ĐẠI HỌC BÁCH KHOA HÀ NỘI

TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

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BÁO CÁO THỰC HÀNH

IT3103-744527-2024.1

BÀI THỰC HÀNH – LAB01

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Contents

TABLE OF FIGURES

BÁO CÁO THỰC HÀNH LAB 1

2. 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:

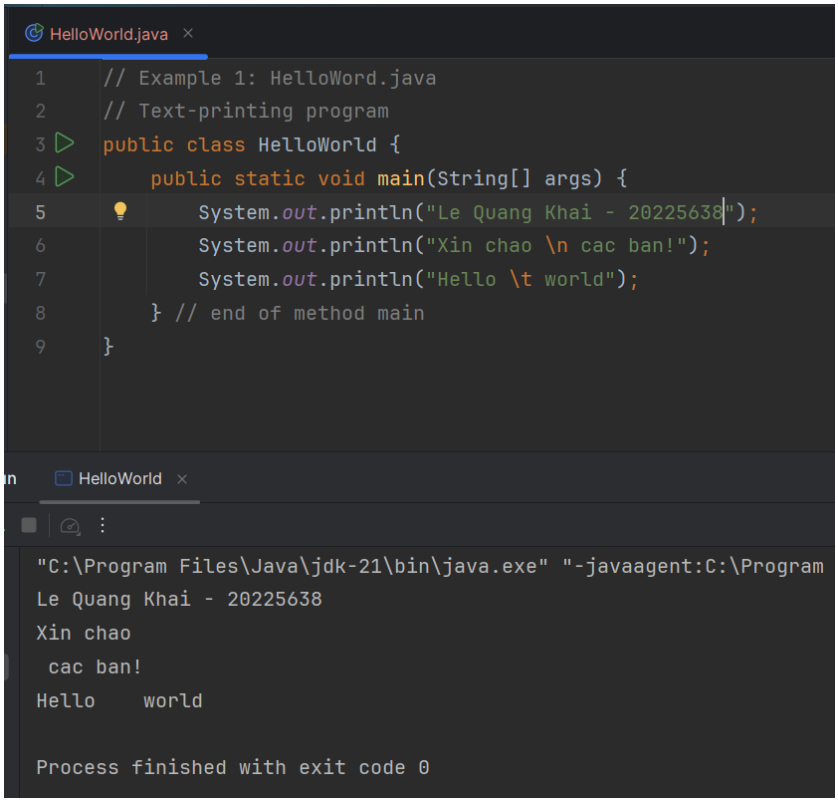


Figure 1. The First Java Application

2.2.2 Write, compile the first dialog Java program

Source code + Kết quả:

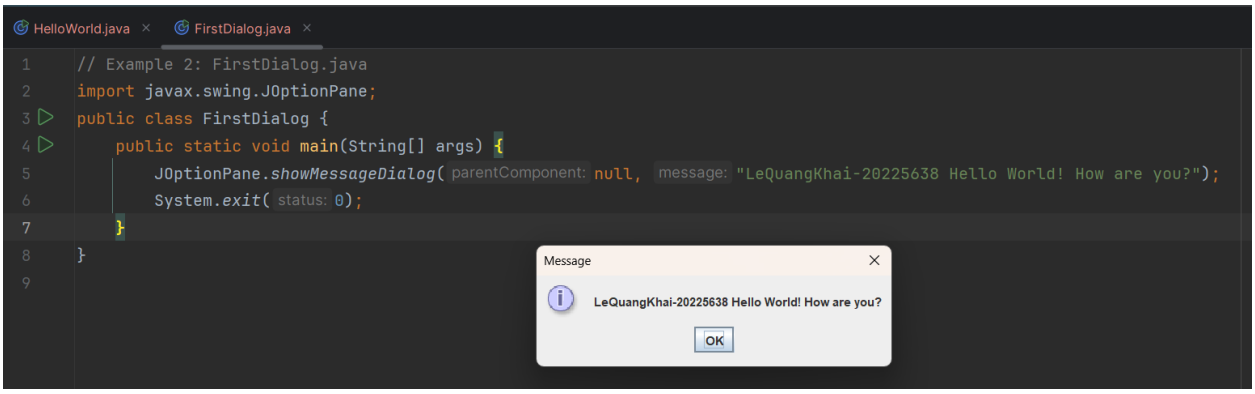


Figure 2. The First Dialog Java Application

2.2.3 Write, compile the first input dialog Java application

Source code + Kết quả:

