

**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**

Họ và tên sv: Hồ Tuấn Anh  
MSSV: 20226100  
Lớp: CNTT Việt Pháp 01-K67  
GVHD: Lê Thị Hoa  
HTGD: Đặng Mạnh Cường

Hà Nội, Ngày 30 tháng 9 năm 2024

# Contents

<b>DANH MỤC HÌNH ẢNH</b>	<b>2</b>
<b>BÁO CÁO THỰC HÀNH LAB 1</b>	<b>3</b>
The Very First Java Programs . . . . .	3
2.2.1 Write, compile the first Java application: . . . . .	3
2.2.2 Write, compile the first dialog Java program . . . . .	3
2.2.3 Write, compile the first input dialog Java application . . . . .	3
2.2.4 Write, compile, and run the following example: . . . . .	4
BÀI TẬP . . . . .	6
2.2.5 Write a program to calculate sum, difference, product, and quotient of 2 double numbers which are entered by users. . . . .	6
2.2.6 Write a program to solve: numbers which are entered by users. . . . .	13
6.1 Write, compile and run the ChoosingOption program: . . . . .	22
6.2 Write a program for input/output from keyboard . . . . .	24
6.3 Write a program to display a triangle with a height of n stars (*), n is entered by users. . . . .	25
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. . . . .	26
6.5 Write a Java program to sort a numeric array, and calculate the sum and average value of array elements. . . . .	29
6.6 Write a Java program to add two matrices of the same size. . . . .	31

## DANH MỤC HÌNH ẢNH

1	Nhập số thứ nhất . . . . .	8
2	Nhập số thứ hai . . . . .	8
3	Hiển thị kết quả nhập số . . . . .	9
4	Phép toán cộng . . . . .	9
5	Phép toán trừ . . . . .	10
6	Phép toán nhân . . . . .	10
7	Phép toán chia . . . . .	11
8	Bắt ngoại lệ - Phép chia cho 0 . . . . .	11
9	Thông báo lỗi phép chia cho 0 . . . . .	12
10	Kết quả khi bắt ngoại lệ phép chia cho 0 . . . . .	12
11	Xử lý ngoại lệ phép chia cho 0 . . . . .	13
12	Giải phương trình bậc nhất 1 ẩn . . . . .	19
13	Giải hệ phương trình bậc nhất 2 ẩn . . . . .	20
14	Giải phương trình bậc hai 1 ẩn . . . . .	21
15	Vẽ tam giác . . . . .	26
16	Số ngày trong tháng 9/2024 . . . . .	28
17	Số ngày trong tháng 2/2020 . . . . .	29
18	Các thao tác trên mảng . . . . .	31
19	Thực hiện phép cộng 2 ma trận cùng kiểu . . . . .	33
20	Bắt ngoại lệ khi nhập 2 ma trận khác kiểu . . . . .	34

# BÁO CÁO THỰC HÀNH LAB 1

## The Very First Java Programs

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

The screenshot shows the VS Code interface with the following details:

- Explorer View:** Shows the project structure for "IT3103.744528.2024.1.20226100.HoTuanAnh". The "HelloWorld.java" file is open in the editor.
- Editor View:** Displays the Java code for "HelloWorld.java":
 

```
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Ho Tu Anh - 20226100");
        System.out.println("Xin chao \n cac ban");
        System.out.println("Hello \t world");
    }
}
```
- Terminal View:** Shows the command-line output of the application:
 

```
Ho Tu Anh - 20226100
Xin chao
cac ban
Hello world
PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh>
```

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

The screenshot shows the VS Code interface with the following details:

- Explorer View:** Shows the project structure for "IT3103.744528.2024.1.20226100.HoTuanAnh". The "FirstDialog.java" file is open in the editor.
- Editor View:** Displays the Java code for "FirstDialog.java":
 

```
import javax.swing.JOptionPane;
public class FirstDialog {
    public static void main(String[] args) {
        JOptionPane.showMessageDialog(null, "Ho Tu Anh - 20226100 - Hello world! How are you?");
        System.exit(0);
    }
}
```
- Terminal View:** Shows the command-line output of the application, including a screenshot of a message dialog box:
 

A message dialog box titled "Message" is displayed with the text: "Ho Tu Anh - 20226100 - Hello world! How are you?".

```
PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh> D:\Program Files\Java\jre-1.8\bin\java.exe -cp ".;C:\Users\nxav1\AppData\Roaming\Code\User\workspaceStorage\17563a225d059960ce0d0ffcb5580\redhat\_java\lib\ws\IT3103.744528.2024.1.20226100.HoTuanAnh_ba3fc4c2\bin" FirstDialog

```

## 2.2.3 Write, compile the first input dialog Java application

The screenshot displays three separate Java IDE windows, likely from Eclipse or similar, showing the same Java code for a simple input dialog application.

```

HelloNameDialog.java
public class HelloNameDialog {
    public static void main(String[] args) {
        String result;
        JOptionPane.showInputDialog("Ho Tuan Anh 20226100 - Please enter your name");
        JOptionPane.showMessageDialog(null, "Tiep la Ho Tuan Anh 20226100. HI = " + result);
        System.exit(0);
    }
}

```

The code is identical across all three windows. In the top window, a modal dialog box appears asking for the user's name. In the middle window, the user enters "Ho Tuan Anh" and the message box shows the result: "Tiep la Ho Tuan Anh 20226100. HI = Ho Tuan Anh". In the bottom window, the message box shows the result again: "Tiep la Ho Tuan Anh 20226100. HI = Ho Tuan Anh".

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

```

1. Java IDE Screenshot (Top):
ShowTwoNumbers.java


```

public class ShowTwoNumbers {
    public static void main(String[] args) {
        String strNum1, strNum2;
        String strNotification = "Ho Tuan Anh 20226100-You've just entered: ";
        JOptionPane.showInputDialog(null,
            "Ho Tuan Anh 20226100-Please input the first number: ",
            "Le", JOptionPane.INFORMATION_MESSAGE);
        strNum1 = JOptionPane.showInputDialog(null,
            "Ho Tuan Anh 20226100-Please input the second number: ",
            "Le", JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 + " and ";
        strNum2 = JOptionPane.showInputDialog(null,
            "Ho Tuan Anh 20226100-Please input the second number: ",
            "Le", JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum2;

        JOptionPane.showMessageDialog(null, strNotification,
            "Ho Tuan Anh - 20226100", JOptionPane.INFORMATION_MESSAGE);
        System.exit(0);
    }
}

```


2. Terminal Screenshot (Bottom):


```

PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuanAnh> cd "C:\Program Files\Java\jre-1.8\bin"
PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuanAnh> java ShowTwoNumbers

```


```

```

1  // Lab01 > mvn clean & ShowTwoNumbers & ShowTwoNumbers > main(String[])
2  import javax.swing.JOptionPane;
3
4  public class ShowTwoNumbers {
5      public static void main(String[] args) {
6          String strNum1, strNum2;
7          String strNotification = "Hồ Tuấn Anh 20226100-You've just entered: ";
8
9          strNum1 = JOptionPane.showInputDialog(null,
10             "Please input the first number: ", JOptionPane.INFORMATION_MESSAGE);
11
12         strNotification += strNum1;
13
14         strNum2 = JOptionPane.showInputDialog(null,
15             "Please input the second number: ", JOptionPane.INFORMATION_MESSAGE);
16
17         strNotification += strNum2;
18
19         JOptionPane.showMessageDialog(null, strNotification,
20             "Hồ Tuấn Anh - 20226100", JOptionPane.INFORMATION_MESSAGE);
21         System.exit(0);
22     }
23
24 }

