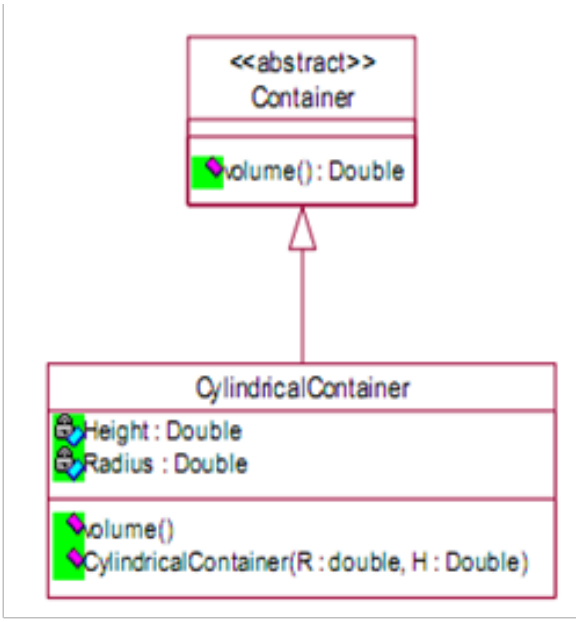
Question 01



The Volume of a Cylinder can be found with the following formula:

Volume = PI * Radius*Radius*Height where PI=3.14159

It is required to map the above class diagram to Java code.

Note: Container is an abstract class.
Height & Radius are private variables
All the methods are public

(i) Write down the Java definition of class container

Answers

```
public abstract class Container {
   private double height;
   private double radius;

   public Container(double height, double radius) {
      this.height = height;
      this.radius = radius;
   }

   public double getHeight() {
      return height;
   }

   public void setHeight(double height) {
      this.height = height;
   }

   public double getRadius() {
```

```
        return radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    // Abstract method to calculate the volume
    public abstract double calculateVolume();
}
```

(ii) Write the Java Definition of class CylindricalContainer. (Implement the Methods)

Answer

```
public class CylindricalContainer extends Container {
    private static final double PI = 3.14159;

    public CylindricalContainer(double height, double radius) {
        super(height, radius);
    }

    @Override
    public double calculateVolume() {
        double volume = PI * getRadius() * getRadius() * getHeight();
        return volume;
    }
}
```

(iii) Create an object from CylindricalContainer and display the volume.

Answers

```
public class Main {
    public static void main(String[] args) {
        double height = 10.0;
        double radius = 5.0;

        // Create an object of CylindricalContainer

        CylindricalContainer container = new
CylindricalContainer(height, radius);

        // Calculate the volume using the calculateVolume() method
```

```
        double volume = container.calculateVolume();

        // Display the volume
        System.out.println("Volume of the cylindrical container: " +
volume);
    }
}
```

Finally output

Volume of the cylindrical container: 785.3975

Question 02

A Student wants to create a game called “Life”, ‘life’ is a RPG game in which a player can move up, down, left & Right. In order to implement this game assume that you need to create an abstraction of the player controllers. Make sure to print the directions of the player when keys are pressed.

Answers

```
public interface PlayerController {
    void moveUp();
    void moveDown();
    void moveLeft();
    void moveRight();
}

public class LifeGame implements PlayerController {
    @Override
    public void moveUp() {
        System.out.println("Player moved UP.");
    }

    @Override
    public void moveDown() {
        System.out.println("Player moved DOWN.");
    }

    @Override
    public void moveLeft() {
        System.out.println("Player moved LEFT.");
    }
```

```
    @Override
    public void moveRight() {
        System.out.println("Player moved RIGHT.");
    }
}

public class Main {
    public static void main(String[] args) {
        LifeGame game = new LifeGame();

        // Test player movements
        game.moveUp();
        game.moveLeft();
        game.moveDown();
        game.moveRight();
    }
}
```

Output

Player moved “UP”.
Player moved “LEFT”.
Player moved “DOWN”.
Player moved “RIGHT”.