CSE 215: Programming Language II Lab

Sec – 8, Faculty - MUO

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Lab – 8

Inheritance

Objective:
To learn more about:

- OOP
- Class & Object
- Inheritance
- Keywords: super & this

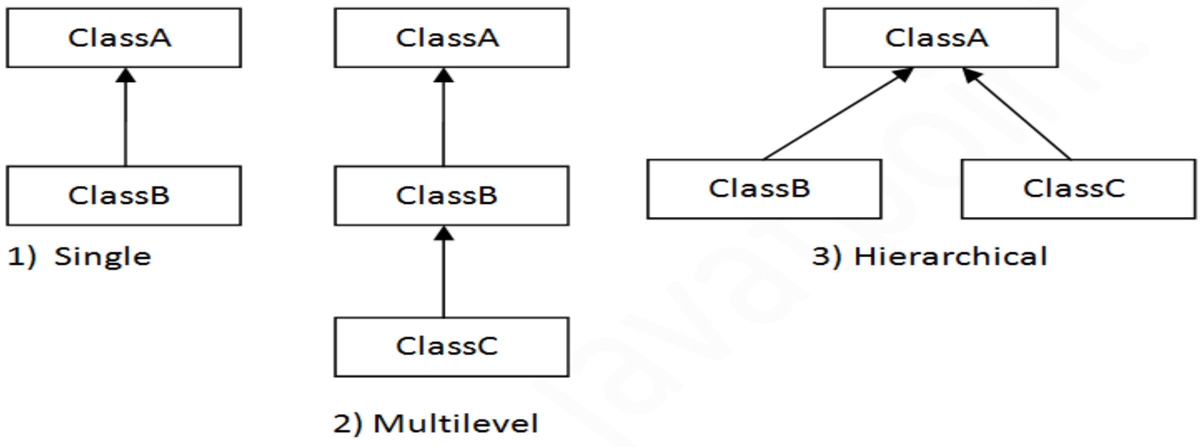
Inheritance is the process where one class acquires the properties (methods and fields) of another class.
The class which inherits the properties of other is known as subclass (derived class, child class) and the class whose properties are inherited is known as superclass (base class, parent class).

Inheritance has two purposes - reuse existing code, reduce code duplication. When common traits are found among two classes, define one as general/base/parent class and the other as specific/child class. Child class inherits the properties of parent class and adds its own properties.

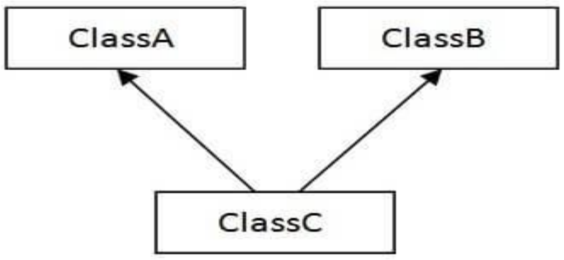
To inherit from a class, use the extends keyword.

Types of inheritance in java

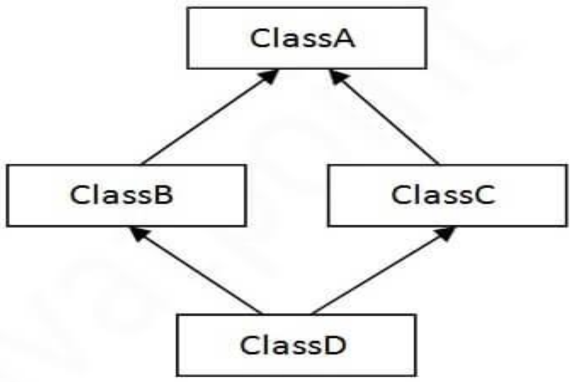
On the basis of class, there can be three types of inheritance in java: single, multilevel and hierarchical.



Multiple inheritance is not supported in Java.



4) Multiple



5) Hybrid

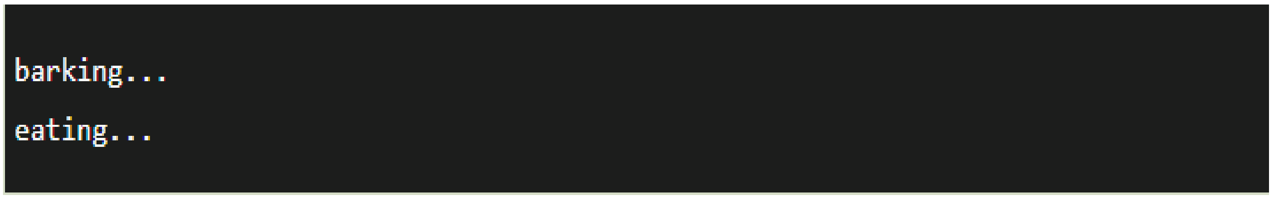
.

