# BÁO CÁO THÍ NGHIỆM

# IT3103 – 750864 – LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG (TN)

### Lab 1: Environment Setup and Java Basics

| | |
|---|---|
| Họ và tên | Trần Đức Nam Anh |
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**GitHub repository**: OOP.Lab.20242.750864.20235655.TranDucNamAnh (không công khai)

**Phần 2.2**:

2.2.1. Code:

```
1
2 public class HelloWorld {
3     public static void main(String args[]) {
4         System.out.println("Xin chao \n cac ban!");
5         System.out.println("Hello \t world!");
6
7     }
8 }
9
```

Kết quả chạy:

```
Xin chao
 cac ban!
Hello    world!
```

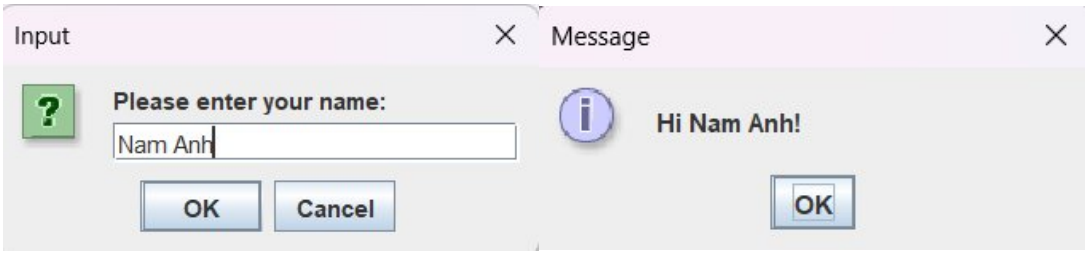
2.2.2. Code:

```java
import javax.swing.JOptionPane;
public class FirstDialog{
    public static void main(String[] args) {
        JOptionPane.showMessageDialog(null,"Hello world! How are you?");
        System.exit(0);
    }
}

```

Kết quả: Hiện ra 1 hộp thoại như sau:


2.2.3 Code:

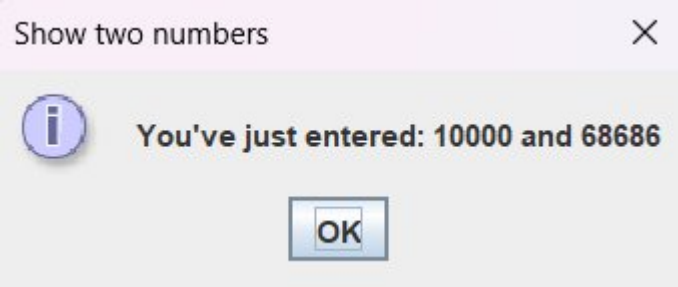
```java

import javax.swing.JOptionPane;
public class HelloNameDialog {
    public static void main(String[] args) {
        String result;
        result = JOptionPane.showInputDialog("Please enter your name:");
        JOptionPane.showMessageDialog(null, "Hi " + result + "!");
        System.exit(0);
    }
}

```




2.2.4. Code:

```java
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main(String[] args) {
        String strNum1, strNum2;
        String strNotification = "You've just entered: ";

        strNum1 = JOptionPane.showInputDialog(
                null,"Please input the first number: ","Input the first number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 + " and ";

        strNum2 = JOptionPane.showInputDialog(
                null,"Please input the second number: ","Input the second number",
                JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum2;

        JOptionPane.showMessageDialog(
                null,strNotification,"Show two numbers",
                JOptionPane.INFORMATION_MESSAGE);
        System.exit(0);
    }
}
```

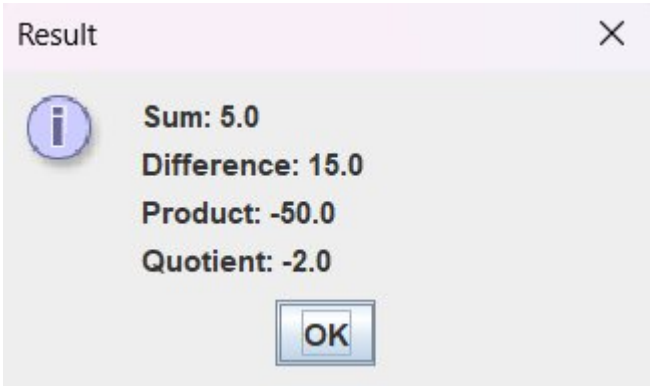
Nhập 2 số 10000 và 68.686 ta được:




2.2.5. Code:

```java
import javax.swing.JOptionPane;

public class CalculateNumber {
    public static void main(String[] args) {
        try {
            String input1 = JOptionPane.showInputDialog(null,
                    "Please input the first number:",
                    "Input the first number",
                    JOptionPane.INFORMATION_MESSAGE);
            String input2 = JOptionPane.showInputDialog(null,
                    "Please input the second number:",
                    "Input the second number",
                    JOptionPane.INFORMATION_MESSAGE);

            double num1 = Double.parseDouble(input1);
            double num2 = Double.parseDouble(input2);

            double sum = num1 + num2;
            double difference = num1 - num2;
            double product = num1 * num2;
            String result = "Sum: " + sum + "\n" +
                            "Difference: " + difference + "\n" +
                            "Product: " + product + "\n";

            if (num2 != 0) {
                double quotient = num1 / num2;
                result += "Quotient: " + quotient;
            } else {
                result += "Division by 0 is not allowed!";
            }

            JOptionPane.showMessageDialog(null, result, "Result", JOptionPane.INFORMATION_MESSAGE);

        } catch (NumberFormatException e) {
            JOptionPane.showMessageDialog(null,
                    "Invalid input! Please enter a number.",
                    "Error",
                    JOptionPane.ERROR_MESSAGE);
        }
    }
}
```

VD: Khi nhập vào 2 số 10 và -5 ta được




(Tổng, Hiệu, Tích, Thương của 10 và -5)

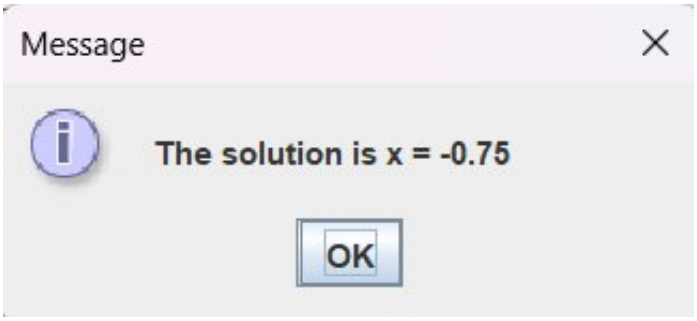
( Không thể chia cho 0)

2.2.6. Code:

```
import javax.swing.JOptionPane;
public class EquationSolver {

    public static void main(String[] args) {
        String[] options = {"Linear equation", "Linear system", "Second degree equation"};
        int choice = JOptionPane.showOptionDialog(
            null,
            "Choose an option:",
            "Option Selector",
            JOptionPane.DEFAULT_OPTION,
            JOptionPane.INFORMATION_MESSAGE,
            null,
            options,
            options[0]
        );
        String strResult;
        if (choice == 0) {
            double num1 = Double.parseDouble(JOptionPane.showInputDialog("Enter a"));
            double num2 = Double.parseDouble(JOptionPane.showInputDialog("Enter b"));
            if(num1 == 0){
                if(num2 == 0)strResult = "Infinite solutions";else strResult = "No solution";
            }else {
                strResult = "The solution is x = "+(-num2/num1);
            }
            JOptionPane.showMessageDialog(null,strResult);
        } else if (choice == 1) {
```

