OOPS PRACTICAL 8

Name: Devasy Patel

Roll No: 20BCE057

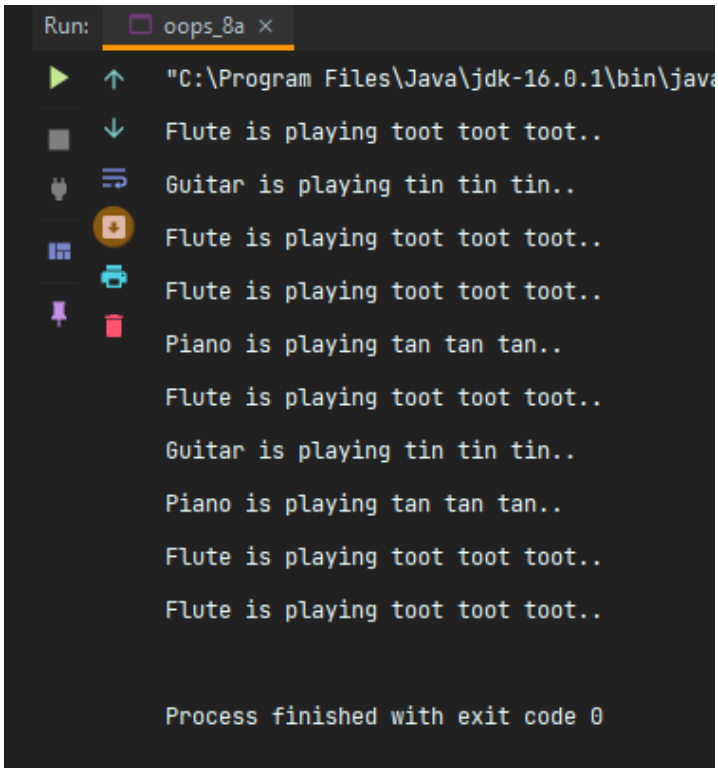
Course Code: 2CS302

Course Name: Object Oriented Programming

Practical 8A

```java
import java.util.*;
abstract class Instrument{
    abstract void play();
}
class Flute extends Instrument{
    void play(){
        System.out.println("Flute is playing toot toot toot..");
    }
}
class Piano extends Instrument{
    void play(){
        System.out.println("Piano is playing tan tan tan..");
    }
}
class Guitar extends Instrument{
    void play(){
        System.out.println("Guitar is playing tin tin tin..");
    }
}
public class oops_8a {
    public static void main(String[] args) {
        Random ran=new Random();
        Instrument ob[]=new Instrument[10];
        for(int i=0;i<10;i++){
            int r=ran.nextInt(3);
           if(r==0){
               ob[i]=new Flute();
           }
           else if(r==1){
               ob[i]=new Piano();
           }
           else if(r==2){
               ob[i]=new Guitar();
           }
        }
        for(int i=0;i<10;i++){
            ob[i].play();
        }
    }
}
```

OUTPUT



THEORETICAL PRINCIPLES USED:

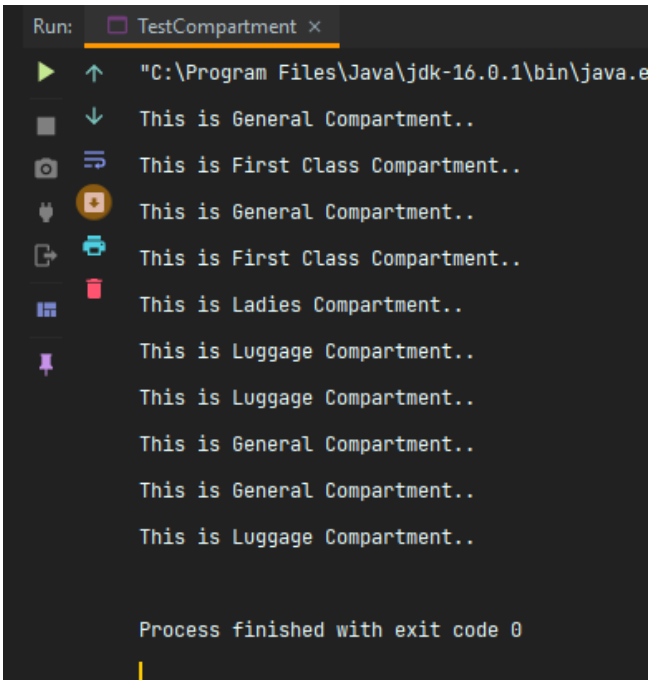
In this practical an Abstract class Instrument is created and also Abstract method play is created, then we create three more class Flute, Piano and Guitar which extends Instrument and in these 3 classes the method definition is given. Then we create a reference variable (array) for Instrument and using Random function we assign array objects to Flute, Guitar and Piano according to number generated i.e if 0 then array object will be Flute

If 1 then array object will be Piano and if 2 then array object is Guitar. Then we display the array.

