**EX. NO: 7b ABSTRACT CLASSES & INTERFACES**

**(15/3/2017-19/3/2017)**

**Note: Part I and Part 2 should be recorded in your observation as directed by your mentor**

**Part-I (Who should do Part-I?)**

***Anyone who wants to clear java, hope everyone wants to…….***

**1. Abstract Class:**

Define an abstract class called **BasicShape** with the following members:

***Private Member Variable:***

area, a double used to hold the shape’s area.

***Public Methods:***

getArea - This concrete method should return the value in the member variable area.

calcArea - This method should be an abstract method.

Next, define a class named **Circle**. It should be derived from the **BasicShape** class.

It should have the following members:

***Private Member Variables:***

centerX, a long integer used to hold the x coordinate of the circle’s center.

centerY, a long integer used to hold the y coordinate of the circle’s center.

radius, a double used to hold the circle’s radius.

***Public Methods:***

constructor—accepts values for centerX, centerY, and radius. Should call the overridden

calcArea function described below.

getCenterX—returns the value in centerX.

getCenterY—returns the value in centerY.

calcArea—calculates the area of the circle (area = 3.14159 \* radius \* radius) and stores

the result in the inherited member area.

Next, define a class named **Rectangle**. It should be derived from the **BasicShape** class. It should have the following members:

***Private Member Variables:***

width, a long integer used to hold the width of the rectangle.

length, a long integer used to hold the length of the rectangle.

***Public Methods:***

constructor—accepts values for width and length. Should call the overridden calcArea

function described below.

getWidth—returns the value in width.

getLength—returns the value in length.

calcArea—calculates the area of the rectangle (area = length \* width) and stores the result

in the inherited member area.

After creating these classes, create a driver program that defines a Circle object and a Rectangle object. Demonstrate that each object properly calculates and reports its area.

**2.** Define an interface named **TVStation** with the following details:

***Data Members:***

satelliteName – String

cableTVName – String

signalFrequency – double

***Methods:***

show()- abstract method

Define another class named **Programme**, as shown below:

***Data Members:***

programmeName – String

sponsor - String

***Methods:***

Constructor

display()

Define a class named **Broadcast** that implements the interface **TVStation** and extends the class **Programme**.

Create an object for the Broadcast class and invoke the methods

3. Define an abstract class named **Shape** that contains an empty method named **numberOfSides()**. Define three classes named **Trapezoid, Triangle** and **Hexagon** such that each one of the classes extends the class **Shap**e. Each one of the classes contains only the method **numberOfSides()** that shows the number of sides in the given geometrical figure.

Demonstrate how the Trapezoid, Triangle and Hexagon classes can be instantiated and their methods can be tested.