LAB GUIDE – SEMESTER 2
COURSE: Java Programming I
LAB: 02

Java Programming I
Lab 2

Objectives:

In this session, you will be practicing with:

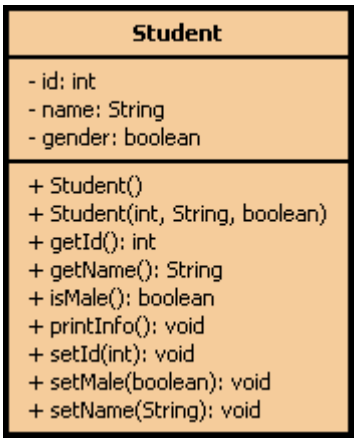
- *Declare Class, create and use Object*
- *Describe the properties and methods*
- *Communication between objects*

Part I: Workshop – 15 minutes

Part II: Step by step – 45 minutes

Exercise 1: ***Declare Class, create and use Object:*** (10 minutes)

A training center programmers require a management application of the student center, a programmer you are required to program the basic entity in the application. One of the entities that are a student, you must write a class of objects named Students.




```
/**
 * Write a description of class Student here.
 *
 * @author (your name)
 * @version (a version number or a date)
 */
public class Student
{
    /**
     * Khai bao cac truong dung de luu gia tri cua cac thuoc tinh trong lop
     */
    private int id;
    private String name;
```

```
    private boolean gender;

    /**
     * Constructor khong co doi so
     */
    public Student()
    {
        // To do:
        this.id=-1;
        this.name="noname";
        this.gender=true;
    }
    /**
     * Constructor co doi so
     */
    public Student(int id,String name,boolean gender) {
        this.id=id;
        this.name=name;
        this.gender=gender;
    }

    public int getId() {
        return this.id;
    }
    public void setId(int value) {
        this.id=value;
    }
    public String getName() {
        return this.name;
    }
    public void setName(String value) {
        this.name=value;
    }
    public boolean isMale() {
        return this.gender;
    }
    public void setMale(boolean value) {
        this.gender=value;
    }
    public void printInfo() {
        System.out.println("-----------------------------------");
        System.out.println("| ID |        Name          | Male |");
        System.out.printf("| %d | %s | %b
|\n",this.id,this.name,this.gender);
    }
}
```

Using the recently declared class to write a java program with the script as follows:

- Declare two objects A and B instance of Students class
- Initialize two objects A and B
- Display information of A student
- Change the name of B student
- Display the information of B student before and after the name change

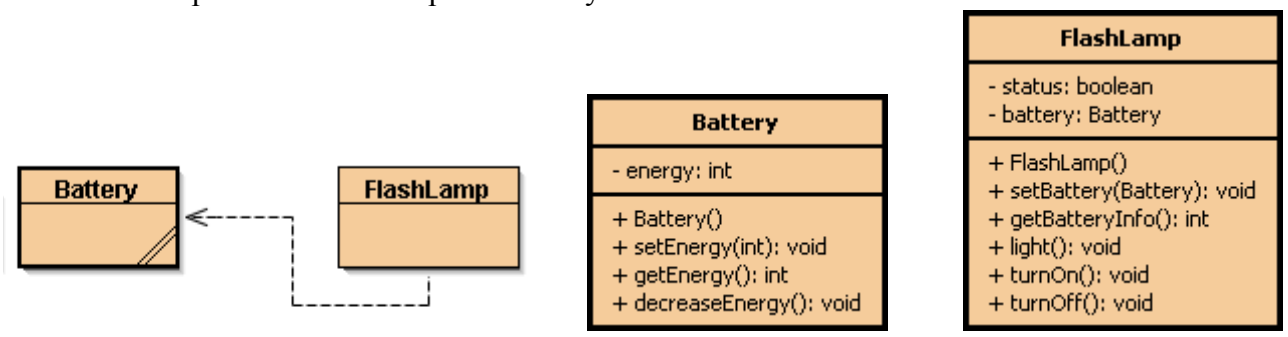
```
/**
 * Lớp Client sử dụng lớp Student để xây dựng chương trình java theo kịch
bản.
 *
 * @author (your name)
 * @version (a version number or a date)
 */
public class Client {
      public static void main(String []agrs) {
            Student studentA;
            Student studentB;
```

```
            studentA=new Student();
            studentB=new Student(1,"Nguyen Van A",true);

            studentB.printInfo();

            studentB.setName("Nguyen Van B");
            studentB.printInfo();
        }
}
```

