Experiment No.-02

Aim: To demonstrate basic concept of Class, Methods, Objects and Constructor.

Problem Statement:

1. Write a Java Program to read and display student information using Class, Methods and Object.
2. Write a Java Program to calculate and display volume of 2 boxes using Class, Methods and Object concepts.
3. Write a Java Program to demonstrate constructor and its types

Theory:

- Object means a real-world entity.
- Object-Oriented Programming is a methodology or paradigm to design a program using classes and objects.
- It simplifies software development and maintenance by providing some concepts:
    - Object
    - Class
    - Abstraction
    - Encapsulation
    - Inheritance
    - Polymorphism

Object:

- Any entity that has state and behavior is known as an object.
    - For example, a chair, pen, table, keyboard, bike, etc.
- Object is a basic unit of Object Oriented Programming.
- Object represents a real-world entity.
- It can be physical or logical.
- An Object can be defined as an instance of a class.
- Java program creates many objects, which interact by invoking methods.
- Characteristics of an object are State , Behavior, Identity, Method

Class:

- Class Definition:
    - Collection of objects is called class.
    - A class is a group of objects which have common properties.
- It is defined as template or blueprint that describes the behavior/state that the object of its type supports.
- It is a logical entity. It can't be physical.
- Class doesn't consume any space
- It represents the set of properties or methods that are common to all objects of one type.
- **A class in Java can contain:**
    - Variables/data members
    - Methods
    - Constructors

Class Structure:

```
class class_name
{
        type variable;
        type method1();
        type method2(parameter-list);
}
```

Syntax to create object for a class

```
class_name object_name=new class_name();
```

- Example- Create an object for class Student- Student s1=new Student();

Method:

- A method is a way to perform some task.
- The method in Java is a collection of instructions that performs a specific task.
- A method is
    - a block of code or collection of statements/ instructions or a set of code grouped together to perform a certain task or operation.
- **Method declaration:**

```
type method_name (parameter-list)
{       // body of method
}
```

- **Types of methods in Java:**
    - Predefined Method
    - User-defined Method

Constructor:

- In Java, a constructor is a block of codes similar to the method.
- It is called when an instance of the class is created.
- At the time of calling constructor, memory for the object is allocated in the memory.
- It is a special type of method which is used to initialize the object.
- Every time an object is created using the new() keyword, at least one constructor is called.
- It calls a default constructor if there is no constructor available in the class. In such case, Java compiler provides a default constructor by default.
- A constructor initializes an object immediately upon creation. Once defined, the constructor isautomatically called immediately after the object is created, before the new operator completes.

- **Rules for creating Java constructor**
    - Constructor name must be the same as its class name
    - A Constructor must have no explicit return type
    - A Java constructor cannot be abstract, static, final.

Two types of constructors in Java:

- Default constructor (no-arg constructor)
- Parameterized constructor

Java Default Constructor

- A constructor is called "Default Constructor" when it doesn't have any parameter.

- **Syntax of default constructor:**

```
<class_name>(){}
```

- The default constructor is used to provide the default values to the object like 0, null, etc., depending on the type.

Java Parameterized Constructor

- A constructor which has a specific number of parameters is called a parameterized constructor.
- The parameterized constructor is used to provide different values to distinct objects.
- However, you can provide the same values also.
- Example

```
Student(int i,String n){
    id = i;
    name = n;
    }
```

Conclusion:

Students understood and implemented programs using concept of Class, Methods, Objects and Constructor.

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