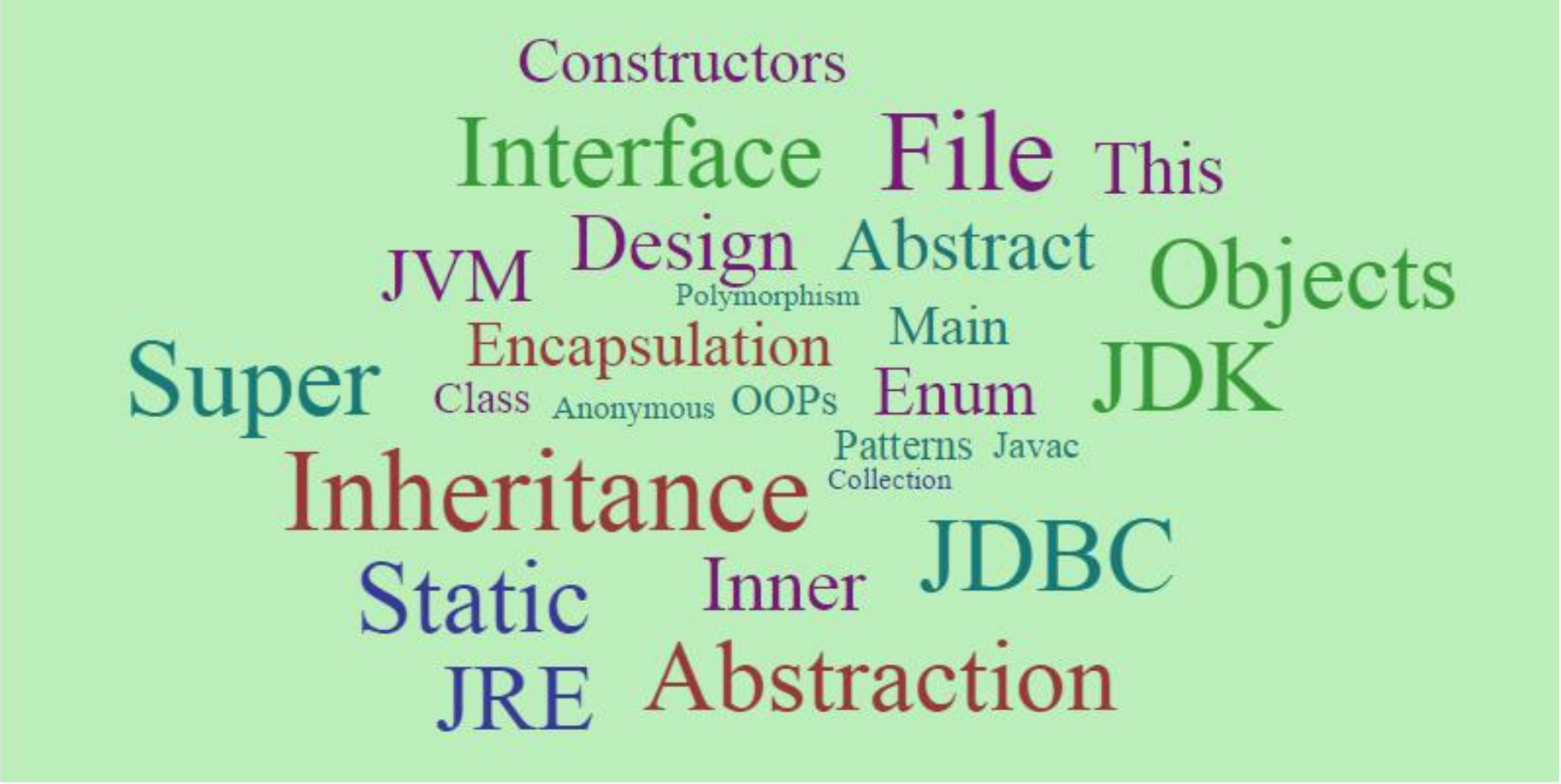
Java Training

Module 1 – Core Java

Are You Ready??