```

PROMPTS: OUTPUT TERMINAL DEBUG CONSOLE PORTS

```

PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuAnh> 6 <'C:\Program Files\Java\jre-1.8\bin\java.exe' > -cp 'C:\Users\nxavi\AppData\Roaming\Code\User\workspaceStorage\1756a225a395996ac04bfffch15586\HoTuAnh\src\main\java\it\ws\IT3103_744528_2024_1_20226100\HoTuAnh\> 'ShowTwoNumbers'
PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuAnh> 6 <'C:\Program Files\Java\jre-1.8\bin\java.exe' > -cp 'C:\Users\nxavi\AppData\Roaming\Code\User\workspaceStorage\1756a225a395996ac04bfffch15586\HoTuAnh\src\main\java\it\ws\IT3103_744528_2024_1_20226100_HoTuAnh\> 'ShowTwoNumbers'
PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuAnh> 6 <'C:\Program Files\Java\jre-1.8\bin\java.exe' > -cp 'C:\Users\nxavi\AppData\Roaming\Code\User\workspaceStorage\1756a225a395996ac04bfffch15586\HoTuAnh\src\main\java\it\ws\IT3103_744528_2024_1_20226100_HoTuAnh\> 'ShowTwoNumbers'
PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuAnh> 6 <'C:\Program Files\Java\jre-1.8\bin\java.exe' > -cp 'C:\Users\nxavi\AppData\Roaming\Code\User\workspaceStorage\1756a225a395996ac04bfffch15586\HoTuAnh\src\main\java\it\ws\IT3103_744528_2024_1_20226100_HoTuAnh\> 'ShowTwoNumbers'
PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100_HoTuAnh> 6 <'C:\Program Files\Java\jre-1.8\bin\java.exe' > -cp 'C:\Users\nxavi\AppData\Roaming\Code\User\workspaceStorage\1756a225a395996ac04bfffch15586\HoTuAnh\src\main\java\it\ws\IT3103_744528_2024_1_20226100_HoTuAnh\> 'ShowTwoNumbers'

```

## 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:

```

1 package problem2_2_5;
2 import javax.swing.*;
3
4 public class ShowTwoNumbers {
5     public double add(double a, double b) {
6         return a + b;
7     }
8
9     public double sub(double a, double b) {
10        return a - b;
11    }
12
13    public double mul(double a, double b) {
14        return a * b;
15    }
16
17    public double div(double a, double b) {
18        if (b == 0) {
19            throw new ArithmeticException("Division by zero is not
allowed.");
20        } // Xu ly ngoai le khi chia cho 0
21        return a / b;
22    }

```

```

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 (ArithmException 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:

```

    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("zero is not allowed.");
            }
            return a / b;
        }
    }

```

The terminal output shows the command to run the program:

```

PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100.HoTuanAnh\lab01> java ShowTwoNumbers

```

Hình 1: Nhập số thứ nhất

```

    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("zero is not allowed.");
            }
            return a / b;
        }
    }

```

The terminal output shows the command to run the program:

```

PS D:\WORK\Programs\Java\IT3103_744528_2024_1_20226100.HoTuanAnh\lab01> java ShowTwoNumbers

```

Hình 2: Nhập số thứ hai

```

    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.");
            }
            return a / b;
        }
    }

```

Hình 3: Hiển thị kết quả nhập số

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

```

    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.");
            }
            return a / b;
        }
    }

```

Hình 4: Phép toán cộng

```

    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.");
            }
            return a / b;
        }
    }

```

Hình 5: Phép toán trừ

```

    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.");
            }
            return a / b;
        }
    }

```

Hình 6: Phép toán nhân

```

    public double div(double a, double b) {
        if (b == 0) {
            throw new ArithmeticException("Division by zero is not allowed.");
        }
        return a / b;
    }

```

Hình 7: Phép toán chia

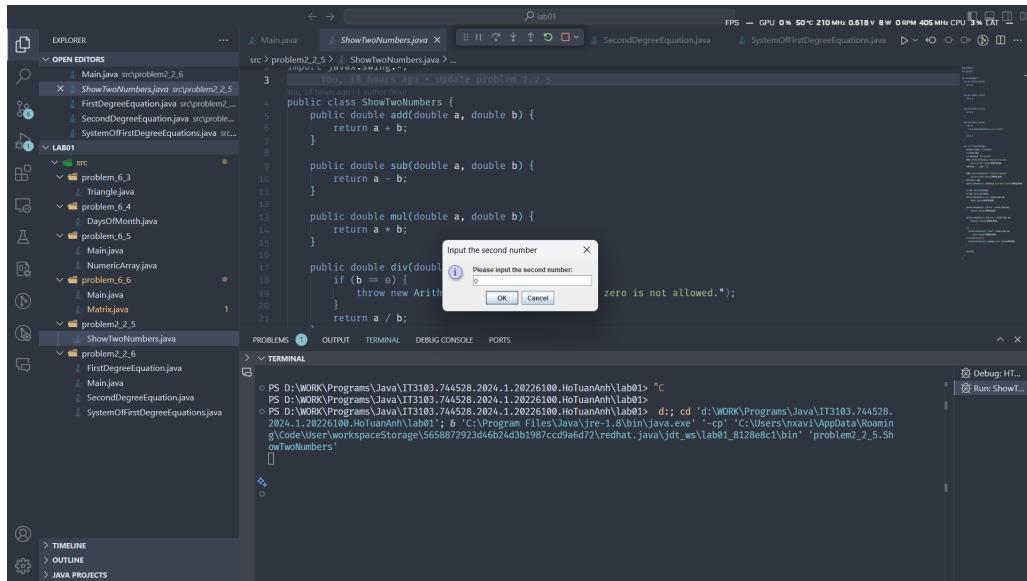
- Bắt ngoại lệ khi thực hiện phép chia cho 0:

```

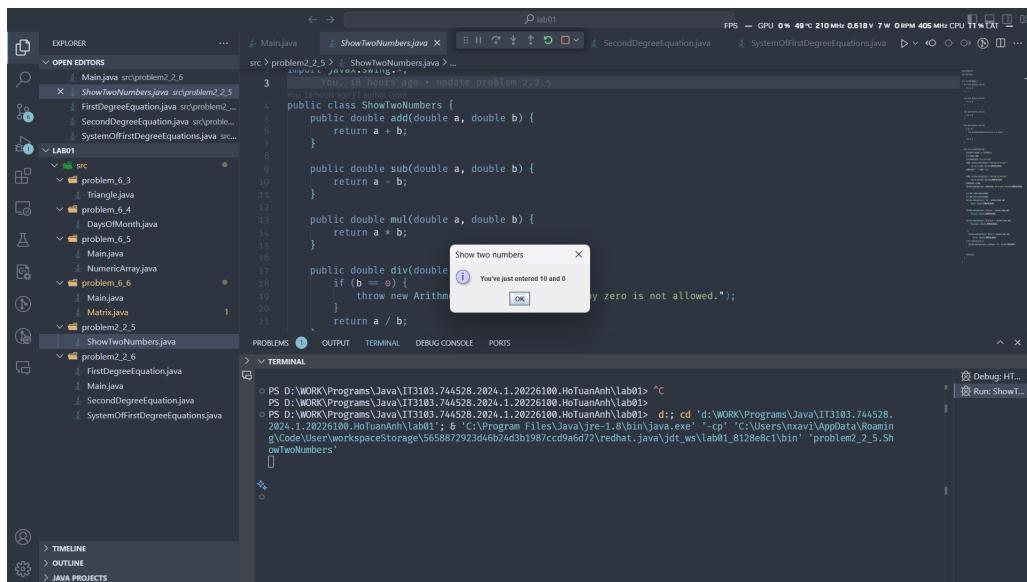
    public double div(double a, double b) {
        if (b == 0) {
            throw new ArithmeticException("Division by zero is not allowed.");
        }
        return a / b;
    }

```

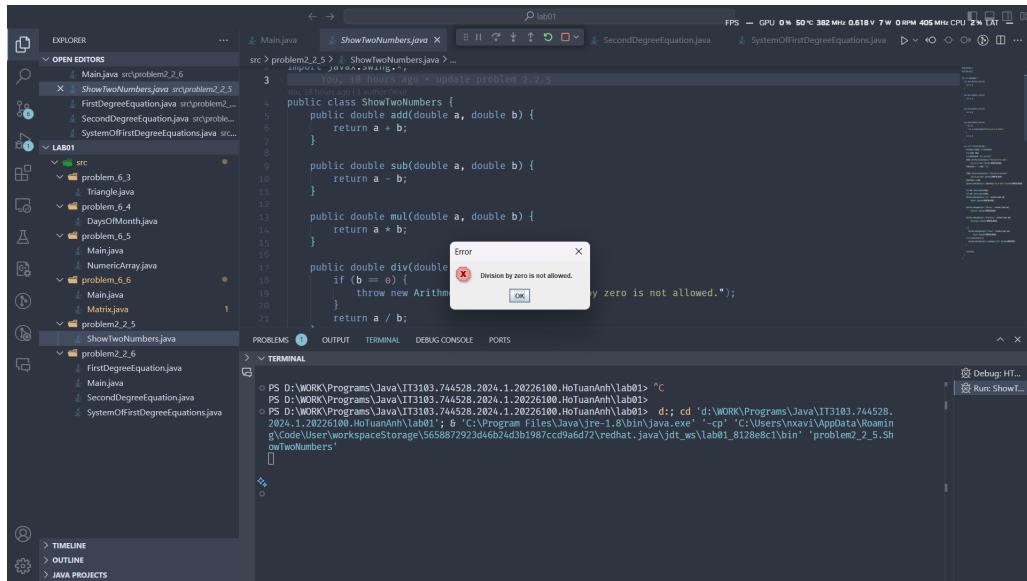
Hình 8: Bắt ngoại lệ - Phép chia cho 0



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:

```

1 package problem2_2_6;
2 import javax.swing.*;
3
4 class FirstDegreeEquation {
5     private double a, b;
6
7     //Getter
8     public double getA() {
9         return a;
10    }
11    public double getB() {
12        return b;
13    }
14    //Setter
15    public void setA() {
16        String input = JOptionPane.showInputDialog(null, "Ho Tuan
17        Anh 20226100 a = ");
18        this.a = Double.parseDouble(input);
19    }
20    public void setB() {
21        String input = JOptionPane.showInputDialog(null, "Ho Tuan
22        Anh 20226100 b = ");
23        this.b = Double.parseDouble(input);
24    }
25    public void solve() throws IllegalArgumentException {
26        // Bat ngoai le
27        if (a == 0) {
28            throw new IllegalArgumentException("Ho Tuan Anh
29            20226100 - Not the format of first degree equation.\n");
30        }
31        JOptionPane.showMessageDialog(null, String.format("Ho Tuan
32        Anh 20226100 - The solution is: x = %.2f", -b / a));
33    }
34 }
```

- Lớp hệ phương trình bậc nhất 2 ẩn:

```

1 package problem2_2_6;
2
3 import javax.swing.*;
4
5 class SystemOfFirstDegreeEquations {
6     private double a11, a12, b1, a21, a22, b2;
7     //Getter
8     public double getA11() {
9         return a11;
10    }
11    public double getA12() {
12        return a12;
13    }
14    public double getB1() {
15        return b1;
16    }
17    public double getA21() {
18        return a21;
```

```

19
20     }
21     public double getA22() {
22         return a22;
23     }
24     public double getB2() {
25         return b2;
26     }
27     //Setter
28     public void setA11() {
29         this.a11 = Double.parseDouble(JOptionPane.showInputDialog(
30             "Ho Tuan Anh 20226100 a11 = "));
31     }
32     public void setA12() {
33         this.a12 = Double.parseDouble(JOptionPane.showInputDialog(
34             "Ho Tuan Anh 20226100 a12 = "));
35     }
36     public void setB1() {
37         this.b1 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 b1 = "));
38     }
39     public void setA21() {
40         this.a21 = Double.parseDouble(JOptionPane.showInputDialog(
41             "Ho Tuan Anh 20226100 a21 = "));
42     }
43     public void setA22() {
44         this.a22 = Double.parseDouble(JOptionPane.showInputDialog(
45             "Ho Tuan Anh 20226100 a22 = "));
46     }
47     public void setB2() {
48         this.b2 = Double.parseDouble(JOptionPane.showInputDialog("Ho Tuan Anh 20226100 b2 = "));
49     }
50
51     public void solve() {
52         double D = a11 * a22 - a12 * a21, Dx = b1 * a22 - b2 * a12
53         , Dy = a11 * b2 - a21 * b1;
54         if (D == 0) {
55             if (Dx == 0 && Dy == 0) {
56                 JOptionPane.showMessageDialog(null, "Ho Tuan Anh
57 20226100 The system has infinitely many solutions.");
58             } else {
59                 JOptionPane.showMessageDialog(null, "Ho Tuan Anh
60 20226100 The system has no solution.");
61             }
62         } else {
63             double x = Dx / D;
64             double y = Dy / D;
65             JOptionPane.showMessageDialog(null, String.format("Ho
66 Tuan Anh 20226100 The solutions are: x = %.2f and y = %.2f", x
67             , y));
68         }
69     }
70 }
71 }
```

- Lớp phương trình bậc hai 1 ẩn:

```

1 package problem2_2_6;
2
3 import javax.swing.*;
4
```

```

5  class SecondDegreeEquation {
6      private double a, b, c;
7      //Getter
8      public double getA() {
9          return a;
10     }
11     public double getB() {
12         return b;
13     }
14     public double getC() {
15         return c;
16     }
17     //Setter
18     public void setA() {
19         String input = JOptionPane.showInputDialog(null, "Ho Tuan
Anh 20226100 a = ");
20         this.a = Double.parseDouble(input);
21     }
22     public void setB() {
23         String input = JOptionPane.showInputDialog(null, "Ho Tuan
Anh 20226100 b = ");
24         this.b = Double.parseDouble(input);
25     }
26     public void setC() {
27         String input = JOptionPane.showInputDialog(null, "Ho Tuan
Anh 20226100 c = ");
28         this.c = Double.parseDouble(input);
29     }
30
31     public void solve() throws IllegalArgumentException {
32         // Bat ngoai le
33         if (a == 0) {
34             throw new IllegalArgumentException("Ho Tuan Anh
20226100 Not the format of second degree equation.\n");
35         }
36         double delta = Math.pow(b, 2) - 4 * a * c;
37         if (delta < 0) {
38             JOptionPane.showMessageDialog(null, "Ho Tuan Anh
20226100 No solution");
39         } else if (delta == 0) {
40             JOptionPane.showMessageDialog(null, String.format("Ho
Tuan Anh 20226100 The solution is: x = %.2f", -b / (2 * a)));
41         } else {
42             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)));
43         }
44     }
45 }
```

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

```

1 package problem2_2_6;
2
3 import javax.swing.*;
4
5
6 public class Main {
7
8     public static void main(String[] args) {
9         String[] options = {
10             "Exit",
```

```

11     "Solve first degree equation",
12     "Solve second degree equation",
13     "Solve system of first-degree equations"
14 };
15
16 while (true) {
17     int option = JOptionPane.showOptionDialog(
18         null,
19         "List available options:",
20         "Menu",
21         JOptionPane.DEFAULT_OPTION,
22         JOptionPane.INFORMATION_MESSAGE,
23         null,
24         options,
25         options[0]
26     );
27     // Neu nhan exit hoac dau x goc phai man hinh thi
28     // thoat ct
29     if (option == 0 || option == JOptionPane.CLOSED_OPTION)
30     {
31         JOptionPane.showMessageDialog(null, "Ho Tuan Anh
32         20226100 Thanks!");
33         break;
34     } else if (option == 1) {
35         JOptionPane.showMessageDialog(null, "Ho Tuan Anh
36         20226100 ax + b = 0");
37         try {
38             FirstDegreeEquation firstDegreeEquation = new
39             FirstDegreeEquation();
40             firstDegreeEquation.setA();
41             firstDegreeEquation.setB();
42             firstDegreeEquation.solve();
43             } catch (Exception e) {
44                 // Neu a != 0 bao loi cho nguoi dung
45                 JOptionPane.showMessageDialog(null, e.
46                 getMessage(), "Error", JOptionPane.ERROR_MESSAGE);
47             }
48         } else if (option == 2) {
49             JOptionPane.showMessageDialog(null, "Ho Tuan Anh
50             20226100 ax^2 + bx + c = 0");
51             try {
52                 SecondDegreeEquation secondDegreeEquation =
53                 new SecondDegreeEquation();
54                 secondDegreeEquation.setA();
55                 secondDegreeEquation.setB();
56                 secondDegreeEquation.setC();
57                 secondDegreeEquation.solve();
58                 } catch (Exception e) {
59                     // Neu a != 0 bao loi cho nguoi dung
60                     JOptionPane.showMessageDialog(null, e.
61                     getMessage(), "Error", JOptionPane.ERROR_MESSAGE);
62                 }
63             } else if (option == 3) {
64                 JOptionPane.showMessageDialog(null, "Ho Tuan Anh
65                 20226100 \n a11.x + a12.y = b1\na21.x + a22.y = b2");
66                 SystemOfFirstDegreeEquations
67                 systemOfFirstDegreeEquations = new
68                 SystemOfFirstDegreeEquations();
69                 systemOfFirstDegreeEquations.setA11();
70                 systemOfFirstDegreeEquations.setA12();
71                 systemOfFirstDegreeEquations.setB1();
72                 systemOfFirstDegreeEquations.setA21();
73             }
74         }
75     }
76 }

