

## Hands-on Exercise Objective

After completing the hands-on exercises, you will be able to:

- Declare constructors
- Overload constructors
- Chain the constructor calling
- Apply access specifiers to constructors

### **Problem Statement 1: Declaring and using constructors**

Create a class **Circle.java** in a package “**com.cognizant.shapes**”, add a float instance variable **radius** and add a default constructor (**Constructor 1**) for the class. This constructor should initialize the radius to a default value **1.5f**.

The above constructor should be invoked from a main method from another class, **Shape.java** (in different package **com.cognizant.geometry**).

### **Problem Statement 2: Overloading constructors and using “this” keyword.**

In the Circle.java class created above add an instance float variable **pi** and create two overloaded constructors.

**Constructor 2-** with a float argument name **radius**. The constructor should initialize the class variable **radius** with the method argument radius.

**NOTE:** The instance variable and the method argument should be named same as “**radius**”.

**Constructor 3-** with two float arguments **radius and pi**. Default the class pi value to 3.5 and set the instance variable with the radius method argument.

The constructor “**constructor 2**” should be invoked from a main method from class, **Area.java** (in a package **com.cognizant.shapes**).

### **Problem Statement 3: Constructor Chaining**

In Circle.java, invoke the Constructor 3 created in the previous step from Constructor 2.

### **Problem Statement 4: Applying access specifiers to constructors/variables**

- a. (Other classes must not be able to call this constructor). Also restrict the access to the variable radius to class level
- b. Provide package level access to Constructor 2 (Classes in other package must **not** be able to access this constructor). Also provide package level access to the variable pi.

**Problem Statement 5:** Create two methods and calculate area and circumference of a Circle

In the **Circle.java** class, create two methods as listed below

- a. Method 1 - calculateCircleArea should accept the float radius as parameter and calculate the area ( $\pi * r * r$ ). It should return the result value to the main method where it should be printed in the console.
- b. Method 2 – calculateCircumference should accept float radius as parameter and calculate the circumference ( $2 * \pi * r$ ). It should return the result value to the main method where it should be printed in the console.

Call these two methods from the main method in **Circle.java** by passing appropriate parameters.