Lets see one example:

```
class Animal
{
     void eat(){
            System.out.println("eating...");
     }
}

class Dog **extends** Animal
{
     void bark(){
           System.out.println("barking...");
     }
}

class TestInheritance
{
     public static void main(String args[]){
          Dog d=new Dog();
          d.bark();
          d.eat();
     }
}
```



```
barking...
eating...
```

Let’s see some KEYWORDS

static keyword

The static keyword belongs to the class than an instance of the class.

The static can be:

1. Variable (also known as a class variable)
2. Method (also known as a class method)

this keyword in Java

this is a **reference variable** that refers to the current object.

Usage of Java this Keyword

1. this can be used to refer current class instance variable.
2. this can be used to invoke current class method (implicitly)
3. this() can be used to invoke current class constructor.

Super Keyword in Java

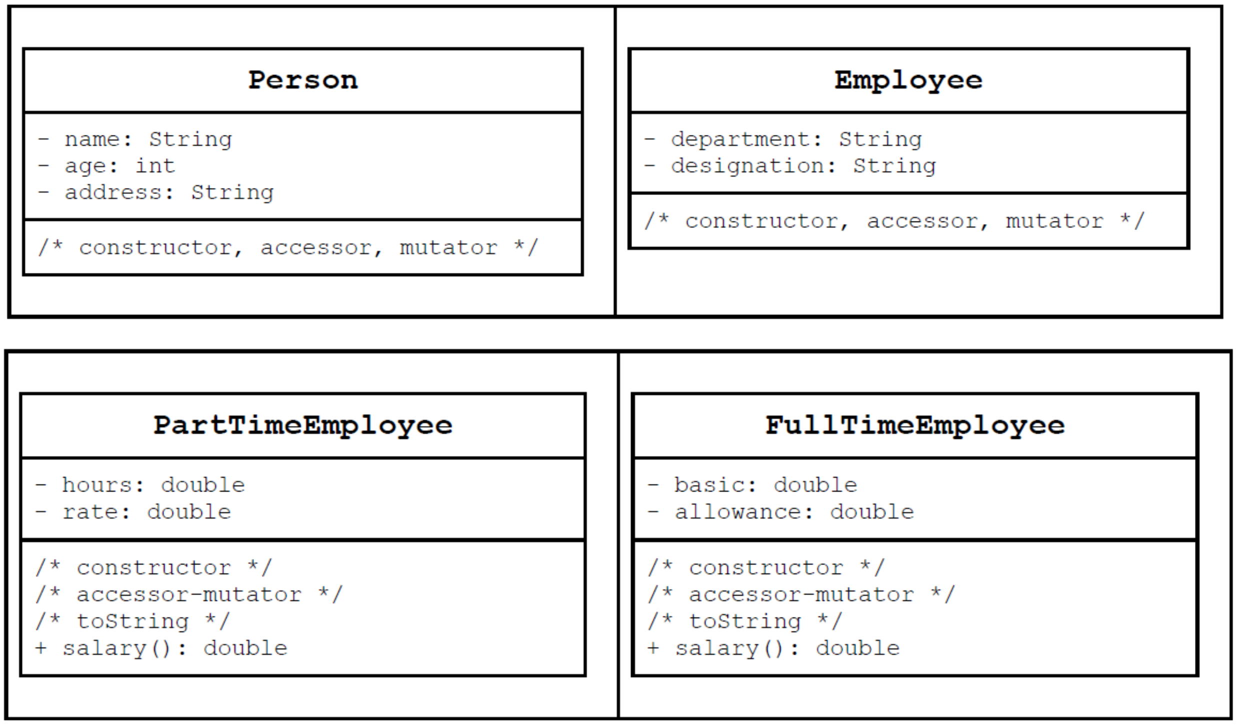
The **super** keyword in Java is a reference variable which is used to refer immediate parent class object.

Usage of Java super Keyword

1. super can be used to refer immediate parent class instance variable.
2. super can be used to invoke immediate parent class method.
3. super() can be used to invoke immediate parent class constructor.

Tasks:

1. Implement the following classes:



*** In Java **accessors are used to get the value of a private field and mutators are used to set the value of a private field**. Accessors are also known as getters and mutators are also known as setters***

The relationship is as follows:
Employee extends Person
PartTimeEmployee extends Employee
FullTimeEmployee extends Employee
Create an object for PartTimeEmployee and FullTimeEmployee and print their salary.
For FullTimeEmployee, basic is the base salary, i.e. 15000.
Allowance is usually provided as percentage, i.e. 25%.
So the total salary of a full time employee = 15000 + 25% of 15000 = 18750