Practical 8B

```
import java.util.*;
abstract class Compartment{
    abstract void notice();
}
class FirstClass extends Compartment{
    void notice(){
        System.out.println("This is First Class Compartment..");
    }
}
class Ladies extends Compartment{
    void notice(){
        System.out.println("This is Ladies Compartment..");
    }
}
class General extends Compartment{
    void notice(){
        System.out.println("This is General Compartment..");
    }
}
class Luggage extends Compartment{
    void notice(){
        System.out.println("This is Luggage Compartment..");
    }
}
public class TestCompartment {
    public static void main(String[] args) {
        Compartment cp[]=new Compartment[10];
        Random ran=new Random();
        for(int i=0;i<10;i++){
            int r=1+ran.nextInt(4);
            if(r==1){
                cp[i]=new FirstClass();
            }
            else if(r==2){
                cp[i]=new Ladies();
            }
            else if(r==3){
                cp[i]=new General();
            }
            else{
                cp[i]=new Luggage();
            }
        }
        for(int i=0;i<10;i++){
            cp[i].notice();
        }
    }
}
```

OUTPUT



THEORETICAL PRINCIPLES USED:

In this practical an Abstract class Compartment is created and also Abstract method notice is created, then we create three more class FirstClass, Ladies, General and Luggage which extends Compartment and in these 3 classes the method definition is given. Then we create a reference variable (array) for Compartment and using Random function we assign array objects FirstClass, Ladies, General and Luggage according to number generated i.e

if 1 then array object will be FirstClass

If 2 then array object will be Ladies

if 3 then array object is General

if 4 then array object is Luggage.

Then we display the array.

Practical 8C

```
import java.util.*;
class Student{
    int roll,age;
    String name;
    void getDetails(int roll,String name,int age){
        this.roll=roll;
        this.name=name;
        this.age=age;
    }
}
class Exam extends Student{
    float marks[]=new float[6];
    void getDetails(int roll,String name,int age,float math,float eng,float
che,float bio,float comp,float de){
        super.getDetails(roll,name,age);
        marks[0]=math;
        marks[1]=eng;
        marks[2]=che;
        marks[3]=bio;
        marks[4]=comp;
        marks[5]=de;
    }
}
class Result extends Exam{
    float total_marks=0;
    void getDetails(int roll,String name,int age,float math,float eng,float
che,float bio,float comp,float de){
        super.getDetails(roll,name,age,math,eng,che,bio,comp,de);
        for(int i=0;i<6;i++){
            total_marks+=marks[i];
        }
    }
    void display(){
        System.out.println("Name: "+name);
        System.out.println("RollNo: "+roll);
        System.out.println("Age: "+age);
        System.out.print("Marks Obtained: "+total_marks);
    }
}
public class oops_8c {
    public static void main(String[] args) {
        float s0,s1,s2,s3,s4,s5;
        int roll,age;
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter your name:");
        String name =sc.nextLine();
        System.out.print("Enter your RollNo:");
        roll= sc.nextInt();
        System.out.print("Enter your Age:");
        age= sc.nextInt();
        System.out.print("Enter your marks in Maths:");
        s0= sc.nextInt();
        if(s0>100 || s0<0){
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        System.out.print("Enter your marks in English:");
        s1= sc.nextInt();
        if(s1>100 || s1<0){
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        System.out.print("Enter your marks in Chemistry:");
        s2= sc.nextInt();
        if(s2>100 || s2<0){
```

```
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        System.out.print("Enter your marks in Biology:");
        s3= sc.nextInt();
        if(s3>100 || s3<0){
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        System.out.print("Enter your marks in Computer:");
        s4= sc.nextInt();
        if(s4>100 || s4<0){
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        System.out.print("Enter your marks in Digital Electronics:");
        s5= sc.nextInt();
        if(s5>100 || s5<0){
            System.out.println("Invalid Marks!!");
            System.exit(0);
        }
        Result r=new Result();
            System.out.print("\n*****************************************\n");
            System.out.print("\t\tREPORT CARD\n");
            r.getDetails(roll, name, age, s0, s1, s2, s3, s4, s5);
            r.display();
            System.out.print("\n*****************************************\n");
    }
}
```

