Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024-25

Class:	SE	Semester:	III
Course Code:		Course Name:	OOPJ

Name of Student:	Aman Mehtar
Roll No. :	32
Assignment No.:	04
Title of Assignment:	
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	5
Demonstrated Knowledge	3	3
Legibility	2	2
Total	10	10

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty : Ms. Neha Raut

Signature : Raut

Date :

Q1) Display volume of sphere and hemisphere using interface and define the templates of methods to be there in the derived classes.

Ans :- Program :-

```java
import java.io.*;
import java.io.*;
import java.util.*;

class sphere
interface VolumeCalculable {
    double PI = 3.14159;
    double calculatevolume (double radius);
}

class sphere implements VolumeCalculable {
    @override
    public double calculateVolume (double radius) {
        return (2.0/3.0) * PI * Math.pow (radius, 3);
    }
}

class Hemisphere implements VolumeCalculable {
    @override
    public double calculateVolume (double radius) {
        return (2.0/3.0) * PI * Math.pow (radius, 3);
    }
}
```

```java
public class Main {
    public static void main (String [] args) {
        Volume Calculable sphere = new sphere ();
        Volume Calculable hemisphere = new Hemisphere ();
        double radius = 5.0;
        double sphereVolume = sphere.calculate Volume (radius);
        double hemisphereVolume = hemisphere.calculateVolume (radius);

        System.oul.println (" Volume of the sphere with
            radius" + radius + " is : " + sphereVolume);
        System.out.println (" Volume of the hemisphere with
            radius "+ radius + " is : " + hemisphere Volume);
    }
}
```

Output :-

Volume of the sphere with radius 5.0 is : 523.59833333
Volume of the hemisphere with radius 5.0 is : 261.79916666

Q2) Create Rectangle and cube class that encapsulates the properties of a rectangle and a cube i.e rectangle has default and parameterised constructor and area () method. Cube has default and parameterised constructor and volume () method. They shared no ancestor other than object. Implement a class size with size () method. This method accepts a single reference to a cube, then size (z) returns its volume. It accepts a single reference argument z. If z refers to a rectangle then size (z) returns its area and if z is a reference to a cube, then size (z) returns its volume. If z refers to an object of any other class, then size (z) returns −1. Use main method in size to call size (...) method.

Ans:- Program :-

```
class Rectangle {
    private double length;
    private double width;
    public Rectangle () {
        this.length = 1.0;
        this.width = 1.0;
    }

    public Rectangle (double length, double width) {
        this.length = length;
        this.width = width;
    }
```

```java
        public double area() {
            return (length * width);
        }
    }

class Cube {
    private double side;
    public Cube() {
        this.side = 1.0;
    }
    public Cube(double side) {
        this.side = side;
    }
    public double volume() {
        return Math.pow(side, 3);
    }
}

class Size {
    public double size(Object z) {
        if (z instanceof Rectangle) {
            Rectangle rect = (Rectangle) z;
            return rect.area();
        }
        else if (z instanceof Cube) {
            Cube cube = (Cube) z;
        }
        else {
            return -1;
        }
    }
}
```

```java
public static void main (String [] args) {
    Rectangle rect1 = new Rectangle ();
    Rectangle rect2 = new Rectangle (4.0, 5.0);
    Cube cube1 = new Cube ();
    Cube cube2 = new Cube (3.0);

    Size sizecalculator = new Size ();

    System.out.println (" Area of default rectangle : " +
        sizecalculator.size (rect1 ));
    System.out.println (" Area of parameterized rectangle : " +
        sizecalculator.size (rect2 ));
    System.out.println (" Volume of default cube : " +
        sizecalculator.size (cube1 ));
    System.out.println (" Volume of parameterized cube : " +
        sizecalculator.size (cube2)
```