

CHAPTER 1

UNIT I

BASIC PRINCIPLES OF OOP

DATA ABSTRACTION (In simple words)

- Hiding unnecessary details.
- Knowing necessary features.

Let us consider one real life example to understand more about abstraction-

Let's consider a car. A car is actually a very complicated machine. Every car is made up of thousands of individual parts each of which serves a different purpose. But while buying a car we do not go inside the engineering details but only consider the necessary ones such as how to drive, how to apply brake and so on...

- **Abstract class:** is a restricted class that cannot be used to create objects (to access it, it must be inherited from another class).
- **Abstract method:** can only be used in an abstract class, and it does not have a body. The body is provided by the subclass (inherited from).

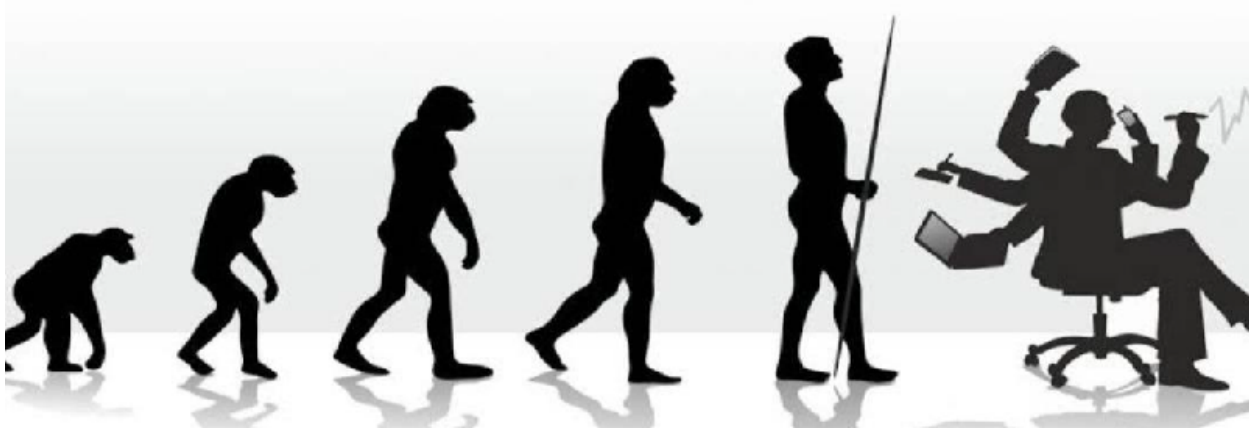
(An abstract class can have both abstract and regular methods)

Ex:-

```
abstract class Animal
{
public abstract void animalSound() ;
public void sleep()
{
System.out.println("Zzz");
}
}
```

INHERITANCE

Let's take the following example to understand inheritance:



We all know that humans have evolved through ages, we also know that our ancestors were probably monkey or chimpanzees... but in today's world are we considering ourselves to the monkey class only?? Of course not... therefore we can say that monkey was a class but human have evolved so much that they have now become a totally new class with only some characteristics as the monkey class.

Thus, we can conclude that **taking, suppressing or adding some characteristics or behaviors from another class and making or defining a whole new class is inheritance.**

Here, from the above real life example we can say that **monkey class is the base class or super class** and **human class is the derived class or sub-class.**

- **Base class:** the class that gets inherited to another class.
- **Derived class:** the class that inherits from the base class.
- **Reusability:** using an existing code to solve a new problem.

The keyword used for inheritance is **extends**.

Syntax :

```
class derived-class extends base-class
{
//methods and fields
}
```

Polymorphism

- The word polymorphism means having **many forms**.
- In simple words, we can define polymorphism as the process of using a method or function for more than one purpose.
- Polymorphism is considered as one of the important features of Object Oriented Programming.
- It is implemented by using **function overloading**.

Real life example of polymorphism

A person at the same time can have different characteristics. Like a man at the same time is a father, a husband, an employee. So the same person possesses different behavior in different situations. This is called polymorphism.

