OOJ LAB-WEEK 8-EXTRA PROGRAMS

Program and Output

Mallika Prasad

1BM19CS081

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Program 1-

Write a program which has an abstract class Solid and implements cylinder, cone and sphere by inheriting from solid to find surface area and volume.

```
import java.util.Scanner;
abstract class solid{
   int r;
   int h;
  solid(int a,int b)
   {
      r=a;
      h=b;
   }
    solid(int a)
    {
       r=a;
    }
    abstract float area();
    abstract float volume();
}
class cylinder extends solid{
```

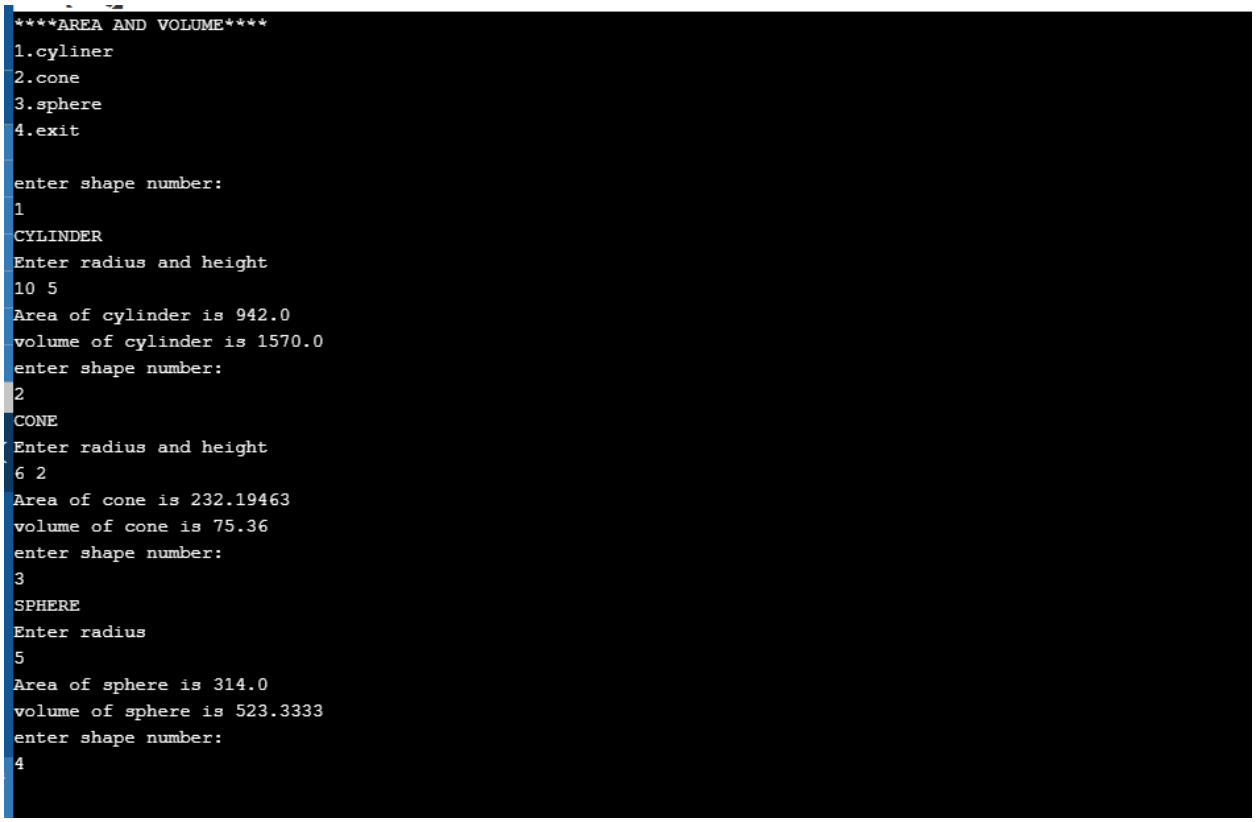
```
    cylinder(int a,int b){
        super(a,b);
    }
    float area(){
        float cyla=(float)(2*3.14*r*h)+(float)(2*3.14*r*r);
        return cyla;
    }
    float volume(){
        float cylv=(float)3.14*r*r*h;
        return cylv;
    }
    }
class cone extends solid{
    cone(int a,int b){
        super(a,b);
    }
    float area(){
        float cona=(float)(3.14*r)*(r+((float)Math.sqrt((h*h)+(r*r))));
        return cona;
    }
    float volume(){
        float conv=(float)3.14*r*r*h/3;
        return conv;
    }
    }
```

```
class sphere extends solid{
   sphere(int a){
      super(a);
   }
   float area(){
      float spha=(float)(4*3.14*r*r);
      return spha;
   }
   float volume(){
