Q1.Create two classes named Mammals and MarineAnimals. Create another class named BlueWhale which inherits both the above classes. Now, create a function in each of these classes which prints "I am mammal", "I am a marine animal" and "I belong to both the categories: Mammals as well as Marine Animals" respectively. Now, create an object for each of the above class and try calling.

1 - function of Mammals by the object of Mammal
2 - function of MarineAnimal by the object of MarineAnimal
3 - function of BlueWhale by the object of BlueWhale
4 - function of each of its parent by the object of BlueWhale

```
interface Mammals
{
	default void show()
	{
		System.out.println("I am mammal");
	}
}

interface MarineAnimals
{
	default void show()
	{
		System.out.println("I am a marine animal");
	}
}

class BlueWhale implements Mammals , MarineAnimals
{

	public void show()
	{
		Mammals.super.show();
		MarineAnimals.super.show();
		System.out.println("I belong to both the categories Mammals as well as
Marine Animals");
	}

	public static void main(String args[])
	{

		BlueWhale bw = new BlueWhale();

		bw.show();
	}
```

```
}
```

```
C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>java BlueWhale
I am mammal
I am a marine animal
I belong to both the categories Mammals as well as Marine Animals
```

2.
Make a class named Fruit with a data member to calculate the number of fruits in a basket. Create two other class named Apples and Mangoes to calculate the number of apples and mangoes in the basket. Print the number of fruits of each type and the total number of fruits in the basket.

```
class Fruit
{
	int fruitcount;

	void show()
	{
		System.out.print("Fruit Count for " + this.getClass().getName() + " is ");
	}

}

class Apples extends Fruit
{
	int count;

	void setCount(int count)
	{
		this.count = count;
	}

	int getCount()
	{
		return this.count;
	}
}

class Mangoes extends Fruit
{
	int count;

	void setCount(int count)
	{
```

```
		this.count = count;
	}

	int getCount()
	{
		return this.count;
	}
}

class FruitDemo
{
	public static void main(String args[])
	{
		Mangoes m = new Mangoes();
		m.setCount(15);
		m.show();
		System.out.println(m.getCount());

		Apples a = new Apples();
		a.setCount(250);
		a.show();
		System.out.println(a.getCount());
	}
}
```

```
C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>java FruitDemo
Fruit Count for Mangoes is 15
Fruit Count for Apples is 250
```

3.

We want to calculate the total marks of each student of a class in Physics,Chemistry and Mathematics and the average marks of the class. The number of students in the class are entered by the user. Create a class named Marks with data members for roll number, name and marks. Create three other classes inheriting the Marks class, namely Physics, Chemistry and Mathematics, which are used to define marks in individual subject of each student. Roll number of each student will be generated Automatically.

```
import java.util.*;
class Marks
{
	int roll_no = 1;
	String name;
```

```
	ArrayList<Integer> arrlist = new ArrayList<Integer>();


	void setMarks(int m)
	{
		arrlist.add(m);
	}
}

class Physics extends Marks
{}

class Chemistry extends Marks
{}

class Mathematics extends Marks
{}


class MarksDemo
{
	public static void main(String args[])
	{
			Physics p = new Physics();
			Chemistry c = new Chemistry();
			Mathematics m = new Mathematics();

			p.roll_no = 1;
			p.name = "Aakash";
			p.setMarks(85);

			c.roll_no = 1;
			c.name = "Aakash";
			c.setMarks(85);

			m.roll_no = 1;
			m.name = "Aakash";
			m.setMarks(85);


			p.roll_no = 2;
			p.name = "Aman";
			p.setMarks(85);


			c.roll_no = 2;
			c.name = "Aman";
			c.setMarks(85);
```

```
m.roll_no = 2;
m.name = "Aman";
m.setMarks(85);


p.roll_no = 3;
p.name = "Ajay";
p.setMarks(90);


c.roll_no = 3;
c.name = "Ajay";
c.setMarks(90);


m.roll_no = 3;
m.name = "Ajay";
m.setMarks(90);


System.out.println("Physics Total");
int psum=0;
for(int i:p.arrlist)
{
        psum = psum + i;
}
System.out.println(psum);
System.out.println("Physics Average");
System.out.println(psum/3);
System.out.println("======================");

System.out.println("Chemistry Total");
int csum=0;
for(int i:c.arrlist)
{
        csum = csum + i;
}
System.out.println(psum);
System.out.println("Chemistry Average");
System.out.println(csum/3);
System.out.println("======================");

System.out.println("Maths Total");
int msum=0;
for(int i:m.arrlist)
{
```

```
                msum = msum + i;
            }
            System.out.println(msum);
            System.out.println("Maths Average");
            System.out.println(msum/3);
            System.out.println("======================");

        }


}
```

```
C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>java MarksDemo
Physics Total
260
Physics Average
86
======================
Chemistry Total
260
Chemistry Average
86
======================
Maths Total
260
Maths Average
86
======================
```

