**Experiment: 4**

PART A

(PART A: TO BE REFERRED BY STUDENTS)

**Aim: To study class, object, access modifiers, constructor, polymorphism-method overloading**

**Learning Outcomes: Learner would be able to**

1. Understand the classes, Objects and methods in JAVA
2. Understand the Constructors and method overloading in JAVA
3. Understanding the encapsulation concept in JAVA
4. Understanding the access modifiers in the JAVA

**Polymorphism**

In java it is possible to create methods that have same name but different parameters lists and different definitions. This is called method overloading. Method overloading is used when objects are required to perform similar tasks but using different input parameters. When we call a method in an object, Java matches up the method name first, and then the number and type of parameters to decide which one of the definitions to execute. This process is known as polymorphism.

**Constructor**

The constructor can be defined as the special type of method that is used to initialize the state of an object. It is invoked when the class is instantiated, and the memory is allocated for the object. Every time, an object is created using the new keyword, the default constructor of the class is called. The name of the constructor must be similar to the class name. The constructor must not have an explicit return type.

Based on the parameters passed in the constructors, there are two types of constructors in Java.

* Default Constructor: default constructor is the one which does not accept any value. The default constructor is mainly used to initialize the instance variable with the default values. It can also be used for performing some useful task on object creation. A default constructor is invoked implicitly by the compiler if there is no constructor defined in the class.
* Parameterized Constructor: The parameterized constructor is the one which can initialize the instance variables with the given values. In other words, we can say that the constructors which can accept the arguments are called parameterized constructors.

**Task 1:**

For the following Problem Statements write programs **using class, objects, constructors and methods with polymorphism.**

|  |  |
| --- | --- |
| 1. | WAP to compute the area of the room by illustrating the concept of constructor overloading where the length and breadth of the room passed as parameter through constructor which are same in one constructor and different in another constructor. Further use a method that computes the area of the room. |
| 2. | WAP to create a class named as Bird which consist the three constructor: first constructor displays the name of the bird with no-arguments. Second constructor takes the name of the bird as a parameter and third constructor takes both name and age of the bird as a parameters. Create three instances of class and display the names of the bird. |
| 3. | WAP to create a class called "Dog" with a name and breed attribute. Create two instances of the "Dog" class, set their attributes using the constructor and modify the attributes using the setter methods and print the updated values. |
| 4. | WAP to create a class called Car with private instance variables company\_name, model\_name, year and mileage. Provide public getter and setter methods to access and modify the company\_name, model\_name and year variables. However, only provide a getter method for mileage variable. |
| 5 | WAP to Create a class called StringHelper with two methods named concatenate. One method takes in two strings and returns their concatenation and other method takes in three strings and returns their concatenation. Create a instances of StringHelper class and call both methods with appropriate parameters. |
| 6 | WAP to create a calculator class with two add methods. The first method takes in two integers and returns their sum. The second method takes in three integers and returns their sum. create a Calculator object and call the add method with two integers similarly call the add method with three integers |
| 7 | A computer science professor written the java code as created a class called “MyClass” with a method named “myMethod” that is overloaded with four different visibility modifiers: public, private, protected and default (package-private).Demonstrate the above concept with method overloading under various visibility modifiers. |

PART B

(PART B: TO BE COMPLETED BY STUDENTS)

Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the portal at the end of the practical. The filename should be **JAVA\_batch\_rollno\_experimentno Example: JAVA\_A1\_A001\_P1**

|  |  |
| --- | --- |
| **Roll No.:** | **Name:** |
| **Prog/Yr/Sem:** | **Batch:** |
| **Date of Experiment:** | **Date of Submission:** |

Task 1: includes the following

1. Input statement

2. Output statement

3. Java code

4. Test cases

**Conclusion (Learning Outcomes):** Reflect on the questions answered by you jot down your learnings about the Topic:

**Homework Questions:**

* + - 1. **What is constructer? When is it invoked?**
      2. What is the difference between Constructor and method/function?
      3. What are the different types of Constructors available in java? Define.
      4. What will be the default access modifier of the constructor if we don’t explicitly define it?