

Introduction to Computer Programming (java A)

Lab 3

[Experimental Objective]

0. Practice storing values with primitive types
1. Learn how to obtain user input from command line arguments or by the **Scanner class**.
2. Learn how to use the *if* and *if...else* selection statements to choose between alternative actions.

[Exercises]

0. Primitive types exercise:

- 1) Write a program that prompts the user to enter his information, and then prints out in a specific format.

Sample output:

```
C:\Users\todd\Desktop>javac Information.java
C:\Users\todd\Desktop>java Information
Enter your name: John
Enter your age: 21
Enter your weight in KG: 57.7
Enter your highest grade in last semester: B
You are John.
You are 21 years old.
You weigh 57.7 KG.
The highest grade you got is B
```

Source code:

```
import java.util.Scanner;

public class Information{
    public static void main(String []args){
        String name;
        int age;
        float weight;
        char grade;

        //creating object of Scanner class
        Scanner input = new Scanner(System.in);

        System.out.print("Enter your name: ");
        name = input.next();
        System.out.print("Enter your age: ");
        age = input.nextInt();
        System.out.print("Enter your weight in KG: ");
        weight = input.nextFloat();
        System.out.print("Enter your highest grade in last semester: ");
        grade = input.next().charAt(0);

        System.out.printf("You are %s.\nYou are %d years old.\n", name, age);
        System.out.printf("You weigh %.1f KG.\nThe highest grade you got is %c\n", weight, grade);
    }
}
```

What happens if you enter '21.5' to the age? We will talk about exception handling later.

- 2) Write a program that prompts the user to enter the height and width of a rectangle then prints the area and perimeter of the rectangle. The area and perimeter should be printed to the nearest two decimal place.

Sample output

```
Enter the width of a rectangle: 1.7
Enter the height of a rectangle: 2.4
The area is 4.08.
The perimeter is 8.20.
```

- 3) Write a time converter that prompts the user to enter the number of seconds then prints the equivalent time in hours, minutes and seconds.

Sample output

```
Enter the number of seconds: 7402
The equivalent time is 2 hours 3 minutes and 22 seconds.
```

1. If we run a Java Program by using the command “**java Hello I Love Programming**” where the name of the class is “Hello”, then it will run Hello.class. For the string after the class name “Hello”, i.e “I Love Programming”, these are command line arguments.

When command line arguments are supplied to JVM, JVM wraps these and supply to `String[] args` in your main method. It can be confirmed that they are actually wrapped up in args array by checking the length of args using `args.length`.

Write an application to get user’s name, age, weight and grade through command line arguments, then prints out in a specific format. It should have similar output as exercise 2 in Lab2.

Sample code:

```
public class Lab3_E1 {
    public static void main(String[] args) {
        String name = args[0];
        int age = Integer.parseInt(args[1]);
        float weight = Float.parseFloat(args[2]);
        char grade = args[3].charAt(0);

        System.out.printf("You are %s. \nYou are %d years old. \n", name, age);
        System.out.printf("You weigh %.1f KG. \n The highest grade you got is %c. \n", weight, grade);
    }
}
```

Command line arguments can be obtained in IDE or in command line:

- (1) in command line

```
C:\workspace\javaLab\src\Lab3>javac Lab3_E1.java
C:\workspace\javaLab\src\Lab3>java Lab3_E1 zhangsan 20 60.1 A
You are zhangsan.
You are 20 years old.
You weigh 60.1 KG.
The highest grade you got is A.
C:\workspace\javaLab\src\Lab3>
```

(2) in IDEA

Settings:

Name: Lab3_E1

Configuration Code Coverage Logs

Main class: Lab3_E1

VM options:

Program arguments: zhangsan 20 60.1 A

Working directory: C:\workspace\javaLab

Environment variables:

Redirect input from:

Use classpath of module: javaLab

Include dependencies with "Provided" scope

JRE: Default (1.8 - SDK of 'javaLab' module)

Shorten command line: user-local default: none - java [options] class

Enable capturing form snapshots

Sample output:

```
Lab3_E1 x
"C:\Program Files\Java\jdk1.8.0_191\bin\java.exe" ...
You are zhangsan.
You are 20 years old.
You weigh 60.1 KG.
The highest grade you got is A.
Process finished with exit code 0
```

What will happen if you input more or less than 4 parameters, or input wrong data type?

2. Write an application which can convert the grades on 100 point scale into GPA according to the following table.

Grade	GPA
100~90	4.0
89~80	3.0
79~70	2.0
69~60	1.0
59~0	0

Sample code:

```
public class Lab3_E2 {
    public static void main(String[] args) {
        float gpa;
        float score = Float.parseFloat(args[0]);

        if(score >= 60)
            System.out.println("You passed the exam.");
        else
            System.out.println("You failed in the exam.");

        if(score >= 90)
            gpa = (float) 4.0;
        else if(score >= 80)
            gpa = 3.0f;
        else if(score >= 70)
            gpa = 2.0f;
        else if(score >= 60)
            gpa = 1.0f;
        else if(score > 0)
            gpa = 0.0f;
        else
        {
            System.out.println("Invalide grade");
            return;
        }
        System.out.printf("Your score is %.1f, the GPA is %.1f\n", score, gpa);
    }
}
```

Sample output:

```
C:\workspace\javaLab\src\Lab3>javac Lab3_E2.java
C:\workspace\javaLab\src\Lab3>java Lab3_E2 96
You passed the exam.
Your score is 96.0, the GPA is 4.0

C:\workspace\javaLab\src\Lab3>java Lab3_E2 85
You passed the exam.
Your score is 85.0, the GPA is 3.0

C:\workspace\javaLab\src\Lab3>java Lab3_E2 77
You passed the exam.
Your score is 77.0, the GPA is 2.0

C:\workspace\javaLab\src\Lab3>java Lab3_E2 60
You passed the exam.
Your score is 60.0, the GPA is 1.0

C:\workspace\javaLab\src\Lab3>java Lab3_E2 59
You failed in the exam.
Your score is 59.0, the GPA is 0.0
```