Function overloading :

When there are multiple functions with the same name but different parameters then these functions are said to be overloaded.

```
void myFunction()  
void myFunction(int a)  
void myFunction(float a)  
void myFunction(int a, float b)  
float myFunction (float a, int b)
```

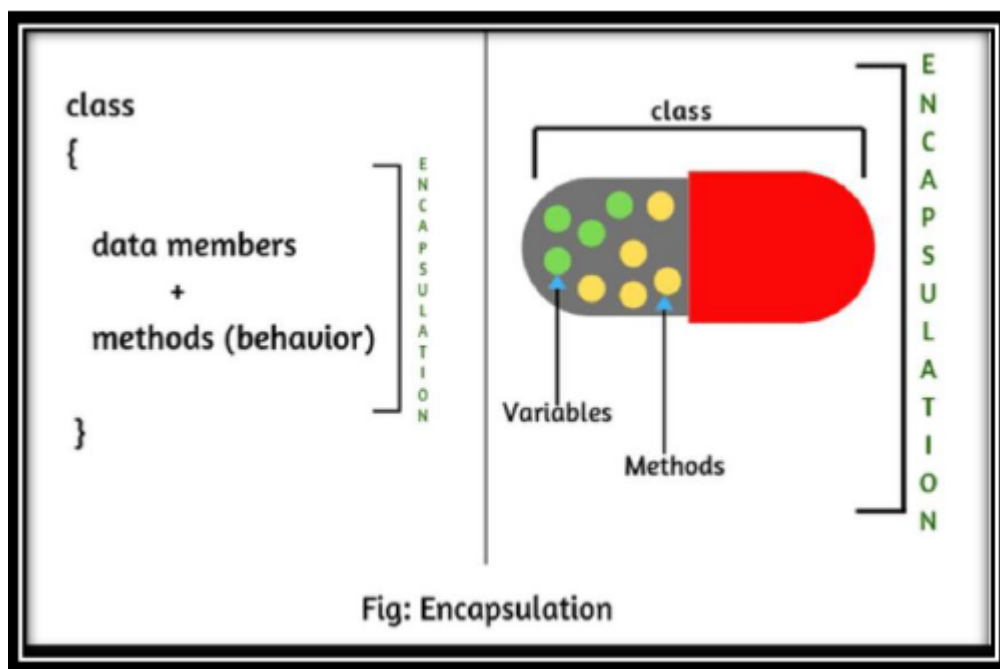
Here, in the above example you can see that the method name or the function name is the same i.e. "myFunction" but the parameters for all the above methods are different. And this is how it can be understood that which method is to be called.

ENCAPSULATION

In simple words. the action of enclosing something in or as if in a capsule.

Encapsulation in Java is a process of wrapping code and data together into a single unit, for example, a capsule which is mixed of several medicines.

Bundling similar fields and methods inside a class together also helps in **data hiding**.



As shown in the above figure:

The data members and the methods are together kept in a class and hence we can say that they are encapsulated within the class.

Advantages of encapsulation:

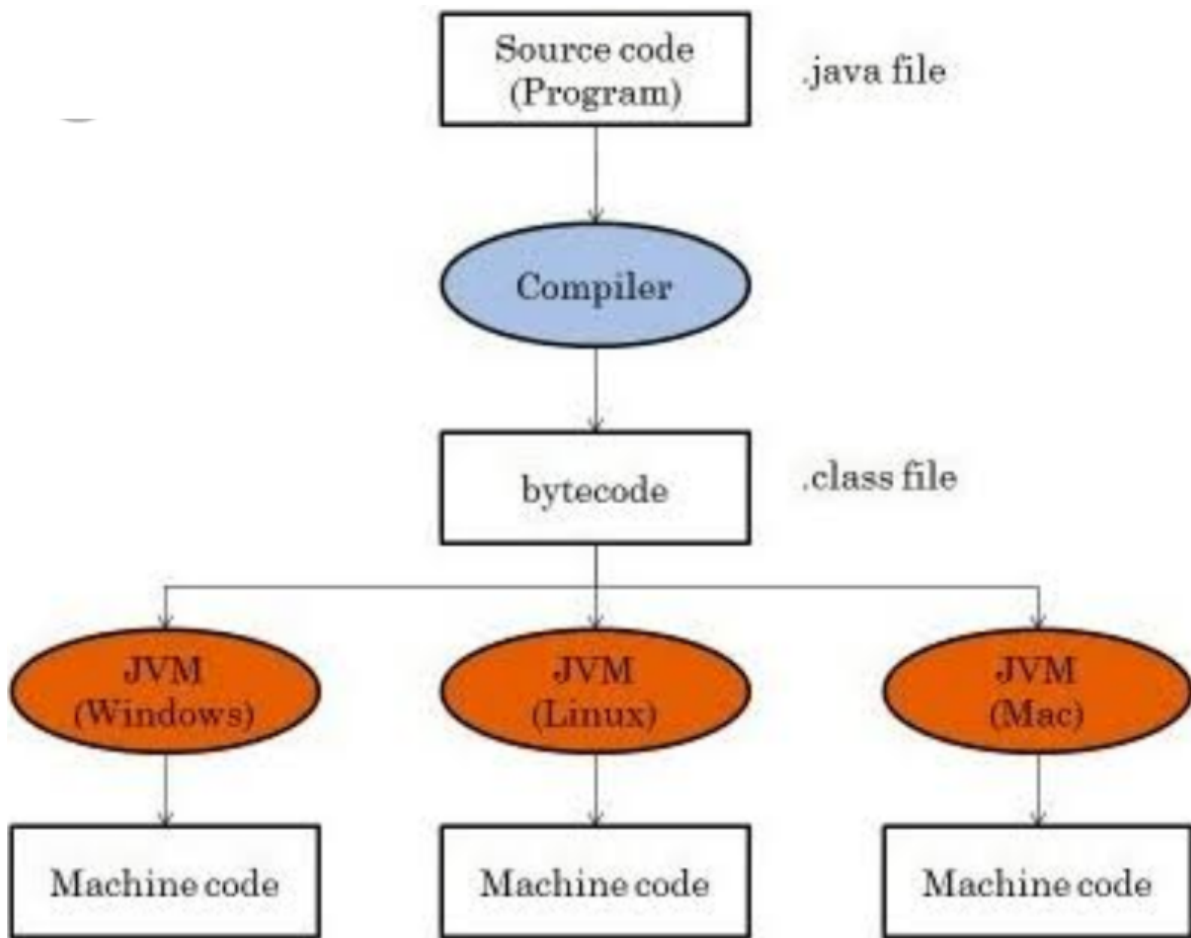
- The **variables in Java** or the method of the class are hidden from any other class and cannot be accessed outside the class.
- We can also call it, as Data-hiding.
- The encapsulated class is easy to test.
- It can be achieved by declaring the class as private while the methods as public so that the variables can be accessed.

UNIT II-INTRODUCTION TO JAVA

Basic Features of java:

1. Java is a object oriented programming language.
2. Java programs are both compiled and interpreted.
3. It can access data from local system as well as from net.
4. Java doesn't require any preprocessor(#) or inclusion of header files for creating a java program.
5. Java is case sensitive language.

Compiler and Interpreter (See the book Pg no.11-12)



Byte Code and Java Virtual Machine(See the Book Pg No.12)

Java package:

Java package is a collection of various classes which can be included in our program with the help of import keyword.

Java.lang is the default package of java programming.

Some example of java packages are: **java.io**, **java.applet**, **java.net**, **java.math** etc.

Java Reserved words:

Java reserved words or keywords are those words which carry special meaning to the java compiler. It can not be used as variables, methods, classes or any other identifiers.

Some of the reserved words or keywords are:

case	Switch	Else	break
static	Main	Do	float
For	Double	Public	int
new	Import	Class	default

Different types of java programming(See the book Pg No.14)

1. Java application
2. Java applet or Internet applet

Output Statement in Java Programming:

System.out.print()-After printing(displaying the result in output screen) cursor remain in the same line.

`System.out.println()`-After printing(displaying the result in output screen) cursor goes to the next line.

Answer the following questions in your copy....

1. Define the following terms:
 - a) Encapsulation with an example
 - b) Data abstraction with an example
2. Describe 'Inheritance' with a suitable example.
3. What is meant by polymorphism? Explain with an example.
4. What does reusability mean?
5. Which OOP principle implements function overloading.
6. What is the use of keyword 'import'?
7. Define Byte code and JVM.
8. Distinguish between
 - a) Compiler and Interpreter.
 - b) Source code and object code
9. Define a) Java application b) Internet applet

****** Children are requested to go through the notes thoroughly and write down the notes and the questions and their answers in your respective copies. All the subject copies will be checked as soon as the school reopens ******

Book: Understanding Computer Applications with BlueJ ICSE Class IX

Chapter: 1: Unit I and Unit II

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