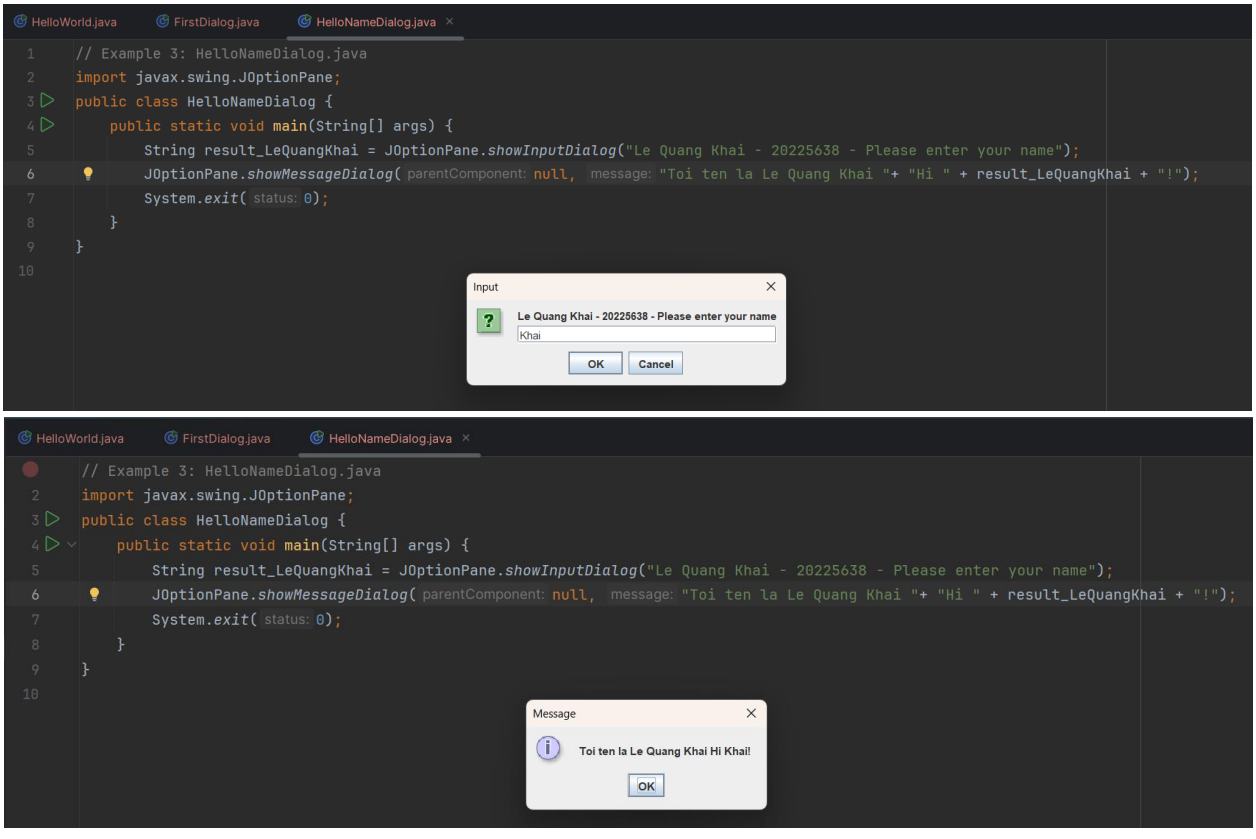


Figure 3. The First Input dialog Java Application

2.2.4 Write, compile, and run the following example:

Source code + Kết quả:

```java
// Example 5: ShowTwoNumbers.java
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main(String[] args) {
        String strNum1_LQK, strNum2_LQK;
        String strNotification_LQK = "You've just entered: ";

        strNum1_LQK = JOptionPane.showInputDialog( parentComponent: null,
                message: "Le Quang Khai 20225638 - Please input the first number: ",
                title: "Le Quang Khai 20225638 - Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification_LQK += strNum1_LQK;

        strNum2_LQK = JOptionPane.showInputDialog( parentComponent: null,
                message: "Le Quang Khai 20225638 - Please input the second number: ",
                title: "Le Quang Khai 20225638 - Input the second number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification_LQK += strNum2_LQK;
        JOptionPane.showMessageDialog( parentComponent: null, strNotification_LQK,
                title: "Show two numbers", JOptionPane.INFORMATION_MESSAGE) ;
        System.exit( status: 0);
    }
}
```

