

VIT - Vellore

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BCSE102P_Structured and Object Oriented Programming Lab_VL2024250502365

VIT V_Structured and OOP_Lab 4_COD_Medium_Structure within Structures

Attempt : 1

Total Mark : 10

Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Ashok, an aspiring architect, needs a program to calculate volumes of geometric shapes.

He wants to define structures Point3D, Sphere, Cylinder, and GeometryCalculator. Help him accept input for the details of the sphere and cylinder. Display their volumes with two decimal places.

Structure Details:

Point3D: Represents a point in 3D space with coordinates (x, y, z).

Sphere: Describes a sphere with a centre of type Point3D and a radius.

Cylinder: Defines a cylinder with a base centre (Point3D), radius, and height.

GeometryCalculator: Combines a Sphere and a Cylinder for calculations.

Formulae:

Sphere Volume = $(4/3) \times 3.14 \times r^3$

Cylinder Volume = $3.14 \times R^2 \times h$

Answer

```
// You are using GCC
```

```
#include<stdio.h>
```

```
struct Point3D{
```

```
    double x;
```

```
    double y;
```

```
    double z;
```

```
};
```

```
struct Sphere{
```

```
    struct Point3D p;
```

```
    double r;
```

```
};
```

```
struct Cylinder{
```

```
    double X;
```

```
    double Y;
```

```
    double Z;
```

```
    double H;
```

```
    double R;
```

```
};
```

```
struct GeometryCalculator{
```

```
    struct Cylinder c;
```

```
    struct Sphere s;
```

```
};
```

```
int main(){
```

```
    struct GeometryCalculator cal;
```

```
    scanf("%lf %lf %lf",&cal.s.p.x,&cal.s.p.y,&cal.s.p.z);
```

```
    scanf("%lf",&cal.s.r);
```

```
    scanf("%lf %lf %lf",&cal.c.X,&cal.c.Y,&cal.c.Z);
```

```
    scanf("%lf %lf",&cal.c.R,&cal.c.H);
```

```
    printf("Sphere's Volume: %.2lf cubic units\n",
```

```
((4.0/3)*3.14*cal.s.r*cal.s.r*cal.s.r));
```

```
    printf("Cylinder's Volume: %.2lf cubic units\n",(3.14*cal.c.R*cal.c.R*cal.c.H));
```

```
} return 0;
```

Status : Correct

Marks : 10/10