Outline

- OOPs concepts
- Introduction to Java
- Installation steps
- Eclipse & First Java Program
- Basics of programming
- Introduction to class and object

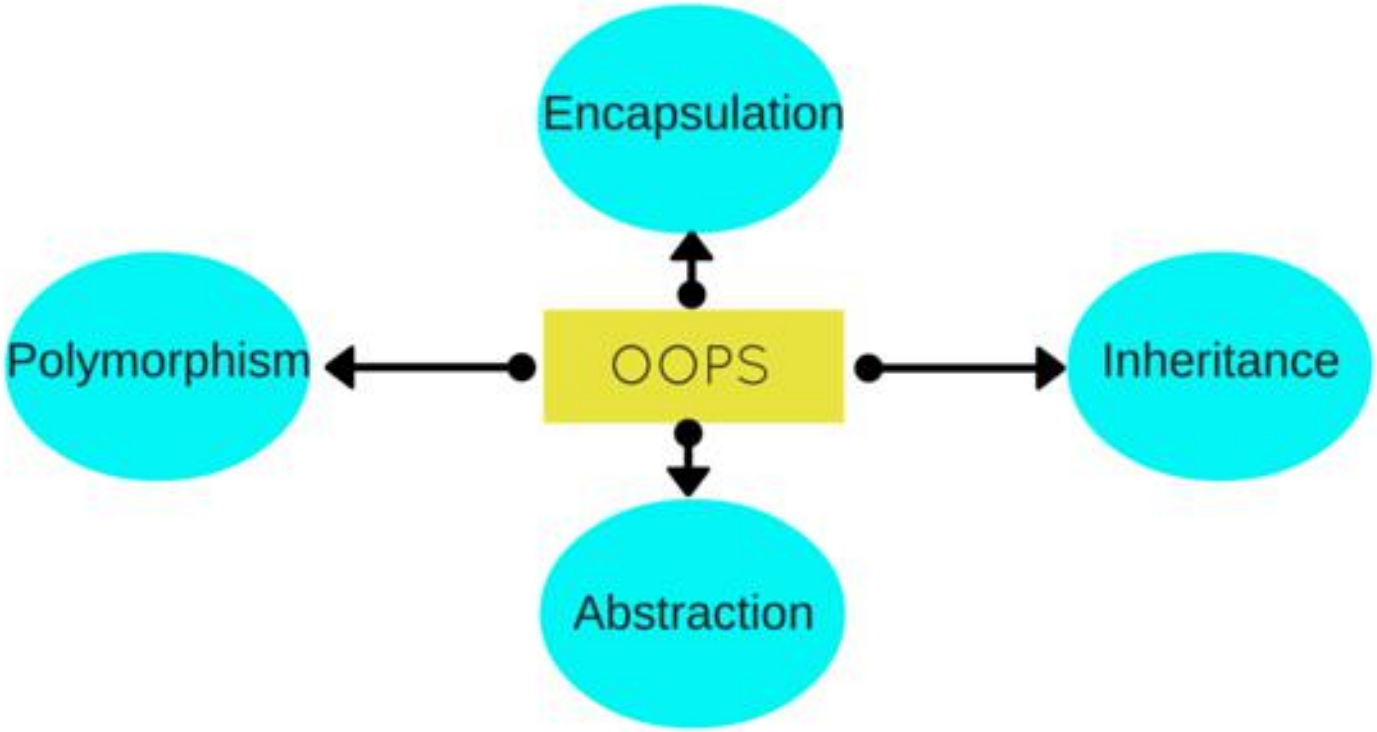
Outline(cont...)

