Rajalakshmi Engineering College

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2024_28_III_OOPS Using Java Lab

2028_REC_OOPS using Java_Week 6_Q4

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Mr.Kapoor wants to create a program to calculate the volume of a Cuboid and a Cube using method overriding.

Implements a base class Cuboid with attributes for length, width, and height. Include a method calculateVolume() that computes the volume of the cuboid.

Extends the base class with a subclass Cube representing a cube, where all sides are equal. Override the calculateVolume() method in the Cube class to compute the volume of the cube.

The program should take user input for the dimensions of the cuboid and the side length of the cube and display the calculated volumes with two decimal places.

Input Format

The first line of input consists of 3 space-separated double values, representing the cuboid length, width, and height, respectively.

The second line consists of a double value, representing the side length of the cube.

Output Format

The first line of output prints the volume of the cuboid, rounded off to two decimal places.

The second line prints the volume of the cube, rounded off to two decimal places.

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 60.0 60.0 60.0
50.0
Output: Volume of Cuboid: 216000.00
Volume of Cube: 125000.00

Answer

```
import java.util.Scanner;

// You are using Java
import java.util.Scanner;

// Base class
class Cuboid {
    protected double length, width, height;

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

```
    public double calculateVolume() {
        return length * width * height;
    }
}

// Subclass
class Cube extends Cuboid {
    public Cube(double side) {
        super(side, side, side); // All sides equal for cube
    }

    @Override
    public double calculateVolume() {
        return length * length * length;
    }
}

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

        // Input for cuboid
        double cuboidLength = scanner.nextDouble();
        double cuboidWidth = scanner.nextDouble();
        double cuboidHeight = scanner.nextDouble();

        // Input for cube
        double cubeSide = scanner.nextDouble();

        // Calculate cuboid volume
        Cuboid cuboid = new Cuboid(cuboidLength, cuboidWidth, cuboidHeight);
        System.out.printf("Volume of Cuboid: %.2f\n", cuboid.calculateVolume());

        // Calculate cube volume (upcasting)
        Cuboid cube = new Cube(cubeSide);
        System.out.printf("Volume of Cube: %.2f", cube.calculateVolume());

        scanner.close();
    }
}
public class Main {
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);

        double cuboidLength = scanner.nextDouble();
        double cuboidWidth = scanner.nextDouble();
        double cuboidHeight = scanner.nextDouble();

        // Regular object instantiation for Cuboid
        Cuboid cuboid = new Cuboid(cuboidLength, cuboidWidth, cuboidHeight);
        System.out.printf("Volume of Cuboid: %.2f\n", cuboid.calculateVolume());

        double cubeSide = scanner.nextDouble();

        // Upcasting - Using superclass reference for subclass object (DMD)
        Cuboid cube = new Cube(cubeSide); // Upcasting
        System.out.printf("Volume of Cube: %.2f", cube.calculateVolume()); // Calls
Cube's method dynamically

        scanner.close();
    }
}
```

Status : Correct **Marks : 10/10**