OUTPUT

```
Enter your name:Devasy
Enter your RollNo:57
Enter your Age:18
Enter your marks in Maths:99
Enter your marks in English:95
Enter your marks in Chemistry:76
Enter your marks in Biology:98
Enter your marks in Computer:100
Enter your marks in Digital Electronics:78

******************
        REPORT CARD
Name: Devasy
RollNo: 57
Age: 18
Marks Obtained: 546.0
******************
```

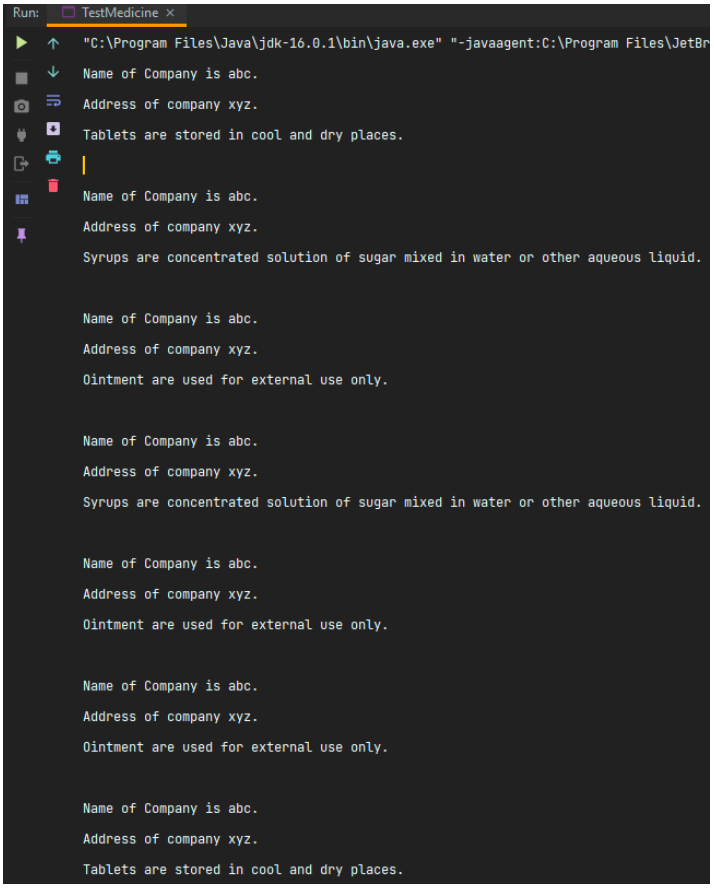
THEORETICAL PRINCIPLES USED:

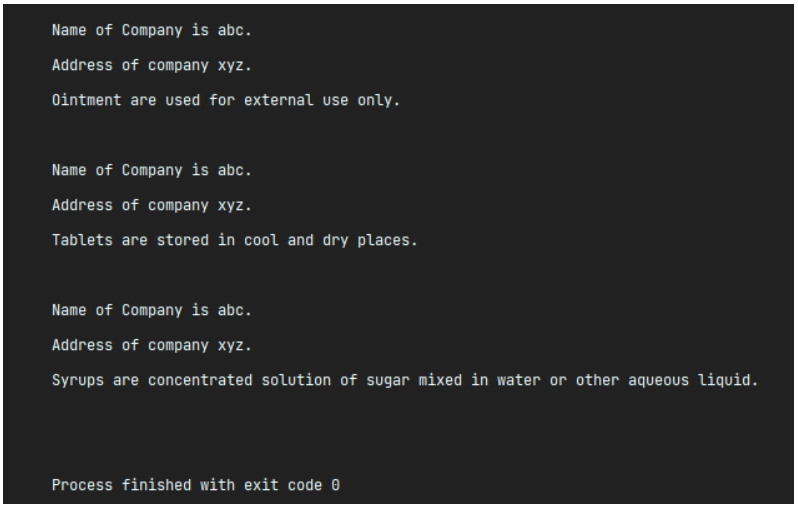
In this practical an Student class is created and a method getDetails which takes Name , age and roll as inputs. Then we create a Exam class which extends Student and we override the getDetails method which takes marks for 6 subjects and using super method to call parent class method. Then we create Result class which extends Exam which also overrides getDetails and diaplays the total marks obtained from 6 subjects.