      float sphv=(float)(4*3.14*r*r*r)/((float)3);
      return sphv;
   }
   }
class Main{
   public static void main(String args[]){
      Scanner ss=new Scanner(System.in);
      int n,rad,hei;
      System.out.println("****AREA AND VOLUME****");
      System.out.println("1.cyliner\n2.cone\n3.sphere\n4.exit\n");
      do
      {
      System.out.println("enter shape number:");
      n=ss.nextInt();
      switch(n)
      {
         case 1:System.out.println("CYLINDER");
```

```
System.out.println("Enter radius and height");
rad=ss.nextInt();
hei=ss.nextInt();
cylinder c=new cylinder(rad,hei);
solid ref;
ref=c;
System.out.println("Area of cylinder is "+ref.area());
System.out.println("volume of cylinder is "+ref.volume());
break;

case 2:System.out.println("CONE");
System.out.println("Enter radius and height");
rad=ss.nextInt();
hei=ss.nextInt();
cone co=new cone(rad,hei);
ref=co;
System.out.println("Area of cone is "+ref.area());
System.out.println("volume of cone is "+ref.volume());
break;

case 3:System.out.println("SPHERE");
System.out.println("Enter radius");
rad=ss.nextInt();
   sphere s=new sphere(rad);
   ref=s;
   System.out.println("Area of sphere is "+ref.area());
```

```
            System.out.println("volume of sphere is "+ref.volume());
        }
        }while(n!=4);
        }
}
```