- Access specifiers/modifiers
- Static
- Scanner and command line arguments
- Public static void main(…)
- Shadowing, this keyword
- Enum
- Types of Inheritance
- Super
- Abstract class and Interface

Outline(cont…)

- Anonymous class
- Inner class
- Exception handling
- Collection
- File I/O
- Multithreading
- Miscellaneous

OOPs Concepts

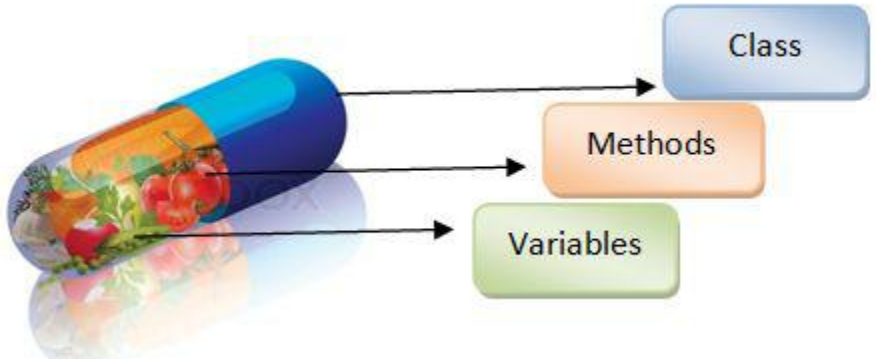


Encapsulation

- Wrapping up of variables and methods together into a single unit
- Data hiding
- How to achieve?

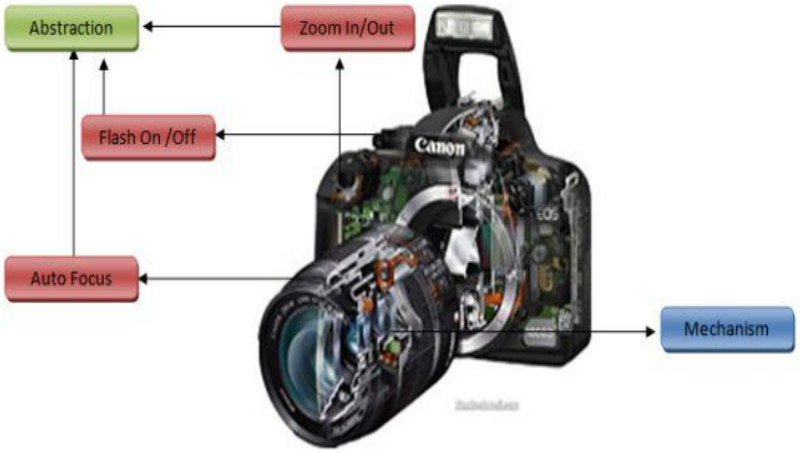
1. Declare properties as private
2. Expose behaviors as public

- How to achieve?
- Using access specifiers



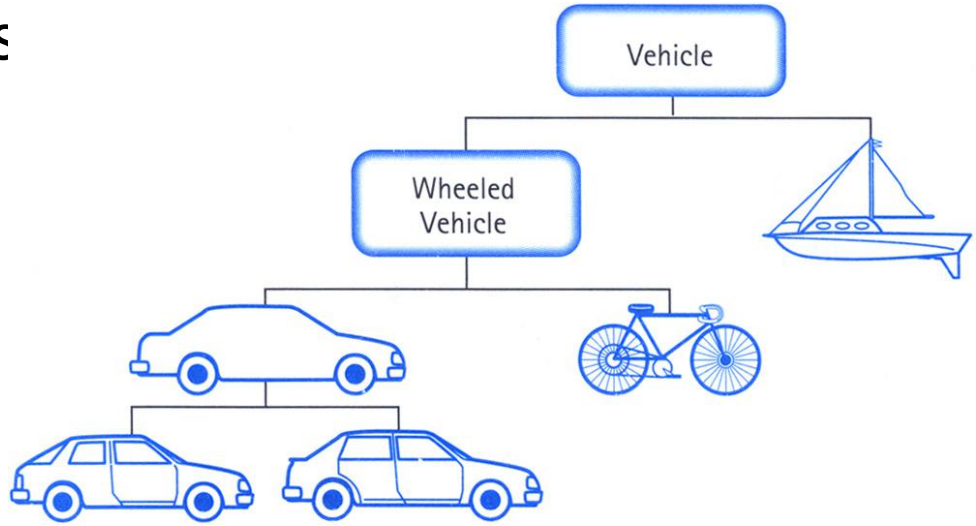
Abstraction

- Showing essentials features of an object to client
- Used as an interface to the user
- How to achieve?
- Using abstract class and inter



