ĐẠI HỌC BÁCH KHOA HÀ NỘI

TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

BÁO CÁO THỰC HÀNH
IT3103-744528-2024.1
BÀI THỰC HÀNH - LAB01

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Hà Nội, Ngày 30 tháng 9 năm 2024

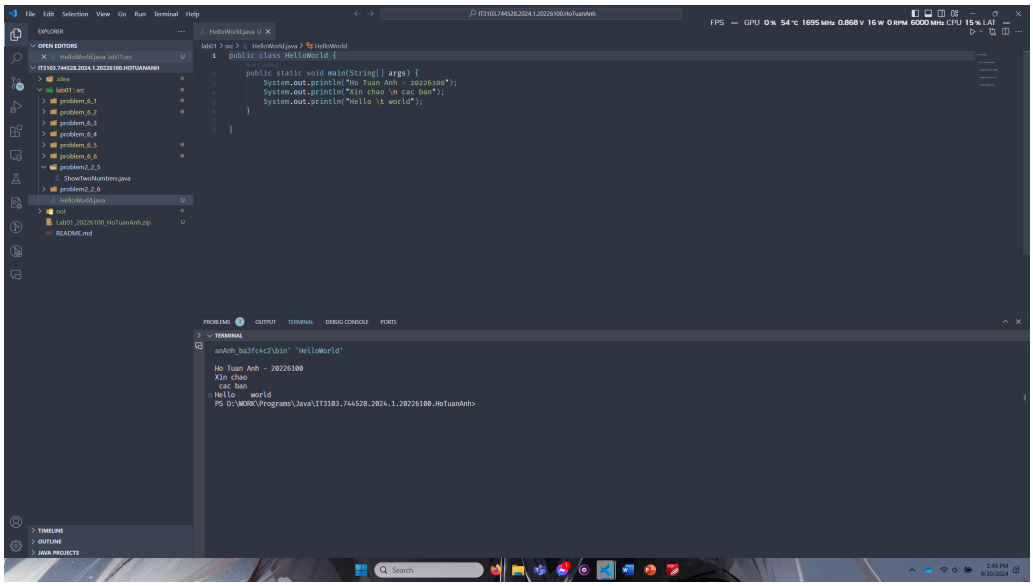
Contents

DANH MỤC HÌNH ẢNH

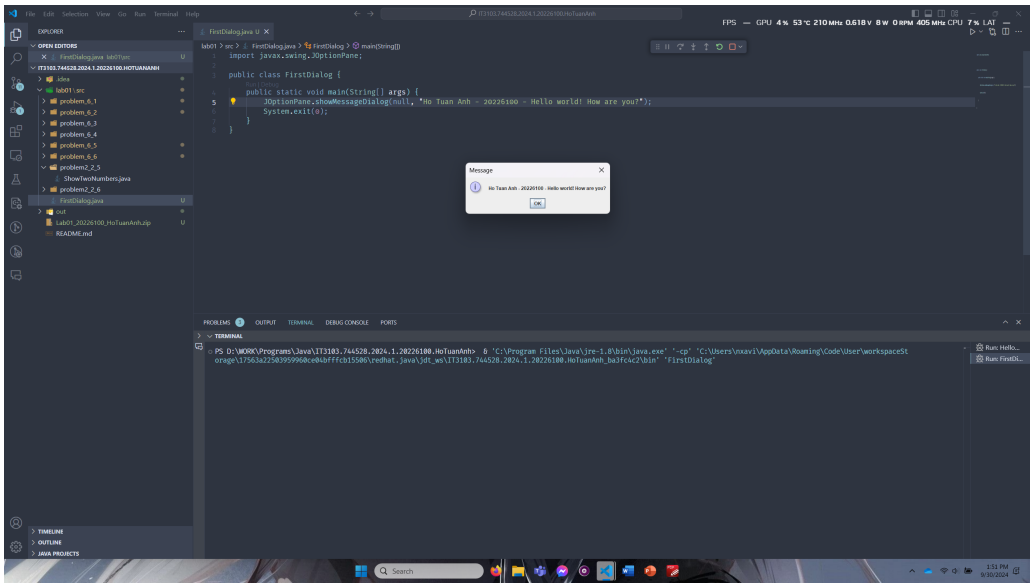
BÁO CÁO THỰC HÀNH LAB 1

The Very First Java Programs

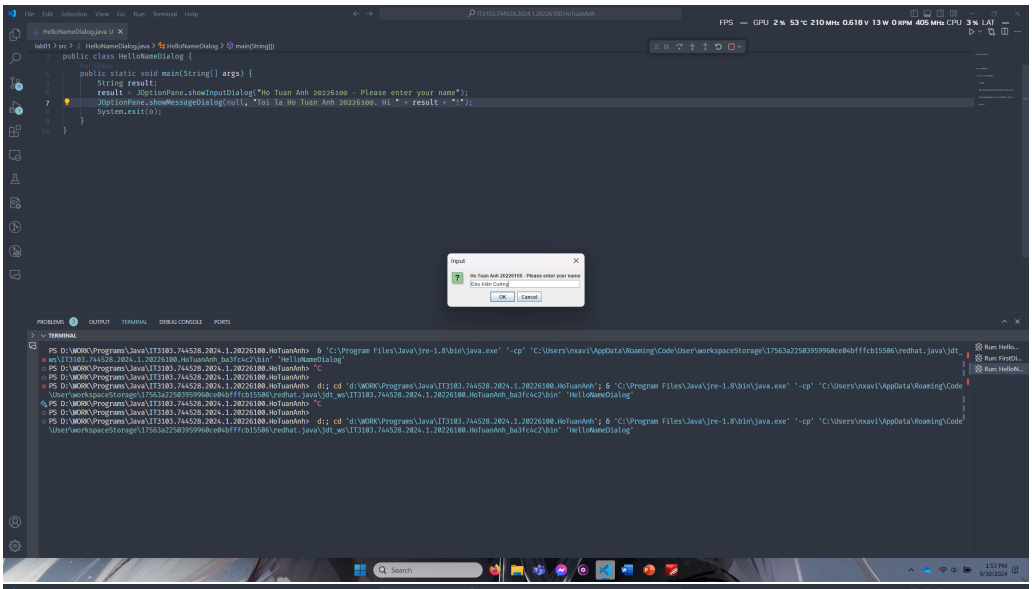
2.2.1 Write, compile the first Java application:

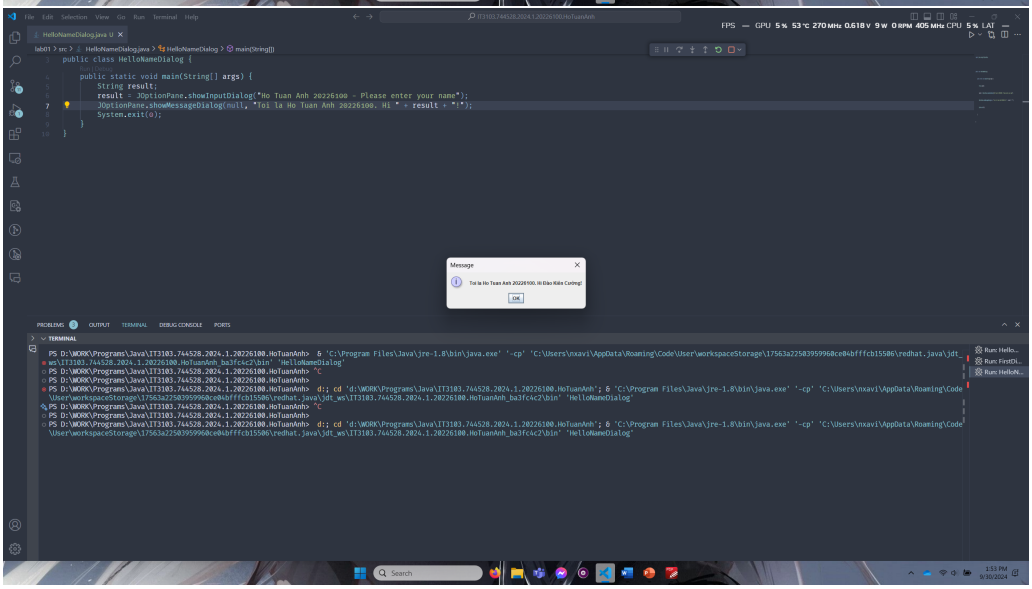


2.2.2 Write, compile the first dialog Java program

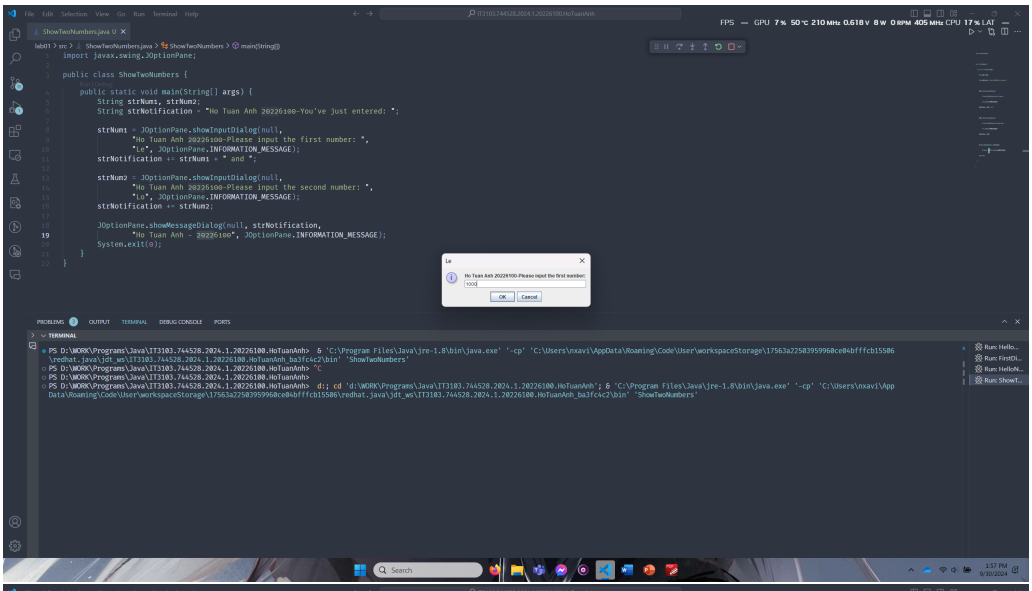


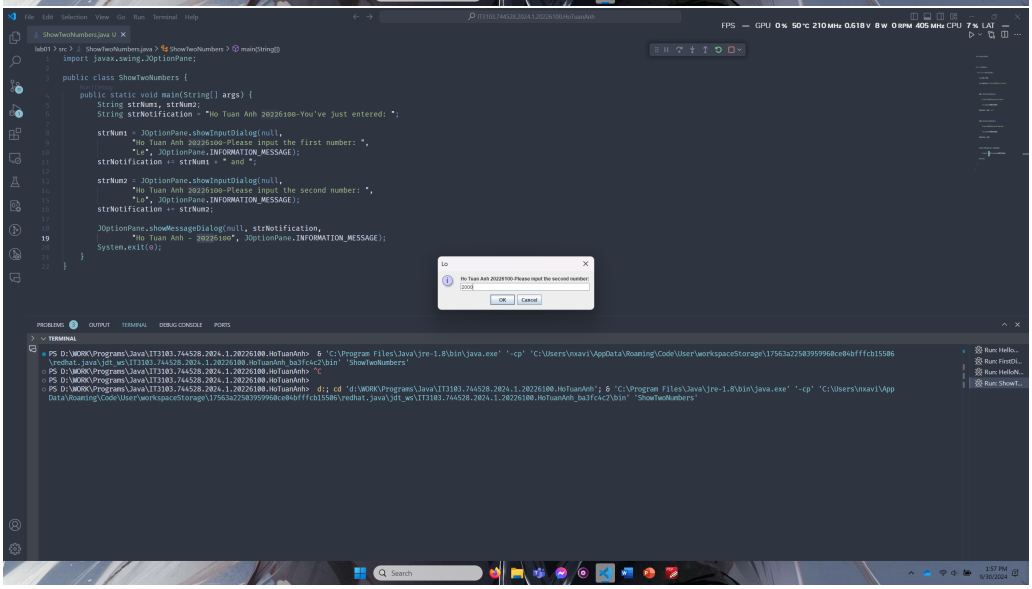
2.2.3 Write, compile the first input dialog Java application