Exercise 2: ***Communication between objects:*** (10 minutes)
For example, simulate the operation of a flashlight. In this example we have two basic groups of Lamp (FlashLamp) and Battery (Battery). Battery objects carrying the status information on its energy, FlashLamp object will use an object to provide battery power for lighting works, then we say that the interaction and information exchange between lamp object and battery object.
Detailed description of FlashLamp and Battery classes:




```
/**
 * Write a description of class Battery here.
 *
 * @author (your name)
 * @version (a version number or a date)
 */
public class Battery
{
    /**
     * Fields
     */
    private int energy;
    /**
     * Constructor for objects of class Battery
     */
    public Battery()
    {
        // To do:
        energy=100;
    }
    /**
     * Method
     */
    public void setEnergy(int value) {
        energy=value;
    }
    public int getEnergy() {
        return energy;
    }
    public void decreaseEnergy() {
        energy--;
    }
}
```

```
/**
 * Write a description of class FlashLamp here.
 *
 * @author (your name)
 * @version (a version number or a date)
 */
public class FlashLamp
{
    /**
     * Fields
     */
    private boolean status;
    private Battery battery;
//"Đặt object Battery vào FlashLamp vẫn chạy tốt -> LTHĐT"
    /**
     * Constructor for objects of class FlashLamp
     */
    public FlashLamp()
    {
        // To do:
        status=false;
    }
    /**
     * Methods
     */
    public void setBattery(Battery battery) {
        this.battery=battery;
    }
    public int getBatteryInfo() {
        return battery.getEnergy();
    }
    public void light() {
        if(status==true&&battery!=null&&battery.getEnergy()>0) {
            battery.decreaseEnergy();
        }
    }
    public void turnOn() {
        if(battery!=null&&battery.getEnergy()>0) {
            status=true;
        }
        light();
    }
    public void turnOff() {
        status=false;
    }
}
```

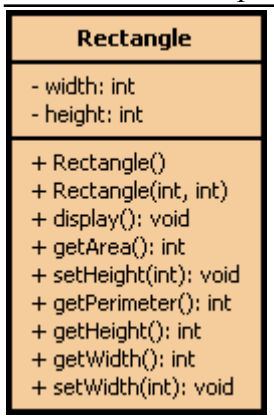
Using the recently defined class java program to build script as follows:

- Declare and initialize an object Battery.
- Declare and initialize an object FlashLamp.
- Install batteries in your flashlights.
- Turn the flashlight on and off 10 times.
- Displays to the screen the remaining battery power.

Part III: Do it yourself – 60 minutes

Exercise 1: ***Describe the properties and methods***

Write a class of rectangle objects named Rectangle, each rectangle has the following characteristics:



display() method has visual display rectangle. For example, the rectangle has a length 7, width 3 will be shown as follows on the console screen:

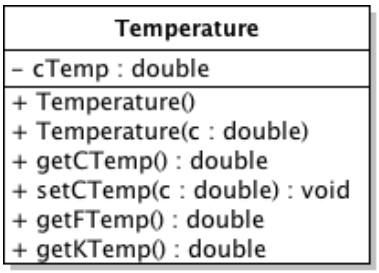
```
#######
#######
#######
```

Using the recently defined Rectangle class to write a java program with the script as follows:

- Declare and initialize an object of type Rectangle.
- Show the rectangle on the screen console.
- Change the length and width of the rectangle.
- Display to screen area and perimeter of this rectangle.

Exercise 2:

Write a class of rectangle objects named Rectangle, each rectangle has the following characteristics:



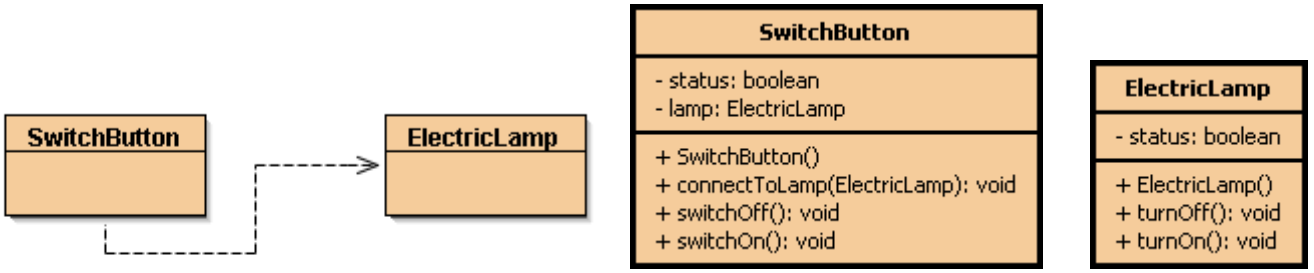
getFTemp() method used to convert temperatures from Celsius to Fahrenheit
getKTemp() method used to convert temperatures from Celsius to Kelvin.

Using the recently defined class java program to build script as follows:

- Initializing Temperature object.
- Assign values of C temperature to the object at a temperature of 25 degrees.
- Display to screen F and Kelvin temperature, respectively.

Exercise 3:

Write a program showing the interaction between two objects: switches and electric lamps. Classes are built with the following characteristics:



***Using the recently defined class java program to build script as follows**:*

- Declare and initialize a SwitchButton object and an ElectricLamp object.
- Connect the SwitchButton object to the ElectricLamp object.
- Turn off the SwitchButton object 10 times.

Part IV: Homework

Exercise 1:

References

http://www.java2s.com