Basis of Computer Programming (java)
Lab Exercise 7

[Experimental Objective]

1. Learn how to shift and scale the random values
2. Learn how to use enumeration
3. Learn how to use the methods overloading
4. Understand the difference between local variables and instance variable(data field or attribute)

[Exercises]

1. (Book P151, 5.16, Calculating Sales)) An online retailer sells five products whose retail prices are as follows: Product 1, $2.98; product 2, $4.50; product 3, $9.98; product 4, $4.49 and product 5, $6.87. Write an application that reads a series of pairs of numbers as follows:
   a) product number
   b) quantity sold

   Your program should use a *switch* statement to determine the retail price for each product. It should calculate and display the total retail value of all products sold. Use a sentinel-controlled loop to determine when the program should stop looping and display the final results.

2. (Finding the factors of an integer) Write a program that reads an integer and displays all its smallest factors in increasing order. For example, if the input integer is 120, the output should be as follows: 2, 2, 2, 3, 5.

3. (Calculating the Value of π) Calculate the value of π from the infinite series

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots$$

   Please use the *do…while* repetition statements to approximate the value of π, please use the *break* statement to terminate the loop when you first get a value that begins with 3.14159. Find that how many terms you have used to get this value that begins with 3.14159.

4. Write a program that reads one integer *n* from the use, then use the *for* repetition statement and the *continue* statement to calculate the sum of all the integers from 1 to *n* except those numbers which are multiple (倍数) of 5.

5. Write a program, that simulate the dice game, use the Math.random() method that randomly yield a result, assumed it as you are rolling the dice. Requiring you to throw the dice 50 times and output the result 5 times for each line.

6. Encode the following codes in your eclipse, notice the change of variable a, which stands for the instance variable and local variable:

```
public class test {
    int a=1;
    public void funa(){
        int a=5;
        System.out.println("The local variable a in funa() before: "+a);
        funb();
        func();
        funb();
        func();
        System.out.println("The local variable a in funa() end: "+a);
    }
    private void funb(){
        int a=10;
        System.out.println("The local variable a in funb() before: "+a);
        a++;
        System.out.println("The local variable a in funb() after a++ : "+a);
    }
    private void func(){
        System.out.println("The instance variable a in func() before: "+a);
        a++;
        System.out.println("The instance variable a in func() after a++: "+a);
    }
    public static void main(String[] args) {
        test tt=new test();
        tt.funa();
            }
}
```

7. Create a class called Addition that includes methods to sum up the different type of data using the method overloading. In order to do the addition, it requires two arguments(addend and augend), the method will do the addition using the arguments, and then return the result. Considering of dealing with the computation of different type of data, overload the methods with integer type, long type, float type, double type, and string type. Create an object from Addition, and call its different overloaded methods.

8. Write a program, that enumerates Monday to Sunday as an enumeration type 'Day', and define the mood as another enumeration type such as, enum Mood{SOSO,SAD,HAPPY}, when the day is Saturday or Sunday, output HAPPY; when the day is Monday or Friday, output SAD; others, output SOSO. Define a Day type attribute, and use a constructor to initialize the attribute's value, by passing an argument into the constructor. Define a method name as moodOfDay() to display the mood, use switch decision control.

[Assignment]
No assignment for the 7th class.