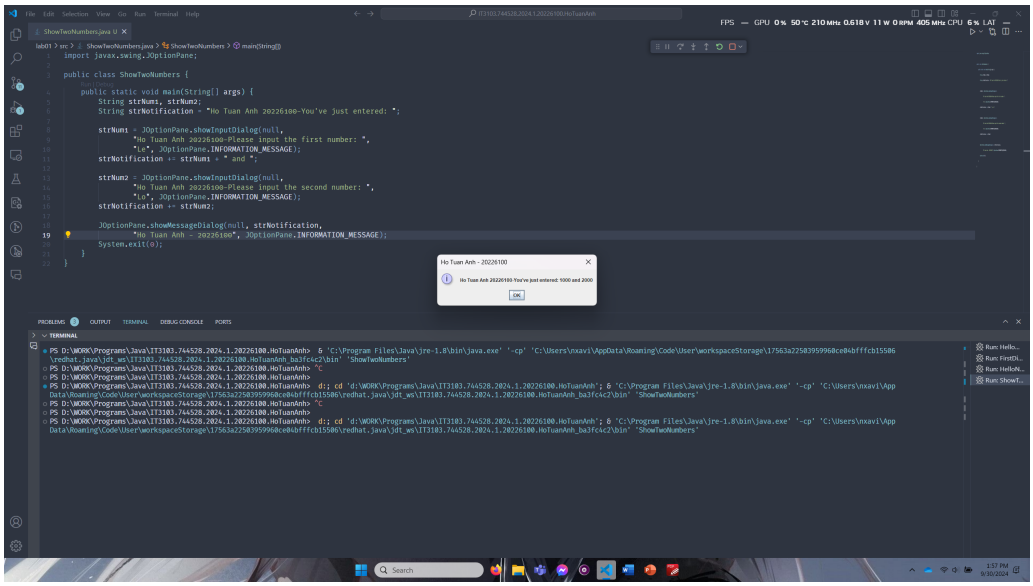




2.2.4 Write, compile, and run the following example:







BÀI TẬP

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

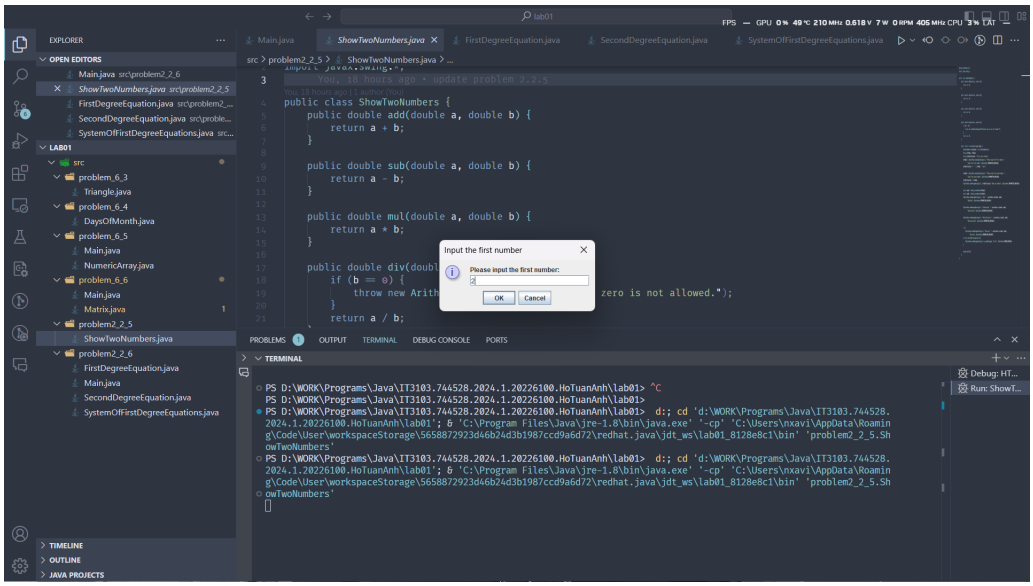
Mã nguồn:

```
package problem2_2_5;
import javax.swing.*;

public class ShowTwoNumbers {
    public double add(double a, double b) {
        return a + b;
    }

    public double sub(double a, double b) {
        return a - b;
    }

    public double mul(double a, double b) {
        return a * b;
    }

    public double div(double a, double b) {
        if (b == 0) {
            throw new ArithmeticException("Division by zero is not allowed."); // Xu ly ngoai le khi chia cho 0
        }
        return a / b;
```

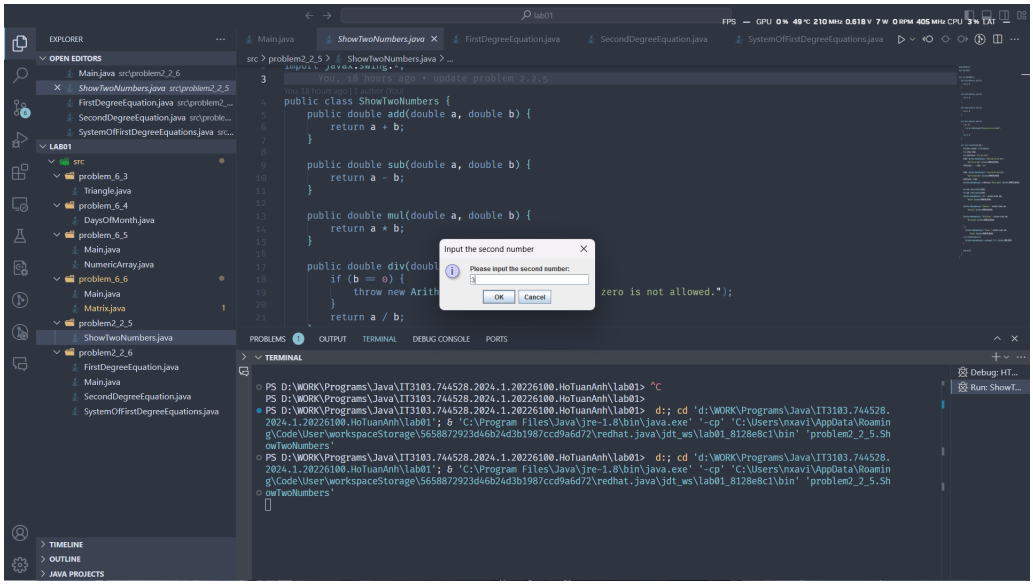
```
22      }
23
24      public static void main(String[] args) {
25          ShowTwoNumbers calculator = new ShowTwoNumbers();
26          String strNum1, strNum2;
27          String strNotification = "You've just entered";
28          strNum1 = JOptionPane.showInputDialog(null, "Please input the
    first number: ",
29                  "Input the first number", JOptionPane.
    INFORMATION_MESSAGE);
30          strNotification += ' ' + strNum1 + " and ";
31
32          strNum2 = JOptionPane.showInputDialog(null, "Please input the
    second number: ",
33                  "Input the second number", JOptionPane.
    INFORMATION_MESSAGE);
34          strNotification += strNum2;
35          JOptionPane.showMessageDialog(null, strNotification, "Show two
    numbers", JOptionPane.INFORMATION_MESSAGE);
36
37          double num1 = Double.parseDouble(strNum1);
38          double num2 = Double.parseDouble(strNum2);
39          JOptionPane.showMessageDialog(null, "Sum: " + calculator.add(
    num1, num2),
40                  "Addition", JOptionPane.INFORMATION_MESSAGE);
41
42          JOptionPane.showMessageDialog(null, "Subtraction: " +
    calculator.sub(num1, num2),
43                  "Subtraction", JOptionPane.INFORMATION_MESSAGE);
44
45          JOptionPane.showMessageDialog(null, "Multiplication: " +
    calculator.mul(num1, num2),
46                  "Multiplication", JOptionPane.INFORMATION_MESSAGE);
47
48          try {
49              JOptionPane.showMessageDialog(null, "Division: " +
    calculator.div(num1, num2),
50                      "Division", JOptionPane.INFORMATION_MESSAGE);
51          } catch (ArithmeticException e) {
52              JOptionPane.showMessageDialog(null, e.getMessage(), "Error"
    , JOptionPane.ERROR_MESSAGE);
53          }
54
55          System.exit(0);
56      }
57  }
```

Kết quả thực thi:

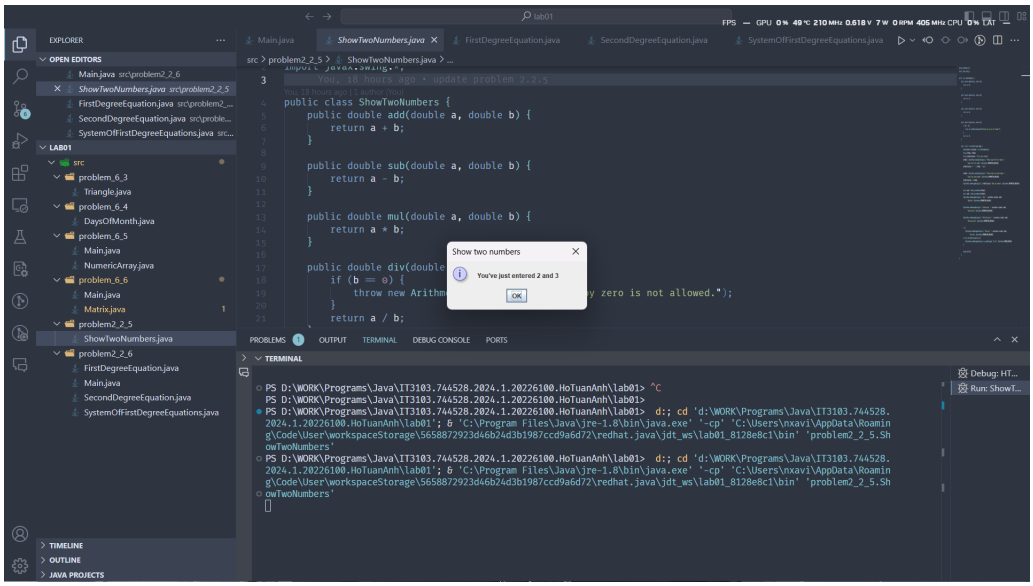
- Nhập 2 số thực kiểu double:



Hình 1: Nhập số thứ nhất

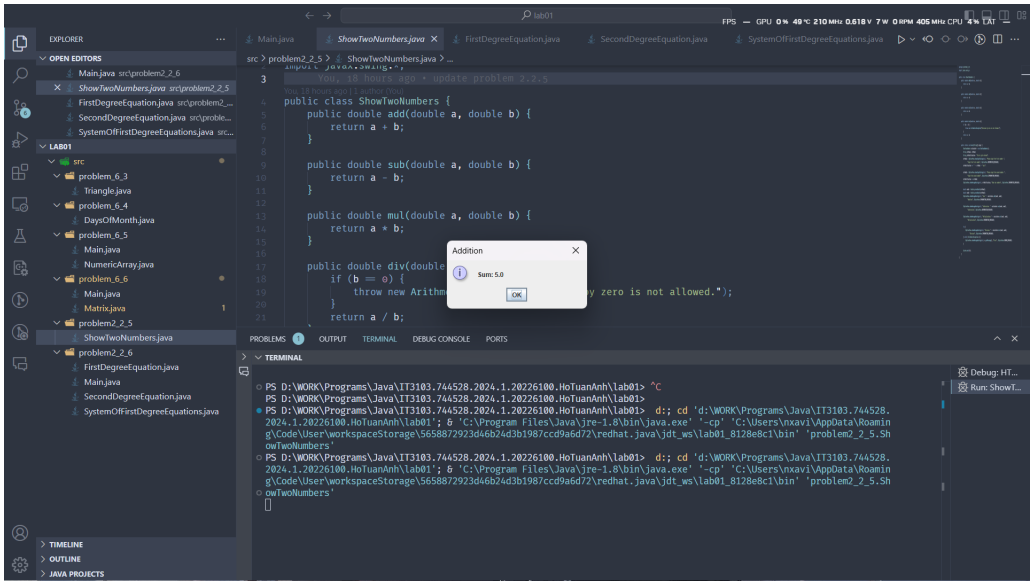


Hình 2: Nhập số thứ hai

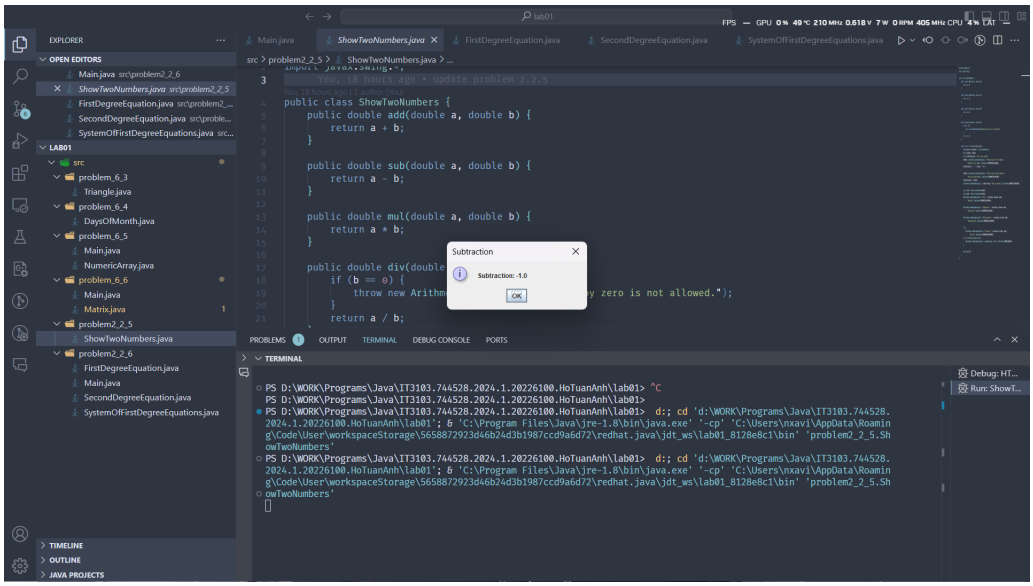


Hình 3: Hiển thị kết quả nhập số

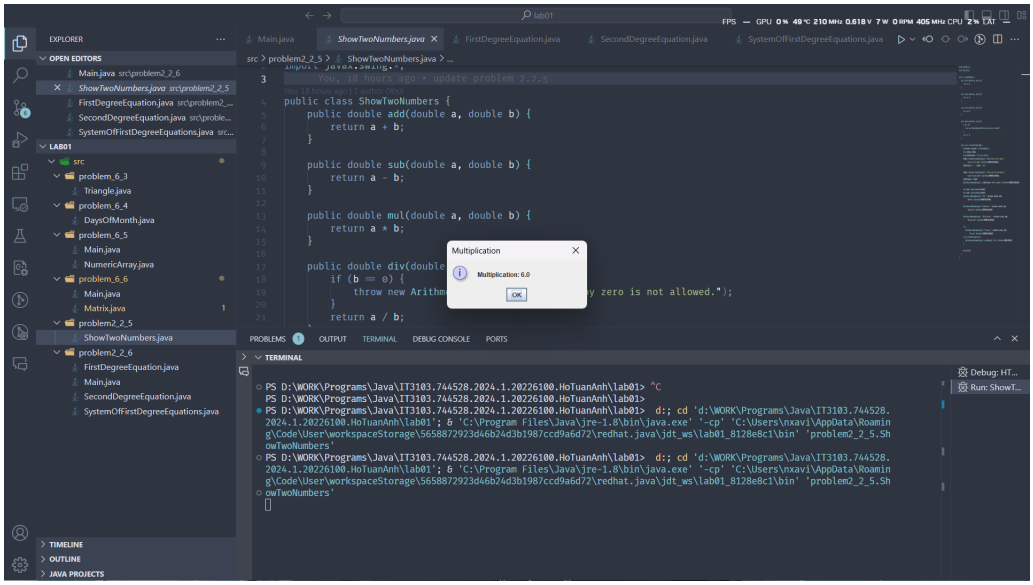
- Thực hiện các phép toán cộng, trừ, nhân, chia:



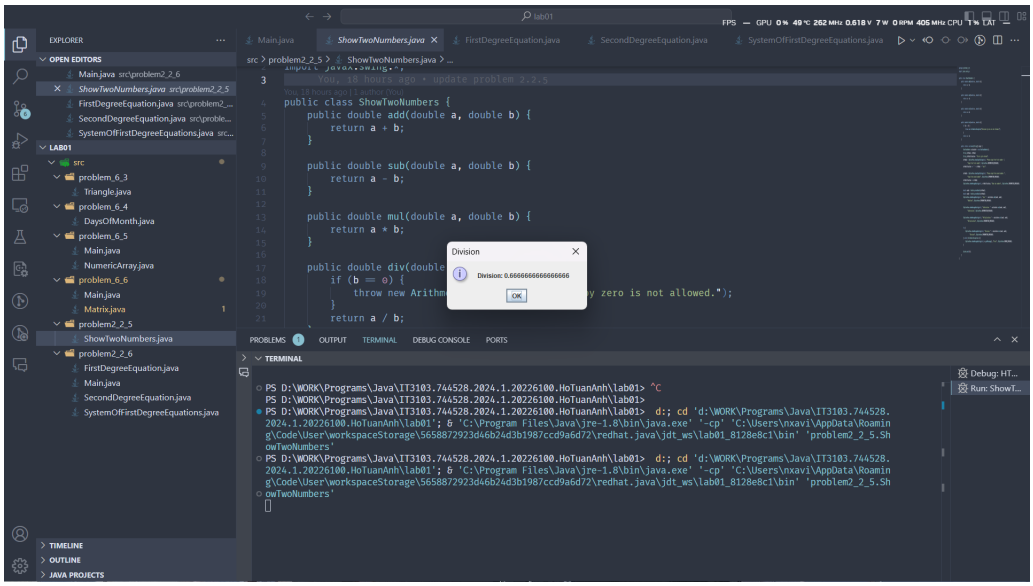
Hình 4: Phép toán cộng



Hình 5: Phép toán trừ

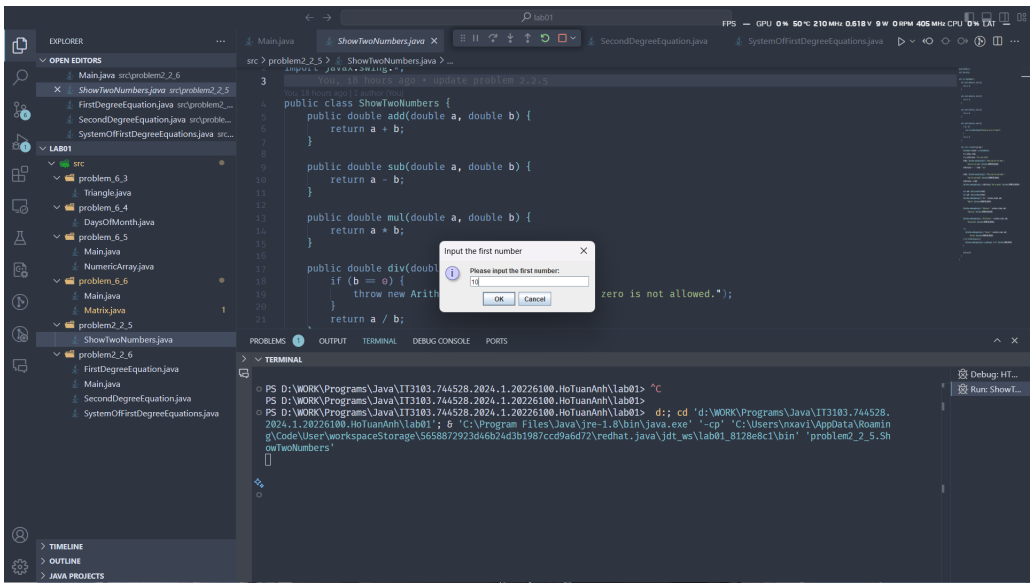


Hình 6: Phép toán nhân

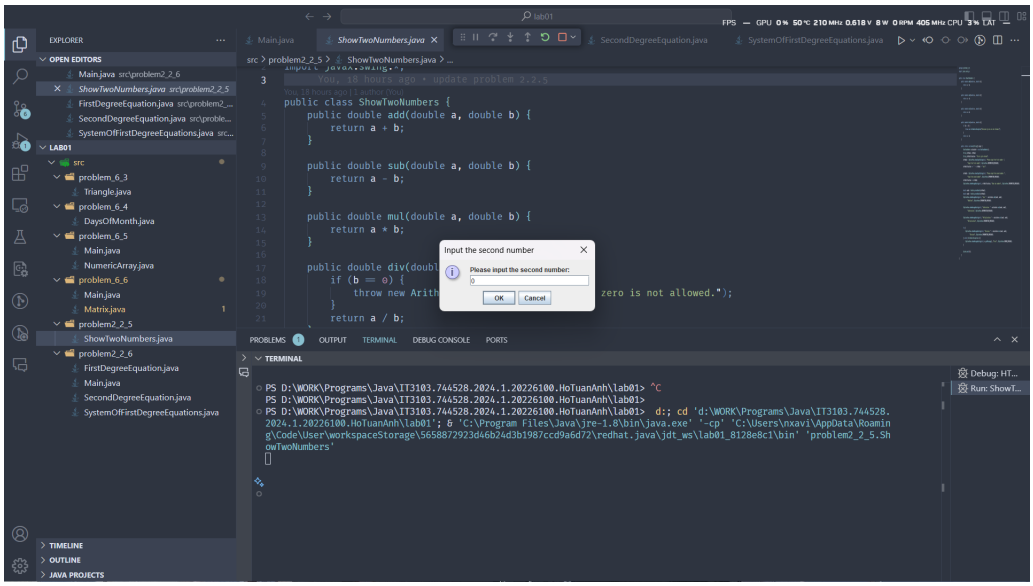


Hình 7: Phép toán chia

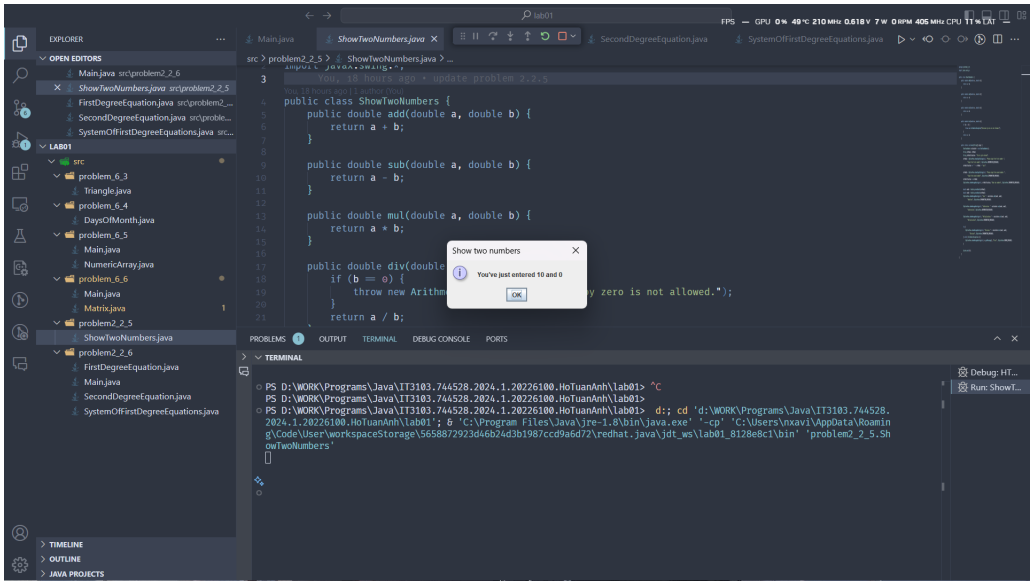
- Bắt ngoại lệ khi thực hiện phép chia cho 0:



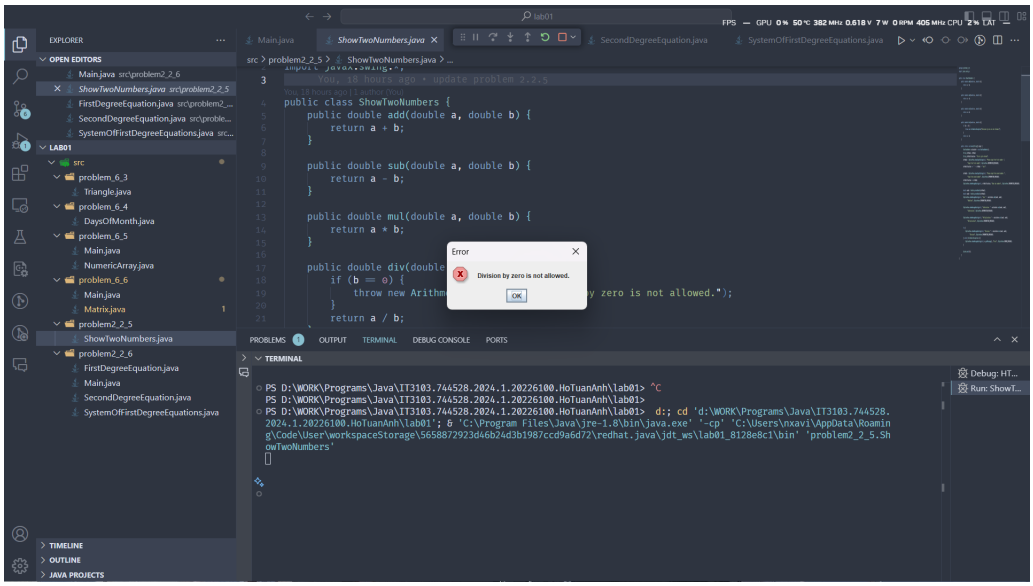
Hình 8: Bắt ngoại lệ - Phép chia cho 0



Hình 9: Thông báo lỗi phép chia cho 0



Hình 10: Kết quả khi bắt ngoại lệ phép chia cho 0



Hình 11: Xử lý ngoại lệ phép chia cho 0

2.2.6 Write a program to solve:

- **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.
- **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:

$$\begin{cases} a_{11}x_1 + a_{12}x_2 &= b_1 \\ a_{21}x_1 + a_{22}x_2 &= b_2 \end{cases} \quad (1)$$

  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:

$$D = |a_{11}a_{12}a_{21}a_{22}| = a_{11}a_{22} - a_{21}a_{12}$$
$$D_1 = |b_1a_{12}b_2a_{22}| = b_1a_{22} - b_2a_{12}$$
$$D_2 = |a_{11}b_1a_{21}b_2| = a_{11}b_2 - a_{21}b_1$$

- **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 and 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 $\Delta = b^2 - 4ac$

Mã nguồn:

- Lớp phương trình bậc nhất 1 ẩn:

```
package problem2_2_6;
import javax.swing.*;

class FirstDegreeEquation {
    private double a, b;

    //Getter
    public double getA() {
        return a;
    }
    public double getB() {
        return b;
    }
    //Setter
    public void setA() {
        String input = JOptionPane.showInputDialog(null, "Ho Tuan Anh 20226100  a = ");
        this.a = Double.parseDouble(input);
    }
    public void setB() {
        String input = JOptionPane.showInputDialog(null, "Ho Tuan Anh 20226100  b = ");
        this.b = Double.parseDouble(input);
    }

    public void solve() throws IllegalArgumentException {
        // Bat ngoai le
        if (a == 0) {
            throw new IllegalArgumentException("Ho Tuan Anh 20226100 - Not the format of first degree equation.\n");
        }
        JOptionPane.showMessageDialog(null, String.format("Ho Tuan Anh 20226100 - The solution is: x = %.2f", -b / a));
    }
}
```

- Lớp hệ phương trình bậc nhất 2 ẩn:

```
package problem2_2_6;

import javax.swing.*;

class SystemOfFirstDegreeEquations {
    private double a11, a12, b1, a21, a22, b2;
    //Getter
    public double getA11() {
        return a11;
    }
    public double getA12() {
        return a12;
    }
    public double getB1() {
        return b1;
    }
    public double getA21() {
        return a21;
```

```
    }
    public double getA22() {
        return a22;
    }
    public double getB2() {
        return b2;
    }
    //Setter
    public void setA11() {
        this.a11 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 a11 = "));
    }
    public void setA12() {
        this.a12 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 a12 = "));
    }
    public void setB1() {
        this.b1 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 b1 = "));
    }
    public void setA21() {
        this.a21 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 a21 = "));
    }
    public void setA22() {
        this.a22 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 a22 = "));
    }
    public void setB2() {
        this.b2 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 b2 = "));
    }

    public void solve() {
        double D = a11 * a22 - a12 * a21, Dx = b1 * a22 - b2 * a12, Dy = a11 * b2 - a21 * b1;
        if (D == 0) {
            if (Dx == 0 && Dy == 0) {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 The system has infinitely many solutions.");
            } else {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 The system has no solution.");
            }
        } else {
            double x = Dx / D;
            double y = Dy / D;
            JOptionPane.showMessageDialog(null, String.format("Ho Tuan Anh 20226100 The solutions are: x = %.2f and y = %.2f", x, y));
        }
    }

}
```

- Lớp phương trình bậc hai 1 ẩn:

```
package problem2_2_6;

import javax.swing.*;

```

```
class SecondDegreeEquation {
    private double a, b, c;
    //Getter
    public double getA() {
        return a;
    }
    public double getB() {
        return b;
    }
    public double getC() {
        return c;
    }
    //Setter
    public void setA() {
        String input = JOptionPane.showInputDialog(null, "Ho Tuan
    Anh 20226100 a = ");
        this.a = Double.parseDouble(input);
    }
    public void setB() {
        String input = JOptionPane.showInputDialog(null, "Ho Tuan
    Anh 20226100 b = ");
        this.b = Double.parseDouble(input);
    }
    public void setC() {
        String input = JOptionPane.showInputDialog(null, "Ho Tuan
    Anh 20226100 c = ");
        this.c = Double.parseDouble(input);
    }

    public void solve() throws IllegalArgumentException {
        // Bat ngoai le
        if (a == 0) {
            throw new IllegalArgumentException("Ho Tuan Anh
    20226100 Not the format of second degree equation.\n");
        }
        double delta = Math.pow(b, 2) - 4 * a * c;
        if (delta < 0) {
            JOptionPane.showMessageDialog(null, "Ho Tuan Anh
    20226100 No solution");
        } else if (delta == 0) {
            JOptionPane.showMessageDialog(null, String.format("Ho
    Tuan Anh 20226100 The solution is: x = %.2f", -b / (2 * a)));
        } else {
            JOptionPane.showMessageDialog(null, String.format("Ho
    Tuan Anh 20226100 The solutions are: x1 = %.2f and x2 = %.2f",
     (-b + Math.sqrt(delta)) / (2 * a), (-b - Math.sqrt(delta)) /
    (2 * a)));
        }
    }
}
```

- Lớp Main chứa phương thức main() thực thi chương trình:

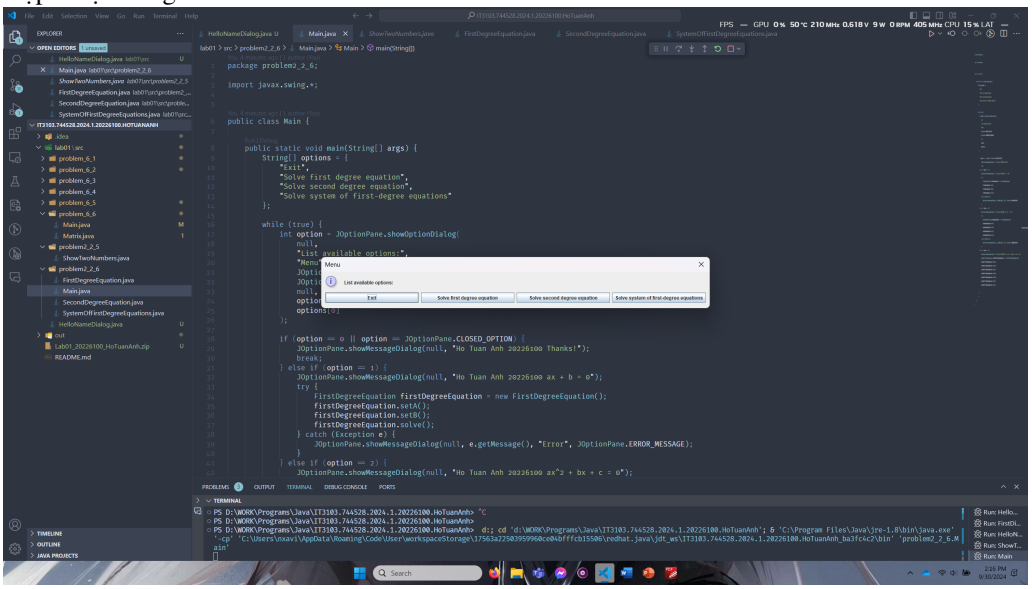
```
package problem2_2_6;

import javax.swing.*;


public class Main {

    public static void main(String[] args) {
        String[] options = {
            "Exit",
```

```
            "Solve first degree equation",
            "Solve second degree equation",
            "Solve system of first-degree equations"
        };

        while (true) {
            int option = JOptionPane.showOptionDialog(
                null,
                "List available options:",
                "Menu",
                JOptionPane.DEFAULT_OPTION,
                JOptionPane.INFORMATION_MESSAGE,
                null,
                options,
                options[0]
            );
            // Neu nhan exit hoac dau x goc phai man hinh thi thoat ct
            if (option == 0 || option == JOptionPane.CLOSED_OPTION) {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 Thanks!");
                break;
            } else if (option == 1) {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 ax + b = 0");
                try {
                    FirstDegreeEquation firstDegreeEquation = new FirstDegreeEquation();
                    firstDegreeEquation.setA();
                    firstDegreeEquation.setB();
                    firstDegreeEquation.solve();
                } catch (Exception e) {
                    // Neu a != 0 bao loi cho nguoi dung
                    JOptionPane.showMessageDialog(null, e.getMessage(), "Error", JOptionPane.ERROR_MESSAGE);
                }
            } else if (option == 2) {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 ax^2 + bx + c = 0");
                try {
                    SecondDegreeEquation secondDegreeEquation = new SecondDegreeEquation();
                    secondDegreeEquation.setA();
                    secondDegreeEquation.setB();
                    secondDegreeEquation.setC();
                    secondDegreeEquation.solve();
                } catch (Exception e) {
                    // Neu a != 0 bao loi cho nguoi dung
                    JOptionPane.showMessageDialog(null, e.getMessage(), "Error", JOptionPane.ERROR_MESSAGE);
                }
            } else if (option == 3) {
                JOptionPane.showMessageDialog(null, "Ho Tuan Anh 20226100 \na11.x + a12.y = b1\na21.x + a22.y = b2");
                SystemOfFirstDegreeEquations systemOfFirstDegreeEquations = new SystemOfFirstDegreeEquations();
                systemOfFirstDegreeEquations.setA11();
                systemOfFirstDegreeEquations.setA12();
                systemOfFirstDegreeEquations.setB1();
                systemOfFirstDegreeEquations.setA21();
```