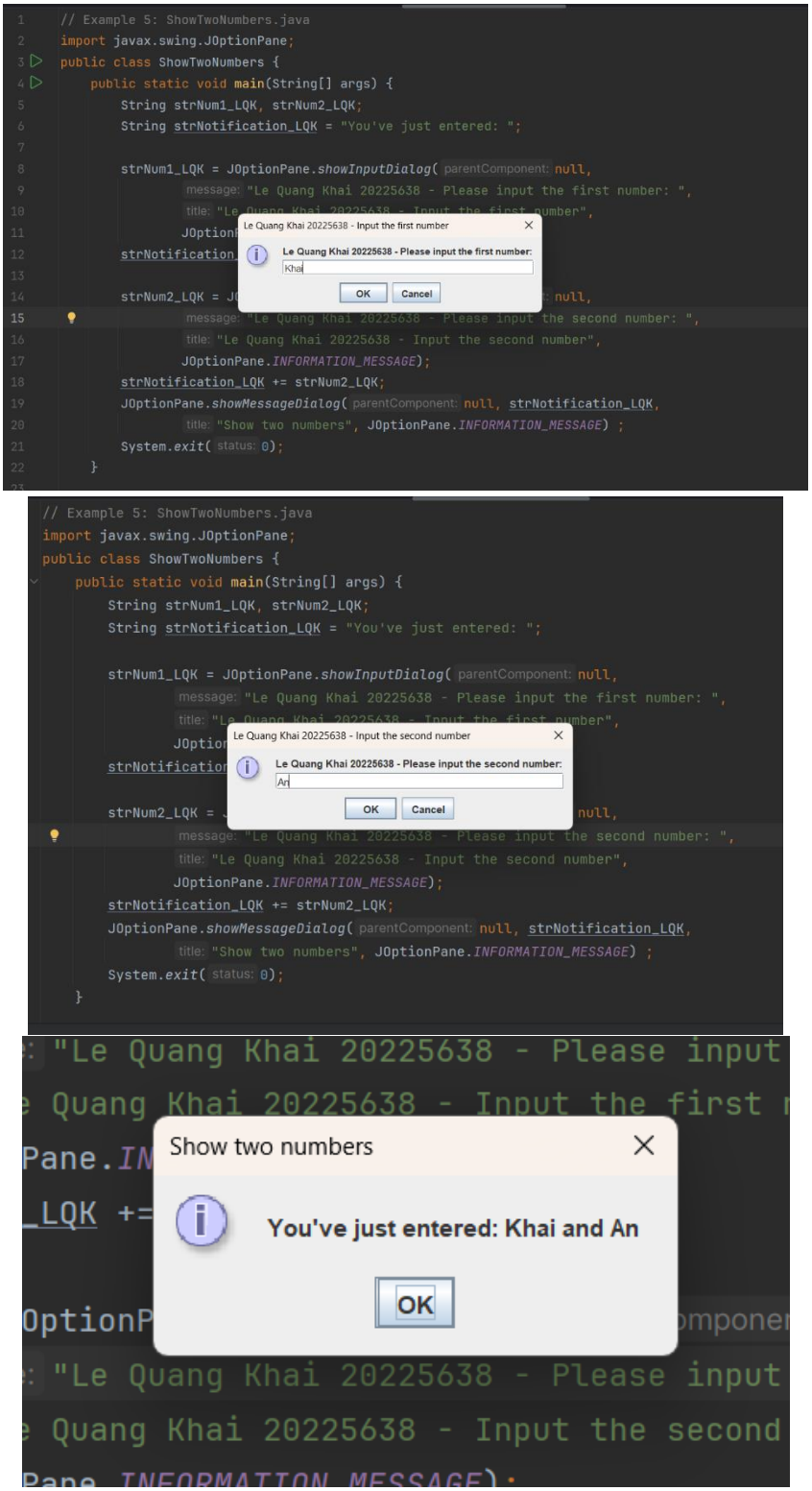


Figure 4. Java Application showing two entered numbers and their sum

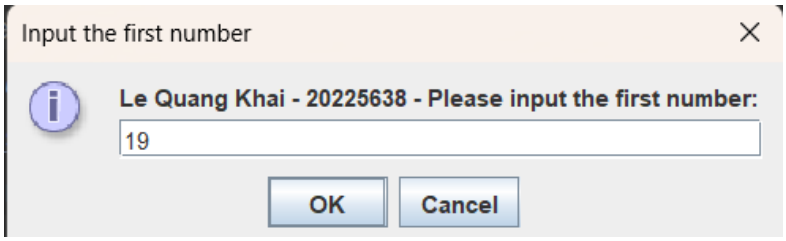
2.2.5 Calculate 2 double numbers

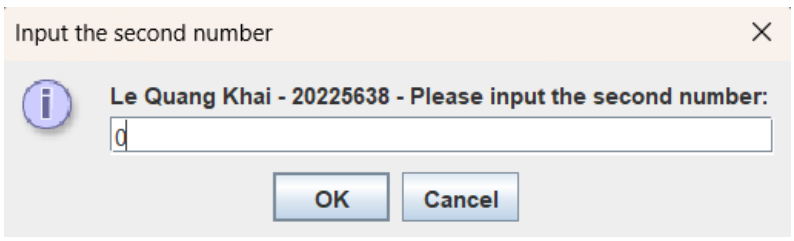
Kết quả:

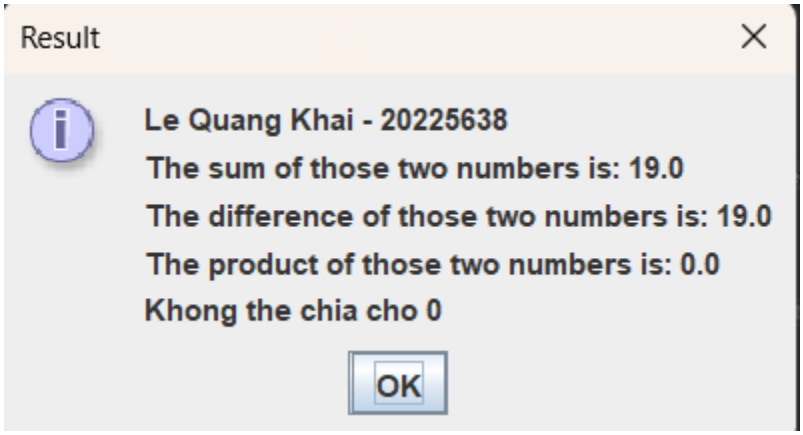
HelloWorld.java FirstDialog.java HelloNameDialog.java ShowTwoNumbers.java CaculateTwoNumbers.java

```
public class CaculateTwoNumbers {

    public static void main(String[] args) {
        String strNum1, strNum2; double num1, num2;

        strNum1 = JOptionPane.showInputDialog( parentComponent: null,
                message: "Le Quang Khai - 20225638 - Please input the first number: ", title: "Input the first number", JO
        num1 = Double.parseDouble(strNum1);

        strNum2 = JOptionPane.showInputDialog( parentComponent: null,
                message: "Le Quang Khai - 20225638 - Please input the second number: ", title: "Input the second number",
        num2 = Double.parseDouble(strNum2);
        String stringResult =
                "Le Quang Khai - 20225638\n" +
                        "The sum of those two numbers is: " + (num1 + num2) + "\n" +
                        "The difference of those two numbers is: " + (num1 - num2) + "\n" +
                        "The product of those two numbers is: " + (num1 * num2) + "\n";
        if(num2 == 0){
            stringResult = stringResult + "Khong the chia cho 0\n";
        }else stringResult += "The quotient of those two numbers is: " + (num1 / num2) + "\n";
        JOptionPane.showMessageDialog( parentComponent: null, stringResult, title: "Result", JOptionPane.INFORMATION_MESSAGE
        System.exit( status: 0);

```

Figure 5. Source code CaculateTwoNumbers







num1 = 19, num2 = 9

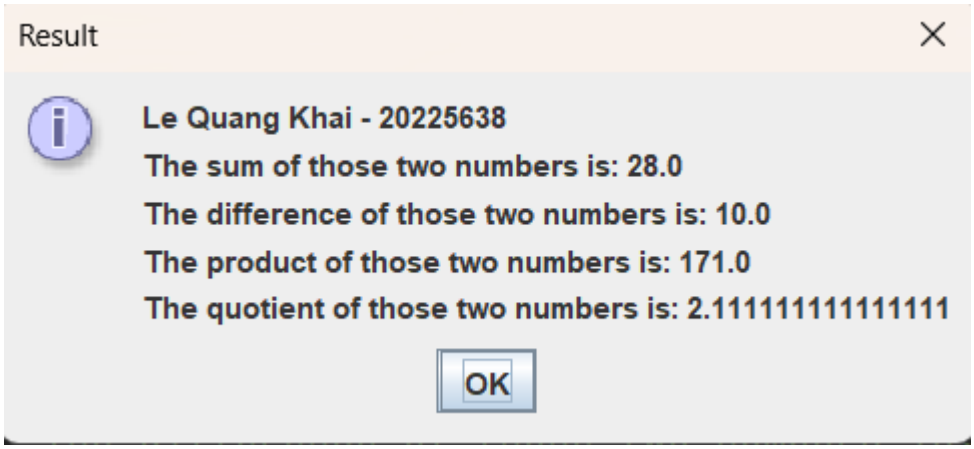


Figure 6. Kết quả CaculateTwoNumbers

2.2.6 Write a program to solve Exercise:

Source code + Kết quả:

```java
import java.util.Scanner;

public class EquationSolver {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Le Quang Khai - 20225638 - Choose the type of equation:");
        System.out.println("1. First-degree equation (ax + b = 0)");
        System.out.println("2. System of first-degree equations with two variables");
        System.out.println("3. Second-degree equation (ax^2 + bx + c = 0)");
        int choice = scanner.nextInt();

        switch (choice) {
            case 1:
                solveLinearEquation(scanner);
                break;
            case 2:
                solveSystemOfEquations(scanner);
                break;
            case 3:
                solveQuadraticEquation(scanner);
                break;
            default:
                System.out.println("Invalid choice.");
        }
```

```java
public class EquationSolver {
    }

    public static void solveLinearEquation(Scanner scanner) {  2 usages
        System.out.println("Enter a: ");
        double a = scanner.nextDouble();
        System.out.println("Enter b: ");
        double b = scanner.nextDouble();

        if (a == 0) {
            System.out.println("Le Quang Khai - 20225638 - Phuong trinh vo nghiem.");
        } else {
            double x = -b / a;
            System.out.println("Nghiem: x = " + x);
        }
    }

    public static void solveSystemOfEquations(Scanner scanner) {  1 usage
        System.out.println("Enter a11, a12, b1: ");
        double a11 = scanner.nextDouble();
        double a12 = scanner.nextDouble();
        double b1 = scanner.nextDouble();

        System.out.println("Enter a21, a22, b2: ");
        double a21 = scanner.nextDouble();
        double a22 = scanner.nextDouble();
```

```
    System.out.println("Enter a21, a22, b2: ");
    double a21 = scanner.nextDouble();
    double a22 = scanner.nextDouble();
    double b2 = scanner.nextDouble();

    double D = a11 * a22 - a21 * a12;
    double D1 = b1 * a22 - b2 * a12;
    double D2 = a11 * b2 - a21 * b1;

    if (D == 0) {
        if (D1 == 0 && D2 == 0) {
            System.out.println("Le Quang Khai - 20225638 - He phuong trinh vo so ng
        } else {
            System.out.println("Le Quang Khai - 20225638 - He phuong trinh vo nghie
        }
    } else {
        double x1 = D1 / D;
        double x2 = D2 / D;
        System.out.println("Nghiem: x1 = " + x1 + ", x2 = " + x2);
    }
}

public static void solveQuadraticEquation(Scanner scanner) {  1 usage
    System.out.println("Enter a: ");
```

```
public static void solveQuadraticEquation(Scanner scanner) {  1 usage
    System.out.println("Enter a: ");
    double a = scanner.nextDouble();
    if (a == 0) {
        System.out.println("Day la phuong trinh bac nhat.");
        solveLinearEquation(scanner);
    }
    if (a != 0) {
        System.out.println("Enter b: ");
        double b = scanner.nextDouble();
        System.out.println("Enter c: ");
        double c = scanner.nextDouble();

        double discriminant = b * b - 4 * a * c;
        if (discriminant > 0) {
            double root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
            double root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
            System.out.println("Phuong trinh 2 nghiem phan biet: x1 = " + root1 + ", x2 = " + root2);
        } else if (discriminant == 0) {
            double root = -b / (2 * a);
            System.out.println("Nghiem kep: x = " + root);
        } else {
            System.out.println("Le Quang Khai - 20225638 - Vo nghiem.");
        }
    }
```