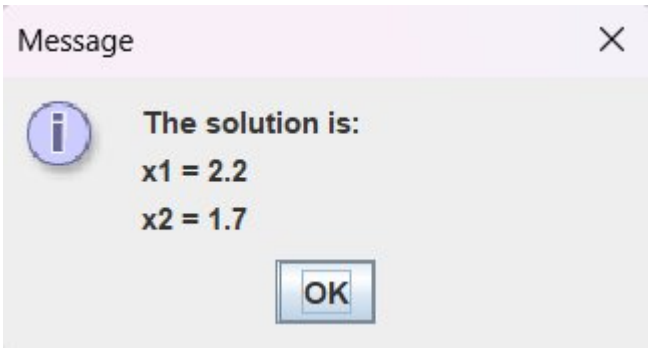
```
            double a11 = Double.parseDouble(JOptionPane.showInputDialog("Enter a11"));
            double a12 = Double.parseDouble(JOptionPane.showInputDialog("Enter a12"));
            double b1 = Double.parseDouble(JOptionPane.showInputDialog("Enter b1"));
            double a21 = Double.parseDouble(JOptionPane.showInputDialog("Enter a21"));
            double a22 = Double.parseDouble(JOptionPane.showInputDialog("Enter a22"));
            double b2 = Double.parseDouble(JOptionPane.showInputDialog("Enter b2"));
            double determinant = a11 * a22 - a12 * a21;
            if (determinant == 0) {
                if (a11 / a21 == a12 / a22 && b1 / b2 == a11 / a21) {
                    JOptionPane.showMessageDialog(null, "Infinite solutions");
                } else {
                    JOptionPane.showMessageDialog(null, "No solution");
                }
            } else {
                double x1 = (b1 * a22 - b2 * a12) / determinant;
                double x2 = (a11 * b2 - a21 * b1) / determinant;
                JOptionPane.showMessageDialog(null, "The solution is:\n" +
                        "x1 = " + x1 + "\n" +
                        "x2 = " + x2);
            }

        } else if (choice == 2) {
            double a = Double.parseDouble(JOptionPane.showInputDialog("Enter a"));
            double b = Double.parseDouble(JOptionPane.showInputDialog("Enter b"));
            double c = Double.parseDouble(JOptionPane.showInputDialog("Enter c"));

            if (a == 0) {
                if (b == 0) {
                    if (c == 0) {
                        JOptionPane.showMessageDialog(null, "Infinite solutions");
                    } else {
                        JOptionPane.showMessageDialog(null, "No solution");
                    }
                } else {
                    double x = -c / b;
                    JOptionPane.showMessageDialog(null, "The solution is x = " + x);
                }
            } else {
                double discriminant = b * b - 4 * a * c;
                if (discriminant > 0) {
                    double x1 = (-b + Math.sqrt(discriminant)) / (2 * a);
                    double x2 = (-b - Math.sqrt(discriminant)) / (2 * a);
                    JOptionPane.showMessageDialog(null, "Two real solutions:\n" +
                            "x1 = " + x1 + "\n" +
                            "x2 = " + x2);
                } else if (discriminant == 0) {
                    double x = -b / (2 * a);
                    JOptionPane.showMessageDialog(null, "One real solution x = " + x);
                } else {
                    JOptionPane.showMessageDialog(null, "No real solution");
                }
            }
        } else {
            JOptionPane.showMessageDialog(null, "No option chosen.");
        }
    }
}
```

VD1: Giải phương trình 4x + 3 = 0

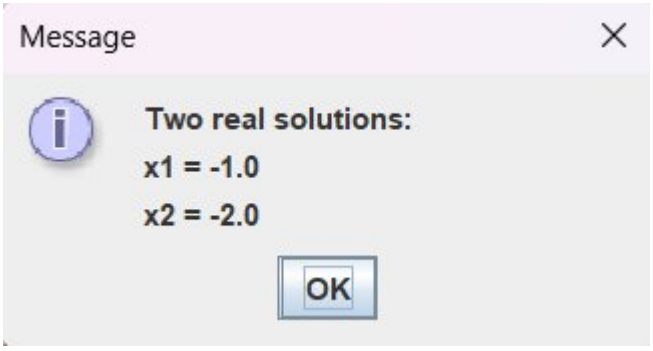



VD2: Giải hệ

(1) 3x + 2y = 10
(2) x – y = 0.5




VD3: Giải phương trình x^2 + 3x + 2 = 0




6.1. Code:

```java
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 chosen: " + (option == JOptionPane.YES_OPTION ? "Yes" : "No"));

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

Kết quả chạy: Hiện ra hộp thoại


Nếu người dùng chọn Cancel, kết quả chạy:


Để tuỳ chỉnh nội dung và các lựa chọn trong hộp thoại ta có thể làm theo đoạn code sau:

```java
import javax.swing.JOptionPane;

public class ChoosingOptionV2 {
    public static void main(String[] args) {
        String[] options = {"Yes", "No"};

        int option = JOptionPane.showOptionDialog(null,
                "Do you want to change to the first class ticket?",
                "Choose an Option",
                JOptionPane.DEFAULT_OPTION,
                JOptionPane.QUESTION_MESSAGE,
                null,
                options,
                options[0]);

        JOptionPane.showMessageDialog(null,
                "You've chosen: " + (option == 0 ? "Yes" : "No"),
                "Result",
                JOptionPane.INFORMATION_MESSAGE);

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


6.2. Code:

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

        System.out.println("What's your name?");
        String strName = keyboard.nextLine();
        System.out.println("How old are you");
        int iAge = keyboard.nextInt();
        System.out.println("How tall are you (m)?");
        double dHeight = keyboard.nextDouble();

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

```

Kết quả chạy (terminal):

```
What's your name?
Nam Anh'
How old are you
20
How tall are you (m)?
180
Mrs/Ms.Nam Anh', 20 years old. Your height is 180.0.
```

6.3. Code:

```java
import java.util.Scanner;

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

        System.out.print("Chọn chiều cao: ");
        int n = scanner.nextInt();

        for (int i = 1; i <= n; i++) {
            for (int j = 0; j < n - i; j++) {
                System.out.print(" ");
            }

            for (int k = 0; k < 2 * i - 1; k++) {
                System.out.print("*");
            }

            System.out.println();
        }

        scanner.close();
    }
}
```

VD: Chiều cao = 35

```
Chọn chiều cao: 35
                                   *
                                  ***
                                 *****
                                *******
                               *********
                              ***********
                             *************
                            ***************
                           *****************
                          *******************
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           *************************************************
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         *****************************************************
        *******************************************************
       *********************************************************
      ***********************************************************
     *************************************************************
    ***************************************************************
   *****************************************************************
  *******************************************************************
 *********************************************************************
***********************************************************************
```

## 6.4. Code:

```java
import java.util.Scanner;

public class DaysInMonth {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int year = getValidYear(scanner);
        int month = getValidMonth(scanner);

        int days = getDaysInMonth(month, year);
        System.out.println("The month " + month + " of year " + year + " has " + days + " days.");

        scanner.close();
    }

    private static int getValidYear(Scanner scanner) {
        int year;
        while (true) {
            System.out.print("Please enter a valid year (non-negative, e.g., 1999): ");
            if (scanner.hasNextInt()) {
                year = scanner.nextInt();
                if (year > 0) {
                    return year;
                } else {
                    System.out.println("Year cannot be negative or 0. Please try again.");
                }
            } else {
                System.out.println("Invalid input. Please enter a valid year.");
                scanner.next();
            }
        }
```

```
    private static int getValidMonth(Scanner scanner) {
        scanner.nextLine();
        int month = -1;
        while (month == -1) {
            System.out.print("Please enter a valid month (e.g., 1, Jan, January): ");
            String monthInput = scanner.nextLine().trim();
            month = getMonthNumber(monthInput);
            if (month == -1) {
                System.out.println("Invalid month. Please try again.");
            }
        }
        return month;
    }

    private static int getMonthNumber(String monthInput) {
        monthInput = monthInput.toLowerCase();
        switch (monthInput) {
            case "1": case "january": case "jan.": case "jan": return 1;
            case "2": case "february": case "feb.": case "feb": return 2;
            case "3": case "march": case "mar.": case "mar": return 3;
            case "4": case "april": case "apr.": case "apr": return 4;
            case "5": case "may": return 5;
            case "6": case "june": case "jun.": case "jun": return 6;
            case "7": case "july": case "jul.": case "jul": return 7;
            case "8": case "august": case "aug.": case "aug": return 8;
            case "9": case "september": case "sep.": case "sep": return 9;
            case "10": case "october": case "oct.": case "oct": return 10;
            case "11": case "november": case "nov.": case "nov": return 11;
            case "12": case "december": case "dec.": case "dec": return 12;
            default: return -1;
        }
```