Inheritance

- Allowing classes to inherit commonly used state and behavior from other class
- Used for code reusability
- How to achieve?
- Using extends keyword



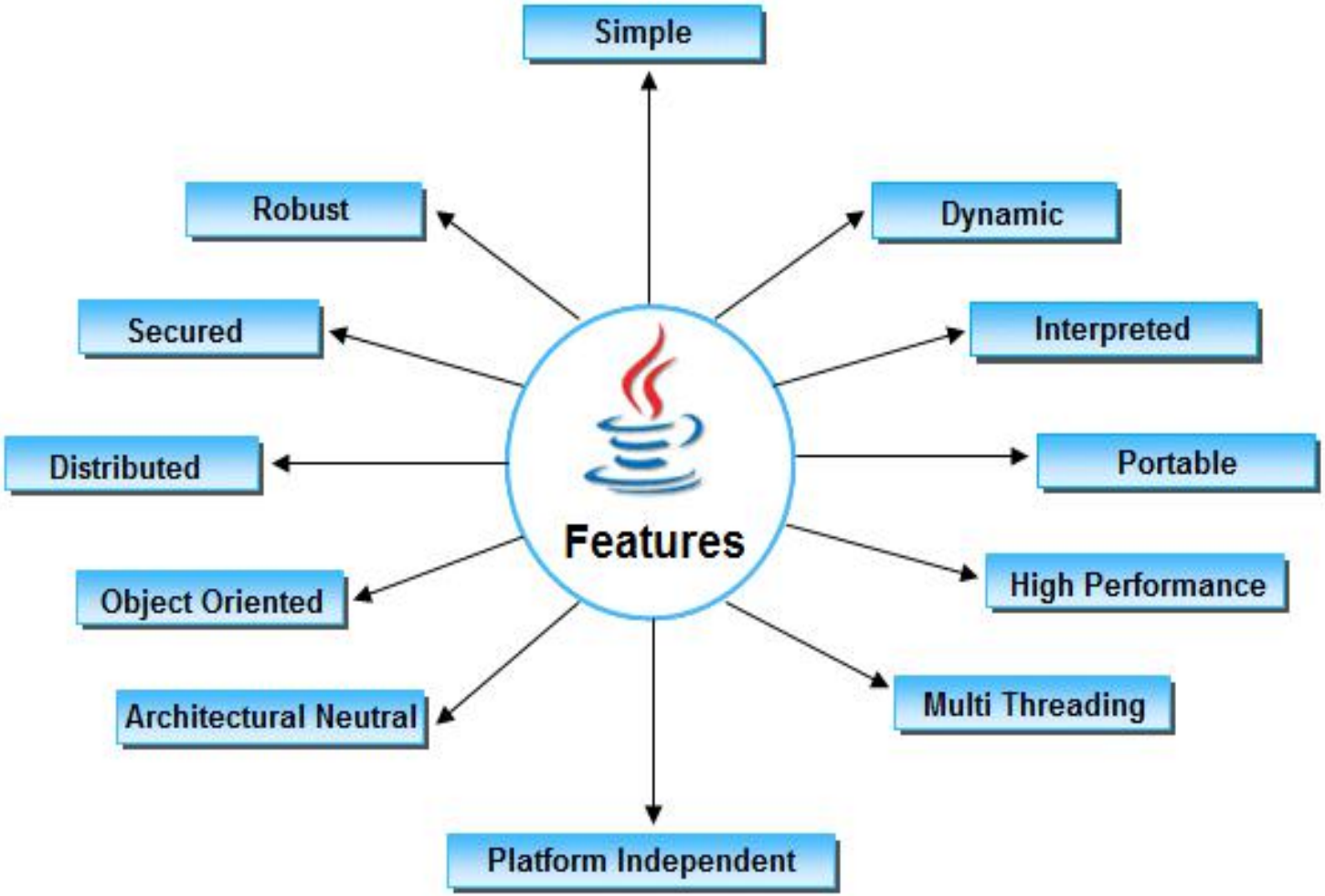
Polymorphism

- One thing in multiple forms
- Ability to process objects differently based upon data type and class
- How to achieve?
- Overloading and Overriding