Figure 7. Source code EquationSolver

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Pr
Le Quang Khai - 20225638 - Choose the type of equation:
1. First-degree equation (ax + b = 0)
2. System of first-degree equations with two variables
3. Second-degree equation (ax^2 + bx + c = 0)
1
Enter a:
5
Enter b:
2
Nghiem: x = -0.4

Process finished with exit code 0
```

```
Le Quang Khai - 20225638 - Choose the type of equation:
1. First-degree equation (ax + b = 0)
2. System of first-degree equations with two variables
3. Second-degree equation (ax^2 + bx + c = 0)
2
Enter a11, a12, b1:
1
2
3
Enter a21, a22, b2:
4
5
6
Nghiem: x1 = -1.0, x2 = 2.0
```

```
Le Quang Khai - 20225638 - Choose the type of equation:
1. First-degree equation (ax + b = 0)
2. System of first-degree equations with two variables
3. Second-degree equation (ax^2 + bx + c = 0)
3
Enter a:
1
Enter b:
5
Enter c:
6
Phuong trinh 2 nghiem phan biet: x1 = -2.0, x2 = -3.0
```

Figure 8. Kết quả EquationSolver

6. Exercises

6.1 Write, compile and run the ChoosingOption program

Source code:

```
import javax.swing.JOptionPane;
public class ChoosingOption {
    public static void main(String[] args) {
        int option = JOptionPane.showConfirmDialog( parentComponent: null,
                message: "Le Quang Khai - 20225638 Do you want to change to first class ticket ?");
        JOptionPane.showMessageDialog( parentComponent: null,  message: "Le Quang Khai 20225638 \n You 've chosen: "
                + (option == JOptionPane.YES_OPTION ? "Yes" : "No"));
        System.exit( status: 0);
    }
}
```

Figure 9. Source code ChoosingOption

Kết quả chạy:

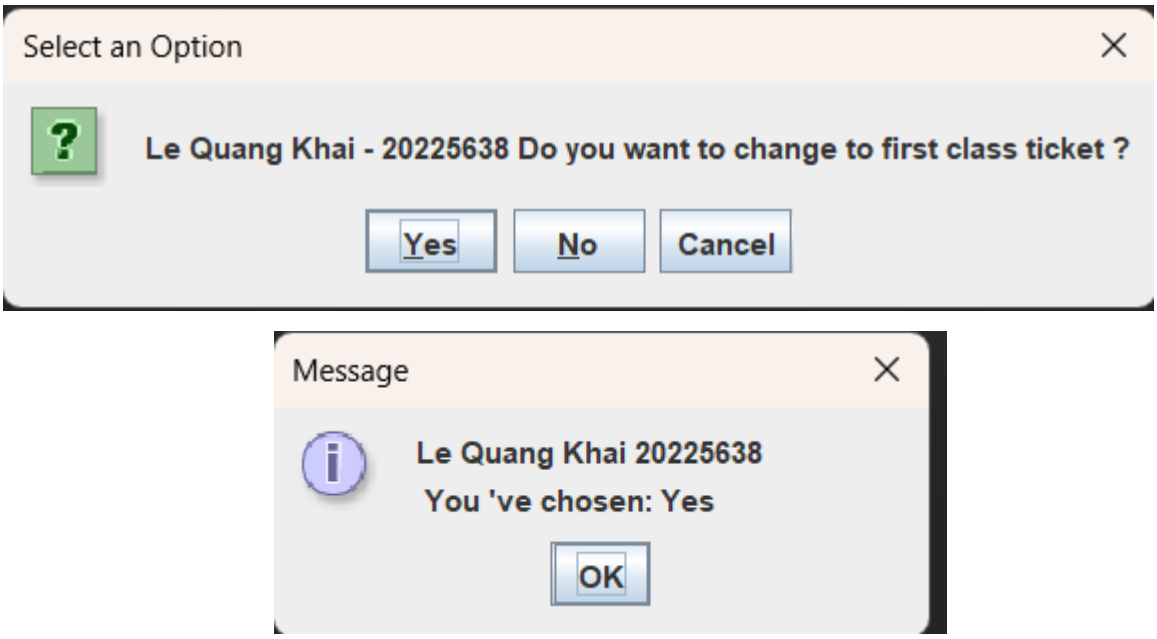


Figure 10. Kết quả chạy ChoosingOption

- Khi người dùng chọn "Cancel" trong hộp thoại JOptionPane.showConfirmDialog, giá trị trả về là JOptionPane.CANCEL_OPTION. Tuy nhiên, trong đoạn mã hiện tại, câu thông báo sẽ coi "Cancel" như là "No" vì điều kiện chỉ kiểm tra nếu người dùng chọn JOptionPane.YES_OPTION. Do đó, khi người dùng chọn "Cancel" hoặc "No", chương trình sẽ hiển thị thông báo là "No".

6.2 Write a program for input/output from keyboard

Source code:

