

**SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY  
SOFTWARE ENGINEERING DEPARTMENT**

**Spring 2021**

**Object Oriented Programming (SWE-103T)  
Assignment # 2**

**Semester: II**  
**Due Date: 30-May-2021**

**Batch: 2020F**  
**Max Points: 10**

**Instructions:**

- Attempt all questions
- Do not copy or cheat from any one, make your own effort. If any assignment found copied it will straight away be rejected.
- Take the help from internet or any other online sources is allowed. If the data has been taken from any online source, then please organize it properly, do not copy and paste exactly.
- There is no maximum page limit.
- Assignment should be in MS Word document. The Word file should be submitted by converting it to a single PDF file.
- Mention your full name and roll number on the first / front page. The page numbers must be mentioned at the right bottom corner in the whole assignment.
- The maximum font size for text is 12 and for heading is 14. The font could be Arial or the Time New Roman.

**Question 1**

**[3 points]**

Describe the concept of inheritance? In general how many types of inheritance can be applied in programming languages? Which type of inheritance java supports? Explain your answer with suitable examples

**Question 2**

**[2 points]**

What are the difference between abstract class and interface? Explain your answer with suitable example?

**Question 3**

**[5 points]**

Construct java abstract class Shape containing **private** information of radius (int) and height (int). The class contains the following for calculations:

- Default constructor setting radius and height to 5.
- A parameterized constructor setting radius and height to values provided in parameters.
- An abstract method volume () returning type double.
- An abstract method surface\_area () returning type double

Then construct a child class Sphere inherit from Shape class. The class contains the following:

- Default constructor calling parent class default constructor to set radius and height to 5.
- A parameterized constructor calling parent class constructor for setting radius and height to values provided in parameters.
- Provide implementation of abstract volume method to calculate and return Volume of Sphere ( $V = \frac{4}{3} \pi R^3$ ).
- Provide implementation of surface area method to calculate and return Surface Area of Sphere ( $SA = 4 \pi R^2$ ).

Then construct a child class Cylinder inherit from Shape class. The class contains the following:

- Default constructor calling parent class default constructor to set radius and height to 5.
- A parameterized constructor calling parent class constructor for setting radius and height to values provided in parameters.
- Provide implementation of abstract volume method to calculate and return Volume of Cylinder ( $V=PI*R^2*H$ ).
- Provide implementation of surface area method to calculate and return Surface Area of Sphere ( $SA=2*PI*R^2 + 2*PI*R*H$ )

Make sure to use Math and Scanner class for computing results and inputs. Then construct a Testing class containing main() method and create **ONE** object of Sphere and Cylinder class. Initialize both objects using different constructor. Finally compute and display Volume of Sphere and Cylinder. Similarly compute and display Surface Area of Cylinder.