CSE 215: Programming Language II Lab

Sec – 8, Faculty - MUO

Lab Officer: Tanzina Tazreen

Lab – 6

Class & Object

Objective:
To learn more about:

- OOP
- Class
- Object
- Attributes
- Method
- Constructor

OOP stands for **Object-Oriented Programming**.

Everything in Java is associated with classes and objects, along with its attributes and methods. For example: in real life, a car is an object. The car has **attributes**, such as weight and color, and **methods**, such as drive and brake.
Object oriented programming allows us to view the entities of the world as objects. For example, a student, a circle, a car, a book, all of them can be thought of as objects with some properties.

Object	Properties
Student	firstName lastName age gender
Circle	radius color
Car	model engineModel diameterOfWheels
Book	title author ISBN

A Class is like an object constructor, or a "blueprint" for creating objects.

Create a Class

To create a class, use the keyword class:

```
 <access_modifier> class <identifier>
{
    // attributes
    // methods
}
```

`<identifier>`: The Name of the Class.
`<access_modifier>`: defining who can see and access this class (access its attributes and methods). We will come back to this in details in the next Lab.

For Example:

```
public class Dog
{
   String breed;
   int age;
   String color;

   void barking() {
   }

   void hungry() {
   }

   void sleeping() {
   }
}
```

Create an Object

In Java, an object is created from a class.

An object of a class can be created within the same class or in a different class.

In Java, the **new** keyword is used to create an object.

```
public class Dog
{
   String breed;
   int age;
```

```
   String color;

   void barking() {
   }

   void hungry() {
   }

   void sleeping() {
   }

   //with in the same class
   public static void main(String[] args)
   {
    Dog Obj = new Dog();
   }
}

// within a different class
public class Main
{
  public static void main(String[] args) {
    Dog Obj = new Dog();
  }
}
```

Remember that the name of the java file should match the class name.
Here we have 2 classes. So, corresponding to that, we have 2 files also with the same name in the same directory/folder.

- Dog.java
- Main.java

Class Attributes & Method:

Attributes = Variable (within a class).

Method = Function (you already learn about this)

How to access them?

You can access attributes and methods of a class by creating an object of that class, and by using the dot syntax (.)

```
public class Dog
{
   String breed;
   int age;
   String color;
```

```
    void barking() {
    }

    void hungry() {
    }

    void sleeping() {
    }

    //with in the same class
    public static void main(String[] args)
    {
     Dog Obj = new Dog();
     Obj.color = "RED";
     Obj.barking();

     //multiple Objects
     Dog Obj2 = new Dog();
    }
}
```

Constructors:

- A constructor in Java is a **special method** with no return type and same method name as the class.
- The constructor is called when an object of a class is created.
- It can be used to set initial values for object attributes
- It can have zero to multiple parameters

```
public class Dog
{
    // Instance Variables
    String breed;
    int age;
    String color;

    // Default Constructor Declaration with no param
    public Dog()
    {
        breed = "NA";
        age = 0;
        color = "white";
    }
```

```
    // Constructor Declaration of Class
    public Dog(String breed, int age, String color)
    {
        this.breed = breed;
        this.age = age;
        this.color = color;
    }

    public static void main(String[] args)
    {
        Dog obj = new Dog();
        Dog obj2 = new Dog("papillon", 5, "white");

    }
}
```

Task:

1. Write a program to print the area and perimeter of a circle having radius of 5 units by creating a class named 'Circle' without any parameter in its constructor. Give another attribute named “color” then print the value of color in the console.

2. Write a program to print the area and perimeter of a circle having radius of 5 units by creating a class named 'Circle' with parameters in its constructor. Give another attribute named “color” then print the value of color in the console.