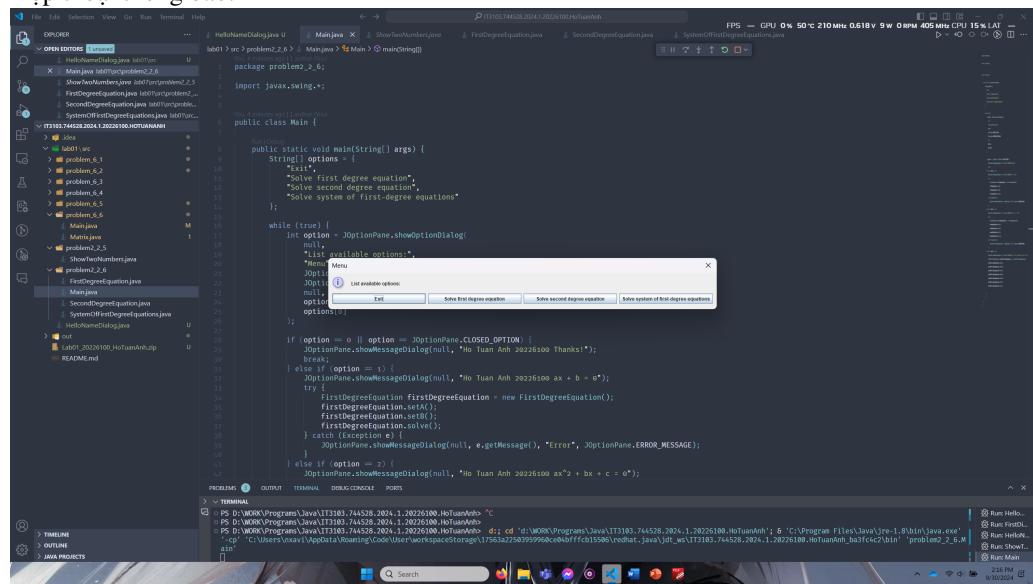
```

```

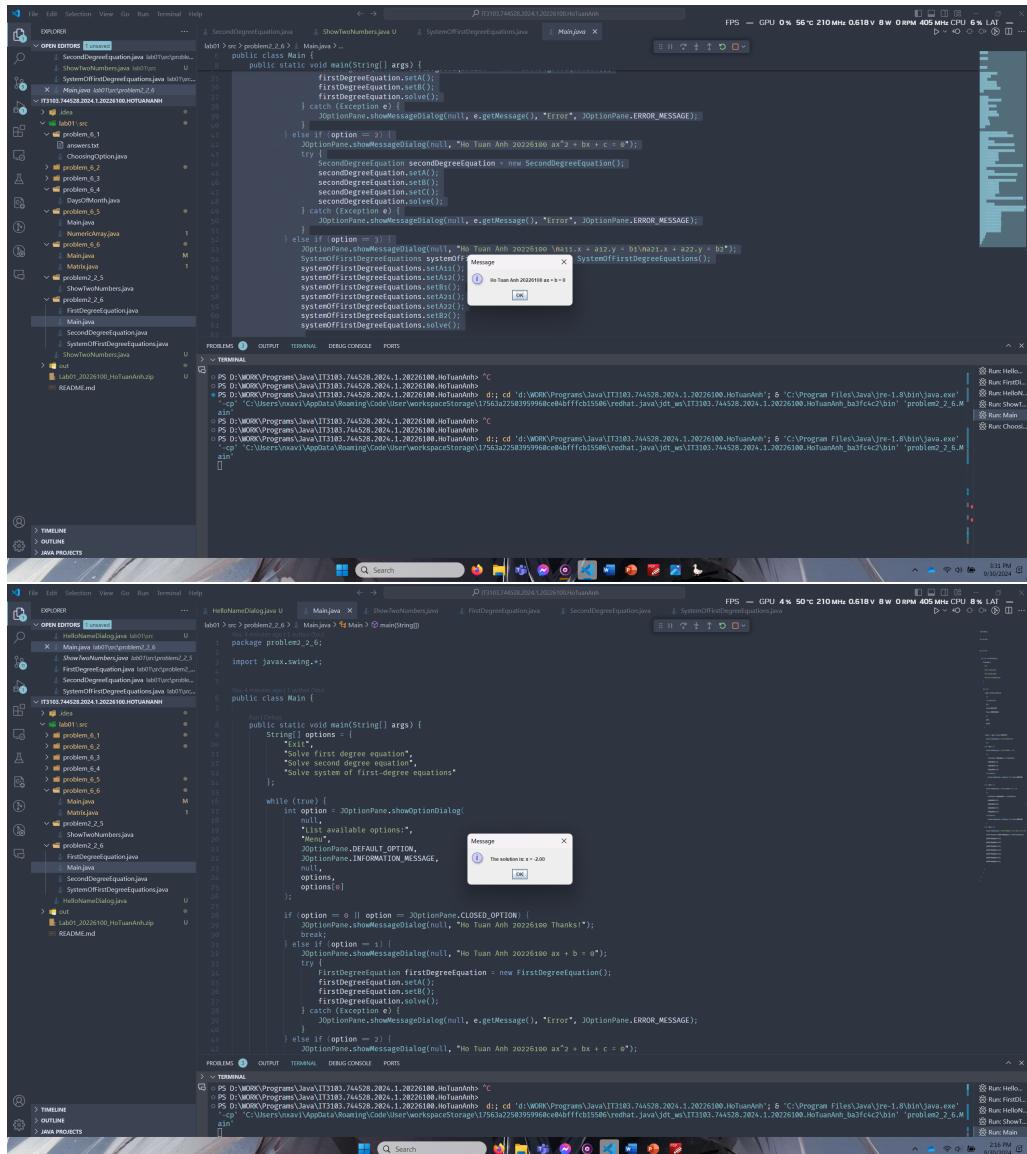
61     systemOfFirstDegreeEquations.setA22();
62     systemOfFirstDegreeEquations.setB2();
63     systemOfFirstDegreeEquations.solve();
64
65   }
66 }
67
68 }
```

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:

The image shows two side-by-side screenshots of a Java IDE (likely Eclipse or IntelliJ IDEA) running on a Windows operating system. Both windows have the title bar 'IT3103\_744528\_2024\_1.20226100.HoTuAnh'. The left window displays the 'Main.java' file, which contains a main method that prints a welcome message and then enters a loop to solve quadratic equations based on user input. It includes imports for java.util.\* and javax.swing.\*. The right window shows the 'FirstDegreeEquation.java' file, which defines a class 'FirstDegreeEquation' with methods for solving first-degree equations. Both windows show a message dialog box in the foreground with the message 'Ho Tu An 20226100 ax^2 + bx + c = 0'.

```

    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]);
                if (option == 0 || option == JOptionPane.CLOSED_OPTION) {
                    JOptionPane.showMessageDialog(null, "Ho Tu An 20226100 Thanks!");
                    break;
                } else if (option == 1) {
                    JOptionPane.showMessageDialog(null, "Ho Tu An 20226100 ax + b = c");
                    try {
                        FirstDegreeEquation firstDegreeEquation = new FirstDegreeEquation();
                        firstDegreeEquation.setA();
                        firstDegreeEquation.setB();
                        firstDegreeEquation.setC();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), "Error", JOptionPane.ERROR_MESSAGE);
                    }
                } else if (option == 2) {
                    JOptionPane.showMessageDialog(null, "Ho Tu An 20226100 ax^2 + bx + c = 0");
                    FirstDegreeEquation firstDegreeEquation = new FirstDegreeEquation();
                    firstDegreeEquation.setA();
                    firstDegreeEquation.setB();
                    firstDegreeEquation.setC();
                } else if (option == 3) {
                    JOptionPane.showMessageDialog(null, "Ho Tu An 20226100 ax^2 + bx + c = 0");
                    SystemOfFirstDegreeEquations systemOfFirstDegreeEquations = new SystemOfFirstDegreeEquations();
                    systemOfFirstDegreeEquations.setA();
                    systemOfFirstDegreeEquations.setB();
                    systemOfFirstDegreeEquations.setC();
                }
            }
        }
    }

```