Introduction

- Higher level programming language
- Not 100% pure
- Developed by Sun Microsystems
- James Gosling – 1991
- Now it is the product of Oracle
- Worldwide 9 million Java develope
- 3 billion mobile phones run Java
- Latest version : Java 8

Java Features

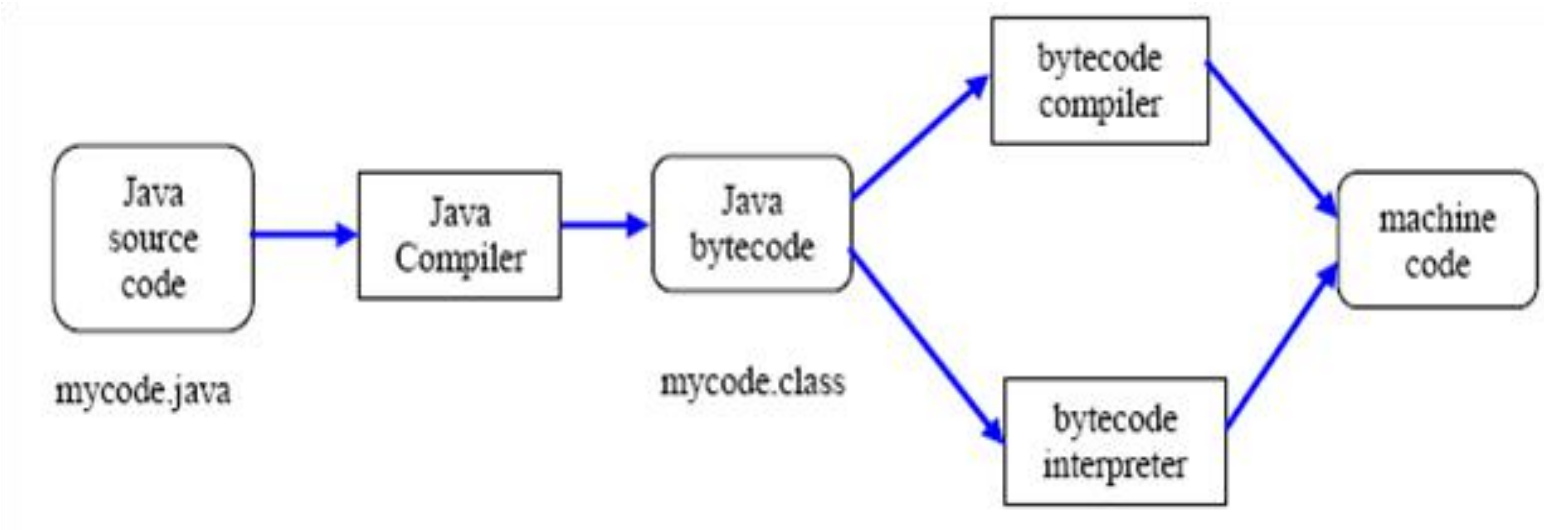


JVM,JDK and JRE

Installation steps

- Download latest java version from https://java.com/en/download/
- C:/Program Files/Java
- Environment variables : PATH,LIB,INCLUDE
- Two commands : javac and java

