BÁO CÁO THỰC HÀNH LAB 1
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG
LỚP: 143577 (LT) – 732870 (TN)

The Very First Java Programs

2.2.1 Write, compile the first Java application:

HelloWorld.java

```java
// Example 1: HelloWorld.java
// Text-printing program
public class HelloWorld {
    public static void main(String args[]){
        System.out.println("Nguyen Huu Duc - 20210192");
        System.out.println("Xin chao \n cac ban!");
        System.out.println("Hello \t world!");
    } // end of main
}

```

Kết quả:

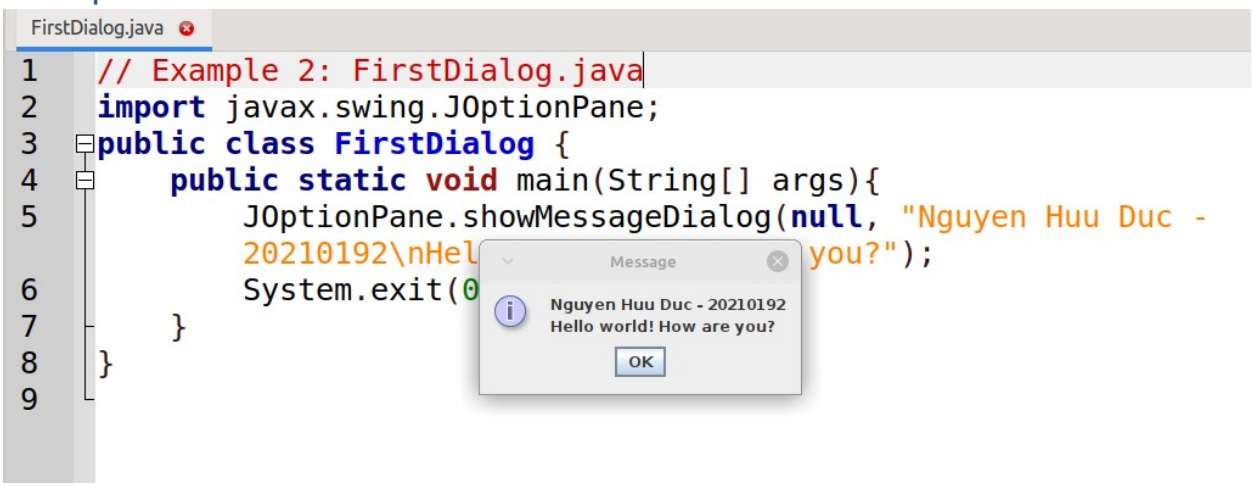
```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Xin chao
 cac ban!
Hello    world!


------------------
(program exited with code: 0)
Press return to continue
```

2.2.2 Write, compile the first dialog Java program

FirstDialog.java

```
1  // Example 2: FirstDialog.java
2  import javax.swing.JOptionPane;
3  public class FirstDialog {
4      public static void main(String[] args){
5          JOptionPane.showMessageDialog(null, "Nguyen Huu Duc -
           20210192\nHello world! How are you?");
6          System.exit(0);
7      }
8  }
9
```

Kết quả:

