Object Oriented Analysis and Design using Java

UE19CS353

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UE19CS353: Object Oriented Analysis and Design using Java

Classes, objects, Attributes, behaviours/methods and Access Modifiers

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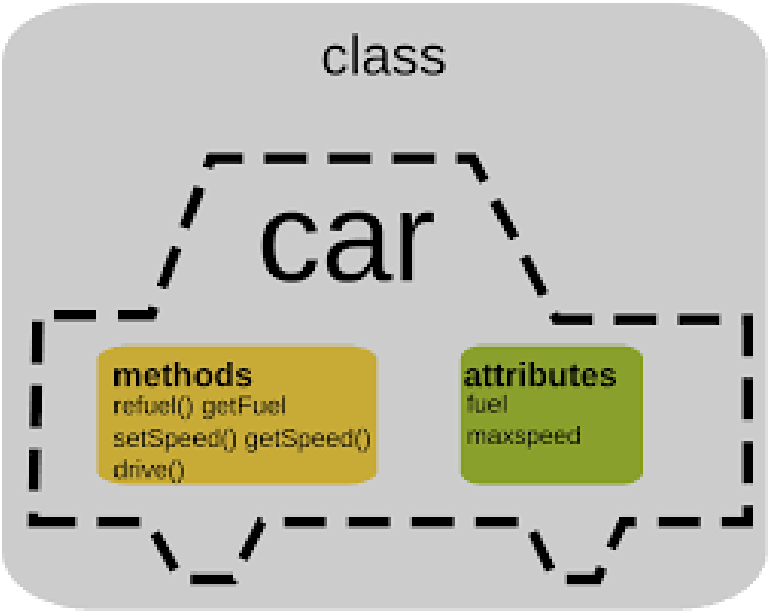
Agenda

- Class in Java
- object in Java
- Classes and Objects
- General class definition
- Class and Object creation in Java
- Program structure
- Simple Java programs and execution
- Access modifiers in Java
- Coding examples

Class in Java

- Defines a **non-primitive** and **new user defined data type**
- May contain **only data or only operation or both**
- The **template or blueprint** from which objects are made
- **Class is the basis of all Computation in Java:** Anything that exists as a part of the Java program has to be encapsulated within a class, whether it is a variable or a method or any other code fragment



object in Java

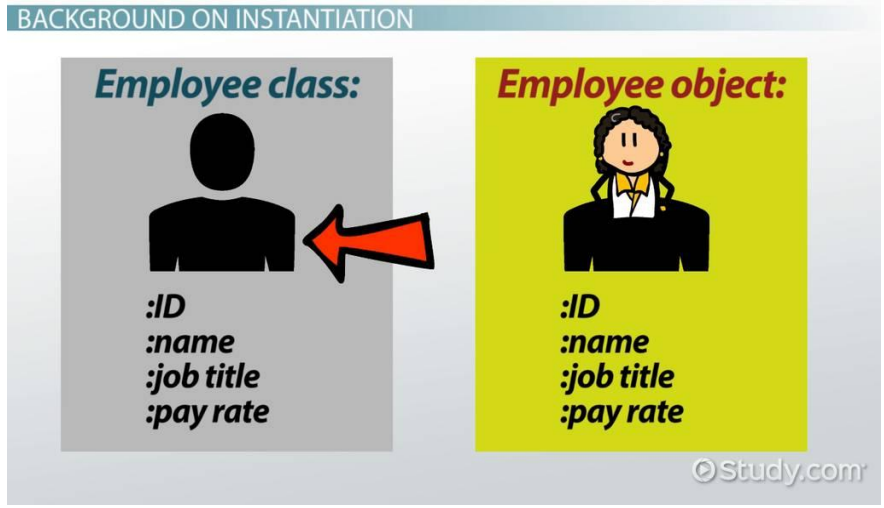
- **An instance of a class**
- Classes are categories and objects are items within each category
- All objects that are instances of the same class share a family resemblance by supporting the same behavior. The behavior of an object is defined by **the methods that you call**
- To work with OOP, identify **three key characteristics of objects**