```

    package problem2_2_6;
    import javax.swing.*;
    public class FirstDegreeEquation {
        double a, b, c;
        public void setA() {
            a = Double.parseDouble(JOptionPane.showInputDialog("Enter coefficient a"));
        }
        public void setB() {
            b = Double.parseDouble(JOptionPane.showInputDialog("Enter coefficient b"));
        }
        public void setC() {
            c = Double.parseDouble(JOptionPane.showInputDialog("Enter coefficient c"));
        }
        public void solve() {
            double discriminant = b * b - 4 * a * c;
            if (discriminant < 0) {
                JOptionPane.showMessageDialog(null, "No solution");
            } else if (discriminant == 0) {
                double root = -b / (2 * a);
                JOptionPane.showMessageDialog(null, "One solution: " + root);
            } else {
                double root1 = (-b - Math.sqrt(discriminant)) / (2 * a);
                double root2 = (-b + Math.sqrt(discriminant)) / (2 * a);
                JOptionPane.showMessageDialog(null, "Two solutions: " + root1 + " and " + root2);
            }
        }
    }

```

Hình 13: Giải hệ phương trình bậc nhất 2 ẩn

- Giải phương trình bậc hai 1 ẩn:

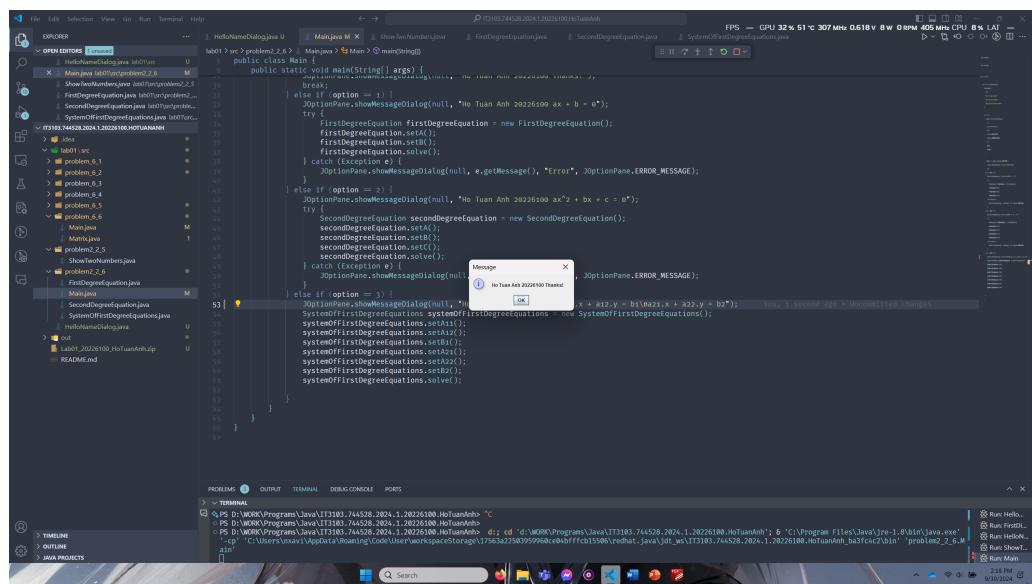
```

    public class Main {
        public static void main(String[] args) {
            if (args.length > 0) {
                String option = args[0];
                if (option.equals("1")) {
                    try {
                        FirstDegreeEquation firstDegreeEquation = new FirstDegreeEquation();
                        firstDegreeEquation.setA(1);
                        firstDegreeEquation.setB(2);
                        firstDegreeEquation.solve();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), JOptionPane.ERROR_MESSAGE);
                    }
                } else if (option.equals("2")) {
                    try {
                        SecondDegreeEquation secondDegreeEquation = new SecondDegreeEquation();
                        secondDegreeEquation.setA(1);
                        secondDegreeEquation.setB(2);
                        secondDegreeEquation.setC(3);
                        secondDegreeEquation.solve();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), JOptionPane.ERROR_MESSAGE);
                    }
                } else if (option.equals("3")) {
                    try {
                        SystemOfFirstDegreeEquations systemOfFirstDegreeEquations = new SystemOfFirstDegreeEquations();
                        systemOfFirstDegreeEquations.setA1(1);
                        systemOfFirstDegreeEquations.setA2(2);
                        systemOfFirstDegreeEquations.setB1(3);
                        systemOfFirstDegreeEquations.setB2(4);
                        systemOfFirstDegreeEquations.setC1(5);
                        systemOfFirstDegreeEquations.setC2(6);
                        systemOfFirstDegreeEquations.solve();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), JOptionPane.ERROR_MESSAGE);
                    }
                } else if (option.equals("4")) {
                    try {
                        SystemOfSecondDegreeEquations systemOfSecondDegreeEquations = new SystemOfSecondDegreeEquations();
                        systemOfSecondDegreeEquations.setA1(1);
                        systemOfSecondDegreeEquations.setA2(2);
                        systemOfSecondDegreeEquations.setA3(3);
                        systemOfSecondDegreeEquations.setB1(4);
                        systemOfSecondDegreeEquations.setB2(5);
                        systemOfSecondDegreeEquations.setB3(6);
                        systemOfSecondDegreeEquations.setC1(7);
                        systemOfSecondDegreeEquations.setC2(8);
                        systemOfSecondDegreeEquations.setC3(9);
                        systemOfSecondDegreeEquations.solve();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), JOptionPane.ERROR_MESSAGE);
                    }
                } else if (option.equals("5")) {
                    try {
                        SystemOfFirstSecondDegreeEquations systemOfFirstSecondDegreeEquations = new SystemOfFirstSecondDegreeEquations();
                        systemOfFirstSecondDegreeEquations.setA1(1);
                        systemOfFirstSecondDegreeEquations.setA2(2);
                        systemOfFirstSecondDegreeEquations.setA3(3);
                        systemOfFirstSecondDegreeEquations.setB1(4);
                        systemOfFirstSecondDegreeEquations.setB2(5);
                        systemOfFirstSecondDegreeEquations.setB3(6);
                        systemOfFirstSecondDegreeEquations.setC1(7);
                        systemOfFirstSecondDegreeEquations.setD1(8);
                        systemOfFirstSecondDegreeEquations.setE1(9);
                        systemOfFirstSecondDegreeEquations.solve();
                    } catch (Exception e) {
                        JOptionPane.showMessageDialog(null, e.getMessage(), JOptionPane.ERROR_MESSAGE);
                    }
                }
            }
        }
    }

```

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:

```

1 package problem_6_1;
2
3 import javax.swing.JOptionPane;
4
5 public class ChoosingOption {
6     public static void main(String[] args) {
7         int option = JOptionPane.showConfirmDialog(null, "Do you want
8             to change to the first class ticket?");
9         JOptionPane.showMessageDialog(null, "You've choosen: " + (
10             option==JOptionPane.YES_OPTION?"Yes":"No"));
11     }
12 }
```

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

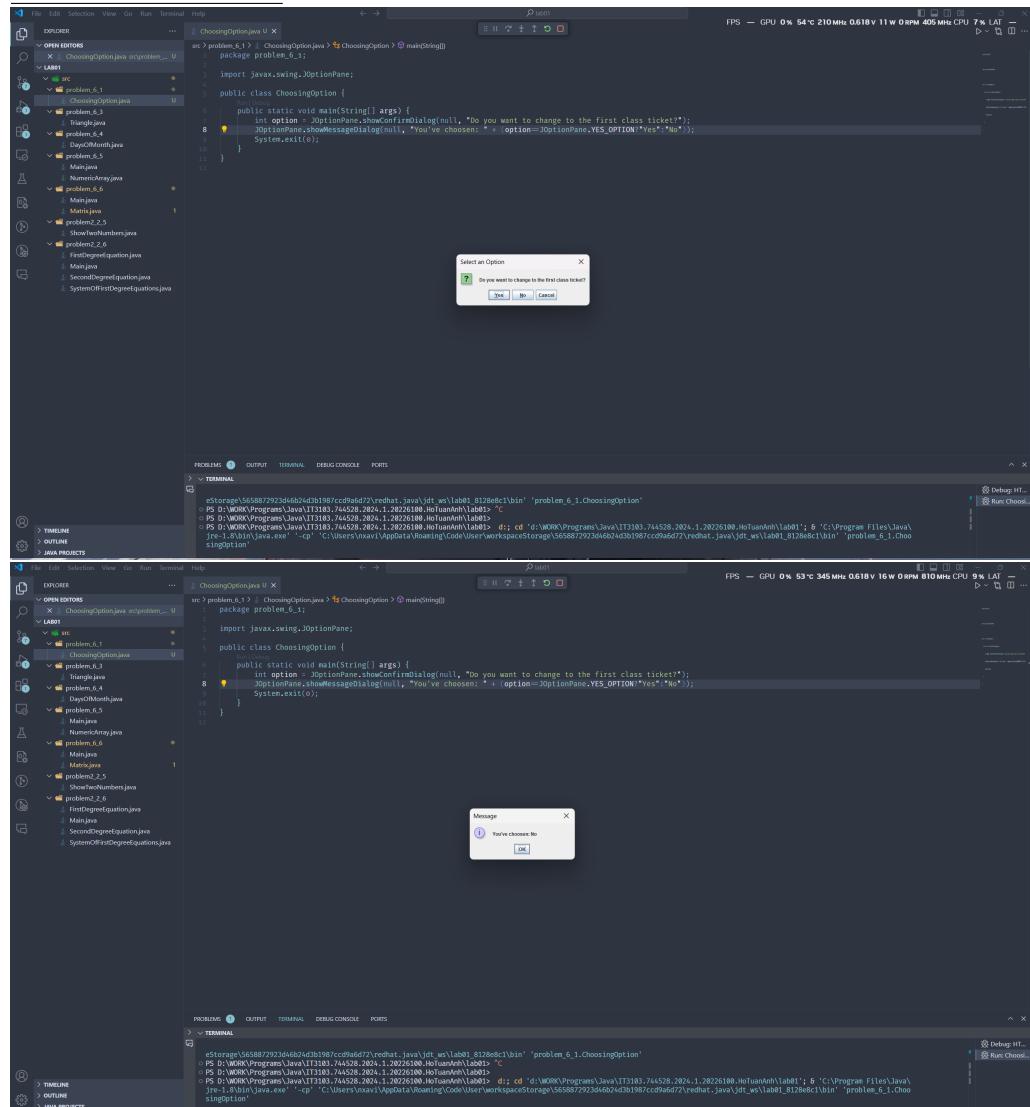
```

1 package problem_6_1;
2
3 import javax.swing.JOptionPane;
4
5 public class ChoosingOption {
6     public static void main(String[] args) {
7         // int option = JOptionPane.showConfirmDialog(null, "Do you
8         // want to change to the first class ticket?");
9         // JOptionPane.showMessageDialog(null, "You've choosen: " + (
10             option==JOptionPane.YES_OPTION?"Yes":"No"));
11         Object[] options = {"I do", "I don't"};
12         int n = JOptionPane.showOptionDialog(null,
13             "Do you like this custom options?",
14             "Custom Option Dialog",
15             JOptionPane.YES_NO_OPTION,
```

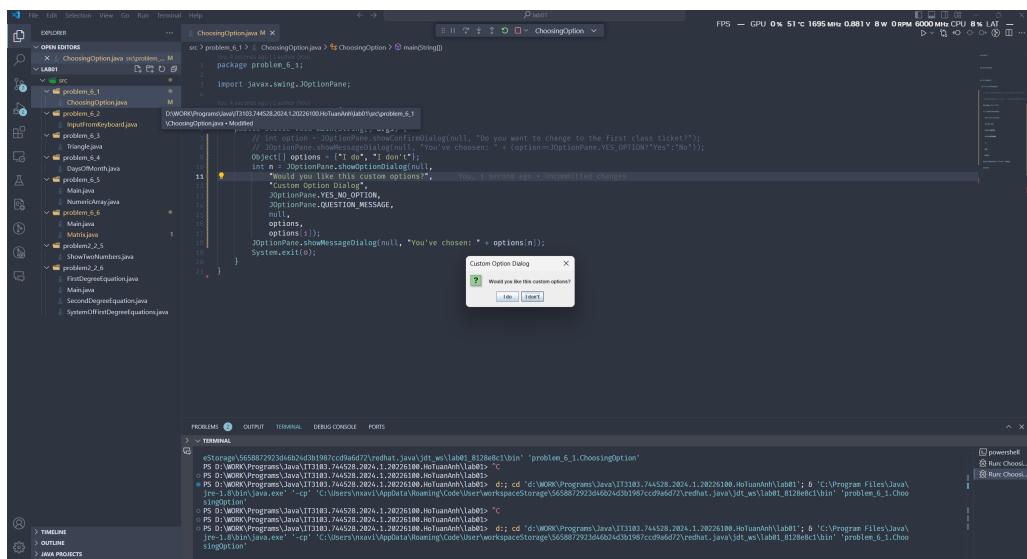
```

14     JOptionPane.QUESTION_MESSAGE,
15     null,
16     options,
17     options[n]);
18     JOptionPane.showMessageDialog(null, "You've chosen: " + options
19     [n]);
20     System.exit(0);
21 }

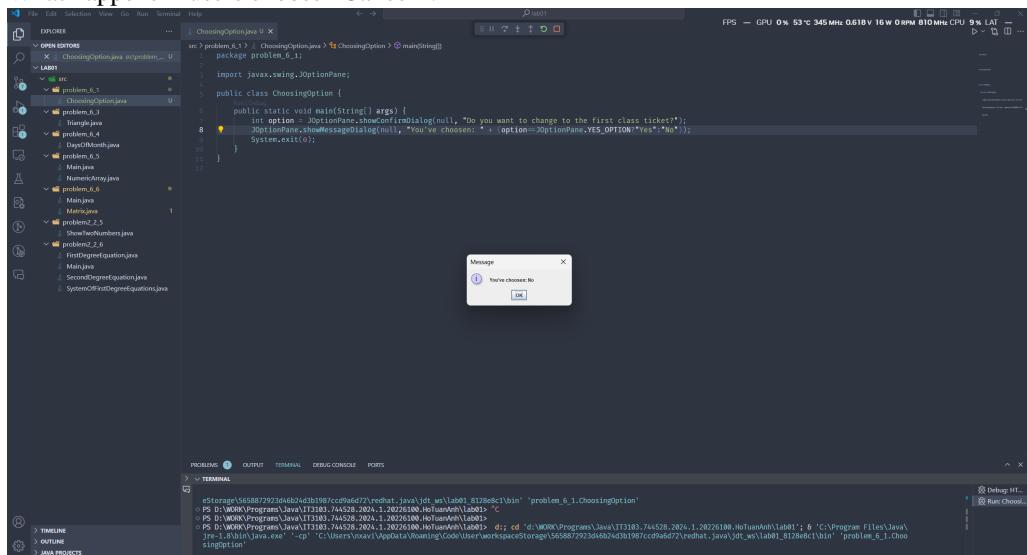
```

**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:

```

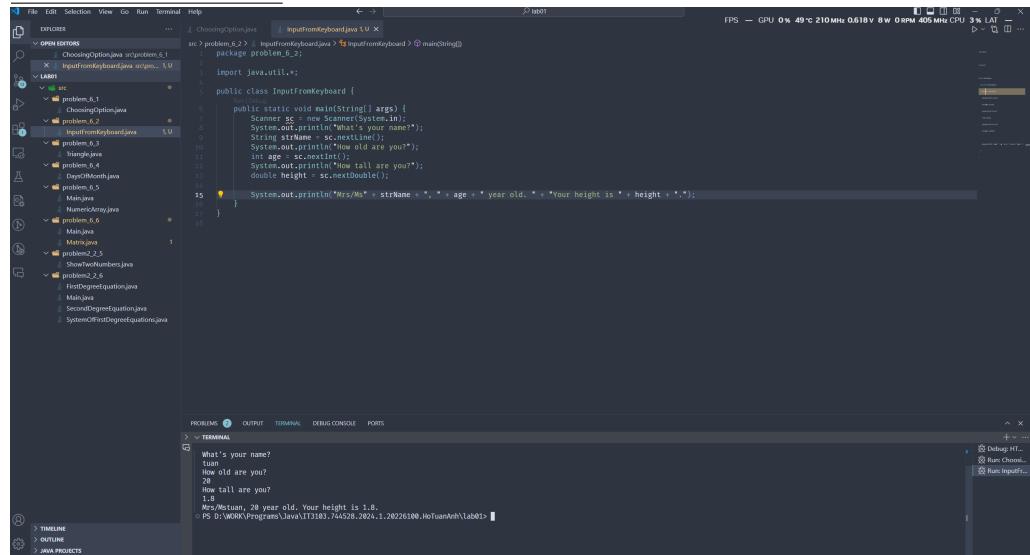
 1 package problem_6_2;
 2
 3 import java.util.*;
 4
 5 public class InputFromKeyboard {
 6     public static void main(String[] args) {
 7         Scanner sc = new Scanner(System.in);
 8         System.out.println("What's your name?");
 9         String strName = sc.nextLine();
10         System.out.println("How old are you?");
  
```