```
    private static int getDaysInMonth(int month, int year) {
        return switch (month) {
            case 1, 3, 5, 7, 8, 10, 12 -> 31;
            case 4, 6, 9, 11 -> 30;
            case 2 -> (isLeapYear(year) ? 29 : 28);
            default -> -1;
        };
    }

    private static boolean isLeapYear(int year) {
        return (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0);
    }
}
```

Một số ví dụ:

```
Please enter a valid year (non-negative, e.g., 1999): 2024
Please enter a valid month (e.g., 1, Jan, January): February
The month 2 of year 2024 has 29 days.
```

```
Please enter a valid year (non-negative, e.g., 1999): 3000
Please enter a valid month (e.g., 1, Jan, January): 3
The month 3 of year 3000 has 31 days.
```

```
Please enter a valid year (non-negative, e.g., 1999): abc
Invalid input. Please enter a valid year.
Please enter a valid year (non-negative, e.g., 1999):
```

6.5. Code

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

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

        System.out.print("Enter the size of the array: ");
        int size = scanner.nextInt();
        double[] array = new double[size];
        System.out.println("Enter " + size + " elements for the array:");
        for (int i = 0; i < size; i++) {
            System.out.print("Element " + (i + 1) + ": ");
            array[i] = scanner.nextDouble();
        }
        Arrays.sort(array);
        double sum = 0;
        for (double num : array) {
            sum += num;
        }
        double average = sum / size;
        System.out.println("\nSorted Array: " + Arrays.toString(array));
        System.out.println("Sum: " + sum);
        System.out.println("Average: " + average);
        scanner.close();
    }
}
```

Ví dụ:

```
Enter the size of the array: 5
Enter 5 elements for the array:
Element 1: 9
Element 2: 6
Element 3: 5
Element 4: 10
Element 5: 3

Sorted Array: [3.0, 5.0, 6.0, 9.0, 10.0]
Sum: 33.0
Average: 6.6
```

6.6. Code:

```java
import java.util.Scanner;

public class Matrices {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of rows: ");
        int rows = scanner.nextInt();
        System.out.print("Enter the number of columns: ");
        int columns = scanner.nextInt();
        int[][] matrix1 = new int[rows][columns];
        int[][] matrix2 = new int[rows][columns];
        int[][] sumMatrix = new int[rows][columns];
        System.out.println("Enter elements of the first matrix:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                System.out.print("Element [" + i + "][" + j + "]: ");
                matrix1[i][j] = scanner.nextInt();
            }
        }
        System.out.println("Enter elements of the second matrix:");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                System.out.print("Element [" + i + "][" + j + "]: ");
                matrix2[i][j] = scanner.nextInt();
            }
        }
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < columns; j++) {
                sumMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
            }
        }
```

```
32          System.out.println("\nThe sum of the two matrices is:");
33          for (int i = 0; i < rows; i++) {
34              for (int j = 0; j < columns; j++) {
35                  System.out.print(sumMatrix[i][j] + "\t");
36              }
37              System.out.println();
38          }
39
40          scanner.close();
41      }
42  }
```

Ví dụ:

```
Enter the number of rows: 3
Enter the number of columns: 3
Enter elements of the first matrix:
Element [0][0]: 1
Element [0][1]: 1
Element [0][2]: 1
Element [1][0]: 1
Element [1][1]: 1
Element [1][2]: 1
Element [2][0]: 1
Element [2][1]: 1
Element [2][2]: 1
Enter elements of the second matrix:
Element [0][0]: 5
Element [0][1]: 5
Element [0][2]: 5
Element [1][0]: 5
Element [1][1]: 5
Element [1][2]: 5
Element [2][0]: 5
Element [2][1]: 5
Element [2][2]: 5

The sum of the two matrices is:
6       6       6
6       6       6
6       6       6
```