Output-



Program 2-

Develop a Java program to implement the hierarchy given below. Include atleast one appropriate member in each of these classes. Set and display details in each of the class and create objects of the leaf members in the hierarchy.

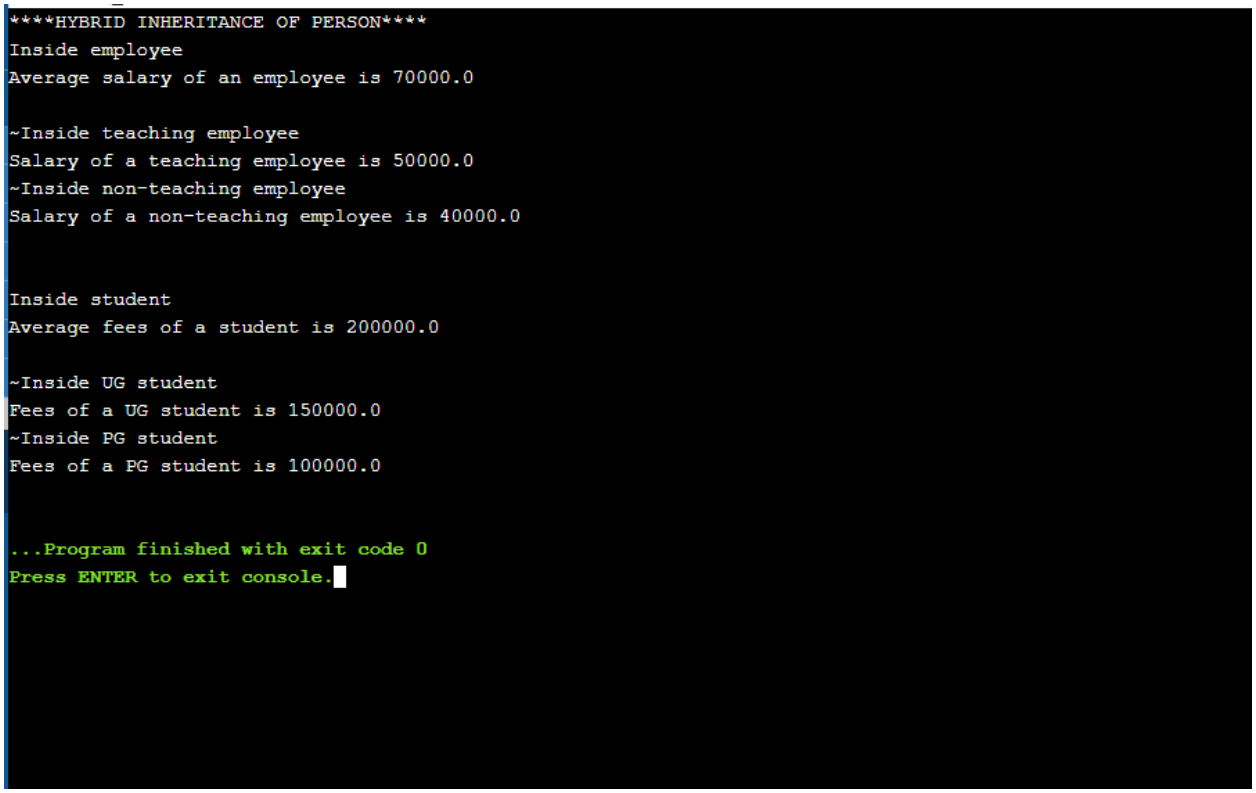
```
import java.util.Scanner;

class person{

   String name;

  /*person(){

      System.out.println("name- Mal ");

   }*/

}


class employee extends person{

   float salary;

   void set(int a){

      System.out.println("Inside employee");

      salary=a;

   }

   void display(){

      System.out.println("Average salary of an employee is "+salary);

   }

}


class student extends person{

   float fees;

   void set(int b){

      System.out.println("Inside student");
```

```
  fees=b;
    }
    void display(){
        System.out.println("Average fees of a student is "+fees);
    }
}

class teaching extends employee{
    float salary2;
    void set(int c){
        System.out.println("~Inside teaching employee");
        salary2=c;
    }
    void display(){
        System.out.println("Salary of a teaching employee is "+salary2);
    }
}

class nonteaching extends employee{
    float salary3;
    void set(int d){
        System.out.println("~Inside non-teaching employee");
        salary3=d;
    }
    void display(){
        System.out.println("Salary of a non-teaching employee is "+salary3);
```

```
    }
}

class ug extends student{
    float fees2;
    void set(int e){
        System.out.println("~Inside UG student");
        fees2=e;
    }
    void display(){
        System.out.println("Fees of a UG student is "+fees2);
    }
}

class pg extends student{
    float fees3;
    void set(int f){
        System.out.println("~Inside PG student");
        fees3=f;
    }
    void display(){
        System.out.println("Fees of a PG student is "+fees3);
    }
}

class Main{
```

```
    public static void main(String []ss){
        System.out.println("****HYBRID INHERITANCE OF PERSON****");
        employee e=new employee();
        e.set(70000);
        e.display();
        System.out.println();
        teaching t=new teaching();
        t.set(50000);
        t.display();
        nonteaching nt=new nonteaching();
        nt.set(40000);
        nt.display();
        System.out.println();
        System.out.println();
        student s=new student();
        s.set(200000);
        s.display();
        System.out.println();
        ug u=new ug();
        u.set(150000);
        u.display();
        pg p=new pg();
        p.set(100000);
        p.display();
    }
}
```

Output-


****HYBRID INHERITANCE OF PERSON****
Inside employee
Average salary of an employee is 70000.0
~Inside teaching employee
Salary of a teaching employee is 50000.0
~Inside non-teaching employee
Salary of a non-teaching employee is 40000.0
Inside student
Average fees of a student is 200000.0
~Inside UG student
Fees of a UG student is 150000.0
~Inside PG student
Fees of a PG student is 100000.0
...Program finished with exit code 0
Press ENTER to exit console.