
            String message = "The number of days in the month " + monthInput + "/" + year + " is: " + days;
            JOptionPane.showMessageDialogparentComponent:(null, message,
           title: "Days in Month", JOptionPane.INFORMATION_MESSAGE);
            break; //Exit the loop after successful input
        }
    }
    private static boolean isValidYear(String yearInput) {
        // Check if the input is a non-negative integer
        return yearInput.matchesregex:("\\d{1,4}") && Integer.parseInt(yearInput) >= 0;
    }
    private static int getMonth(String monthInput) {
        // Convert the month input to a standard month number (1-12)
        switch (monthInput.toLowerCase().trim()) {
            case "january":
            case "jan":
            case "jan.":
            case "1":
                return 1;
            case "february":
            case "feb":
            case "feb.":
            case "2":
                return 2;
            case "march":
            case "mar":
            case "mar.":
            case "3":
                return 3;
            case "april":
            case "apr":
            case "apr.":
            case "4":
                return 4;
            case "may":
            case "5":
                return 5;
            case "june":
            case "jun":
            case "jun.":
```

```
64                case "6":
65                    return 6;
66                case "july":
67                case "jul":
68                case "jul.":
69                case "7":
70                    return 7;
71                case "august":
72                case "aug":
73                case "aug.":
74                case "8":
75                    return 8;
76                case "september":
77                case "sep":
78                case "sep.":
79                case "9":
80                    return 9;
81                case "october":
82                case "oct":
83                case "oct.":
84                case "10":
85                    return 10;
86                case "november":
87                case "nov":
88                case "nov.":
89                case "11":
90                    return 11;
91                case "december":
92                case "dec":
93                case "dec.":
94                case "12":
95                    return 12;
96                default:
97                    return -1; //Invalid month
98            }
99        }
100       private static int getDaysInMonth(int month, int year) {
101           // Determine the number of days in a month considering leap years
102           switch (month) {
103               case 1: //January
104               case 3: //March
105               case 5: //May
106               case 7: //July
107               case 8: //August
108               case 10: //October
109               case 12: //December
110                   return 31;
111               case 4: //April
112               case 6: //June
113               case 9: //September
114               case 11: //November
115                   return 30;
116               case 2: //February
117                   return isLeapYear(year) ? 29 : 28;
118               default:
119                   return 0; //Invalid month
120           }
121       }
122       private static boolean isLeapYear(int year) {
123           //Check if the year is a leap year
124           return (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0);
125       }
126   }
```



Hình 12: Mã nguồn và kết quả chạy chương trình BT4

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

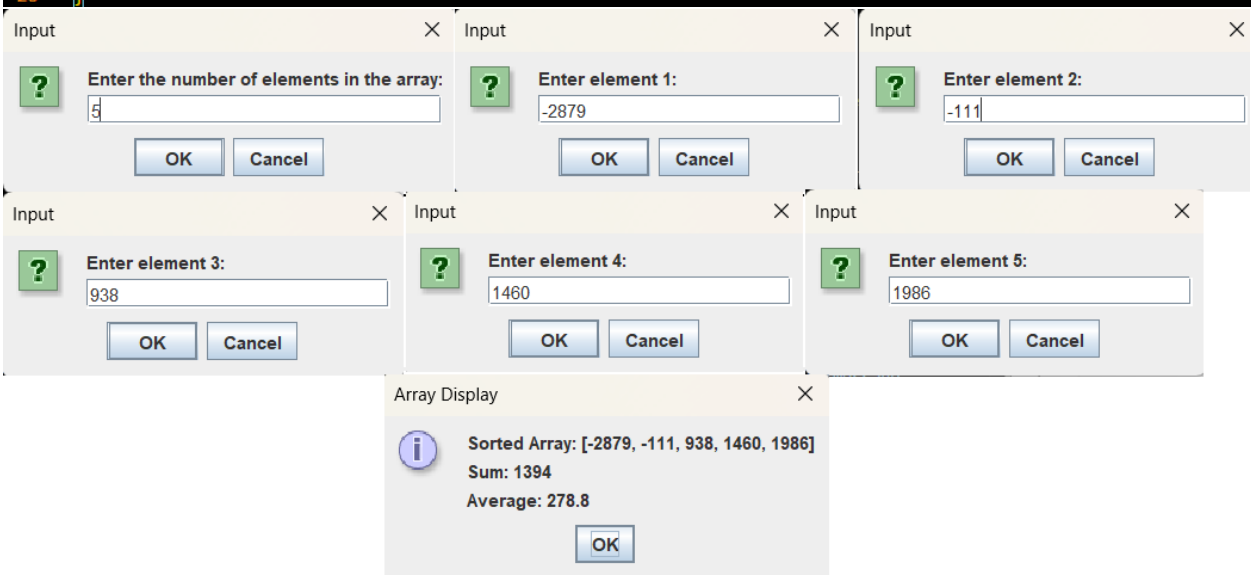


Note: You must create a new Java project for this exercise.

- The array can be entered by the user or a constant.

Kết quả:

```java
//Dang Hong Minh - 20225740
import java.util.Arrays;
import javax.swing.JOptionPane;
public class ArrayDisplay {
    Run | Debug
    public static void main(String[] args) {
        //Prompt the user to enter the size of the array
        String inputSize = JOptionPane.showInputDialog(message:"Enter the number of elements in the array:");
        int size = Integer.parseInt(inputSize);
        //Initialize the array
        int[] numbers = new int[size];
        for (int i = 0; i < size; i++) {
            String inputElement = JOptionPane.showInputDialog("Enter element " + (i + 1) + ":");
            numbers[i] = Integer.parseInt(inputElement);
        }
        Arrays.sort(numbers); //Sort the array
        int sum = 0;
        for (int num : numbers) {
            sum += num;
        } //Calculate the sum
        double average = (double) sum / size; //Calculate the average
        // Display the sorted array, sum, and average
        String sortedArray = Arrays.toString(numbers);
        String message = "Sorted Array: " + sortedArray + "\nSum: " + sum + "\nAverage: " + average;
        JOptionPane.showMessageDialog(parentComponent:null, message,
        title:"Array Display", JOptionPane.INFORMATION_MESSAGE);
        System.exit(status:0);
    }
}
```



Hình 13: Mã nguồn và kết quả chạy chương trình BT5

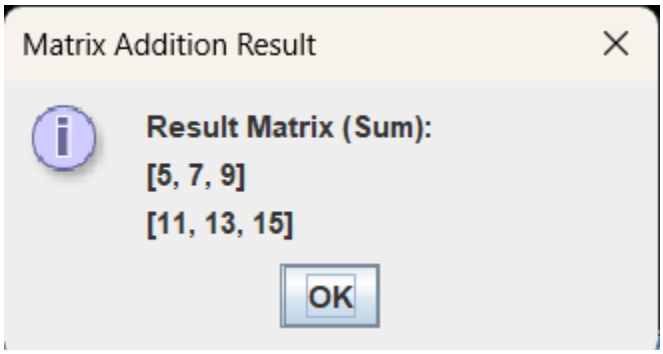
6.6 Write a Java program to add two matrices of the same size.

Note: You must create a new Java project for this exercise.

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

Kết quả:

```java
//Dang Hong Minh -20225470
import javax.swing.JOptionPane;
import java.util.Arrays;
public class MatrixAddition {
    Run | Debug
    public static void main(String[] args) {
        //Get matrix dimensions from the user
        String inputRows = JOptionPane.showInputDialog(message:"Enter the number of rows for the matrices:");
        String inputColumns = JOptionPane.showInputDialog(message:"Enter the number of columns for the matrices:");
        int rows = Integer.parseInt(inputRows);
        int columns = Integer.parseInt(inputColumns);
        //Initialize two matrices
        int[][] matrix1 = new int[rows][columns];
        int[][] matrix2 = new int[rows][columns];
        //Get user input for the first matrix
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                String element = JOptionPane.showInputDialog("Enter element for matrix 1 at[" + (i + 1) + "][" + (j + 1) + "]:");
                matrix1[i][j] = Integer.parseInt(element);
            }
        }
        //Get user input for the second matrix
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                String element = JOptionPane.showInputDialog("Enter element for matrix 2 at [" + (i + 1) + "][" + (j + 1) + "]:");
                matrix2[i][j] = Integer.parseInt(element);
            }
        }
        //Create the result matrix for storing the sum
        int[][] resultMatrix = new int[rows][columns];
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                resultMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
            }
        }
        //Convert the result matrix to a string for display
        StringBuilder resultString = new StringBuilder(str:"Result Matrix (Sum):\n");
        for (int[] row : resultMatrix) {
            resultString.append(Arrays.toString(row)).append(str:"\n");
        }
        //Display the result matrix
        JOptionPane.showMessageDialog(parentComponent:null, resultString.toString(), title:"Matrix Addition Result", JOptionPane.INFORMATION_MESSAGE);
        System.exit(status:0);
    }
}
```



Hình 14: Mã nguồn và kết quả chạy chương trình BT6