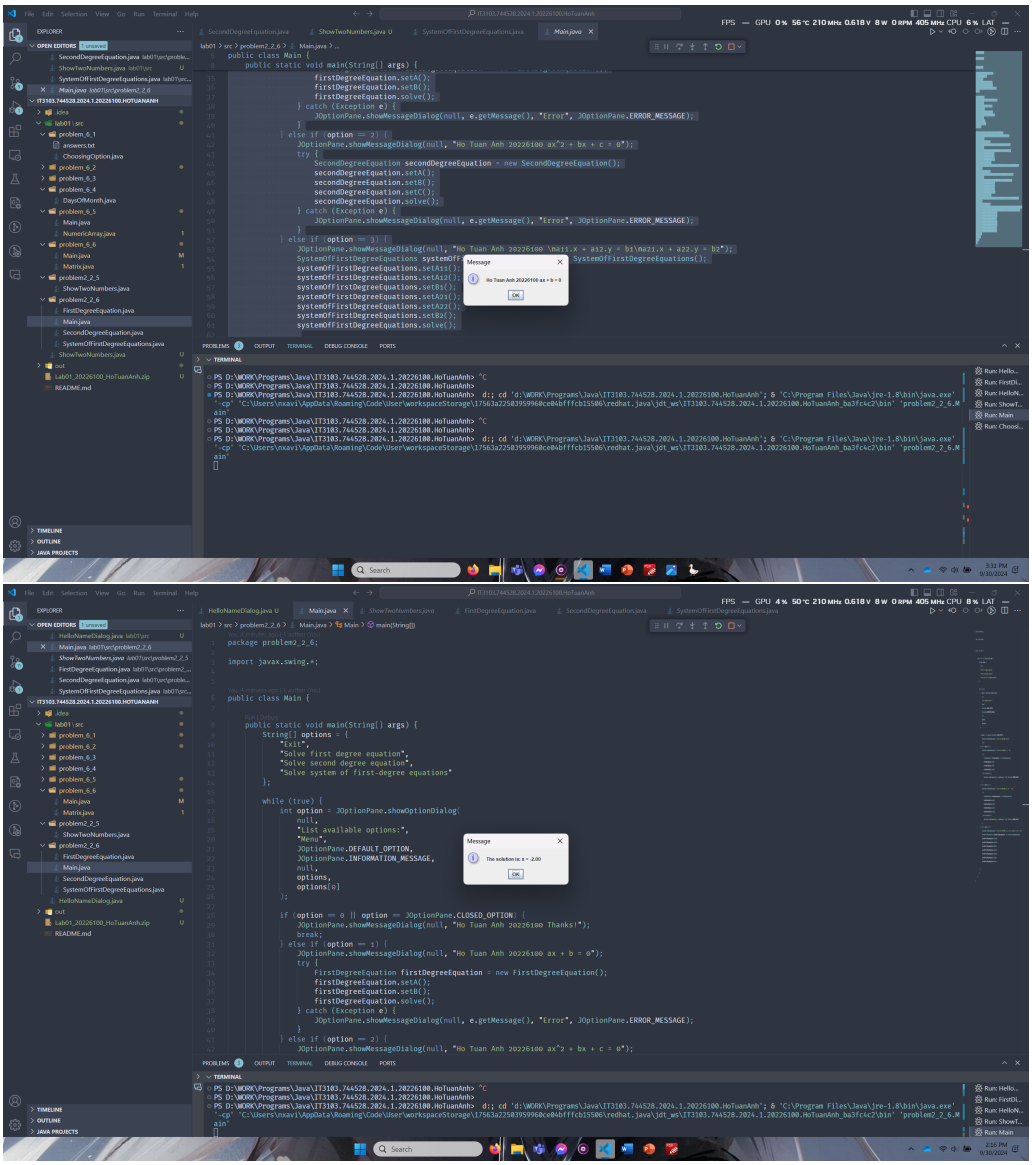
```
                    systemOfFirstDegreeEquations.setA22();
                    systemOfFirstDegreeEquations.setB2();
                    systemOfFirstDegreeEquations.solve();

                }
            }
        }
}
```

Kết quả thực thi:

- Hộp thoại thông báo:

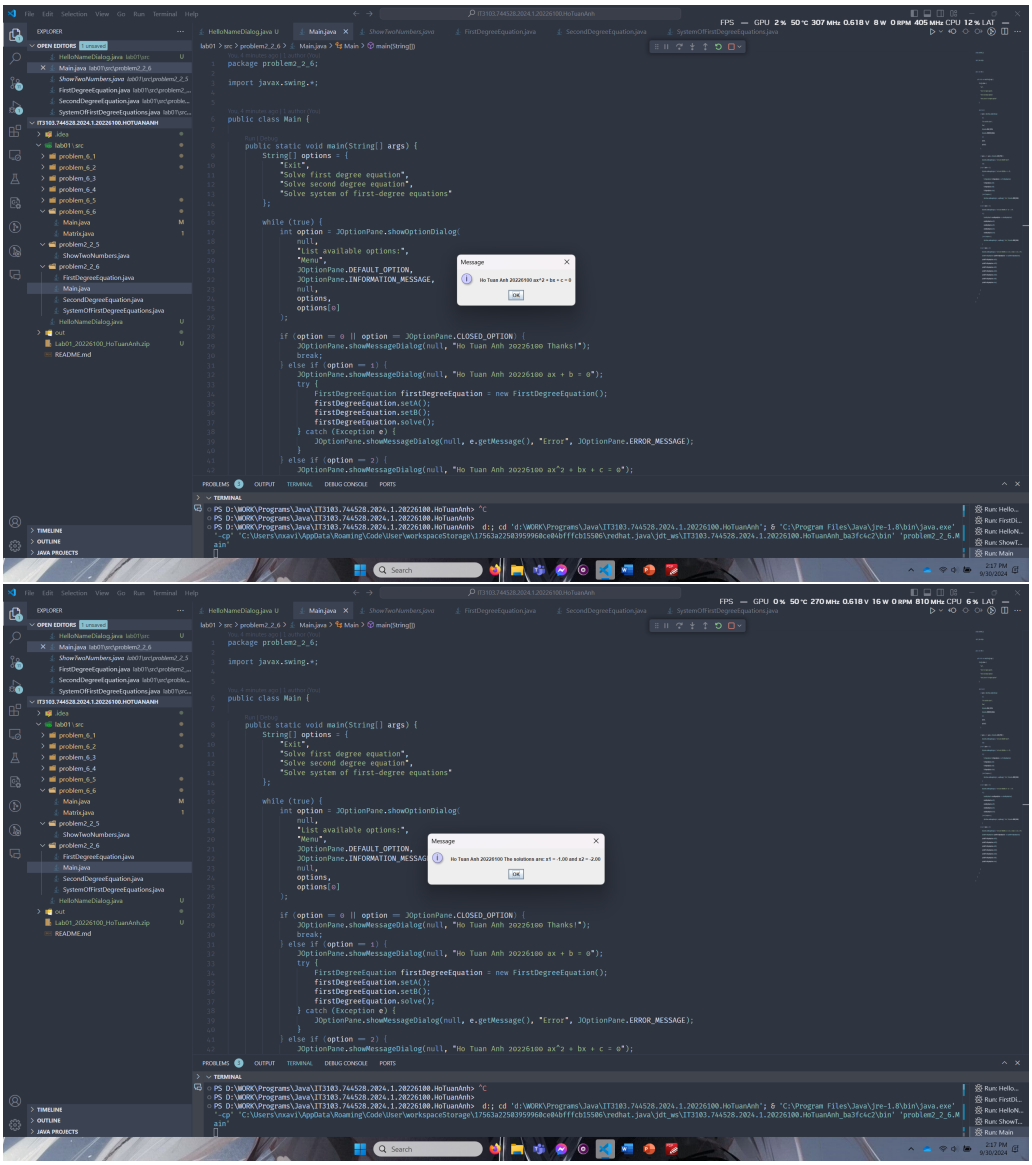


- Giải phương trình bậc nhất 1 ẩn:



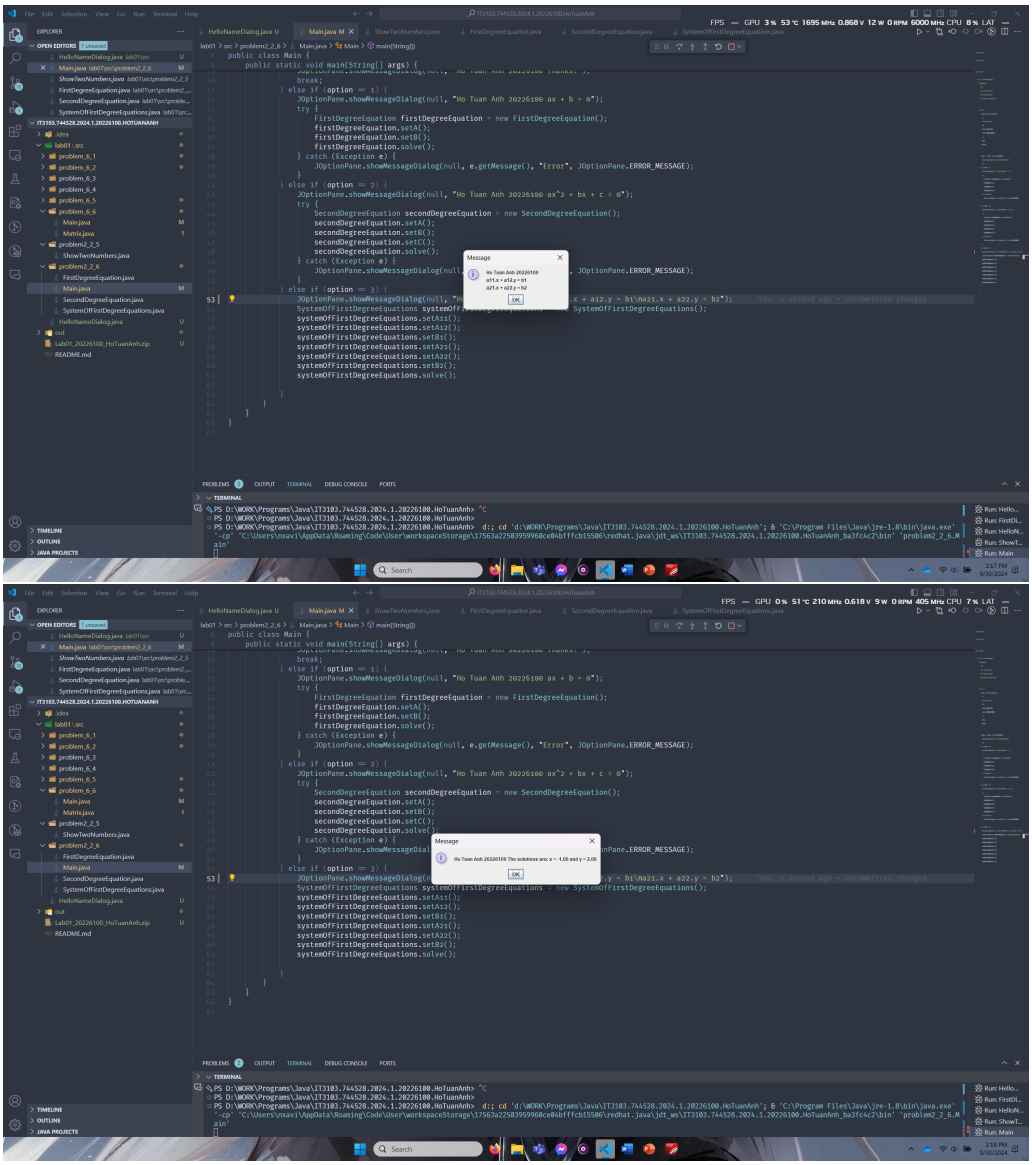
Hình 12: Giải phương trình bậc nhất 1 ẩn