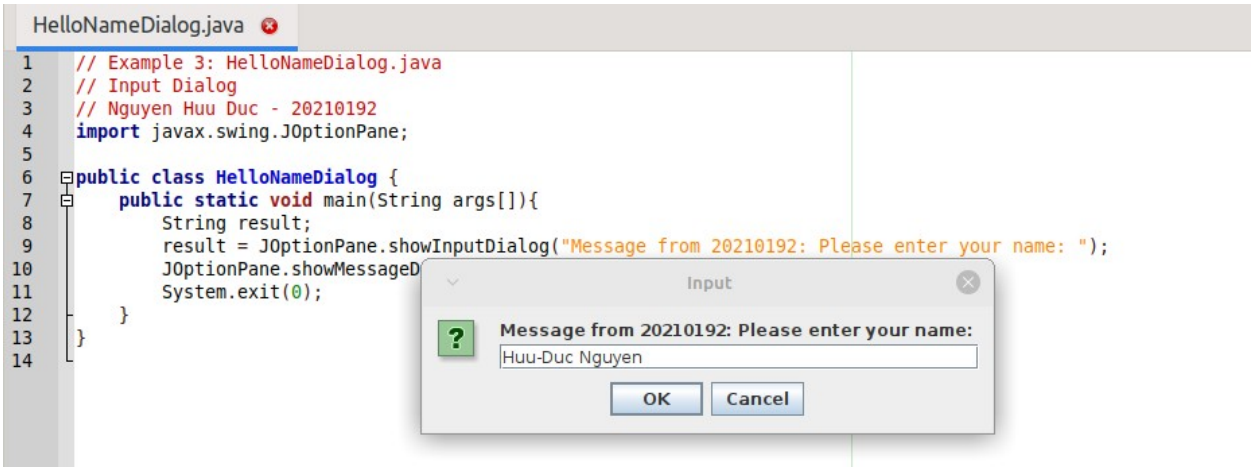


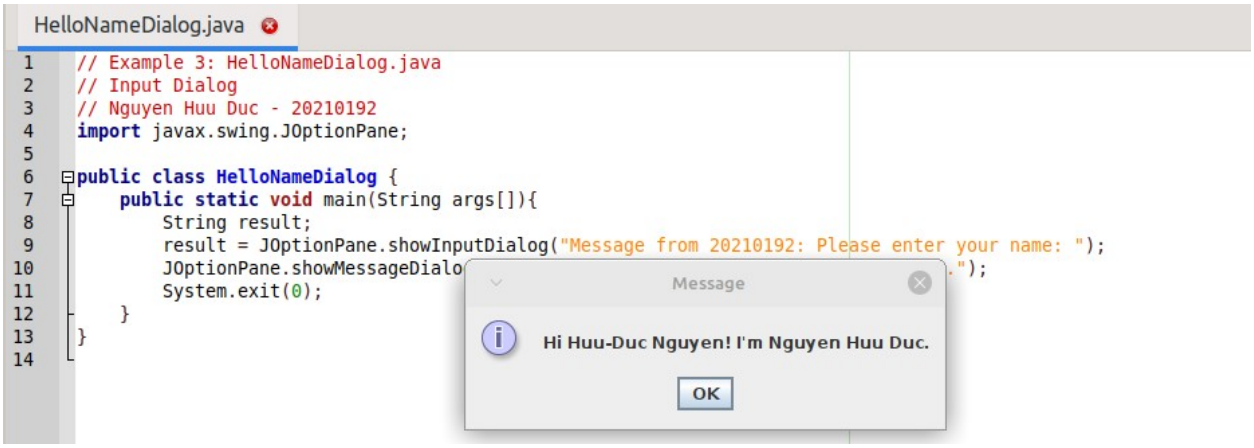
2.2.3 Write, compile the first input dialog Java application

HelloNameDialog.java

```
1  // Example 3: HelloNameDialog.java
2  // Input Dialog
3  // Nguyen Huu Duc - 20210192
4  import javax.swing.JOptionPane;
5
6  public class HelloNameDialog {
7      public static void main(String args[]){
8          String result;
9          result = JOptionPane.showInputDialog("Message from 20210192: Please enter your name: ");
10         JOptionPane.showMessageDialog(null,"Hi " + result + "! I'm Nguyen Huu Duc.");
11         System.exit(0);
12     }
13 }
```

Kết quả:



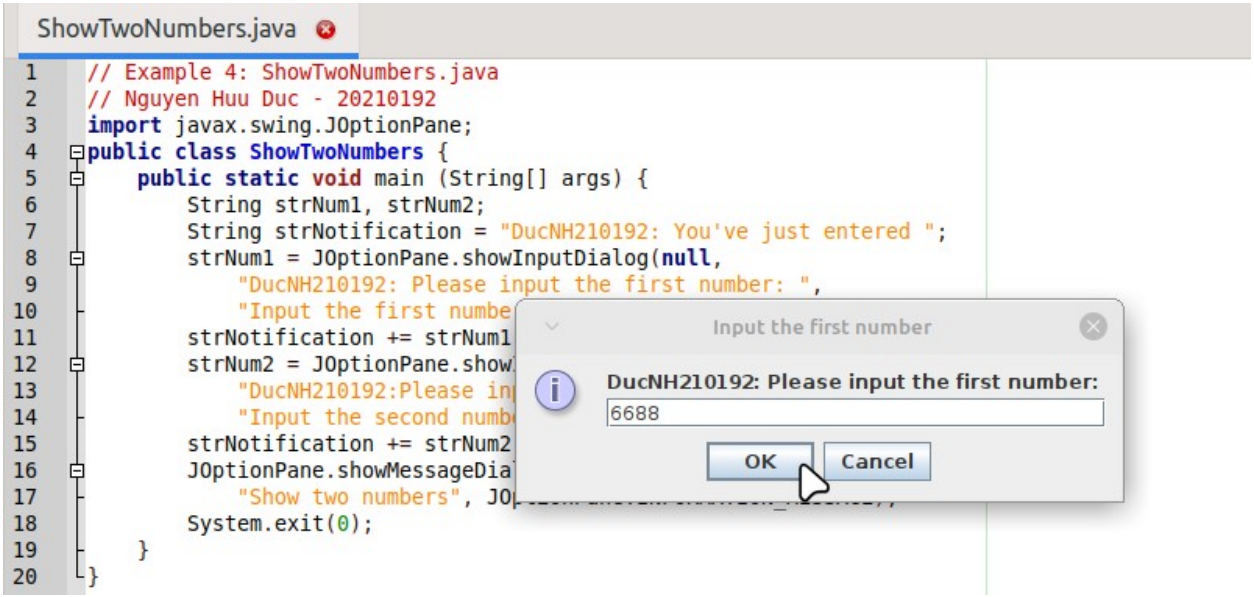


2.2.4 Write, compile, and run the following example:

ShowTwoNumbers.java

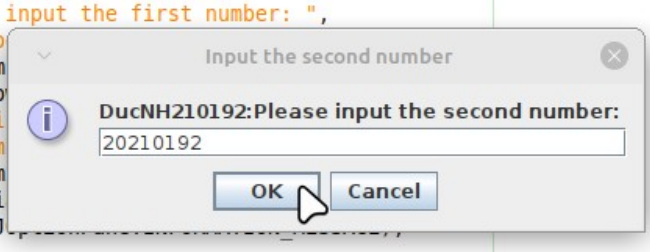
```java
// Example 4: ShowTwoNumbers.java
// Nguyen Huu Duc - 20210192
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main (String[] args) {
        String strNum1, strNum2;
        String strNotification = "DucNH210192: You've just entered ";
        strNum1 = JOptionPane.showInputDialog(null,
            "DucNH210192: Please input the first number: ",
            "Input the first number", JOptionPane.INFORMATION_MESSAGE);
        strNotification += strNum1 + " and ";
        strNum2 = JOptionPane.showInputDialog(null,
            "DucNH210192: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);
    }
}
```

Kết quả:



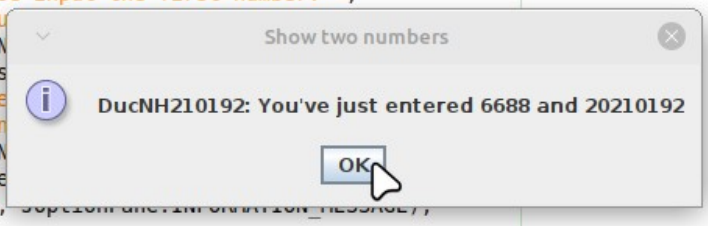
ShowTwoNumbers.java

```java
// Example 4: ShowTwoNumbers.java
// Nguyen Huu Duc - 20210192
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main (String[] args) {
        String strNum1, strNum2;
        String strNotification = "DucNH210192: You've just entered ";
        strNum1 = JOptionPane.showInputDialog(null,
            "DucNH210192: Please input the first number: ",
            "Input the first numb
        strNotification += strNum
        strNum2 = JOptionPane.sho
            "DucNH210192:Please i
            "Input the second num
        strNotification += strNum
        JOptionPane.showMessageDi
            "Show two numbers", J
        System.exit(0);
    }
}
```



ShowTwoNumbers.java

```java
// Example 4: ShowTwoNumbers.java
// Nguyen Huu Duc - 20210192
import javax.swing.JOptionPane;
public class ShowTwoNumbers {
    public static void main (String[] args) {
        String strNum1, strNum2;
        String strNotification = "DucNH210192: You've just entered ";
        strNum1 = JOptionPane.showInputDialog(null,
            "DucNH210192: Please input the first number: ",
            "Input the first nu
        strNotification += strN
        strNum2 = JOptionPane.s
            "DucNH210192:Please
            "Input the second n
        strNotification += strN
        JOptionPane.showMessage
            "Show two numbers",
        System.exit(0);
    }
}
```



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

Calculator.java

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class Calculator {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        // get input from user
        System.out.print("(DucNH210192) Enter the first number: ");
        double a = input.nextDouble();
        System.out.print("(DucNH210192) Enter the second number: ");
        double b = input.nextDouble();
        input.close();
        // Sum of the numbers
        System.out.printf("Sum of the numbers: %5.3f\n", a+b);
        // Difference of the numbers
        System.out.printf("Difference of the numbers: %5.3f\n", a-b);
        // Product of the numbers
        System.out.printf("Product of the numbers: %5.3f\n", a*b);
        // Quotient of the numbers
        System.out.printf("Quotient of the numbers: %5.3f\n", a/b);
        System.exit(0);
    }
}
```

Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
(DucNH210192) Enter the first number: 6.8
(DucNH210192) Enter the second number: 2.2
Sum of the numbers: 9.000
Difference of the numbers: 4.600
Product of the numbers: 14.960
Quotient of the numbers: 3.091


------------------
(program exited with code: 0)
```

```
File  Edit  View  Terminal  Tabs  Help
(DucNH210192) Enter the first number: 9
(DucNH210192) Enter the second number: 0
Sum of the numbers: 9.000
Difference of the numbers: 9.000
Product of the numbers: 0.000
Quotient of the numbers: Infinity


------------------
(program exited with code: 0)
```