```

11     int age = sc.nextInt();
12     System.out.println("How tall are you?");
13     double height = sc.nextDouble();
14
15     System.out.println("Mrs/Ms " + strName + ", " + age + " year old
16 . " + "Your height is " + height + ".");
17 }

```

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:

```

1 package problem_6_3;
2 import java.util.*;
3 class Triangle {
4     public static void main(String[] args)
5     {
6         Scanner sc = new Scanner(System.in);
7         System.out.print("Input the number of rows to be printed: ");
8         int n = sc.nextInt();
9
10        for (int i = 1; i <= n; i++) {
11            for (int j = n; j >= i; j--) {
12                System.out.print(" ");
13            }
14            for (int j = 1; j <= i; j++) {
15                System.out.print("* ");
16            }
17            System.out.println();
18        }
19        sc.close();
20    }
}

```

Kết quả thực thi:

The screenshot shows the Eclipse IDE interface. In the center, the code editor displays `Triangle.java` with the following content:

```

src > problem_6_3 > Triangle.java > ...
  ...
  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--) {
          ...
        }
        for (int j = 1; j <= i; j++) {
          ...
        }
        System.out.println();
      }
    }
  }
  ...
  
```

Below the code editor is the terminal window, which shows the execution of the program:

```

PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\Lab01> cd 'C:\Program Files\Java\jre-1.8\bin'
java -cp . C:\Users\hxaval\Appdata\Local\Temp\ws\Lab01_8158e6c1\bin\ 'problem_6_3.Triangle'
Input the number of rows to be printed: 10
      *
     ***
    *****
   ******
  *****
 *****
*****
 *****
 ****
  ***
   *
  
```

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:

```

1 package problem_6_4;
2 import java.util.List;
3 import java.util.Scanner;
4 import java.util.Arrays;
5 import java.util.Calendar;
6
7
8 public class DaysOfMonth {
9     // Collection chua danh dang
10    private List<String[]> monthsList = Arrays.asList(
11        new String[]{"January", "Jan.", "Jan", "1"},
12        new String[]{"February", "Feb.", "Feb", "2"},
13        new String[]{"March", "Mar.", "Mar", "3"},
14        new String[]{"April", "Apr.", "Apr", "4"},
15        new String[]{"May", "May.", "May", "5"},
16        new String[]{"June", "Jun.", "Jun", "6"},
17        new String[]{"July", "Jul.", "Jul", "7"},
18        new String[]{"August", "Aug.", "Aug", "8"},
19        new String[]{"September", "Sept.", "sept", "9"},
20        new String[]{"October", "Oct.", "Oct", "10"},
21        new String[]{"November", "Nov.", "Nov", "11"},
22        new String[]{"December", "Dec.", "Dec", "12"})
23    );
24    public static void main(String[] args) {
25        Scanner sc = new Scanner(System.in);
26        Calendar calendar = Calendar.getInstance(); // Tao thoi gian
27        theo mac dinh
28        System.out.print("Enter year: ");
29        int year = sc.nextInt();
30        calendar.set(Calendar.YEAR, year);
31        System.out.print("Enter month: ");
32        String month = sc.next();
33        // loai bo khoang trang thua o au v cuoi chuoi nhap vao.
34        month = month.trim();
35
36        int monthNumber = -1;
37        for (String[] monthNames : new DaysOfMonth().monthsList) {
38            for (String name : monthNames) {
39                if (name.equalsIgnoreCase(month)) {
40                    monthNumber = Integer.parseInt(monthNames[3]) - 1;
41                    break;
42                }
43            }
44            if (monthNumber != -1) break;
45        }
46        // Kiểm tra tháng nhập vào hợp lệ hay không:
47        if (monthNumber == -1) {
48            System.out.println("Invalid month input.");
49        } else {
50            calendar.set(Calendar.MONTH, monthNumber);
51            int daysInMonth = calendar.getActualMaximum(Calendar.
52                DAY_OF_MONTH);
53            String monthName = "";
54            for (String[] monthNames : new DaysOfMonth().monthsList) {
55                if (Integer.parseInt(monthNames[3]) - 1 == monthNumber)
56                {
57                    monthName = monthNames[0];
58                    break;
59                }
60            }
61            System.out.println("Month: " + monthName + " - Number of
62            days: " + daysInMonth + "\n");
63        }
64    }
65}

```

```

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

```

Kết quả thực thi:

- Năm thường:

The screenshot shows the Eclipse IDE interface. On the left, the Explorer view displays a project structure under 'LAB01' containing several Java files: DaysOfMonth.java, problem\_6\_4.java, problem\_6\_5.java, problem\_6\_6.java, problem2\_2\_5.java, problem2\_2\_6.java, FirstDegreeEquation.java, SecondDegreeEquation.java, and SystemOfFirstDegreeEquations.java. The 'DaysOfMonth.java' file is selected and shown in the center editor pane. The code defines a class 'DaysOfMonth' with a static method 'main' that prints the number of days in September of the current year (2024). The right side of the interface shows the 'Terminal' view where the program's output is displayed.

```

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*"}
);

```

```

PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\Lab01> java -jar C:\Program Files\Java\jre-1.8\bin\java.exe -cp "C:\Users\xxavil\AppData\Roaming\Code\User\workspaceStorage\5650872923d46b2d3b1987\cd9ad6f7\redhat.java\dt_wsl\Lab01.8128e8c1\bin" problem_6_4.daysOfMonth
Enter year: 2024
Enter month: Sept.
Month: September - Number of days: 30

```

Hình 16: Số ngày trong tháng 9/2024

- Năm nhuận:

```

1 package problem_6_4;
2
3 import java.util.List;
4 import java.util.Scanner;
5 import java.util.Arrays;
6 import java.util.Calendar;
7
8
9 public class DaysOfMonth {
10
11     private List<String> monthsList = Arrays.asList(
12         new String[]{"January", "Jan", "1"}, 
13         new String[]{"February", "Feb", "2"}, 
14         new String[]{"March", "Mar", "3"}, 
15         new String[]{"April", "Apr", "4"}, 
16         new String[]{"May", "May", "5"}, 
17         new String[]{"June", "Jun", "6"}, 
18         new String[]{"July", "Jul", "7"}, 
19         new String[]{"August", "Aug", "8"}, 
20         new String[]{"September", "Sep", "9"}, 
21         new String[]{"October", "Oct", "10"}, 
22         new String[]{"November", "Nov", "11"}, 
23         new String[]{"December", "Dec", "12"}
24     );
25 }

```

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:

```

1 package problem_6_5;
2 import java.util.*;
3
4 public class NumericArray {
5     private int[] arr;
6
7     public NumericArray(int n) {
8         this.arr = new int[n];
9     }
10
11    public void setArray(int n) {
12        Scanner sc = new Scanner(System.in);
13        for (int i = 0; i < n; i++) {
14            this.arr[i] = sc.nextInt();
15        }
16    }
17
18    public int[] sort() {
19        Arrays.sort(arr);
20        return arr;
21    }
22
23    public int getSum() {
24        return Arrays.stream(arr).sum();
25    }

```