- Giải hệ phương trình bậc nhất 2 ẩn:



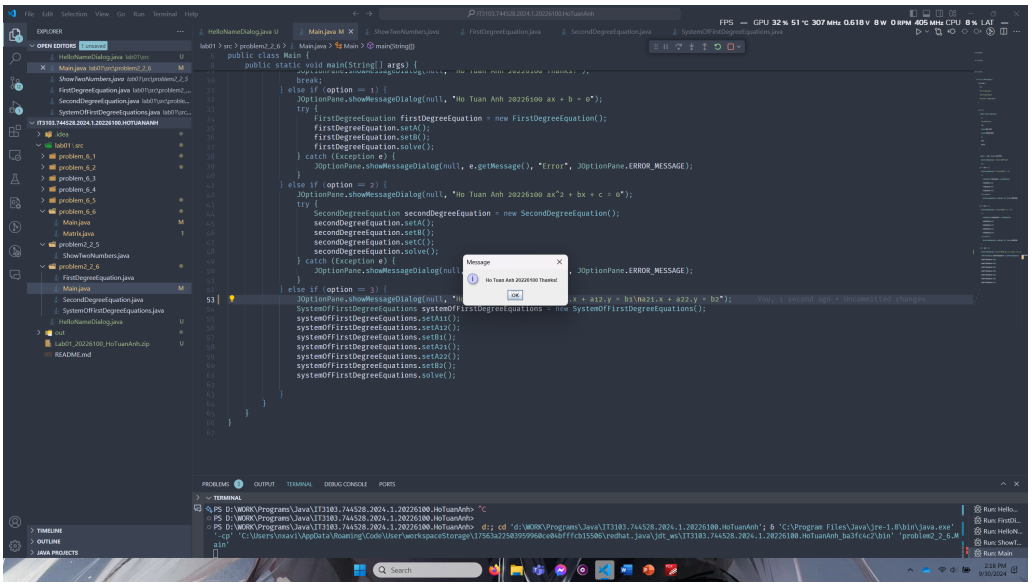
Hình 13: Giải hệ phương trình bậc nhất 2 ẩn

- Giải phương trình bậc hai 1 ẩn:



Hình 14: Giải phương trình bậc hai 1 ẩn

- Thoát chương trình:



6.1 Write, compile and run the ChoosingOption program:

Notes: We use JavaBasics project for this exercise.

Mã nguồn:

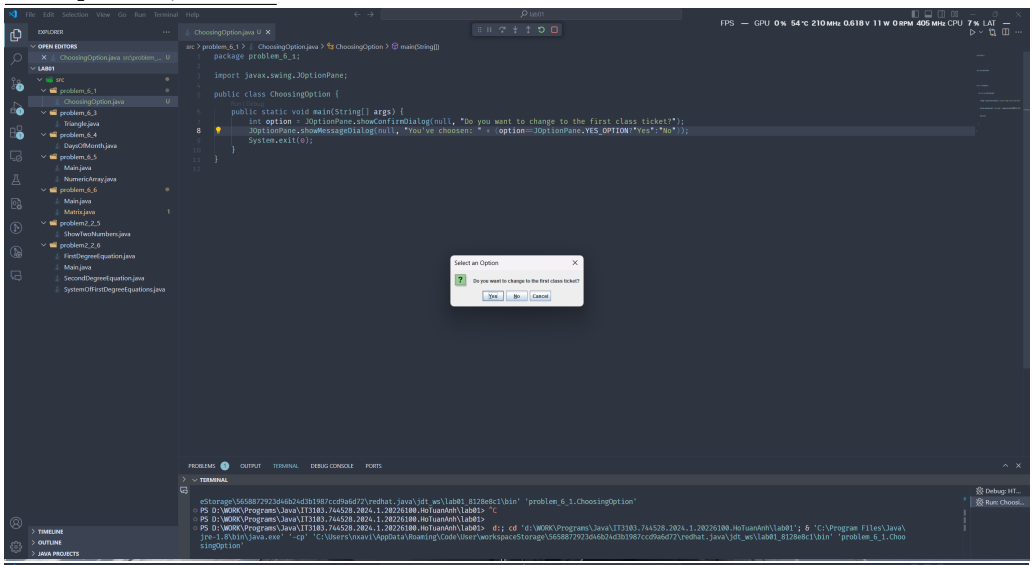
```
package problem_6_1;

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 choosen: " + (option==JOptionPane.YES_OPTION?"Yes":"No"));
        System.exit(0);
    }
}
```

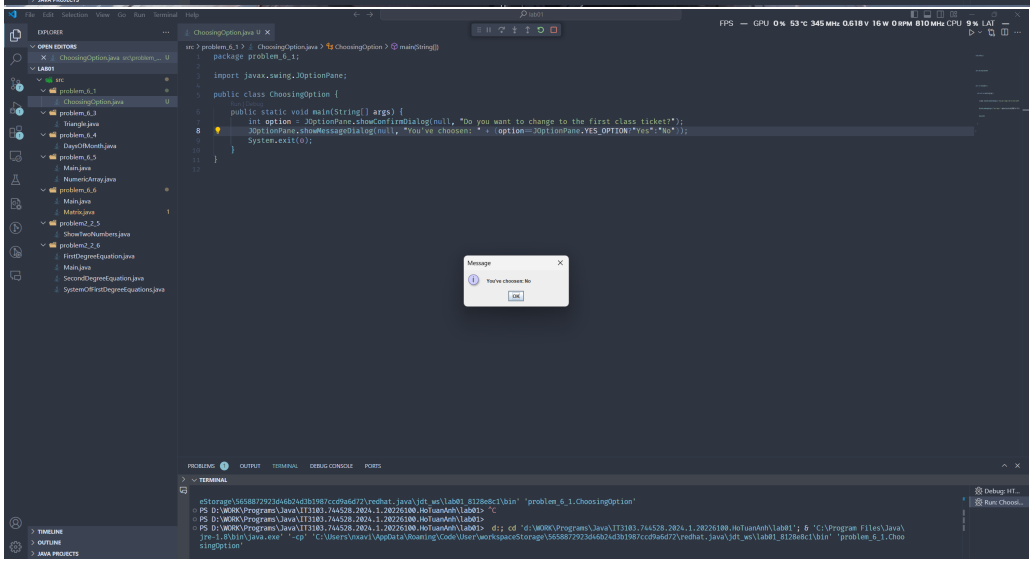
How to customize the options to users, e.g. only two options: "Yes" and "No", OR "I do" and "I don't"?

```
package problem_6_1;

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 choosen: " + (option==JOptionPane.YES_OPTION?"Yes":"No"));
        Object[] options = {"I do", "I don't"};
        int n = JOptionPane.showOptionDialog(null,
            "Do you like this custom options?",
            "Custom Option Dialog",
            JOptionPane.YES_NO_OPTION,
```

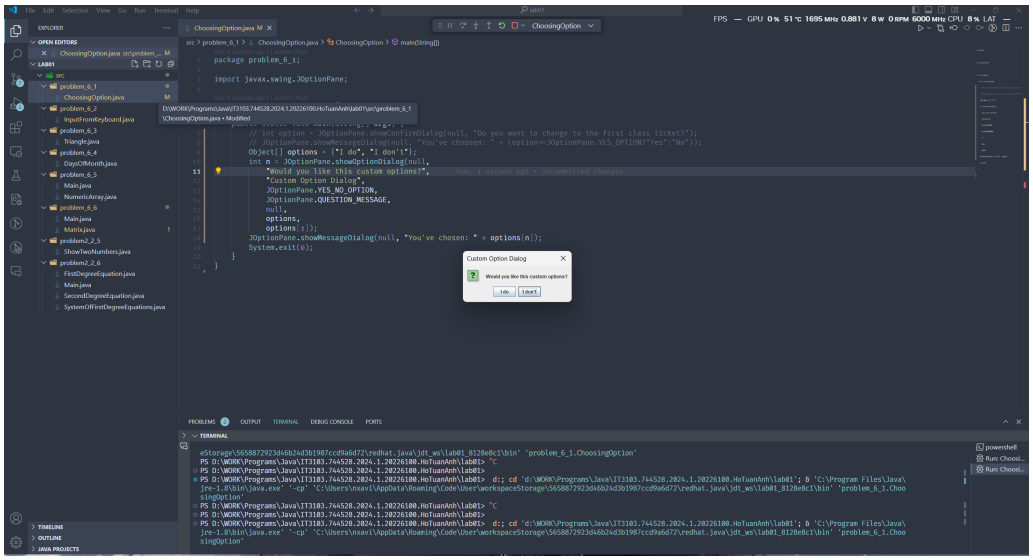
```
            JOptionPane.QUESTION_MESSAGE,
            null,
            options,
            options[1]);
        JOptionPane.showMessageDialog(null, "You've chosen: " + options
    [n]);
        System.exit(0);
    }
}
```

Kết quả thực thi:

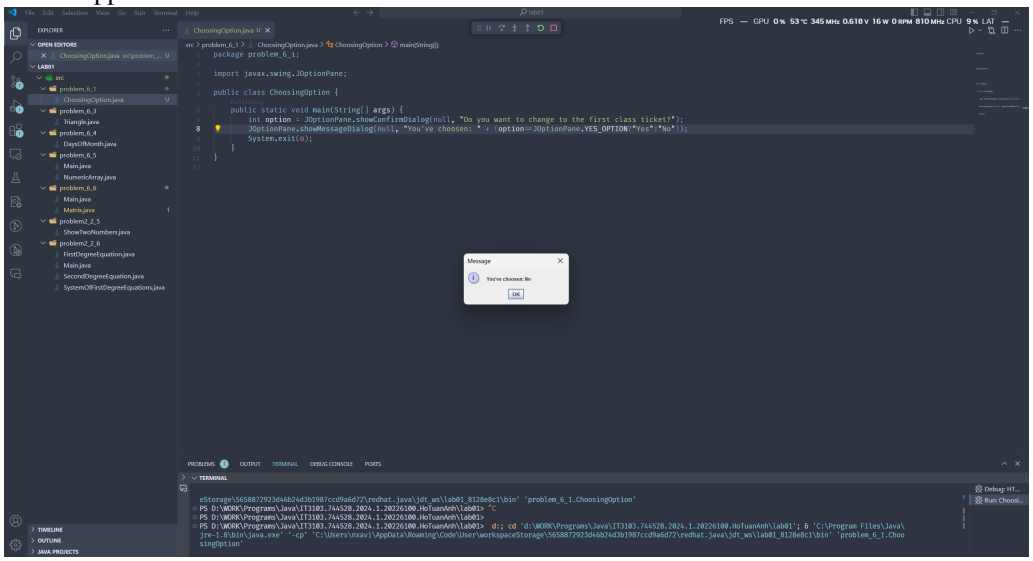




Giao diện sau khi chỉnh sửa:



What happens if users choose “Cancel”?



