Java Inner Classes (Nested Classes)

- Java inner class or nested class is a class that is declared inside the class.
- We use inner classes to logically group classes in one place to be more readable and maintainable.
- Additionally, it can access all the members of the outer class, including private data members and methods

Syntax of Inner class

```
class Java_Outer_class
{
    //code
    class Java_Inner_class
    {
        //code
    }
}
```

Advantage of Java inner classes

- There are three advantages of inner classes in Java. They are as follows:

1) Nested classes represent a particular type of relationship that is it can access all the members (data members and methods) of the outer class, including private.
2) Nested classes are used to develop more readable and maintainable code because it logically group classes and interfaces in one place only.
3) Code Optimization: It requires less code to write.

Need of Java Inner class

- Sometimes users need to program a class in such a way so that no other class can access it. Therefore, it would be better if you include it within other classes.
- If all the class objects are a part of the outer object then it is easier to nest that class inside the outer class. That way all the outer class can access all the objects of the inner class.

Types of Nested classes

- There are two types of nested classes non-static and static nested classes.

- **Non-static nested class (inner class)**

1) Member inner class
2) Anonymous inner class
3) Local inner class

- **Static nested class**

Member inner class

- A non-static class that is created inside a class but outside a method is called member inner class. It is also known as a regular inner class.
- It can be declared with access modifiers like public, default, private, and protected.

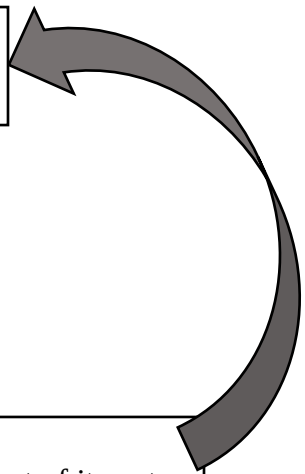
Java Member Inner Class Example

- In this example, we are creating a msg() method in the member inner class that is accessing the static data member of the outer class.

```
class Outer
{
    static int data=30;
    class Inner
    {
            void msg()
            {
                    System.out.println("data is "+data);
            }
    }
}
class Main
{
    public static void main(String args[])
    {

            Outer ou=new Outer();  //creating object of outer class
            Outer.Inner in=ou.new Inner();// creating object of inner class


            in.msg();
    }
}
/* E:\Ankur Patel\Sem-I\JAVA\T3 mcq>java Main
data is 30 */
```



How to instantiate Member Inner class in Java?

- An object or instance of a member's inner class always exists within an object of its outer class. The new operator is used to create the object of member inner class with slightly different syntax.

Java static nested class

- A static class is a class that is created inside a class, is called a static nested class in Java. It cannot access non-static data members and methods. It can be accessed by outer class name.
- It can access static data members of the outer class, including private.
- The static nested class cannot access non-static (instance) data members.

Java static nested class example with instance method

```
class Outer
{
	static int data=40;
	static class Inner
	{
		void msg()
		{
			System.out.println("data is "+data);
		}
	}
}
class Main
{
	public static void main(String args[])
	{
		Outer.Inner obj=new Outer.Inner();
		obj.msg();
	}
}
/*
E:\Ankur Patel\Sem-I\JAVA\T3 mcq>java Main
data is 40 */
```

- In this example, you need to create the instance of static nested class because it has instance method msg().
- But you don't need to create the object of the Outer class because the nested class is static and static properties, methods, or classes can be accessed without an object.

Java static nested class example with a static method

- If you have the static member inside the static nested class, you don't need to create an instance of the static nested class.

```
class Outer
```

```
{
	static int data=50;
	static class Inner
	{
		static void msg()
		{
			System.out.println("data is "+data);
		}
	}
}
class Main
{
	public static void main(String args[])
	{
		Outer.Inner.msg();//no need to create the instance of static nested class
	}
}
/*
E:\Ankur Patel\Sem-I\JAVA\T3 mcq>java Main
data is 50*/
```