Compilation



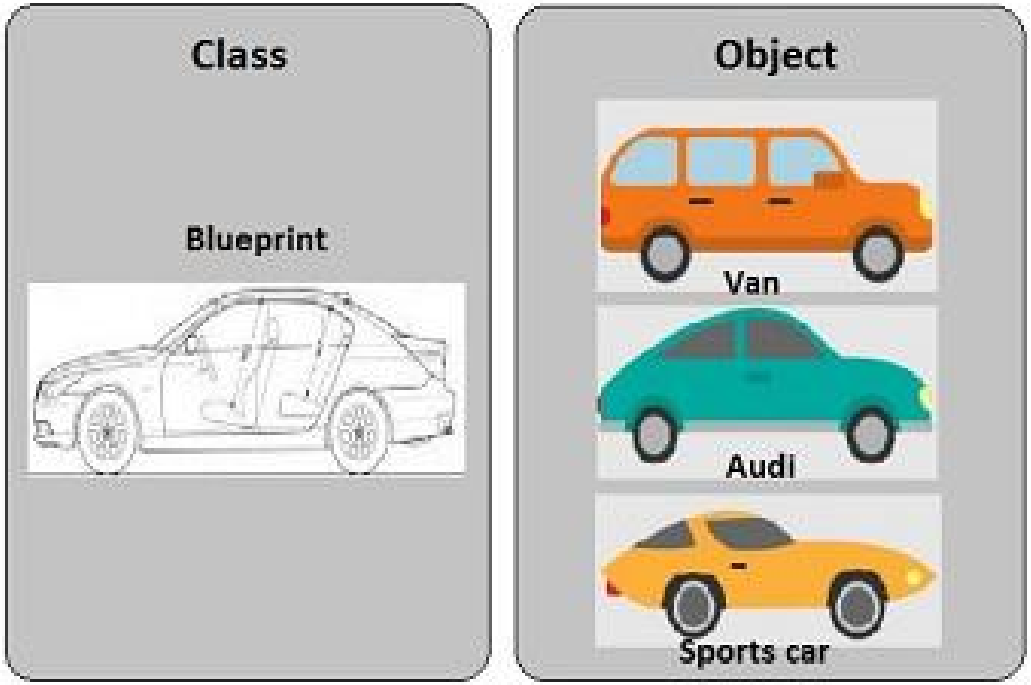
Eclipse

- Open source IDE
- To develop robust and fully-featured platform
- Download from http://www.eclipse.org/
- You may download latest version : either Mars or Neon

Basics of programming

Introduction to class and object

- Class : blueprint to describe states and behaviors
- Object : instance of class
- Three types of variables : local, instance and class level variables
- Constructor
- Object creation



Access Specifiers

- To define visibility of variables and methods
- Not applicable to local variables
- 4 types

Visibility	Public	Protected	*Default*	Private
From the same class	Yes	Yes	Yes	Yes
From any class in the same package	Yes	Yes	Yes	No
From a subclass in the same package	Yes	Yes	Yes	No
From a subclass outside the same package	Yes	Yes, *through inheritance*	No	No
From any non-subclass class outside the package	Yes	No	No	No