2.2.6 Write a program to solve

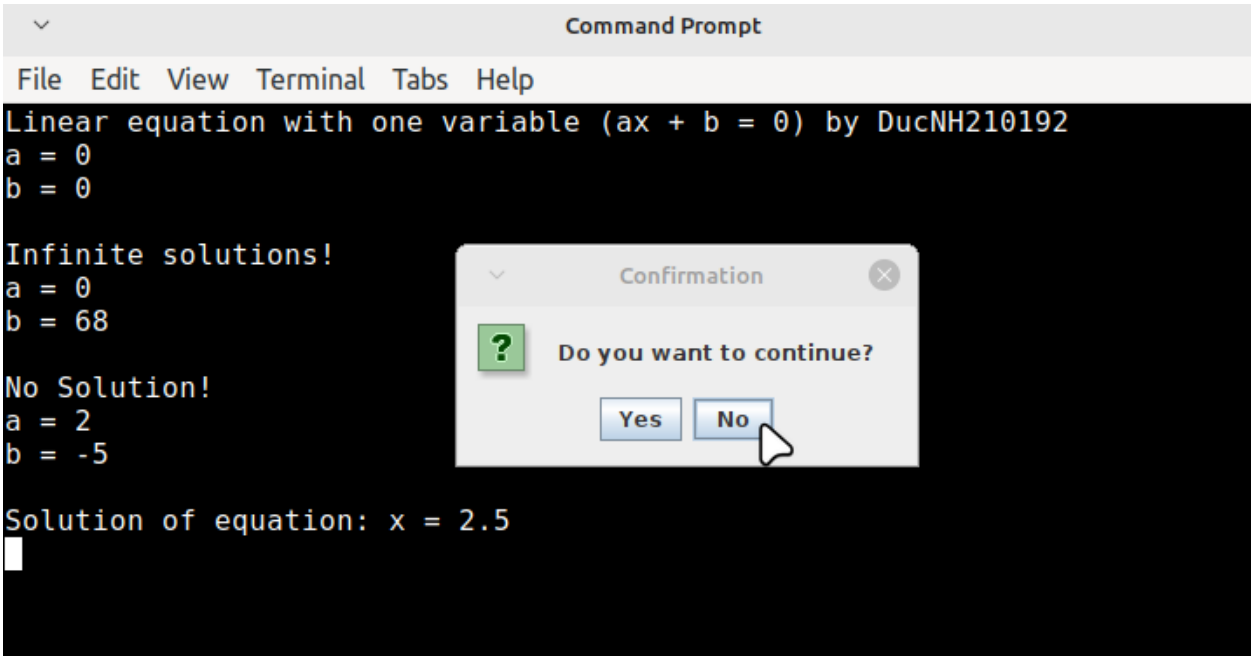
For simplicity, we only consider the real roots of the equations in this task.

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

LinearEquation.java

```java
import java.util.Scanner;
import javax.swing.JOptionPane;
// Nguyen Huu Duc - 20210192
public class LinearEquation {
    public static void main(String[] args) {
        System.out.println("Linear equation with one variable (ax + b = 0) by DucNH210192");
        Scanner input = new Scanner(System.in);
        while (true) {
            System.out.print("a = ");
            double a = input.nextDouble();
            System.out.print("b = ");
            double b = input.nextDouble();
            System.out.println();
            if (a == 0) {
                if (b == 0) System.out.println("Infinite solutions!");
                else System.out.println("No Solution!");
            } else System.out.println("Solution of equation: x = " + (-b/a));
            int option = JOptionPane.showOptionDialog(null, "Do you want to continue?", "Confirmation",
            JOptionPane.YES_NO_OPTION,JOptionPane.QUESTION_MESSAGE, null, new Object[] {"Yes", "No"}, null);
            if (option!=JOptionPane.YES_OPTION) break;
        }
        input.close();
        System.exit(0);
    }
}
```

Kết quả:



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

LinearSystem.java

```java
import java.util.Scanner; // Nguyen Huu Duc - 20210192
public class LinearSystem {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Linear system by DucNH210192");
        System.out.println("a11 * x1 + a12 * x2 = b1");
        System.out.println("a21 * x1 + a22 * x2 = b2");
        // Get input from users
        System.out.print("Enter a11, a12, b1: ");
        double a11 = scanner.nextDouble();
        double a12 = scanner.nextDouble();
        double b1 = scanner.nextDouble();
        System.out.print("Enter a21, a22, b2: ");
        double a21 = scanner.nextDouble();
        double a22 = scanner.nextDouble();
        double b2 = scanner.nextDouble();
        scanner.close();
        double det = a11 * a22 - a21 * a12; // calculate the determinant
        double dx = (a22 * b1 - a12 * b2);
        double dy = (a11 * b2 - a21 * b1);
        if (det == 0){
            if (dx!=dy) System.out.println("Infinite solutions!");
            else System.out.println("No unique solution!");
        } else {
            double x1 = dx / det;
            double x2 = dy / det;
            System.out.println("x1 = " + x1 + ", x2 = " + x2);
        }
        System.exit(0);
    }
}
```

Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
Linear system by DucNH210192
a11 * x1 + a12 * x2 = b1
a21 * x1 + a22 * x2 = b2
Enter a11, a12, b1: 1 1 5.0
Enter a21, a22, b2: 2 -1.0 1
x1 = 2.0, x2 = 3.0


------------------
(program exited with code: 0)
```

- The second-degree equation with one variable

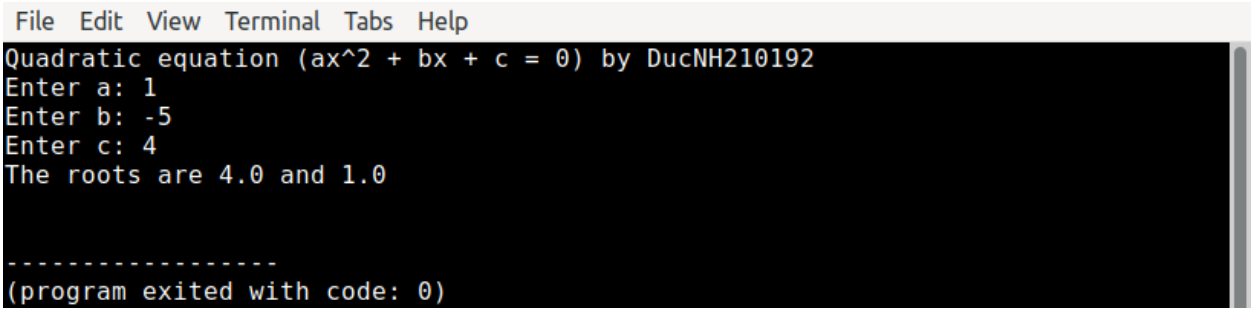
QuadraticEquation.java

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class QuadraticEquation{
    public static void main(String[] args){
        System.out.println("Quadratic equation (ax^2 + bx + c = 0) by DucNH210192");
        // Get user's input
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a: ");
        double a = input.nextDouble();
        System.out.print("Enter b: ");
        double b = input.nextDouble();
        System.out.print("Enter c: ");
        double c = input.nextDouble();
        double d= b*b-4*a*c; // calculate Delta
        if (a==0) {
            if (b == 0) {
                if (c == 0) System.out.println("Infinite solutions!");
                else System.out.println("No Solution!");
            } else System.out.println("The root is " + (-c/b));
        }
        else if (d>0.0){
            double r1 = (-b+Math.pow(d, 0.5))/(2*a);
            double r2 = (-b-Math.pow(d, 0.5))/(2*a);
            System.out.println("The roots are " + r1 + " and " + r2);
        } else if (d==0.0){
            double r1 = -b/(2*a);
            System.out.println("The root is " + r1);
        } else System.out.println("No Solution!");
        System.exit(0);
    }
}
```

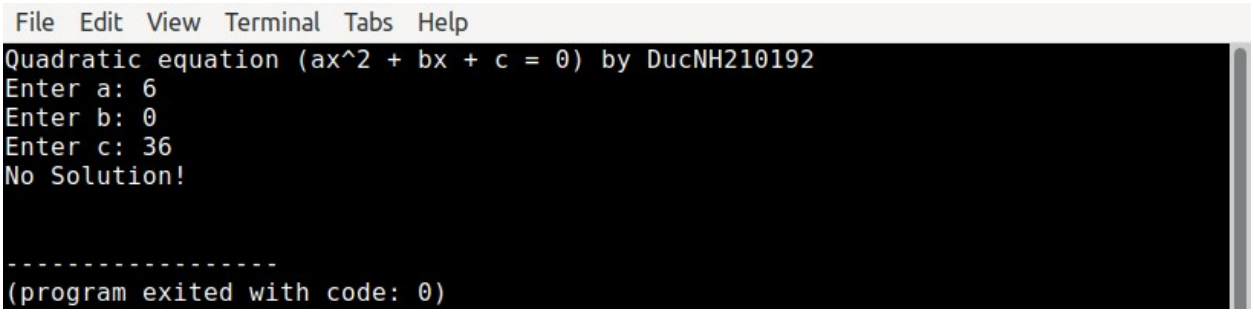
Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
Quadratic equation (ax^2 + bx + c = 0) by DucNH210192
Enter a: 0
Enter b: 0
Enter c: 0
Infinite solutions!