Practical 8D

```
import java.util.Random;
class Medicine{
    public void display(){
        System.out.print("Name of Company is abc.\n");
        System.out.print("Address of company xyz.\n");
    }
}
class Tablet extends Medicine{
public void display(){
    super.display();
    System.out.println("Tablets are stored in cool and dry places.\n");
    }
}
class Syrup extends Medicine{
    public void display(){
        super.display();
        System.out.println("Syrups are concentrated solution of sugar mixed in
water or other aqueous liquid.\n");
    }
}
class Ointment extends Medicine{
    public void display(){
        super.display();
        System.out.println("Ointment are used for external use only.\n");
    }
}
public class TestMedicine {
    public static void main(String[] args) {
        Medicine med[]=new Medicine[10];
        Random ran=new Random();
        for(int i=0;i<10;i++){
            int r=1+ran.nextInt(3);
            if(r==1){
                med[i]=new Tablet();
            }
            else if(r==2){
                med[i]=new Syrup();
            }
            else{
                med[i]=new Ointment();
            }
        }
        for(int i=0;i<10;i++){
            med[i].display();
        }
    }
}
```

OUTPUT





THEORETICAL PRINCIPLES USED:

In this practical we create a Medicine class which has a display method which prints name and address of company. Then we create 3 class Syrup, Tablet and Ointment which extends Medicine class and then overriding the display method in 3 class some extra info is also display with the name and address of company with help of super method.

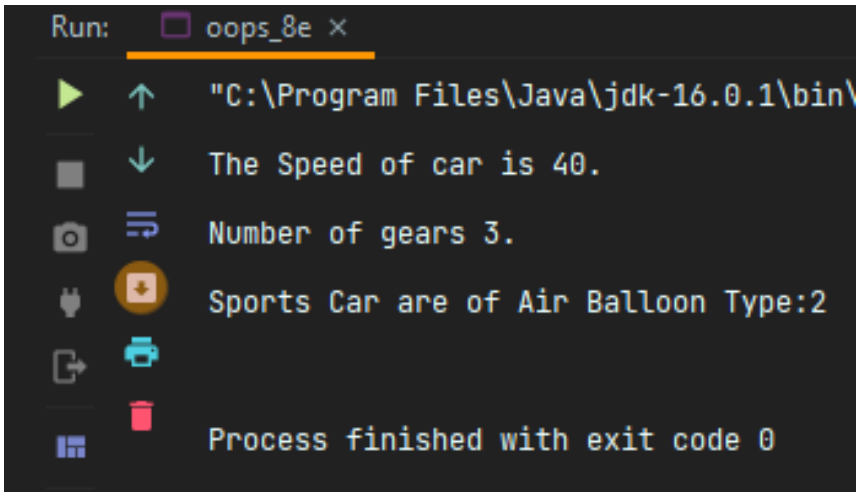
Then we create a reference variable for Medicine and using Random Function if 1 then Tablet object

If 2 then Syrup Object and if 3 then Ointment object.

Practical 8E

```
import java.util.*;
class Car{
    int speed,noOfGears;
    public void drive(){
        this.speed=40;
        this.noOfGears=3;
    }
    public void display(){
        System.out.println("The Speed of car is "+this.speed+"."+"\nNumber of gears
"+this.noOfGears+".");
    }
}
class SportCar extends Car{
    Scanner sc=new Scanner(System.in);
    int AirBalloonType;
    public void drive(){
        super.drive();
        this.AirBalloonType=2;
    }
    public void display(){
    super.display();
        System.out.println("Sports Car are of Air Balloon
Type:"+this.AirBalloonType);
    }
}
public class oops_8e {
    public static void main(String[] args) {
        SportCar sc=new SportCar();
        sc.drive();
        sc.display();
    }
}
```

OUTPUT



THEORETICAL PRINCIPLES USED:

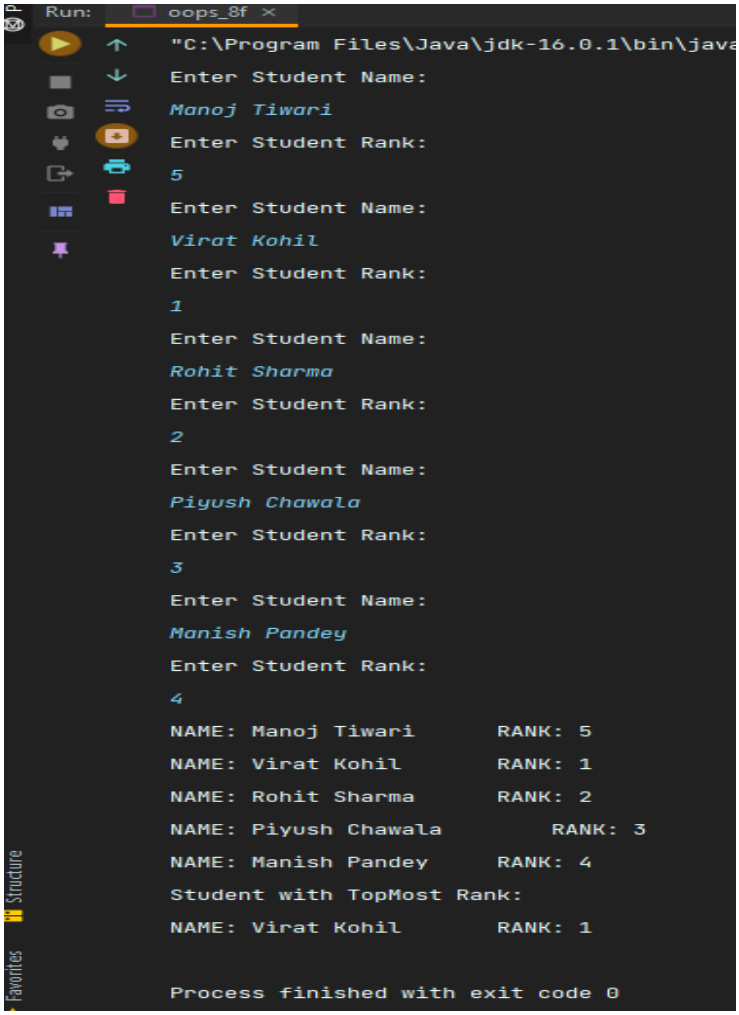
In this practical we create a class Car which has private var named as speed and noofGears and also contains display method which display speed and noofGears of the Car.

Then we create a class SportCar which extends Car which contains a constructor which initializes the var AirBallonType. It also contains display which overrides the Car class display method which takes Speed and noofGears input from user and display the speed and noofGears using super and also display the AirBallonType of the Car.

Practical 8F

```
import java.util.*;
class Record{
    public String name[];
    public int rnk[];
    Record(){
        name=new String[5];
        rnk=new int[5];
    }
    void readvalues(){
        Scanner sc=new Scanner(System.in);
        Scanner sc1=new Scanner(System.in);
        for(int i=0;i<5;i++){
            System.out.println("Enter Student Name:");
            name[i]=sc1.nextLine();
            System.out.println("Enter Student Rank:");
            rnk[i]=sc.nextInt();
        }
    }
    void display(){
        for(int i=0;i<5;i++){
            System.out.println("NAME: "+name[i]+"\t\tRANK: "+rnk[i]);
        }
    }
}
class Rank extends  Record{
    int index,a=0;
    Rank(){
        this.index=0;
    }
    void highest() {
        super.readvalues();
        super.display();
        for (int i = 0; i < 5; i++) {
                if (rnk[i] < rnk[this.index]) {
                    this.index = i;
                }
        }
    }
    void display(){
        System.out.println("Student with TopMost Rank:");
        System.out.println("NAME: "+name[index]+"\t\tRANK: "+rnk[index]);
    }
}
public class oops_8f {
    public static void main(String[] args) {
        Rank ran=new Rank();
        ran.highest();
        ran.display();
    }
}
```

OUTPUT


Run:
oops_8f
"C:\Program Files\Java\jdk-16.0.1\bin\java
Enter Student Name:
Manoj Tiwari
Enter Student Rank:
5
Enter Student Name:
Virat Kohil
Enter Student Rank:
1
Enter Student Name:
Rohit Sharma
Enter Student Rank:
2
Enter Student Name:
Piyush Chawala
Enter Student Rank:
3
Enter Student Name:
Manish Pandey
Enter Student Rank:
4
NAME: Manoj Tiwari RANK: 5
NAME: Virat Kohil RANK: 1
NAME: Rohit Sharma RANK: 2
NAME: Piyush Chawala RANK: 3
NAME: Manish Pandey RANK: 4
Student with TopMost Rank:
NAME: Virat Kohil RANK: 1
Process finished with exit code 0
Structure
Favorites

THEORETICAL PRINCIPLES USED:

In this practical we create a class Record which contains two array one String to store name and one Integer array to store rank of student. It also contains constructor which initializes the size of both the arrays. Then the readvalues takes input from the user for name and rank of student and the display method prints all the data.

Another class Rank is created which extends Record which contains constructor which initializes the var index to 0. It also contains highest method which calculated the highest rank from the data it also uses super.readvalues method to fetch all the data from parent class and find the highest among the data.

Then there is display method which also uses super.dislay method to display all data from parent class and in additional it also prints the data for student with highest rank.