4.
We want to store the information of different vehicles. Create a class named Vehicle with two data member named mileage and price. Create its two subclasses
***Car with data members to store ownership cost, warranty (by years), seating capacity and fuel type (diesel or petrol).**
***Bike with data members to store the number of cylinders, number of gears, cooling type(air, liquid or oil), wheel type(alloys or spokes) and fuel tank size(in inches)**
Make another two subclasses Audi and Ford of Car, each having a data member to store the model type. Next, make two subclasses Bajaj and TVS, each having a data member to store the make-type.
Now, store and print the information of an Audi and a Ford car (i.e. model type, ownership cost, warranty, seating capacity, fuel type, mileage and price.) Do the same for a Bajaj and a TVS Bike.

```
class Vehicle
{
	int mileage;
	int price;
}

class Car extends Vehicle
{
	int cost;
	int warranty;
	int seating_capacity;
	String fuel_type;

}

class Bike extends Vehicle
{
	int no_cylinders;
	int gears;
	String cooling_type;
	String wheel_type;
	int fuel_tank_size;
}

class Audi extends Car
{
	String model_type;

	void set_data(String model_type,
			int cost,
			int warranty,
			int seating_capacity,
			String fuel_type,
			int mileage,
			int price)
			{
				this.cost = cost;
				this.warranty = warranty;
				this.seating_capacity = seating_capacity;
				this.fuel_type = fuel_type;
				this.mileage = mileage;
				this.price = price;
			}

	void get_data()
	{
		System.out.println("cost ="  + cost
		+"warranty =" +warranty
```

```
                +"seating_capacity =" + seating_capacity
                +"fuel_type ="  + fuel_type
                +"mileage =" + mileage
                +"price =" + price);
        }

}

class Ford extends Car
{
        String model_type;

        void set_data(String model_type,
                        int cost,
                        int warranty,
                        int seating_capacity,
                        String fuel_type,
                        int mileage,
                        int price)
                        {
                                this.cost = cost;
                                this.warranty = warranty;
                                this.seating_capacity = seating_capacity;
                                this.fuel_type = fuel_type;
                                this.mileage = mileage;
                                this.price = price;
                        }

        void get_data()
        {
                System.out.println("cost =" + cost
                +"warranty ="+ warranty
                +"seating_capacity ="+ seating_capacity
                +"fuel_type ="+ fuel_type
                +"mileage ="+ mileage
                +"price ="+ price);
        }
}

class Bajaj extends Bike
{
        String make_type;

        void set_data(int no_cylinders,
                        int gears,
                        String cooling_type,
                        String wheel_type,
                        int fuel_tank_size,
```

```
                        String make_type)
        {
                this.no_cylinders = no_cylinders;
                this.gears=gears;
                this.cooling_type=cooling_type;
                this.wheel_type=wheel_type;
                this.fuel_tank_size=fuel_tank_size;
                this.make_type = make_type;
        }

        void get_data()
        {
                System.out.println("no_cylinders = "  + no_cylinders +
                                                " gears = "  + gears +
                                                " cooling_type = " + cooling_type +
                                                " wheel_type = " + wheel_type +
                                                " fuel_tank_size = " +  fuel_tank_size +
                                                " make_type = " + make_type);
        }
}

class TVS extends Bike
{
        String make_type;

        void set_data(int no_cylinders,
                int gears,
                String cooling_type,
                String wheel_type,
                int fuel_tank_size,
                String make_type)
        {
                this.no_cylinders = no_cylinders;
                this.gears=gears;
                this.cooling_type=cooling_type;
                this.wheel_type=wheel_type;
                this.fuel_tank_size=fuel_tank_size;
                this.make_type = make_type;
        };

        void get_data()
        {
                System.out.println("no_cylinders = "  + no_cylinders +
                                                " gears = "  + gears +
                                                " cooling_type = " + cooling_type +
                                                " wheel_type = " + wheel_type +
                                                " fuel_tank_size = " +  fuel_tank_size +
                                                " make_type = " + make_type);
```

```
        };
}

class Vehicle_Demo
{
        public static void main(String args[])
        {
                Audi audi = new Audi();
                Ford ford = new Ford();
                Bajaj bajaj = new Bajaj();
                TVS tvs = new TVS();

                audi.set_data("Sedan",
                        15000000,
                        10,
                        6,
                        "Petrol",
                        19,
                        15000000);


                ford.set_data("City",
                        1500000,
                        5,
                        4,
                        "Diesel",
                        24,
                        15000);

                        bajaj.set_data(
                        48,
                        6,
                        "Air",
                        "Alloys",
                        52,
                        "Electric"
                        );

                        tvs.set_data(
                        48,
                        6,
                        "Oil",
                        "Spokes",
                        48,
                        "Hybird"
                        );

                audi.get_data();
```

```
                ford.get_data();
                bajaj.get_data();
                tvs.get_data();


        }
}
```

```
C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>javac VehicleDemo.java

C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>java Vehicle_Demo
cost =15000000warranty =10seating_capacity =6fuel_type =Petrolmileage =19price =15000000
cost =1500000warranty =5seating_capacity =4fuel_type =Dieselmileage =24price =15000
no_cylinders = 48 gears = 6 cooling_type = Air wheel_type = Alloys fuel_tank_size = 52 make_type = Electric
no_cylinders = 48 gears = 6 cooling_type = Oil wheel_type = Spokes fuel_tank_size = 48 make_type = Hybird
```