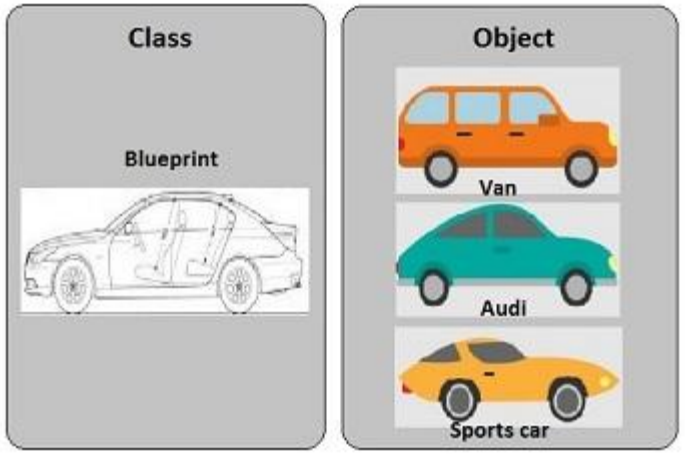
1. The object's behavior - What can be done with the object, or what methods can be applied to it?

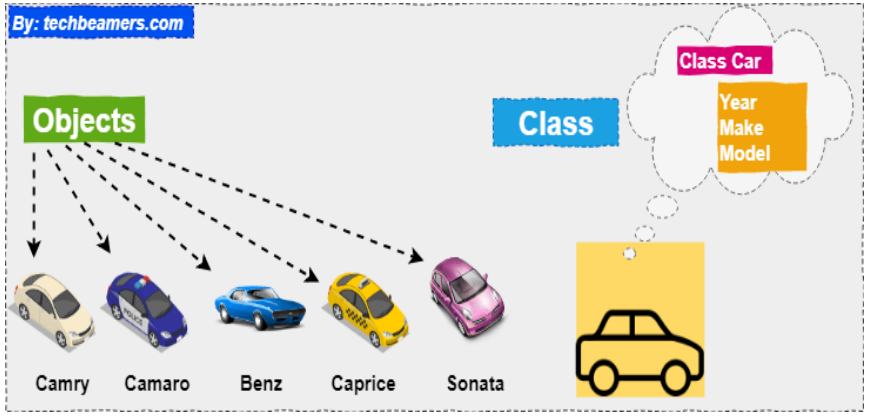
2.The object's state - How does the object react when it is invoked?

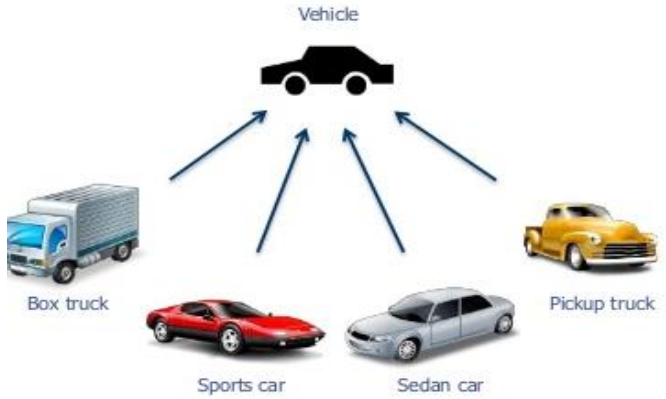
3.The object's identity - How is the object distinguished from others that may have the same behavior and state?