------------------
(program exited with code: 0)
```

```
File  Edit  View  Terminal  Tabs  Help
Quadratic equation (ax^2 + bx + c = 0) by DucNH210192
Enter a: 0
Enter b: 5
Enter c: -25.5
The root is 5.1


------------------
(program exited with code: 0)
```


File Edit View Terminal Tabs Help
Quadratic equation (ax^2 + bx + c = 0) by DucNH210192
Enter a: 1
Enter b: -5
Enter c: 4
The roots are 4.0 and 1.0

(program exited with code: 0)


File Edit View Terminal Tabs Help
Quadratic equation (ax^2 + bx + c = 0) by DucNH210192
Enter a: 6
Enter b: 0
Enter c: 36
No Solution!

(program exited with code: 0)

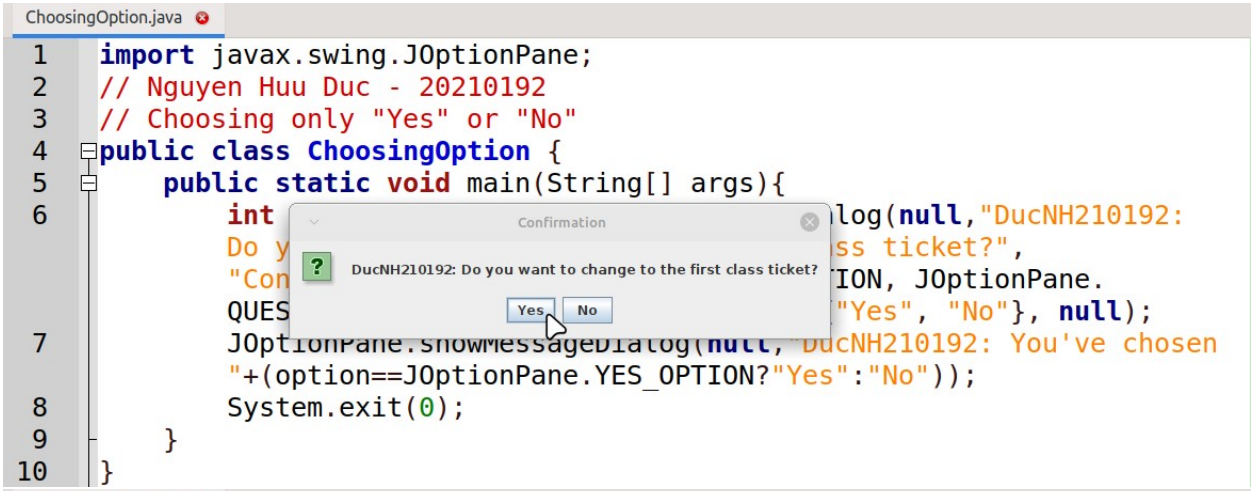
Exercises

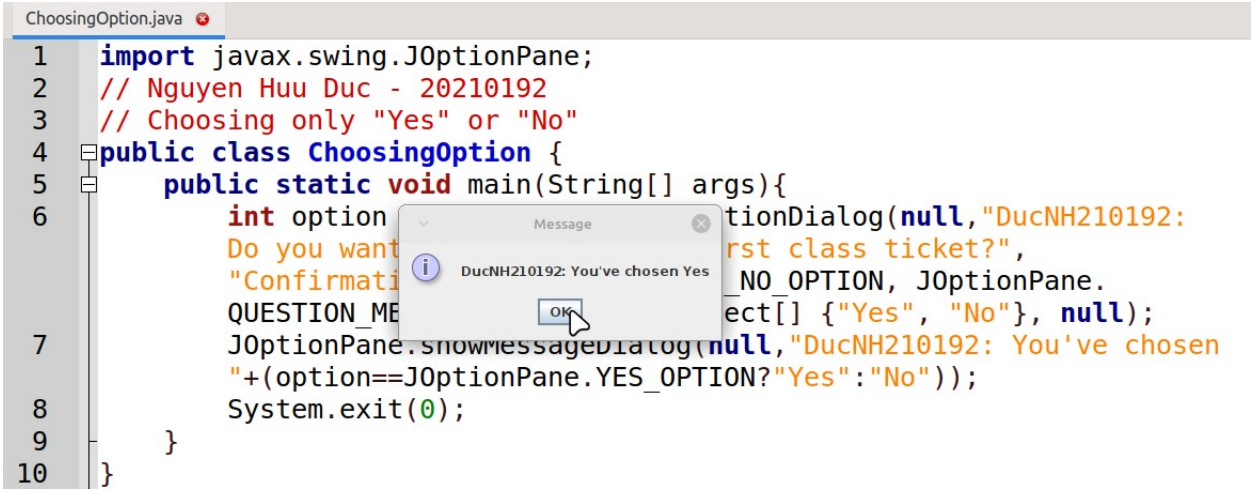
6.1 Write, compile and run the ChoosingOption program

ChoosingOption.java