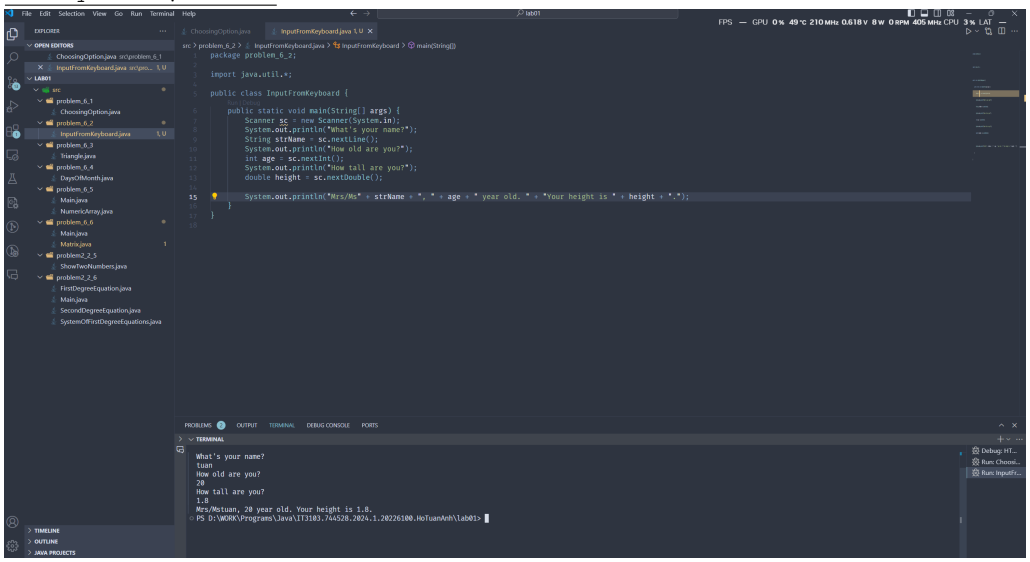
6.2 Write a program for input/output from keyboard

Mã nguồn:

```
package problem_6_2;

import java.util.*;

public class InputFromKeyboard {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("What’s your name?");
        String strName = sc.nextLine();
        System.out.println("How old are you?");
```

```
        int age = sc.nextInt();
        System.out.println("How tall are you?");
        double height = sc.nextDouble();

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

Kết quả thực thi:

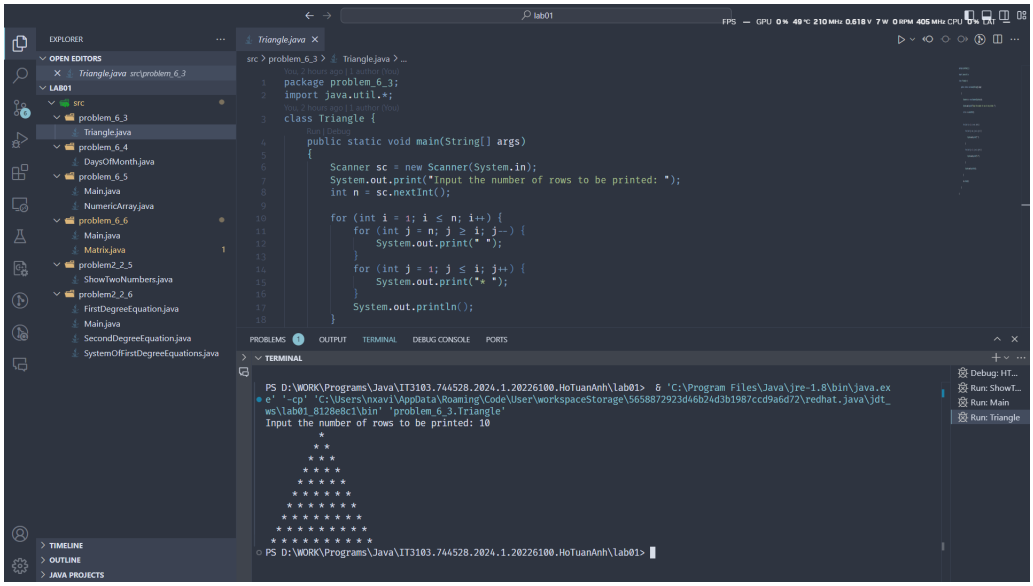


6.3 Write a program to display a triangle with a height of n stars (*), n is entered by users.

Mã nguồn:

```
package problem_6_3;
import java.util.*;
class Triangle {
  public static void main(String[] args)
  {
    Scanner sc = new Scanner(System.in);
    System.out.print("Input the number of rows to be printed: ");
    int n = sc.nextInt();

    for (int i = 1; i <= n; i++) {
      for (int j = n; j >= i; j--) {
        System.out.print(" ");
      }
      for (int j = 1; j <= i; j++) {
        System.out.print("* ");
      }
      System.out.println();
    }
        sc.close();
  }
}
```

Kết quả thực thi:



Hình 15: Vẽ tam giác

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

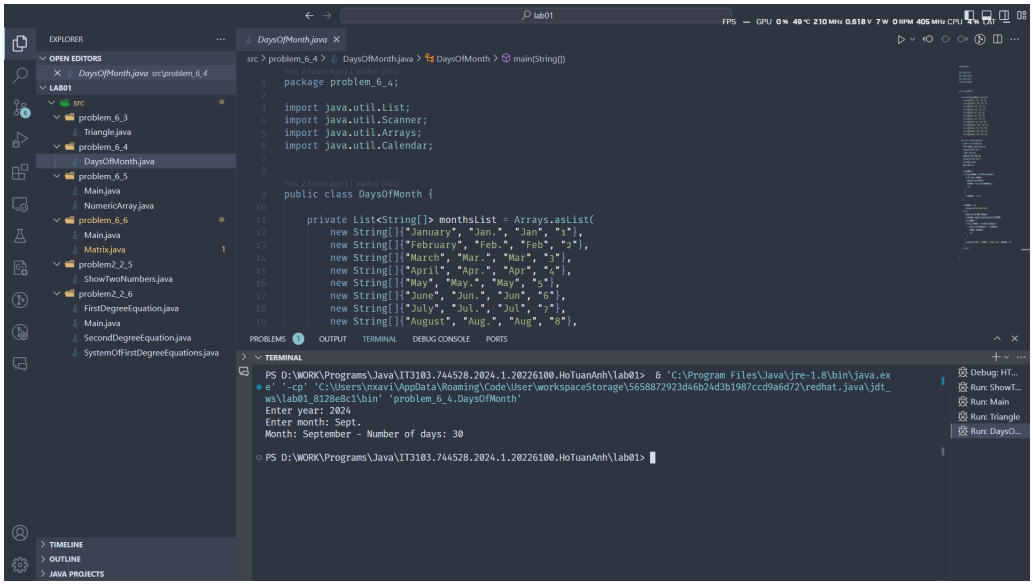
Mã nguồn:

```java
package problem_6_4;
import java.util.List;
import java.util.Scanner;
import java.util.Arrays;
import java.util.Calendar;


public class DaysOfMonth {
    // Collection chua dinh dang
    private List<String[]> monthsList = Arrays.asList(
        new String[]{"January", "Jan.", "Jan", "1"},
        new String[]{"February", "Feb.", "Feb", "2"},
        new String[]{"March", "Mar.", "Mar", "3"},
        new String[]{"April", "Apr.", "Apr", "4"},
        new String[]{"May", "May.", "May", "5"},
        new String[]{"June", "Jun.", "Jun", "6"},
        new String[]{"July", "Jul.", "Jul", "7"},
        new String[]{"August", "Aug.", "Aug", "8"},
        new String[]{"September", "sept.", "sept", "9"},
        new String[]{"October", "Oct.", "Oct", "10"},
        new String[]{"November", "Nov.", "Nov", "11"},
        new String[]{"December", "Dec.", "Dec", "12"}
    );
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Calendar calendar = Calendar.getInstance(); // Tao thoi gian
    theo mac dinh
        System.out.print("Enter year: ");
        int year = sc.nextInt();
        calendar.set(Calendar.YEAR, year);
        System.out.print("Enter month: ");
        String month = sc.next();
        // loai bo khoang trang thua o  au  v  cuoi chuoi nhap vao.
        month = month.trim();

        int monthNumber = -1;
        for (String[] monthNames : new DaysOfMonth().monthsList) {
            for (String name : monthNames) {
            if (name.equalsIgnoreCase(month)) {
                monthNumber = Integer.parseInt(monthNames[3]) - 1;
                break;
            }
        }
            if (monthNumber != -1) break;
        }
        //Kiwm tra thang nhap vao hop le hay khong:
        if (monthNumber == -1) {
            System.out.println("Invalid month input.");
        } else {
            calendar.set(Calendar.MONTH, monthNumber);
            int daysInMonth = calendar.getActualMaximum(Calendar.
    DAY_OF_MONTH);
            String monthName = "";
            for (String[] monthNames : new DaysOfMonth().monthsList) {
                if (Integer.parseInt(monthNames[3]) - 1 == monthNumber)
     {
                    monthName = monthNames[0];
                    break;
                }
            }
            System.out.println("Month: " + monthName + " - Number of
    days: " + daysInMonth + "\n");
```