5.
Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle having the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively. Again, make another class named Square having the same function which prints "Square is a rectangle".
Now, try calling the function by the object of each of these classes.

```
class Shape
{
        void show()
        {
                System.out.println("This is Shape");
        }
}

class Polygon extends Shape
{
        void show()
        {
                System.out.println("Polygon is a shape");
        }
}

class Rectangle extends Polygon
{
        void show()
        {
                System.out.println("Rectangle is a polygon");
```

```
	}
}

class Triangle extends Polygon
{
	void show()
	{
		System.out.println("Triangle is a polygon");
	}
}

class Square extends Polygon
{
	void show()
	{
		System.out.println("Rectangle is a polygon");
	}
}

class DemoShape
{
	public static void main(String args[])
	{
		Shape s = new Shape();
		Polygon p= new Polygon();
		Rectangle r= new Rectangle();
		Triangle t= new Triangle();
		Square sq= new Square();

		s.show();
		p.show();
		r.show();
		t.show();
		sq.show();
	}
}
```

```
C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>javac demoshape.java

C:\Users\Aakash\Desktop\4.Java\Java Assignment 4 (Inheritance)>java DemoShape
This is Shape
Polygon is a shape
Rectangle is a polygon
Triangle is a polygon
Rectangle is a polygon
```

6.

All the banks operating in India are controlled by RBI. RBI has set a well defined guideline (e.g. minimum interest rate, minimum balance allowed, maximum withdrawal limit etc) which all banks must follow. For example, suppose RBI has set minimum interest rate applicable to a saving bank account to be 4% annually; however, banks are free to use 4% interest rate or to set any rates above it.

Write a program to implement bank functionality in the above scenario. Note: Create few classes namely Customer, Account, RBI (Base Class) and few derived classes (SBI, ICICI, PNB etc). Assume and implement required member variables and functions in each class.

Hint:

```
Class Customer
{
//Personal Details ...
// Few functions ...
}
Class Account
{
// Account Detail ...
// Few functions ...
}
Class RBI
{
Customer c; //hasA relationship
Account a; //hasA relationship
..
Public double GetInterestRate() { }
Public double GetWithdrawalLimit() { }
}
Class SBI: public RBI
{
//Use RBI functionality or define own functionality.
}
Class ICICI: public RBI
{
//Use RBI functionality or define own functionality.
}
```