```
1  import javax.swing.JOptionPane;
2  // Nguyen Huu Duc - 20210192
3  // Choosing only "Yes" or "No"
4  public class ChoosingOption {
5      public static void main(String[] args){
6          int option = JOptionPane.showOptionDialog(null,"DucNH210192:
           Do you want to change to the first class ticket?",
           "Confirmation", JOptionPane.YES_NO_OPTION, JOptionPane.
           QUESTION_MESSAGE, null, new Object[] {"Yes", "No"}, null);
7          JOptionPane.showMessageDialog(null,"DucNH210192: You've chosen
           "+(option==JOptionPane.YES_OPTION?"Yes":"No"));
8          System.exit(0);
9      }
10 }
```

Kết quả:





6.2 Write a program for input/output from keyboard

InputFromKeyboard.java

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class InputFromKeyboard {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("From DucNH210192 ...");
        System.out.println("What's your name?");
        String strName = input.nextLine();
        System.out.println("How old are you?");
        int iAge = input.nextInt();
        System.out.println("How tall are you (m)?");
        double dHeight = input.nextDouble();
        System.out.println("Mr/Mrs. "+strName+", "+iAge+" year(s) old. Your height is "+dHeight+"m.");
        System.exit(0);
    }
}
```

Kết quả:

File Edit View Terminal Tabs Help

```
From DucNH210192 ...
What's your name?
Huu Duc
How old are you?
21
How tall are you (m)?
180
Mr/Mrs. Huu Duc, 21 year(s) old. Your height is 180.0m.


------------------
(program exited with code: 0)
```

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

DisplayTriangle.java

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class DisplayTriangle{
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("DucNH210192: Enter height of triangle ... ");
        int height = input.nextInt();
        System.out.println();
        input.close();
        int w = 1;
        for (int i = 1; i <= height; i++) {
            for (int j = 1; j <= height-i; j++) System.out.print(" ");
            for (int k = 1; k <= w; k++) System.out.print("*");
            w+=2;
            System.out.println();
        }
        System.exit(0);
    }
}
```

Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
DucNH210192: Enter height of triangle ... 8

       *
      ***
     *****
    *******
   *********
  ***********
 *************
***************


------------------
(program exited with code: 0)
Press return to continue
```

6.4 Write a program to display the number of days of a month

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class DisplayDaysOfAMonth {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int month;
        System.out.println("Nguyen Huu Duc - 20210192");
        System.out.println("Enter a month (E.g: January, Jan., Jan, or 1); ");
        String inputMonth = scanner.next();
        switch (inputMonth) { // convert month to int type
            case "January":
            case "Jan.":
            case "Jan":
            case "1":
                month = 1;
                break;
            case "February":
            case "Feb.":
            case "Feb":
            case "2":
                month = 2;
                break;
            case "March":
            case "Mar.":
            case "Mar":
            case "3":
                month = 3;
                break;
            case "April":
            case "Apr.":
            case "Apr":
            case "4":
                month = 4;
                break;
            case "May":
            case "5":
                month = 5;
                break;
            case "June":
            case "Jun":
            case "6":
                month = 6;
                break;
            case "July":
            case "Jul":
            case "7":
                month = 7;
                break;
            case "August":
            case "Aug.":
            case "Aug":
            case "8":
                month = 8;
                break;
            case "September":
            case "Sept.":
            case "Sep":
            case "9":
                month = 9;
                break;
```