```
59          }
60          sc.close();
61      }
62
63  }
```

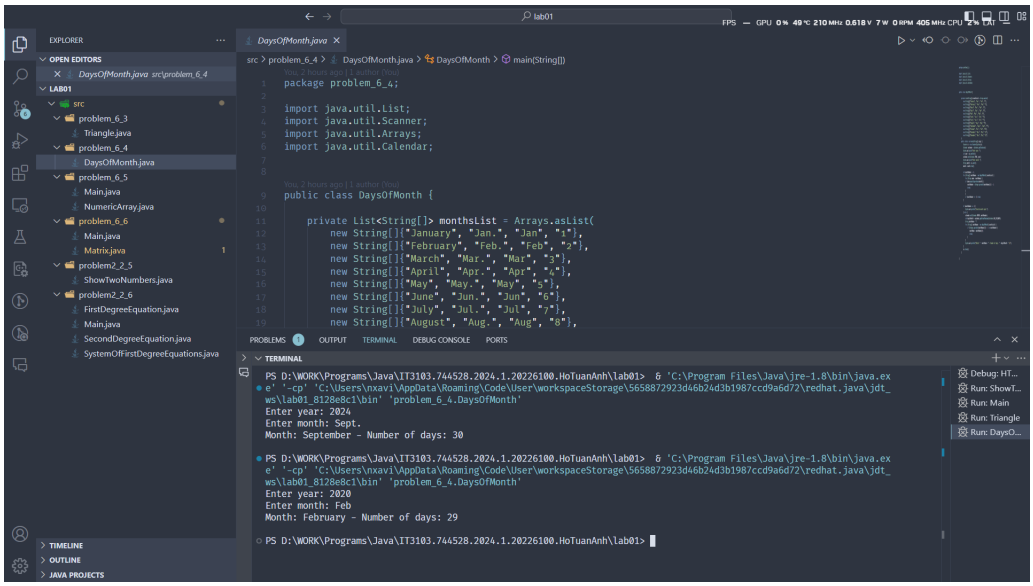
Kết quả thực thi:

- Năm thường:



Hình 16: Số ngày trong tháng 9/2024

- Năm nhuận:



Hình 17: Số ngày trong tháng 2/2020

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

Mã nguồn:

- Lớp NumericArray xử lý yêu cầu bài toán:

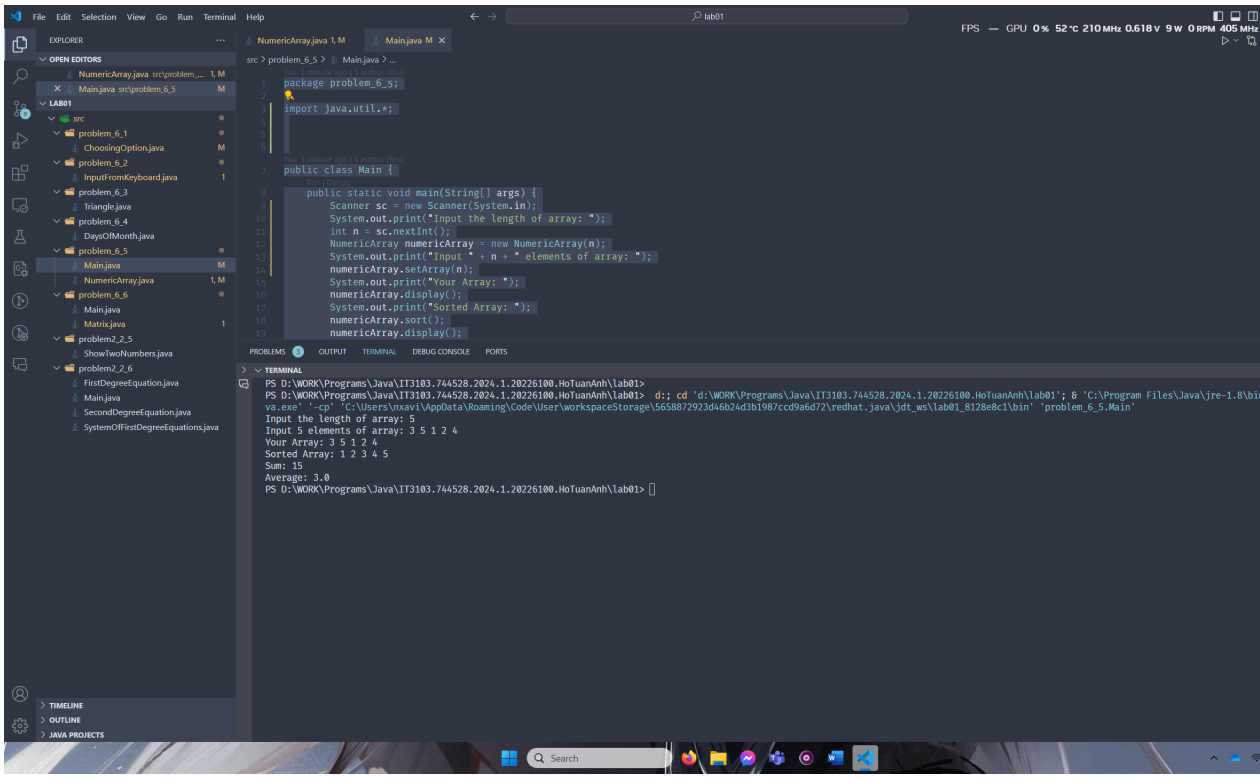
```
package problem_6_5;
import java.util.*;

public class NumericArray {
    private int[] arr;

    public NumericArray(int n) {
        this.arr = new int[n];
    }

    public void setArray(int n) {
        Scanner sc = new Scanner(System.in);
        for (int i = 0; i < n; i++) {
            this.arr[i] = sc.nextInt();
        }
    }

    public int[] sort() {
        Arrays.sort(arr);
        return arr;
    }

    public int getSum() {
        return Arrays.stream(arr).sum();
    }

```

```
    public double getAverage() {
        return (double) getSum() / arr.length;
    }

    public void display() {
        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();
    }
}
```

- Lớp Main thực thi chương trình:

```
package problem_6_5;
import java.util.*;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Input the length of array: ");
        int n = sc.nextInt();
        NumericArray numericArray = new NumericArray(n);
        System.out.print("Input " + n + " elements of array: ");
        numericArray.setArray(n);
        System.out.print("Your Array: ");
        numericArray.display();
        System.out.print("Sorted Array: ");
        numericArray.sort();
        numericArray.display();
        System.out.println("Sum: " + numericArray.getSum());
        System.out.println("Average: " + numericArray.getAverage()
    );
        sc.close();
    }
}
```

Kết quả thực thi:



Hình 18: Các thao tác trên mảng

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

Mã nguồn:

- Lớp Matrix xử lý yêu cầu bài toán:

```
package problem_6_6;
import java.util.*;

public class Matrix {
    private int[][] matrix;

    public Matrix() {
        this.matrix = null;
    }

    public Matrix(int[][] matrix) {
        this.matrix = matrix;
    }

    public void setMatrix(int r, int c) {
        matrix = new int[r][c];
        Scanner sc = new Scanner(System.in);
        for (int i = 0; i < r; i++) {
```

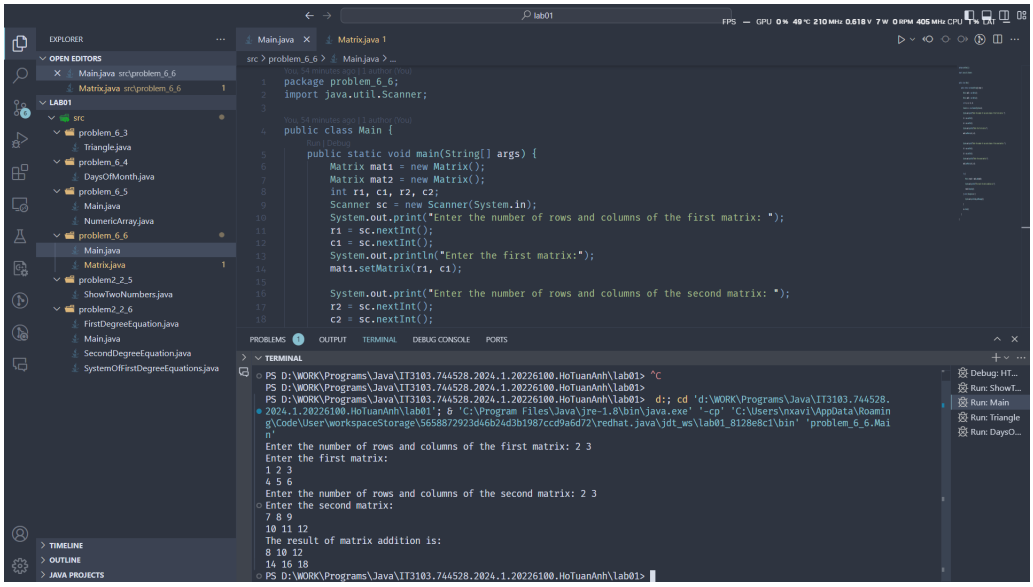
```
            for (int j = 0; j < c; j++) {
                matrix[i][j] = sc.nextInt();
            }
        }
    }

    public void display() {
        if (matrix == null) {
            System.out.println("Matrix is empty.");
            return;
        }

        for (int i = 0; i < matrix.length; i++) {
            for (int j = 0; j < matrix[i].length; j++) {
                System.out.print(matrix[i][j] + " ");
            }
            System.out.println();
        }
    }
    // Bat ngoai le
    public Matrix add(Matrix other) throws
    IllegalArgumentException {
        if (this.matrix.length != other.matrix.length || this.
    matrix[0].length != other.matrix[0].length) {
            throw new IllegalArgumentException("Two matrices are
    not the same size.");
        }

        int r = matrix.length;
        int c = matrix[0].length;
        int[][] result = new int[r][c];

        for (int i = 0; i < r; i++) {
            for (int j = 0; j < c; j++) {
                result[i][j] = this.matrix[i][j] + other.matrix[i
    ][j];
            }
        }
        return new Matrix(result);
    }
}
```

- Lớp Main thực thi chương trình:

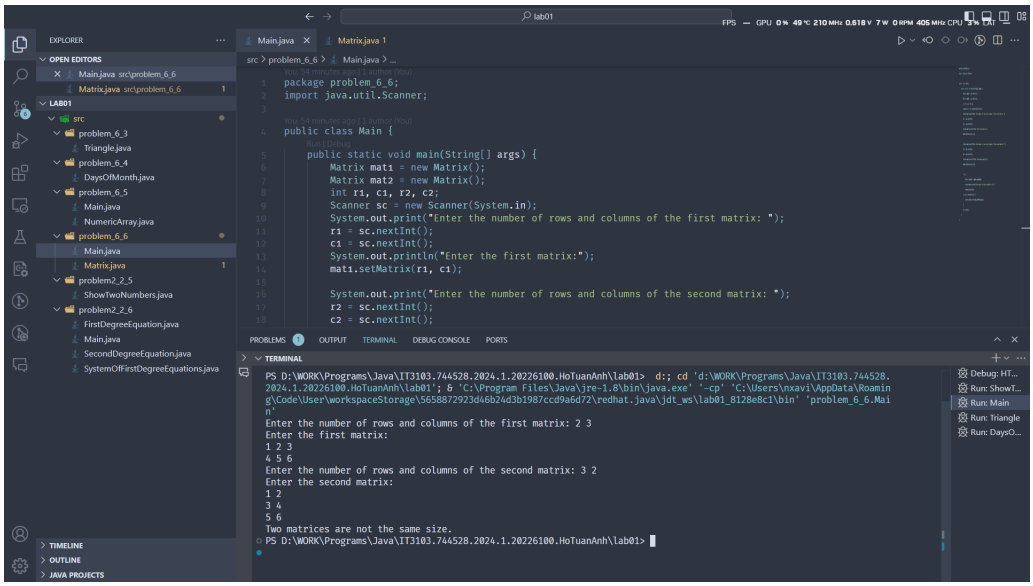
```
package problem_6_6;
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Matrix mat1 = new Matrix();
        Matrix mat2 = new Matrix();
        int r1, c1, r2, c2;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of rows and columns of
    the first matrix: ");
        r1 = sc.nextInt();
        c1 = sc.nextInt();
        System.out.println("Enter the first matrix:");
        mat1.setMatrix(r1, c1);
```

```
15
16          System.out.print("Enter the number of rows and columns of
        the second matrix: ");
17          r2 = sc.nextInt();
18          c2 = sc.nextInt();
19          System.out.println("Enter the second matrix:");
20          mat2.setMatrix(r2, c2);
21          // Xu ly ngoai le 2 ma tran khac kieu
22          try {
23              Matrix result = mat1.add(mat2);
24              System.out.println("The result of matrix addition is:"
        );
25              result.display();
26          } catch (Exception e) {
27              System.out.println(e.getMessage());
28          }
29          sc.close();
30      }
31  }
32
33
34
```

Kết quả thực thi:



Hình 19: Thực hiện phép cộng 2 ma trận cùng kiểu



Hình 20: Bắt ngoại lệ khi nhập 2 ma trận khác kiểu