Ques1: A Plastic manufacturer sells plastic in different shapes like 2D sheet and 3D box. The cost of sheet is Rs 40/ per square ft. and the cost of box is Rs 60/ per cubic ft. Implement it in Java to calculate the cost of plastic as per the dimensions given by the user where 3D inherits from 2D

```
import java.util.Scanner;

class Plastic2D {
   double areaCost = 40;



    public double calculateCost(double area) {
        return area * areaCost;
    }
}

class Plastic3D extends Plastic2D {
  double volumeCost = 60;



    public double calculateCost(double area, double volume) {
        double cost2D = calculateCost(area);
        double cost3D = volume * volumeCost;
        return cost2D + cost3D;
    }
}

public class program1 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the dimensions for 2D sheet (length width):
");
        double length2D = scanner.nextDouble();
        double width2D = scanner.nextDouble();
        double area2D = length2D * width2D;

        System.out.print("Enter the dimensions for 3D box (length width
height): ");
        double length3D = scanner.nextDouble();
        double width3D = scanner.nextDouble();
        double height3D = scanner.nextDouble();
        double volume3D = length3D * width3D * height3D;

        Plastic3D plastic3D = new Plastic3D();
        double totalCost = plastic3D.calculateCost(area2D, volume3D);

        System.out.println("Total cost of plastic: Rs " + totalCost);
```

```
        scanner.close();
    }
}
```

Ques2: Illustrate the execution of constructors in multi-level inheritance with three Java classes – plate(length, width), box(length, width, height), wood box (length, width, height, thick) where box inherits from plate and woodbox inherits from box class. Each class has constructor where dimensions are taken from user.

```
import java.util.Scanner;

class Plate{
    int length;
    int width;
    public Plate(int length,int width){
        this.length = length;
        this.width =  width;
    }
    public void showDimensions(){
        System.out.println("Dimensions of Plate (in length and width):
"+length+" "+width);
    }
}

class Box extends Plate {
    int height;
    public Box(int length,int width,int height){
        super(length, width);
        this.height=height;
    }
    public void showDimensions(){
        super.showDimensions();
        System.out.println("height: " + height);
    }
}

class Woodbox extends Box {
    int thick;
    public Woodbox(int length,int width,int height,int thick){
        super(length,width,height);
        this.thick=thick;
    }
    public void showDimensions(){
        super.showDimensions();
        System.out.println("Thick: " + thick);
    }
}
```

```java
public class program2 {
    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter dimensions for Plate here");
        int Platelength = scanner.nextInt();
        int Platewidth = scanner.nextInt();

        System.out.println("Enter dimensions for Box here");
        int boxlength = scanner.nextInt();
        int boxwidth = scanner.nextInt();
        int boxheight = scanner.nextInt();

        System.out.println("Enter dimensions for Woodbox here");
        int Woodboxlength = scanner.nextInt();
        int Woodboxwidth = scanner.nextInt();
        int Woodboxheight = scanner.nextInt();
        int Woodboxthickness = scanner.nextInt();

        Plate plate = new Plate(Platelength, Platewidth);
        plate.showDimensions();

        Plate box = new Box(boxlength, boxwidth, boxheight);
        box.showDimensions();

        Plate woodbox = new
Woodbox(Woodboxlength,Woodboxwidth,Woodboxheight,Woodboxthickness);
        woodbox.showDimensions();

        scanner.close();
    }
}
```

Ques3: Write a program in Java having three classes Apple, Banana and Cherry. Class Banana and Cherry are inherited from class Apple and each class have their own member function show() . Using Dynamic Method Dispatch concept display all the show() method of each class

```java
class Apple {
    void show() {
        System.out.println("This is the show() method of class Apple.");
    }
}

class Banana extends Apple {

    void show() {
        System.out.println("This is the show() method of class Banana.");
    }
}
```

```
class Cherry extends Apple {

    void show() {
        System.out.println("This is the show() method of class Cherry.");
    }
}

public class program3 {
    public static void main(String[] args) {

        Apple fruit1 = new Apple();
        fruit1.show();

        Apple fruit2 = new Banana();
        fruit2.show();

        Apple fruit3 = new Cherry();
        fruit3.show();
    }
}
```

Ques4: Write a class Account containing acc_no, balance as data members and two methods as input() for taking input from user and disp() method to display the details. Create a subclass Person which has name and aadhar_no as extra data members and override disp() function. Write the complete progrm to take and print details

```
import java.util.Scanner;

class Account {
    int acc_no;
    double balance;

    public void input() {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter Account Number: ");
        acc_no = scanner.nextInt();
        System.out.print("Enter Balance: ");
        balance = scanner.nextDouble();
    }

    public void disp() {
        System.out.println("Account Number: " + acc_no);
        System.out.println("Balance: Rs " + balance);
    }
}

class Person extends Account {
    String name;
```

```
    String aadhar_no;

    public void disp() {
        super.disp();
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter Name: ");
        name = scanner.nextLine();
        System.out.print("Enter Aadhar Number: ");
        aadhar_no = scanner.nextLine();
        System.out.println("Name: " + name);
        System.out.println("Aadhar Number: " + aadhar_no);
    }
}

public class program4 {
    public static void main(String[] args) {
        Person[] persons = new Person[3];

        for (int i = 0; i < 3; i++) {
            System.out.println("Enter details for Person " + (i + 1) + ":");
            persons[i] = new Person();
            persons[i].input();
            persons[i].disp();
            System.out.println();
        }
    }
}
```