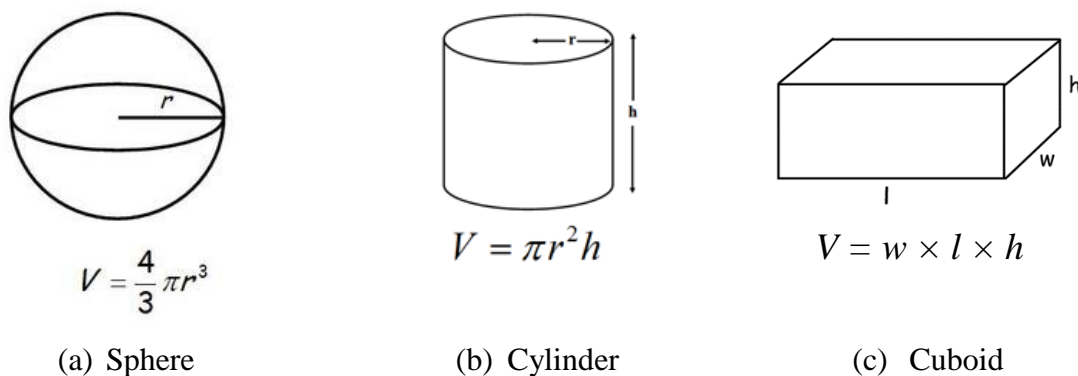
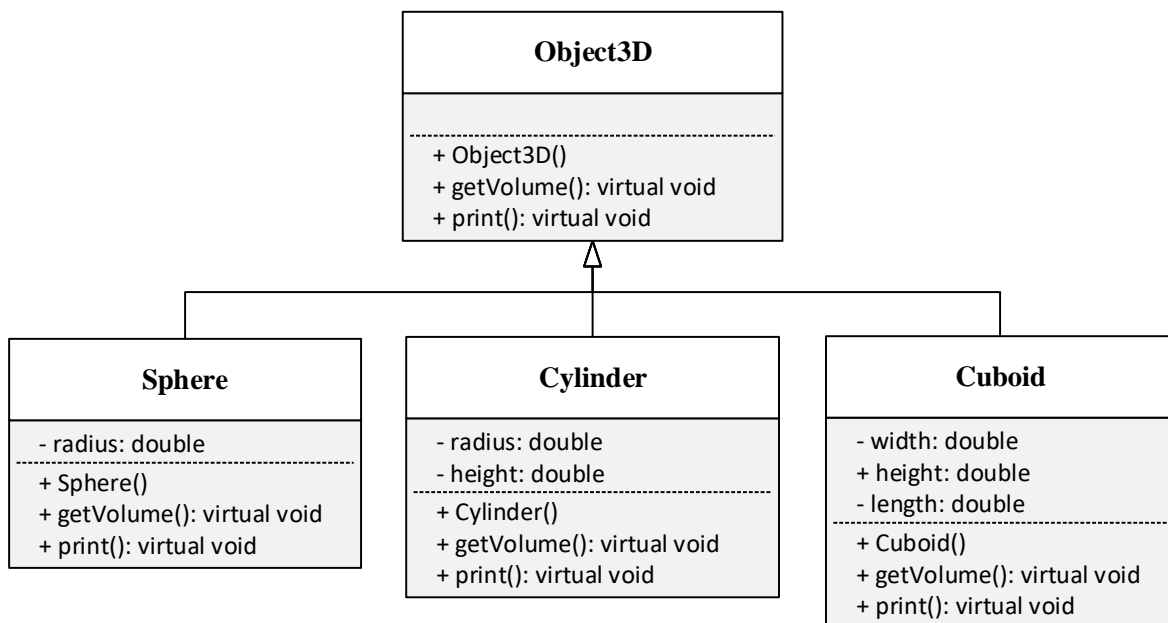


**Exercise 1 (Question 1, Exercise 3, Lab 9, pg 124-126)**

Three dimensional (3D) objects can be represented with their geometrical characteristics. For example, a sphere can be defined by its radius, a cylinder with radius and height, and a cuboid with its dimension's width, length and height. As different attributes are used for representing the objects, the calculation to obtain the volume of each object is also different. Figure 9.1 shows the formulas to determine the volume for each object respectively. While Figure 9.2 shows the class diagram representing the relationship between these 3D objects as well as their attributes and methods.



**Figure 9.1:** Formula to obtain the volume of a sphere, cylinder and cuboid



**Figure 9.2:** UML class diagram for three dimensional objects

Given an incomplete implementation for the class **Sphere**, **Cylinder** and **Cuboid**, in Program 9.8. Complete the program based on the tasks stated in the program (Task 1 to Task

8). Figure 9.3 shows an example output that your program should produce. Yours might be different if you use different values for each object.

```
Object #1
Cuboid: dimension= 10 x 20 x 30
Volume= 6000

Object #2
Cylinder: r=20, h=20
Volume= 25132

Object #3
Sphere: r=10
Volume= 4188.67

Object #4
Cylinder: r=2, h=5
Volume= 62.83

Object #5
Sphere: r=3
Volume= 113.094

Total volume = 35496.6
```

**Figure 9.3:** Expected output