```

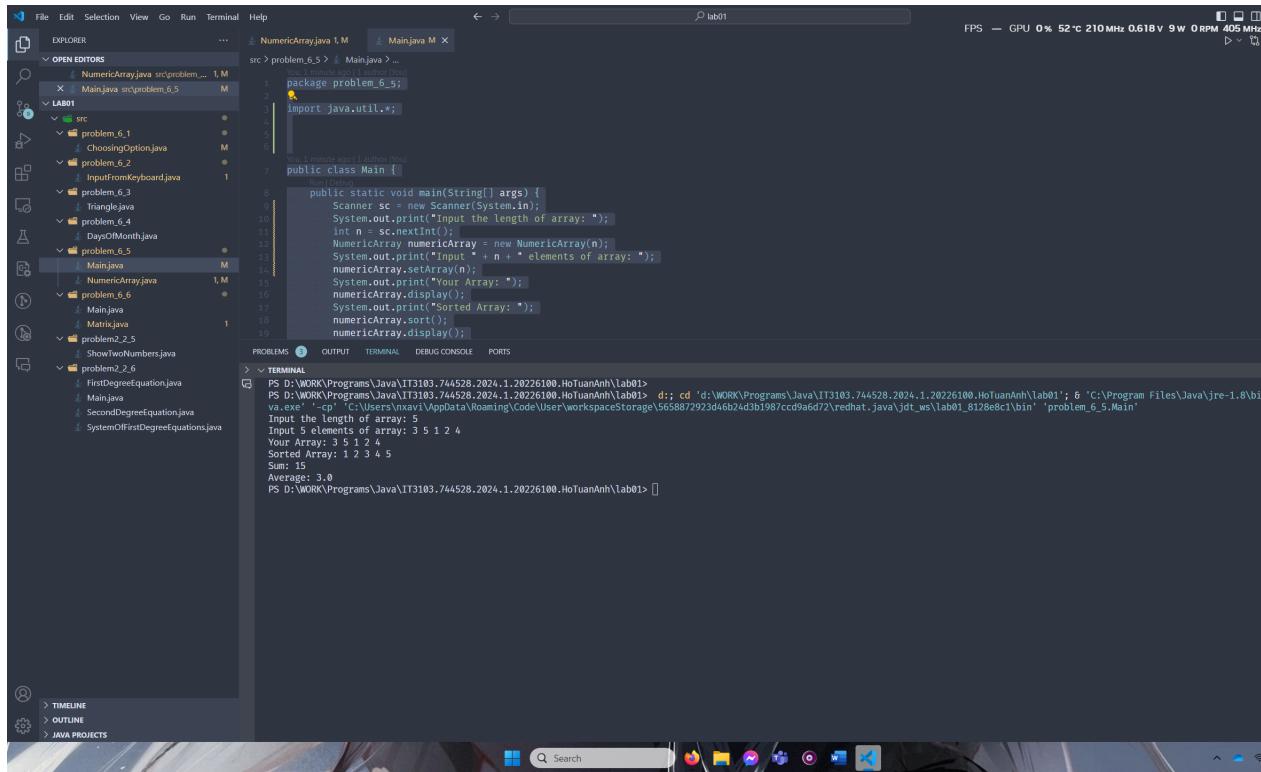
27     public double getAverage() {
28         return (double) getSum() / arr.length;
29     }
30
31     public void display() {
32         for (int i = 0; i < arr.length; i++) {
33             System.out.print(arr[i] + " ");
34         }
35         System.out.println();
36     }
37 }
38
39
40 }
```

- Lớp Main thực thi chương trình:

```

1 package problem_6_5;
2 import java.util.*;
3
4 public class Main {
5     public static void main(String[] args) {
6         Scanner sc = new Scanner(System.in);
7         System.out.print("Input the length of array: ");
8         int n = sc.nextInt();
9         NumericArray numericArray = new NumericArray(n);
10        System.out.print("Input " + n + " elements of array: ");
11        numericArray.setArray(n);
12        System.out.print("Your Array: ");
13        numericArray.display();
14        System.out.print("Sorted Array: ");
15        numericArray.sort();
16        numericArray.display();
17        System.out.println("Sum: " + numericArray.getSum());
18        System.out.println("Average: " + numericArray.getAverage()
19    );
20    sc.close();
21 }
22 }
```

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:

```

1 package problem_6_6;
2 import java.util.*;
3
4 public class Matrix {
5     private int[][] matrix;
6
7     public Matrix() {
8         this.matrix = null;
9     }
10
11    public Matrix(int[][] matrix) {
12        this.matrix = matrix;
13    }
14
15    public void setMatrix(int r, int c) {
16        matrix = new int[r][c];
17        Scanner sc = new Scanner(System.in);
18        for (int i = 0; i < r; i++) {

```

```

19         for (int j = 0; j < c; j++) {
20             matrix[i][j] = sc.nextInt();
21         }
22     }
23 }
24
25 public void display() {
26     if (matrix == null) {
27         System.out.println("Matrix is empty.");
28         return;
29     }
30
31     for (int i = 0; i < matrix.length; i++) {
32         for (int j = 0; j < matrix[i].length; j++) {
33             System.out.print(matrix[i][j] + " ");
34         }
35         System.out.println();
36     }
37 }
38 // Bat ngoai le
39 public Matrix add(Matrix other) throws
IllegalArgumentException {
40     if (this.matrix.length != other.matrix.length || this.
matrix[0].length != other.matrix[0].length) {
41         throw new IllegalArgumentException("Two matrices are
not the same size.");
42     }
43
44     int r = matrix.length;
45     int c = matrix[0].length;
46     int[][] result = new int[r][c];
47
48     for (int i = 0; i < r; i++) {
49         for (int j = 0; j < c; j++) {
50             result[i][j] = this.matrix[i][j] + other.matrix[i
][j];
51         }
52     }
53     return new Matrix(result);
54 }
55 }
56
57
58
59

```

- Lớp Main thực thi chương trình:

```

1 package problem_6_6;
2 import java.util.Scanner;
3
4 public class Main {
5     public static void main(String[] args) {
6         Matrix mat1 = new Matrix();
7         Matrix mat2 = new Matrix();
8         int r1, c1, r2, c2;
9         Scanner sc = new Scanner(System.in);
10        System.out.print("Enter the number of rows and columns of
the first matrix: ");
11        r1 = sc.nextInt();
12        c1 = sc.nextInt();
13        System.out.println("Enter the first matrix:");
14        mat1.setMatrix(r1, c1);

```

```

15     System.out.print("Enter the number of rows and columns of
16     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     );
26         result.display();
27     } catch (Exception e) {
28         System.out.println(e.getMessage());
29     }
30     sc.close();
31 }
32
33
34

```

Kết quả thực thi:

The screenshot shows the Visual Studio Code interface with the following details:

- Explorer:** Shows the project structure under "LAB01".
- Main.java** is the active file in the editor.
- Terminal:** Displays the command-line output of the program execution.
- Output:** Shows the results of the matrix addition.

```

PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\lab01> ^
PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\lab01>
PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\lab01> d;; cd 'd:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\lab01' & 'C:\Program Files\Java\jre-1.8.0\bin\java.exe' -cp 'C:\Users\xvav1\AppData\Roaming\Code\User\workspaceStorage\65688293d46b24d3b1987cd56d72\redhat.java\jdt_ws\lab01_812be8c1\bin' 'problem_6.Main'
n
Enter the number of rows and columns of the first matrix: 2 3
1 2 3
4 5 6
Enter the number of rows and columns of the second matrix: 2 3
7 8 9
10 11 12
The result of matrix addition is:
8 10 12
14 16 18
PS D:\WORK\Programs\Java\IT3103.744528.2024.1.20226100.HoTuanAnh\lab01>

```

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

The screenshot shows a Java development environment with several open files in the Explorer pane. The current file is `Main.java`, which contains code for matrix multiplication. The terminal window below shows the execution of the program. When the user inputs the size of the first matrix as 2x3 and the second as 3x2, the program outputs an error message: "Two matrices are not the same size." This indicates a runtime exception was thrown due to a logical error in the matrix size validation logic.

```

Main.java
Matrix.java

src > problem_6_6 > Main.java > ...
src > problem_6_6 > Matrix.java > ...
you 54 minutes ago | author mhou
1 package problem_6_6;
2 import java.util.Scanner;
3
4 public class Main {
5     public static void main(String[] args) {
6         Matrix mat1 = new Matrix();
7         Matrix mat2 = new Matrix();
8         int r1, c1, r2, c2;
9         Scanner sc = new Scanner(System.in);
10        System.out.print("Enter the number of rows and columns of the first matrix: ");
11        r1 = sc.nextInt();
12        c1 = sc.nextInt();
13        System.out.println("Enter the first matrix:");
14        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();
}

```

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