```java
import java.util.Scanner;

public class InputFromKeyboard {
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.println("Le Quang Khai 20225638 - What 's your name ?");
        String strName = sc.nextLine();
        System.out.println("Le Quang Khai 20225638 - How old are you ?");
        int iAge = sc.nextInt();
        System.out.println("Le Quang Khai 20225638 - How tall are you (m) ?");
        double dHeight = sc.nextDouble();

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

Figure 11. Source code InputFromKeyboard

Kết quả:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\
Le Quang Khai 20225638 - What 's your name ?
Khai
Le Quang Khai 20225638 - How old are you ?
20
Le Quang Khai 20225638 - How tall are you (m) ?
1.74
Mrs/Ms. Khai, 20 years old. Your height is 1.74.

Process finished with exit code 0
```

Figure 12. Kết quả InputFromKeyboard

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

Source code:

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Le Quang Khai - 20225638 \nEnter height of triangle: ");
        int height = sc.nextInt();
        for (int i = 0; i < height; i++) {
            for (int j = i; j < height; j++) {
                System.out.print(" ");
            }
            for (int j = 0; j < 2 * i + 1; j++) {
                System.out.print("*");
            }
            System.out.print("\n");
        }
    }
}
```

Figure 13. Source code Ex6.3

Kết quả:

Figure 14. Kết quả Ex6.3

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.

Source code:

Main.java

```java
import java.util.Arrays;
import java.util.List;
import java.util.Scanner;

public class Main {
    private static void solution(int month, int year) {  4 usages
        month += 1;
        boolean isLeapYear = (year % 4 == 0 && year % 100 != 0) || year % 400 == 0;
        String typeYear = "Day of month in " + ((isLeapYear) ? "Leap Year is " : "Common Year is ");
        if ((month != 2 && month <= 7 && month % 2 == 1) || (month > 7 && month % 2 == 0)) {
            System.out.println(typeYear + "31");
        } else if (month == 2) {
            System.out.println(typeYear + ((isLeapYear) ? "29" : "28"));
        } else {
            System.out.println(typeYear + "30");
        }
    }

    public static void main(String[] args) {

        List<String> months = Arrays.asList("january", "february", "march", "april", "may", "june",
                "july", "august", "september", "october", "november", "december");
        List<String> abbreviation = Arrays.asList("jan.", "feb.", "mar.", "apr.", "may", "june",
                "july", "aug.", "sept.", "oct.", "nov.", "dec.");
        List<String> letter = Arrays.asList("jan", "feb", "mar", "apr", "may", "june",
                "july", "aug", "sept", "oct", "nov", "dec");
public static void main(String[] args) {

    List<String> months = Arrays.asList("january", "february", "march", "april", "may", "june",
            "july", "august", "september", "october", "november", "december");
    List<String> abbreviation = Arrays.asList("jan.", "feb.", "mar.", "apr.", "may", "june",
            "july", "aug.", "sept.", "oct.", "nov.", "dec.");
    List<String> letter = Arrays.asList("jan", "feb", "mar", "apr", "may", "june",
            "july", "aug", "sept", "oct", "nov", "dec");
    List<String> number = Arrays.asList("1", "2", "3", "4", "5", "6", "7", "8", "9", "10", "11", "12

    Scanner sc = new Scanner(System.in);

    System.out.print("Le Quang Khai - 20225638\nEnter month and year: ");
    try {
        String month = sc.next().toLowerCase();
        int year = sc.nextInt();

        int index;
        if ((index = months.indexOf(month)) != -1) solution(index, year);
        else if ((index = abbreviation.indexOf(month)) != -1) solution(index, year);
        else if ((index = letter.indexOf(month)) != -1) solution(index, year);
        else if ((index = number.indexOf(month)) != -1) solution(index, year);
        else System.out.println("Month is not correct!");
    } catch (Exception e) {
        System.out.println("Month or year is not correct!");
```

