Hacettepe University
Department of Computer Engineering
BBM104 Introduction to Programming Laboratory II
Programming Assignment II

Submission Date	: 10.03.2016
Due Date	: 23.03.2016
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Programming Language	: JAVA
Subject	: Inheritance

INTRODUCTION

Object-oriented programming has advantages such as modeling problems with less complexity and more code reuse. In this experiment, you will observe these advantages by using inheritance mechanism which is an important property of object-oriented programming. By the help of this experiment, you will learn the concept of inheritance, relationships among classes by using object references, control of multiple instances of classes in Java. Besides the programming task, you will also learn to comply with coding standards and to document your program by using Javadoc. (See **Appendix A.** for useful information).

PROBLEM

Problem Definition

In this experiment you are expected to develop a system to monitorize payroll of Personnel who is working in a governmental institution. You will be given two input text files as follows:

1. Information of Personnel (Personnel.txt)

This text file includes information of each personnel, which are name **(name)**, surname **(surname)**, registration number **(registerNumber),** position of personnel **(position)** and year of start **(yearOfStart)** as follows:

[name and surname] *tab* **[registration number]** *tab* **[position of pesonnel]** *tab* **[and year of start]** *newline*

[name and surname] *tab* **[registration number]** *tab* **[position of pesonnel]** *tab* **[and year of start]** *newline*

[name and surname] *tab* **[registration number]** *tab* **[position of pesonnel]** *tab* **[and year of start]** *newline*

….

Example content of Personnel.txt

ERDEM YILMAZ	M5632	MANAGER	2003
AHMET UZUN	W8567	WORKER	2005
KERIM KALICI	S7956	SECURITY	2007
AYSUN DERICI	O5879	OFFICER	2010
DOGAN YILMAZ	C2698	CHİEF	2004
AHMET UZUN	P4687	PARTTIME_EMPLOYEE	2011

…

2. Text for Monitoring (Monitoring.txt)

This text file includes registration number **(registerNumber)** and working hours **(hourOfWork)** per week during a month as shown below:

[registration number] *tab* **[1. week]** *tab* **[2. week]** *tab* **[3. week]***tab* **[4. week]** *newline*

Example content of Monitoring.txt

M5632	50	50	50	50
W8567	50	50	50	50
S7956	54	30	54	40
O5879	45	45	45	45
C2698	45	40	40	40
P4687	20	18	20	15
...				

3. Personnel Hierarchy and Salary Content

In this governmental institution, Personnel are classified as **Manager, Officer, Employee and Security.** There are two kinds of Employee who is working as **Part-time** and **Full-time**. In addition, the Employees who is working as Full-time can work as a **Worker** or a **Chief**.

Managers have a base salary **(baseSalary)**, special service benefits **(ssBenefits)** and severance pay **(severancePay).** Also, they have overwork salary **(overWorkSalary)** but Managers can work maximum 8 hours per week and for each working hour they are paid 5 TL. (if they work more than 8 hours per week, they will not be paid additional money).

Officers are paid the same way with Managers for base salary **(baseSalary)** but special service benefits **(ssBenefits),** severance pay **(severancePay)** and overwork salary **(overWorkSalary)** are calculated in a different way from Managers. Officers can work maximum 10 hours per week and for each working hour they are paid 4 TL.

For Security, salaries are calculated based on the number of working hours **(hourOfWork)** and severance pay **(severancePay)**. In addition to working hours, they are paid 4 TL for transportation **(transMoney)** and 5 TL food **(foodMoney)** per day. Security can work maximum 9 hours and minimum 5 hours per day. They use permission (i.e. they do not work) one day of the week. For each working hour they are paid 6,5 TL.

The salaries of Full-time Employees are calculated based on the number of working days **(dayOfWork)** and severance pay **(severancePay).** Full-time Employees do not work at weekends. Workers are paid 73 TL and Chiefs are paid 84 TL per day. Also, they have overwork salary **(overWorkSalary).** Workers can work maximum 10 hours a week and are paid 4 TL per hour while Chiefs can work maximum 8 hours a week and are paid 5 TL per hour to gain overwork salary. (if they work more than their maximum hours, they will not be paid additional money).

The salaries of Part-time Employees are calculated based on the number of working hours (**hourOfWork**). Part-time Employees can work minimum 10 hours and maximum 20 hours a week and they are paid 12 TL per hour.

4. Salary Calculation

* Managers, Officers, Workers and Chiefs work for 40 standard hours per week, excluding the working hours to gain overwork salary.

* One month is equal to four weeks (it means that 1 month is equal to 28 days)

* Base salary is 1800 TL and it is constant for Manager and Officer.

* Special service benefits is %135 of the base salary of Managers and %49 of the base salary of Officers.

* Severance pay changes according to experience of Personnel, that is, the number of working years in the governmental institution. For each year, Personnel gains 20 points multiplied by 0,8.

It is calculated as follows:

(current year - year of start) * 20 * 0,8 = X TL

5. Output

You are expected to write output of your program to a text file named as **registerNumber.txt** **for each personnel** as follows:

```
Name  : ERDEM
Surname : YILMAZ
Registiration Number : M5632
Position : MANAGER
Year of Start : 2003
Total Salary : 4598.00 TL
```

Submit Format

File hierarchy must be zipped before submitted (Not .rar, only .zip files are supported by the system)

<student id>.zip

- javadoc.zip (See : https://en.wikipedia.org/wiki/Javadoc)

- src.zip (Main.java, *.java)

- Report.pdf (It will be same format with homework 1)

(See for report : ftp://ftp.cs.hacettepe.edu.tr/pub/dersler/genel/FormatForLabReports.doc)

Late Policy

You may use up to three extension days for the assignment. But each extension day will bring about additional 10% degradation for evaluation of the assignment.

