Class Fundamentals and Objects

1. Create a class Book with properties title, author, and price. Create an object of Book and initialize the properties through the constructor. Print the properties of the book.
2. Define a class Car with properties make, model, and year. Create a method displayCarInfo to display the car details. Instantiate the Car class and call the method.
3. Write a class Student with an instance variable name and rollNo. Create a constructor that initializes both. Instantiate the class and display the details of the student.

Constructors

4. Create a class Rectangle with two instance variables length and width. Implement a constructor to initialize these variables. Create an object of the Rectangle class and compute its area.
5. Create a class Circle with a property radius. Write two constructors: one default and one that initializes the radius. Print the area of the circle using both constructors.
6. Write a constructor in the class Employee to initialize name, employeeId, and salary. Then, create an employee object and display the values.

Garbage Collection

7. Write a program to demonstrate garbage collection by creating multiple objects in a method and then forcing garbage collection using System.gc(). Observe and explain the behavior.
8. Create a class Product that has a constructor and a destructor (finalize method). Create an object, and observe when the finalize method is called.
9. Write a program that creates multiple objects of a class. After creating the objects, set all the references to null and invoke the garbage collector. Check the memory before and after garbage collection.

this Keyword

10. Define a class Book with two instance variables title and author. Use the this keyword in the constructor to distinguish between instance variables and constructor parameters.
11. Create a class Person with instance variables firstName and lastName. Write a method setFullName(String firstName, String lastName) and use the this keyword to refer to instance variables.
12. Create a class Employee that has an instance variable name and a local variable name. Use the this keyword to distinguish between the two.

Java's Access Modifiers

13. Create a class Account with private properties accountNumber and balance. Write public getter and setter methods to access and modify these properties.

14. Create a class Bank with a public method deposit and a private method checkBalance. Show how the private method is not accessible outside the class.
15. Write a class Employee with the following access modifiers: public, protected, private, and package-private for different properties. Demonstrate the access of each property within and outside the class.

Method Overloading

16. Write a class Calculator that contains multiple add methods: one that adds two integers, one that adds three integers, and one that adds two floating-point numbers. Demonstrate method overloading by calling each method.
17. Create a class Display with method overloading. Write two methods printInfo: one that prints a string and one that prints an integer. Call both methods from the main method.
18. Create a class Area that contains overloaded methods calculateArea to calculate the area of a rectangle, square, and circle. Demonstrate calling each method with the appropriate parameters.

static Keyword

19. Write a class Counter that has a static variable count and a static method incrementCount. Create two objects of the class and increment the count using both objects. Display the count using both objects and see if it’s the same.
20. Create a class Student with a static variable schoolName. Implement a static method to display the school name for each student. Instantiate multiple Student objects and call the static method.