Figure 15. Source code Ex6.4 DaysOfAMonthYear

Kết quả:

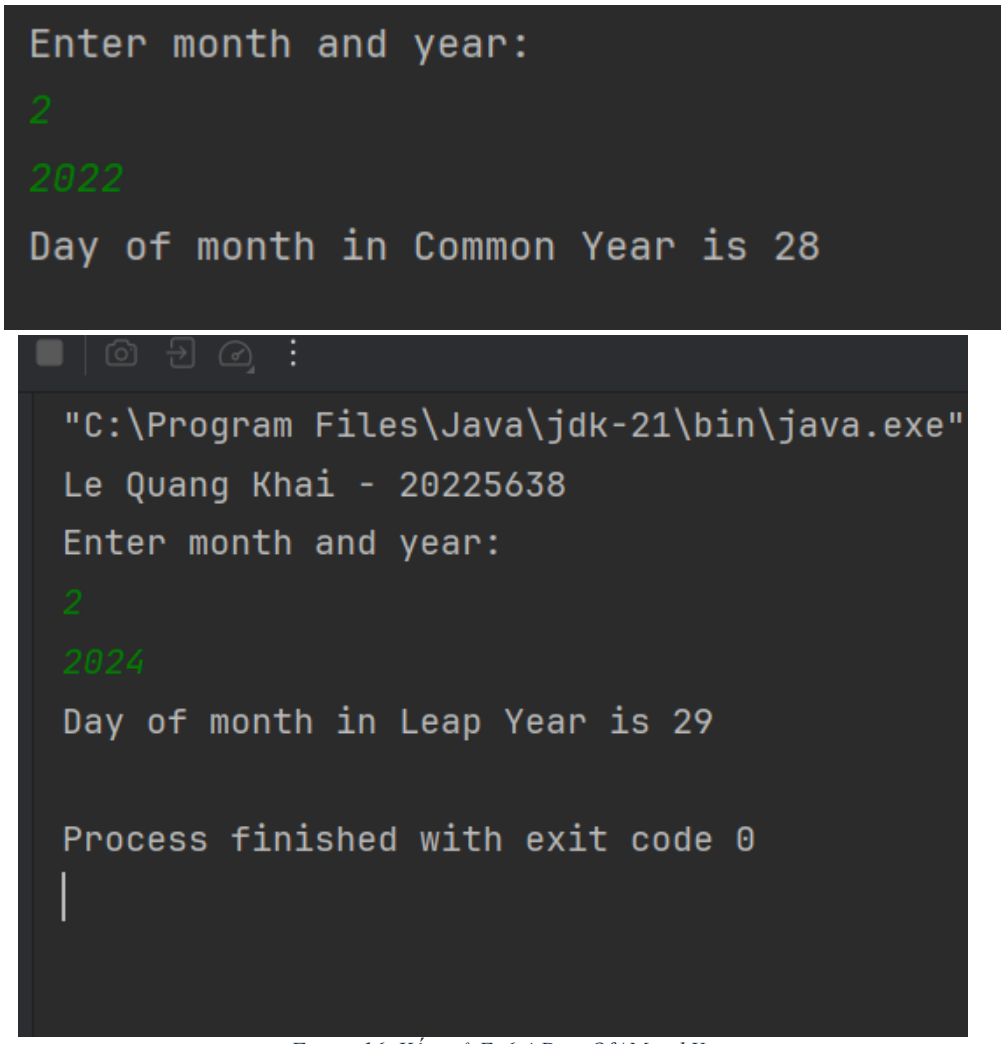


Figure 16. Kết quả Ex6.4 DaysOfAMonthYear

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

Source code:

```java
import java.util.Arrays;
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        System.out.print("Le Quang Khai - 20225638\nEnter size of array: ");
        int n = sc.nextInt();
        int[] arr = new int[n];
        System.out.print("Le Quang Khai - 20225638\nEnter element of array: ");
        int sum = 0;
        for (int i = 0; i < n; i++){
            arr[i] = sc.nextInt();
            sum += arr[i];
        }
        Arrays.sort(arr);
        System.out.println("Array after soft is: " + Arrays.toString(arr));
        System.out.println("Sum of array is: " + sum);
        System.out.println("Average of array is: " + (double) sum / arr.length);
    }
}
```

Figure 17. Source code Ex6.5

Kết quả:

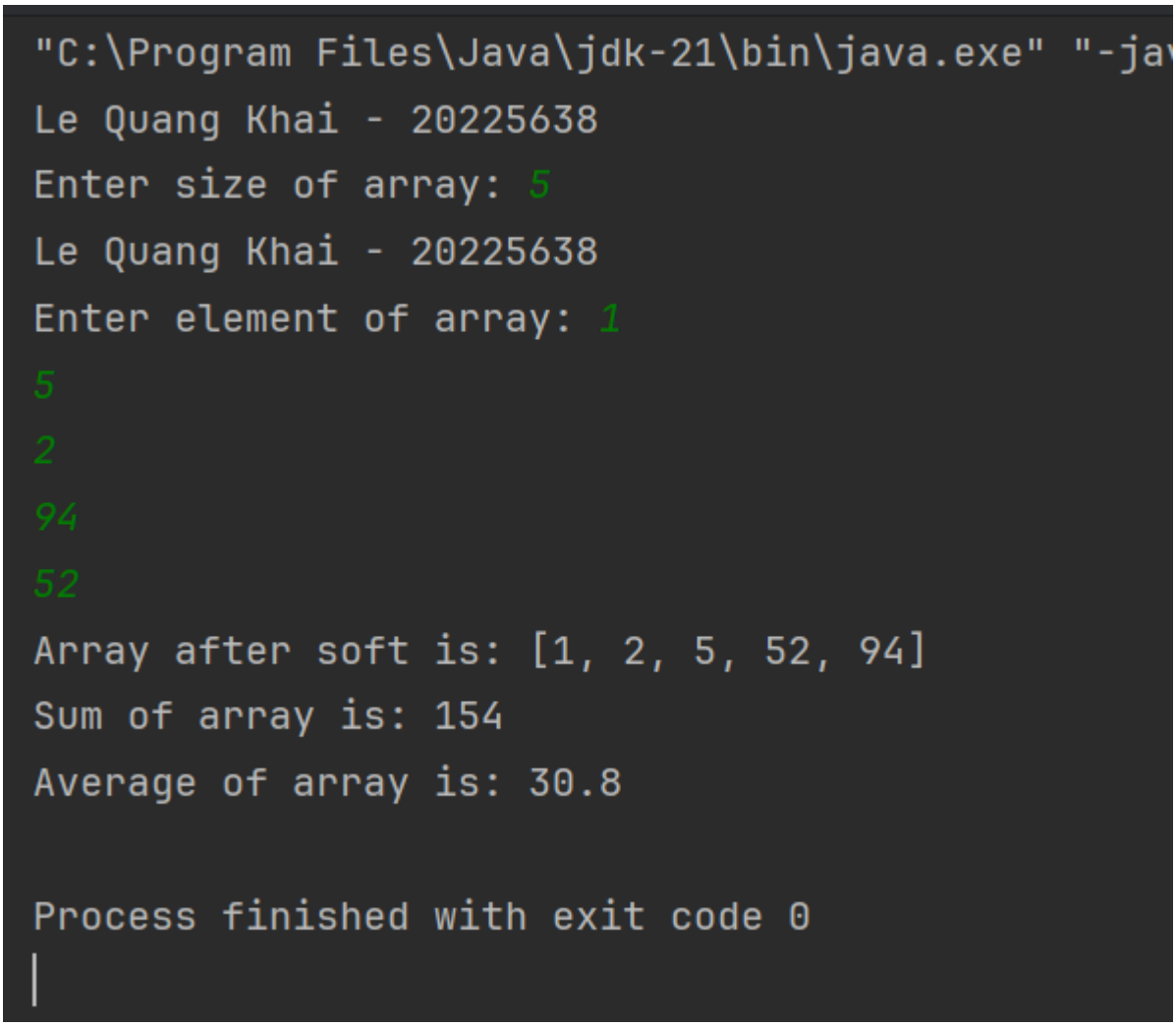


Figure 18. Kết quả Ex6.5

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

Source code:

```java
public class Main {
    public static void main(String[] args) {
        System.out.print("Le Quang Khai 20225638 - Enter size of matrix: ");
        int size = sc.nextInt();
        int[][] firstMatrix = new int[size][size];
        int[][] secondMatrix = new int[size][size];
        int[][] resultMatrix = new int[size][size];

        System.out.println("Le Quang Khai 20225638 - Enter the element of first matrix:");
        for (int i = 0; i < size; i++) {
            for (int j = 0; j < size; j++) {
                firstMatrix[i][j] = sc.nextInt();
            }
        }
        System.out.println("Le Quang Khai 20225638 - Enter the element of second matrix:");
        for (int i = 0; i < size; i++) {
            for (int j = 0; j < size; j++) {
                secondMatrix[i][j] = sc.nextInt();
                resultMatrix[i][j] = firstMatrix[i][j] + secondMatrix[i][j];
            }
        }
        System.out.println("Le Quang Khai 20225638 - The sum of two matrix is:");
        for (int i = 0; i < size; i++) {
            for (int j = 0; j < size; j++) System.out.print(resultMatrix[i][j] + " ");
            System.out.println();
        }
```

Figure 19. Source code Ex 6.6 Calculate Matrix Same Size

Kết quả:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Progra
Le Quang Khai 20225638 - Enter size of matrix: 3
Le Quang Khai 20225638 - Enter the element of first matrix:
1 2 3
4 5 6
7 8 9
Le Quang Khai 20225638 - Enter the element of second matrix:
2 3 4
5 6 7
8 9 10
Le Quang Khai 20225638 - The sum of two matrix is:
3 5 7
9 11 13
15 17 19

Process finished with exit code 0
```

Figure 10. Kết quả Ex 6.6 Calculate Matrix Same Size