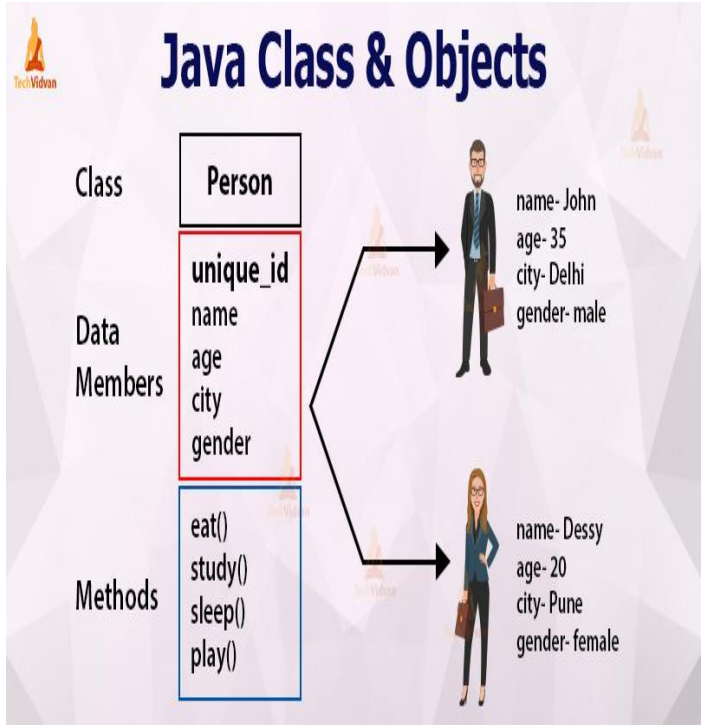
Classes and Objects



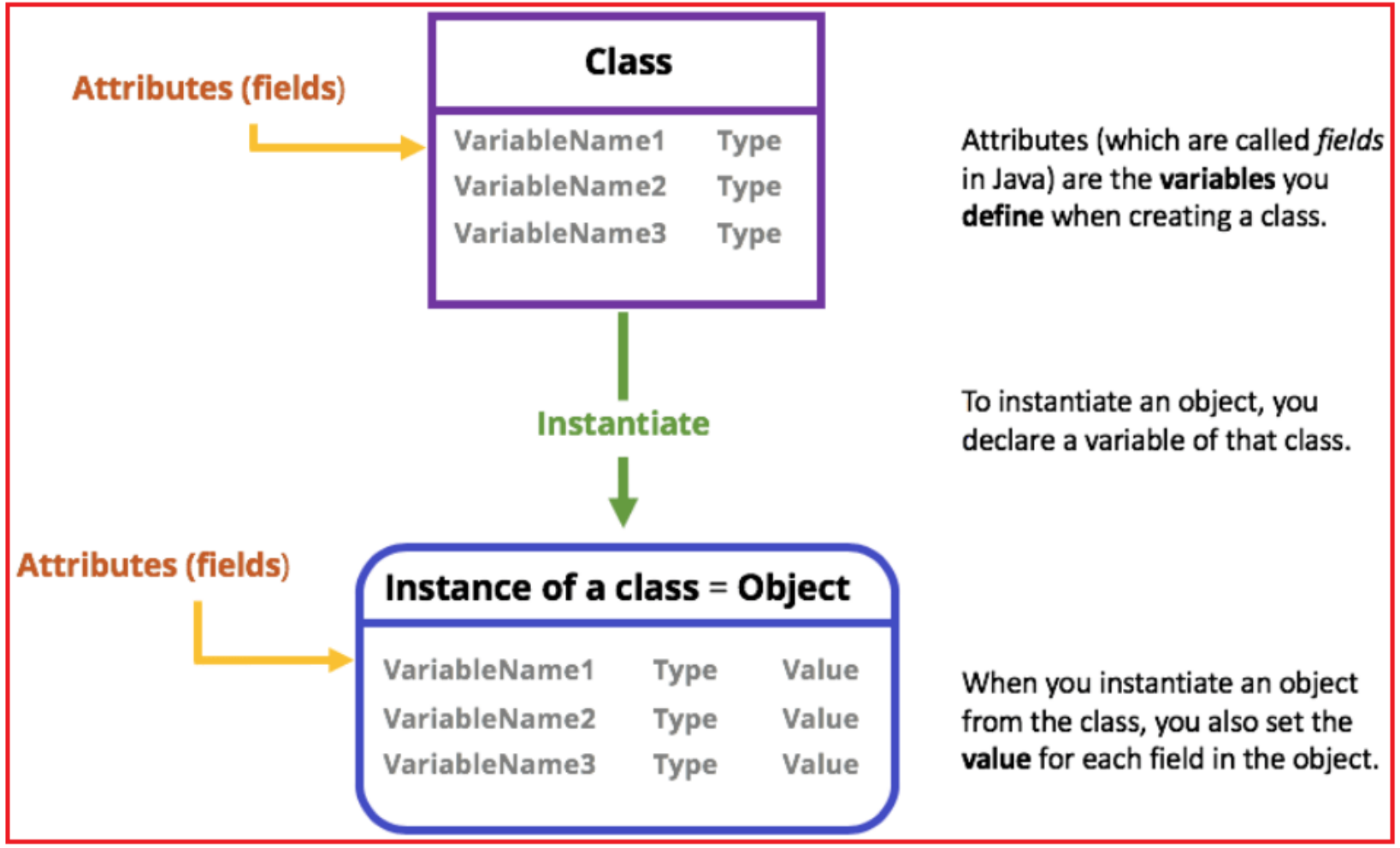








Classes and Objects continued..