```java
            case "October":
            case "Oct.":
            case "Oct":
            case "10":
                month = 10;
                break;
            case "November":
            case "Nov.":
            case "Nov":
            case "11":
                month = 11;
                break;
            case "December":
            case "Dec.":
            case "Dec":
            case "12":
                month = 12;
                break;
            default:
                System.out.println("Invalid month!");
                scanner.close();
                return;
        }
        System.out.println("Enter a year (E.g: 1999): ");
        int year = scanner.nextInt();
        if (year <= 0) {
            System.out.println("Invalid year!");
            scanner.close();
            return;
        }
        scanner.close();
        boolean isLeapYear = false;
        /* Check leap year
         * If a year is fully divisible by 400 or
         * is divisible by 4 and not divisible by 100, it is a leap year.
         * */
        if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0) isLeapYear = true;
        if (isLeapYear && month == 2) {
            System.out.println("29 days."); // In Leap year, February has 29 days.
            return;
        } else if (month == 2) {
            System.out.println("28 days.");
            return;
        }
        switch (month) { // April, June, September and November have 30 days.
            case 4:
            case 6:
            case 9:
            case 11:
                System.out.println("30 days.");
                return;
            default: // Otherwise 31 days.
                System.out.println("31 days.");
                return;
        }
    }
}
```

Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Enter a month (E.g: January, Jan., Jan, or 1);
February
Enter a year (E.g: 1999):
2003
28 days.


------------------
(program exited with code: 0)
```

```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Enter a month (E.g: January, Jan., Jan, or 1);
Sept.
Enter a year (E.g: 1999):
2003
30 days.


------------------
(program exited with code: 0)
```

```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Enter a month (E.g: January, Jan., Jan, or 1);
Feb
Enter a year (E.g: 1999):
2004
29 days.


------------------
(program exited with code: 0)
```

```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Enter a month (E.g: January, Jan., Jan, or 1);
Dec
Enter a year (E.g: 1999):
2023
31 days.


------------------
(program exited with code: 0)
```

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

SortArray.java

```java
import java.util.Arrays;
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class SortArray {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Nguyen Huu Duc - 20210192");
        System.out.print("Enter array size: ");
        int size = input.nextInt();
        int[] arr = new int[size];
        double sum = 0;
        for (int i = 0; i < size; i++){ // get each int number
            arr[i] = input.nextInt();
            sum += arr[i]; // calculate sum
        }
        double avg = sum / size; // calculate average
        input.close();
        System.out.print("The original array is: "); // before sort
        System.out.print(Arrays.toString(arr));
        Arrays.sort(arr);
        System.out.print("\nThe sorted array is: ");
        System.out.print(Arrays.toString(arr));  // sorted array
        System.out.println("\nSum of the array elements is: " + sum);
        System.out.printf("Average value of the array elements is: %2f\n", avg);
        System.exit(0);
    }
}
```

Kết quả:

```
File  Edit  View  Terminal  Tabs  Help
Nguyen Huu Duc - 20210192
Enter array size: 6
21 09 2003 2021 68 0192
The original array is: [21, 9, 2003, 2021, 68, 192]
The sorted array is: [9, 21, 68, 192, 2003, 2021]
Sum of the array elements is: 4314.0
Average value of the array elements is: 719.000000


------------------
(program exited with code: 0)
Press return to continue
```

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

AddTwoMatrices.java

```java
import java.util.Scanner;
// Nguyen Huu Duc - 20210192
public class AddTwoMatrices {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Nguyen Huu Duc - 20210192");
        System.out.print("Enter the number of rows of the matrix: ");
        int rows = input.nextInt();
        System.out.print("Enter the number of columns of the matrix: ");
        int cols = input.nextInt();
        int[][] firstMatrix = new int[rows][cols];
        int[][] secondMatrix = new int[rows][cols];
        int[][] sumMatrix = new int[rows][cols];
        // get the first matrix's elements
        System.out.println("Enter the first matrix (row by row): ");
        for (int i = 0; i < rows; i++){
            for (int j = 0; j < cols; j++) firstMatrix[i][j] = input.nextInt();
        }
        // get the second matrix's elements and calculate sum matrix
        System.out.println("Enter the second matrix (row by row): ");
        for (int i = 0; i < rows; i++){
            for (int j = 0; j < cols; j++){
                secondMatrix[i][j] = input.nextInt();
                sumMatrix[i][j] = firstMatrix[i][j] + secondMatrix[i][j];
            }
        }
        input.close();
        System.out.println("The sum matrix: ");
        for (int i = 0; i < rows; i++){
            for (int j = 0; j < cols; j++){
                System.out.print(sumMatrix[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Kết quả:

```
Nguyen Huu Duc - 20210192
Enter the number of rows of the matrix: 3
Enter the number of columns of the matrix: 3
Enter the first matrix (row by row):
4 3 5
6 8 2
1 9 7
Enter the second matrix (row by row):
2 6 9
5 7 1
8 3 4
The sum matrix:
6 9 14
11 15 3
9 12 11
```