2.

```
Import java.util.Date;
public class GeometricObject
{
private String color = "White";   //setting white as default color
private boolean filled;
private Date dateCreated;
public GeometricObject()
{
dateCreated = new Date();
}
public GeometricObject(String color, boolean filled)
{
this.color = color; // “this” refers to the current object
this.filled = filled;
dateCreated = new Date();
}
public String getColor()
{
return color;
}
public void setColor(String color)
{
this.color = color;
}
public boolean getFilled()
{
return filled;
}
public void setFilled(boolean filled)
{
this.filled = filled;
}
public Date getDateCreated()
{
return dateCreated;
}
public String toString()
{
return "Created on: "+dateCreated+" Color: "+color+" Filled: "+filled;
}
}
```

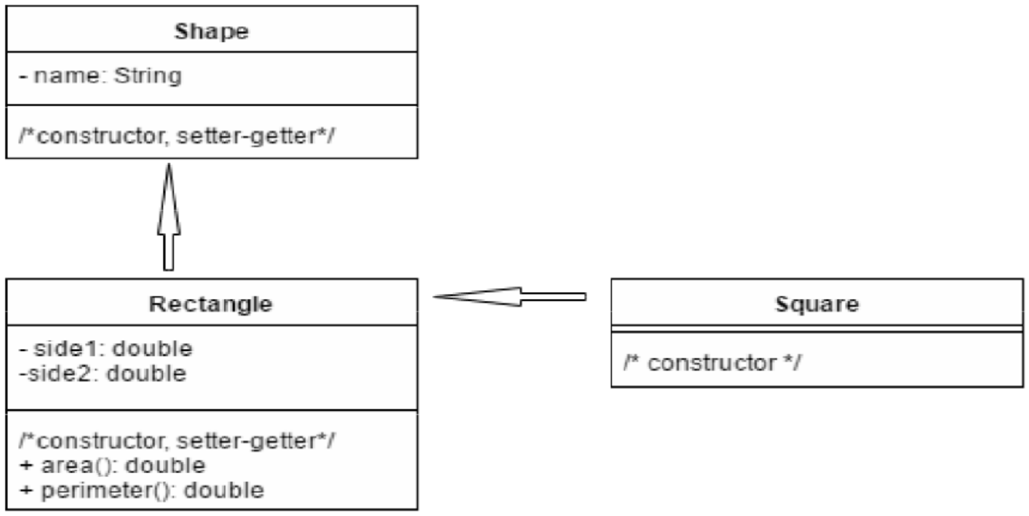
Design a class named **`Triangle`** that extends **`GeometricObject`**.
The class contains:

i. Three double data fields named **side1, side2, and side3** with default values 1.0 to denote three sides of the triangle.
ii. A no-arg constructor that creates a default triangle.
iii. A constructor that creates a triangle with the specified side1, side2, and side3.
iv. The accessor methods for all three data fields.
v. A method named **`getArea()`** that returns the area of this triangle.
vi. A method named **`getPerimeter()`** that returns the perimeter of this triangle.
vii. A method named **`toString()`** that returns a string description with values of three sides of the triangle.

Write a test program that prompts the user to enter three sides of the triangle, a color, and a boolean value to indicate whether the triangle is filled. Create a Triangle object with these inputs. Display its area, perimeter, color, and true or false to indicate whether it is filled or not

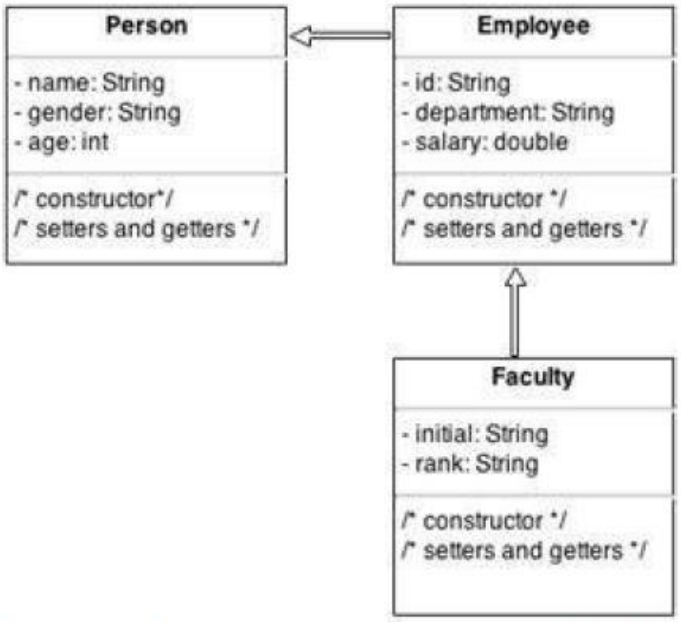
3.

Implement the following classes. Then create a Square object and print its area and perimeter.



4.

Implement the following classes:



In main method, create a Faculty object and display name, age, salary and initial. Call the toString() method of the Faculty object to display all of its information.