Attributes (which are called *fields* in Java) are the **variables** you **define** when creating a class.

To instantiate an object, you declare a variable of that class.

When you instantiate an object from the class, you also set the **value** for each field in the object.

General class definition

Class Name
Attributes / Variables
Methods / Behaviours

```
class class_name {  // class is a keyword
        data_type instance_variable1;
        data_type instance_variable2;……..
        data_type method1() {…//body of the method}
        data_type method1() {…//body of the method}
…….
}
```

Box
Width, Height, Depth
disp () , set_width()

```
//Example class Box
class Box {
        float width;        float height;        float depth;
        void disp()
        {   // code to display width and height and depth        }
        void set_width()
        {   // code to set the width of the Box        }   …….
}
```

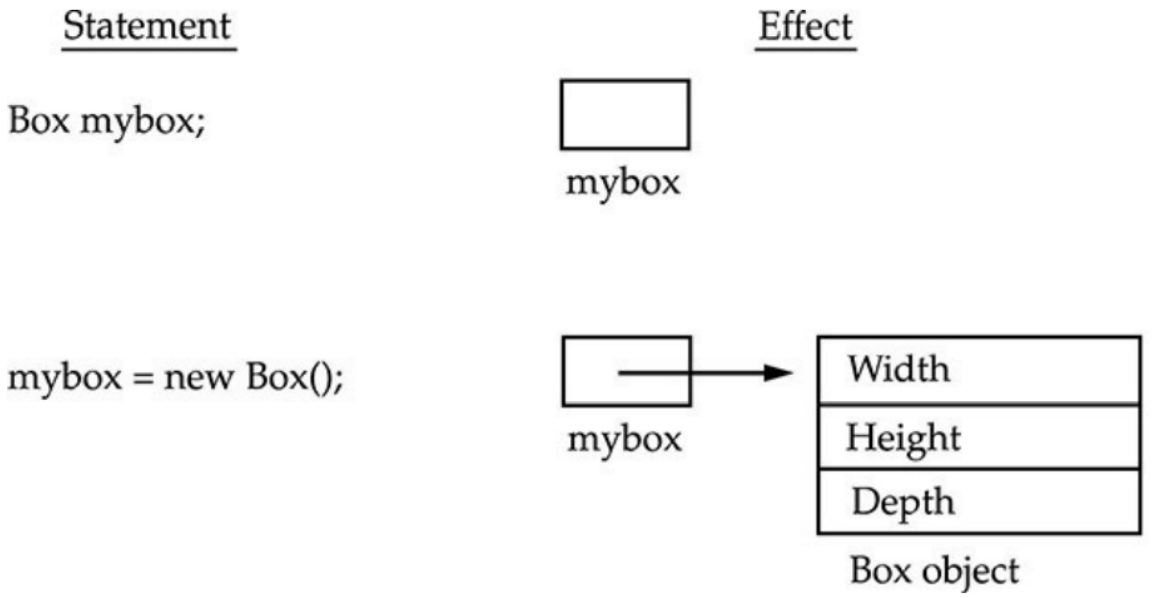
Class and Object creation in Java

Creation of a Class:

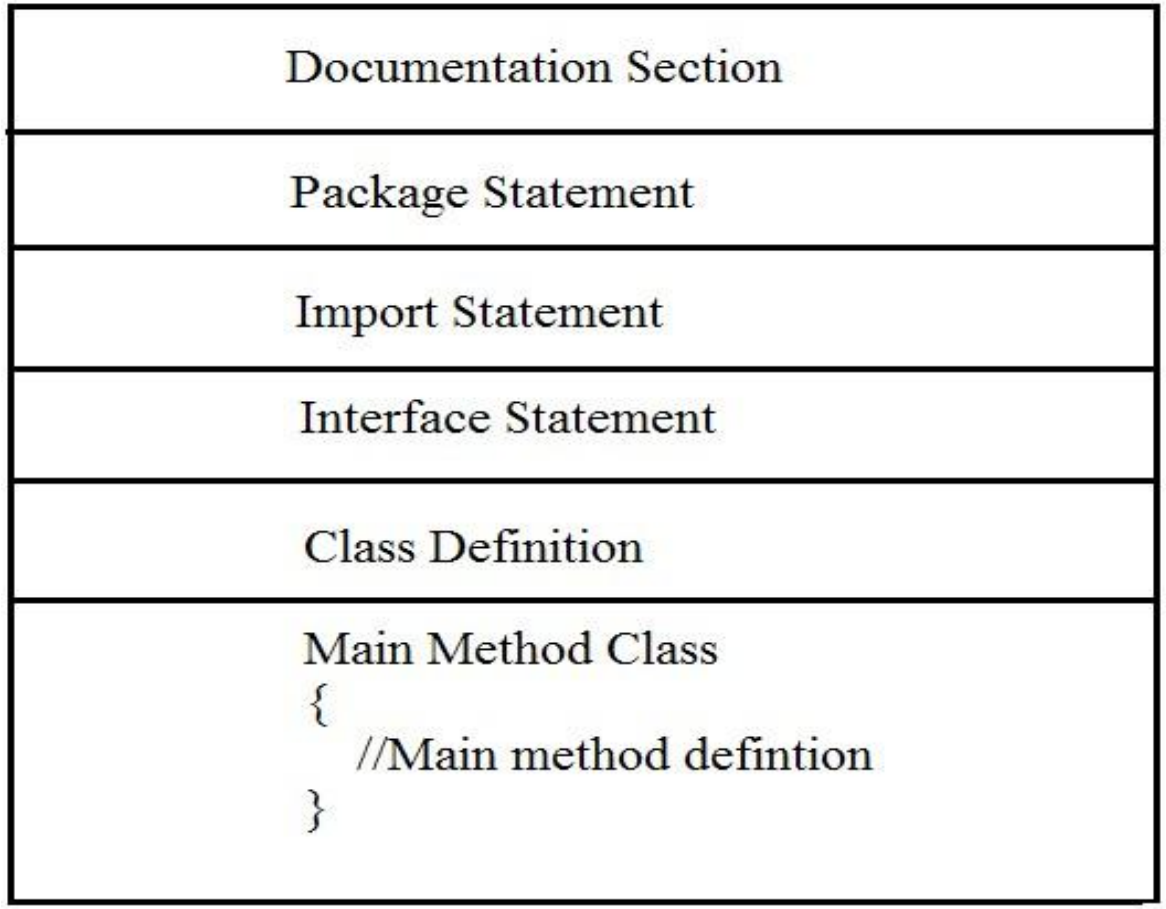
```
class Box
{
        double width;   double height;  double depth;
        void disp()
        {
                System.out.println("width: "+width);
                System.out.println("height: "+height);
                System.out.println("depth: "+depth);
        }
}
```

Creation of an instance of a class:

Box mybox = new Box();



Program Structure in Java



Simple Java Program and execution

- **Simple java code**

```
public class Sample
{
  public static void main(String[] args)
  {
    System.out.println("Hello World");
  }
}
```

- **Code development**

1: Open a command prompt window and go to the directory where you saved the java program (Sample.java).

2: Type 'javac Sample.java' and press enter to compile your code. If there are no errors in your code, the command prompt will take you to the next line

3: Type ' java Sample ' to run your program.

You will be able to see the result printed on the window.

OR

Use IDE – Eclipse, NetBeans, IntelliJ, BlueJ…..

Access Modifiers in Java

- Specifies the accessibility or scope of a field, method, constructor, or class.
- There are four types:
  - ✓ **Private**: Can be accessed only within the class. It cannot be accessed from outside the class.
  - **Default**: Can be accessed only within the package. It cannot be accessed from outside the package. If you do not specify any access level, it will be the default.
  - **Protected**: Can be accessed within the package and outside the package through child class. If you do not make the child class, it cannot be accessed from outside the package.
  - ✓ **Public**: The access level of a public modifier is everywhere. It can be accessed from within the class, outside the class, within the package and outside the package
- Coding examples

THANK YOU

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