Constraints

You should obey the constraints described below. Otherwise your experiment will not be evaluated as well as you expected.

1. The names of classes, attributes and methods should obey to Java naming convention.

2. You are responsible for a correct model design. Your design should be accurate.

3. You should use inheritance mechanism.

4. You should use method overriding.

5. Every method and class must be documented using Javadoc.

6. All assignments must be original, individual work. Duplicate or very similar assignments are both going to be considered as cheating.

Appendix A.

Under this section you will find useful information about the project. They are at the beginning level. For advanced information you need to make additional research.

Inheritance

Object-oriented programming (OOP) covers software in terms similar to those that people use to describe real-world objects. It takes advantage of class relationships, where objects of a certain class, such as a class of vehicles, have the same characteristics –i.e. cars, trucks, little red wagons and roller skates have much in common. Inheritance is one important property of OOP. OOP takes advantage of inheritance relationships, where new classes of objects are derived by absorbing characteristics of existing classes and adding unique characteristics of their own. In Java, a class (called the **derived class** or **subclass**) extends from another class (called the **base class** or **superclass**).

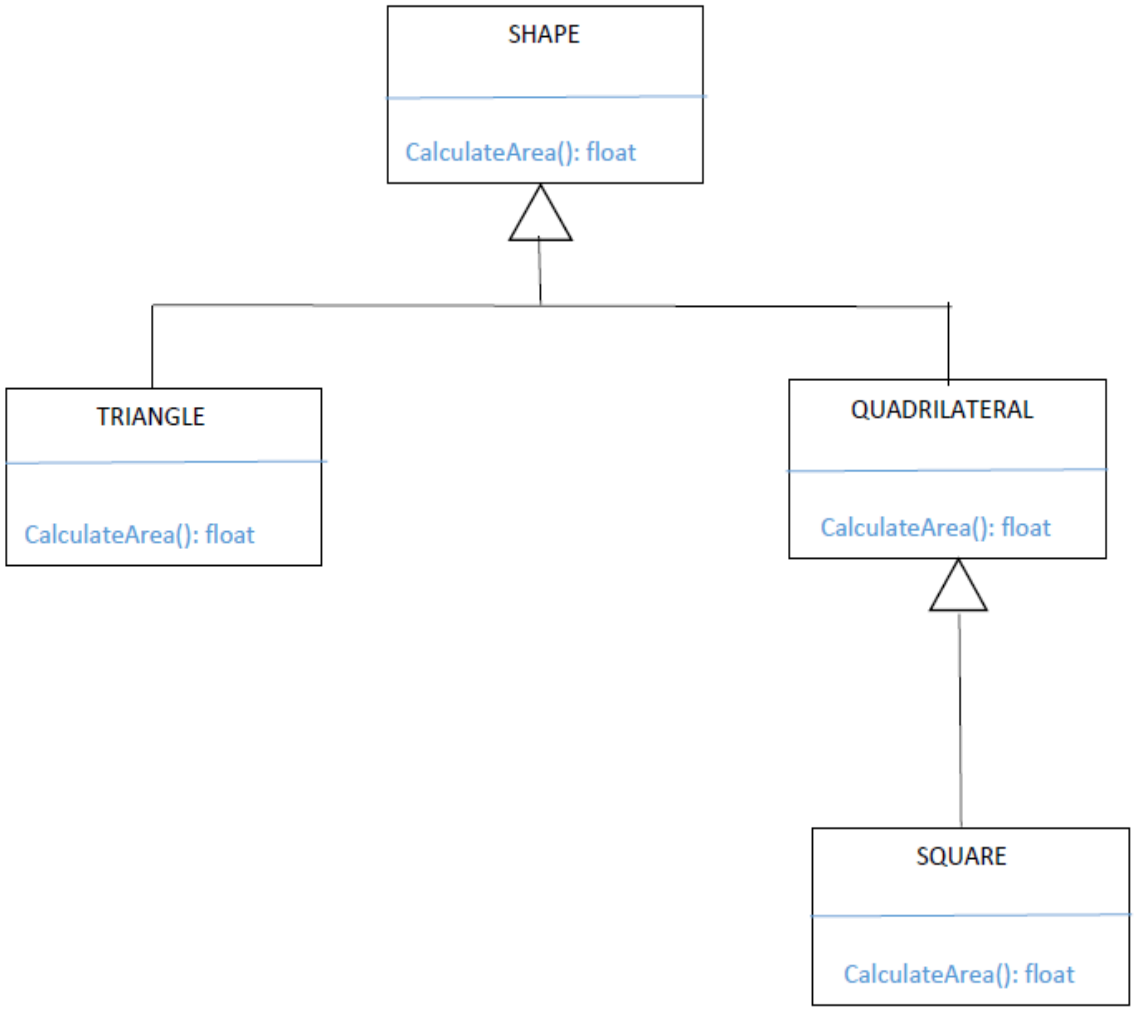

Figure 1 Hierarchy of shape classes

In Fig. 1 a shape hierarchy is shown. Shape class is superclass of all the other classes. Square class is a subclass of Quadrilateral.

Method Overriding

When a class extend another class, the subclass can use the super class' methods. However sometimes the subclass should change behavior of a method which is provided by superclass. The method implementation in the subclass overrides (replaces) the implementation in the superclass. The subclass method and superclass method have the same name, parameters and the same return type. That is called method overriding. In Fig. 1 **calculateArea()** method overrides in the each subclass. The method behaves as different in each subclass.