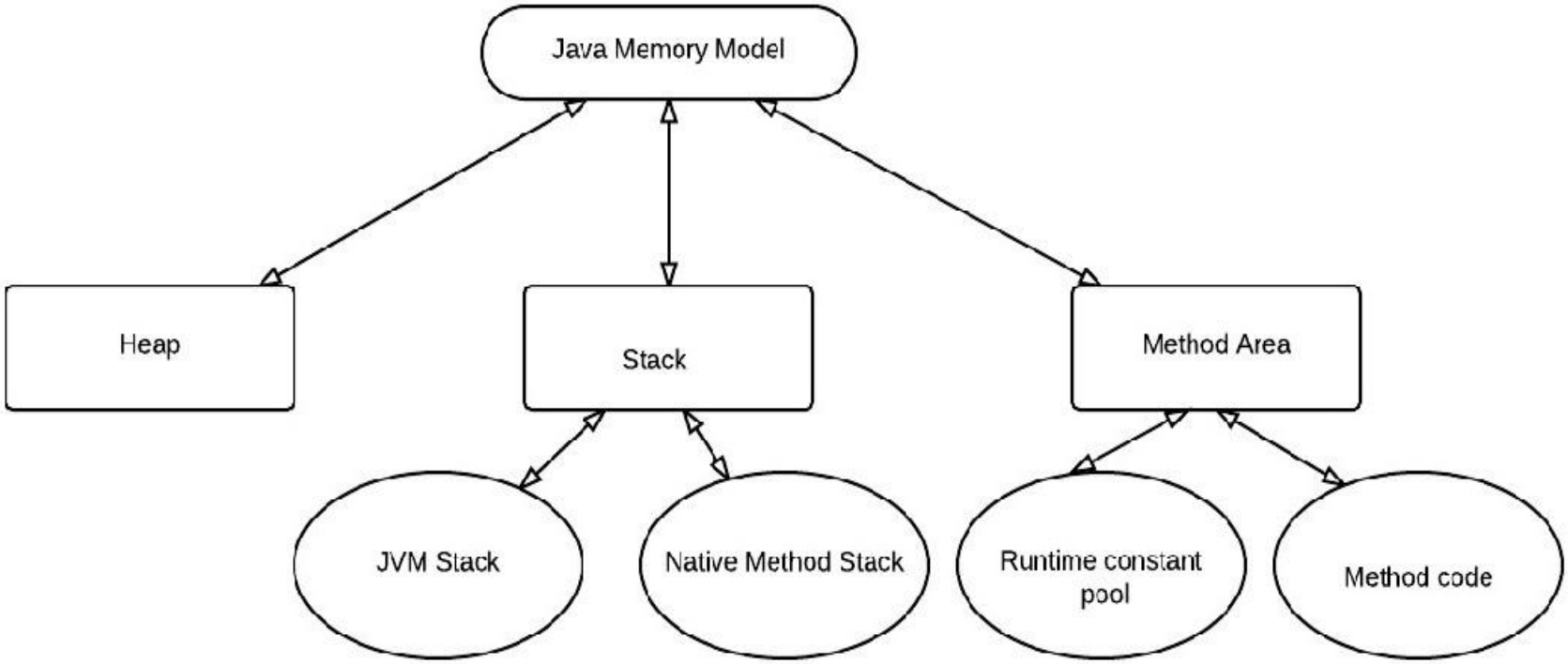
Static

- Scope : class level
- Independent of objects
- Shared among all objects of a class
- Applicable to variable, method and block
- One time memory allocation at the time of class loading
- Saves memory compare to instance variables
- Memory is allocated in class area(others are stack memory,heap memory,etc)
- Syntax : Classname.variable, Classname.method()

Static(Cont…)

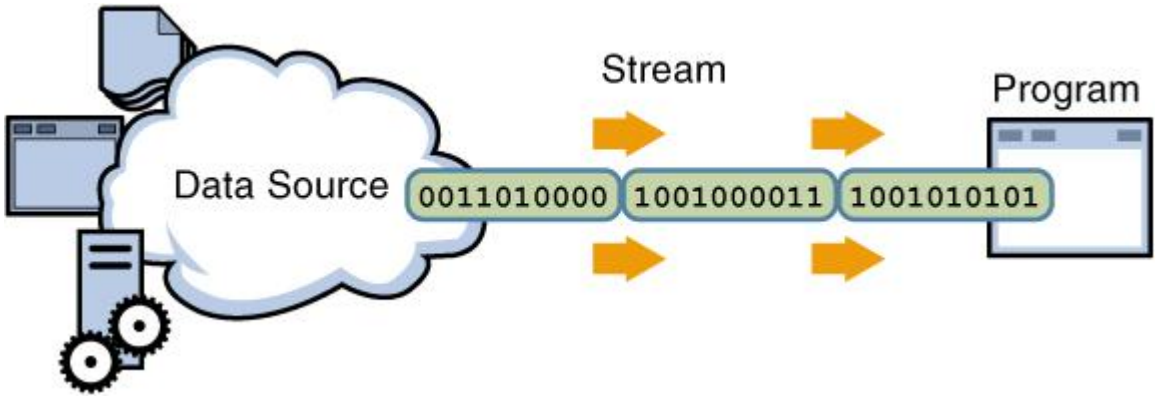
- Static method
- It allows only static variables
- cannot use this and super keywords
- Static block
- It is used to initialize static variables
- It is executed before main method
- It is invoked at the time of class loading

Memory Model

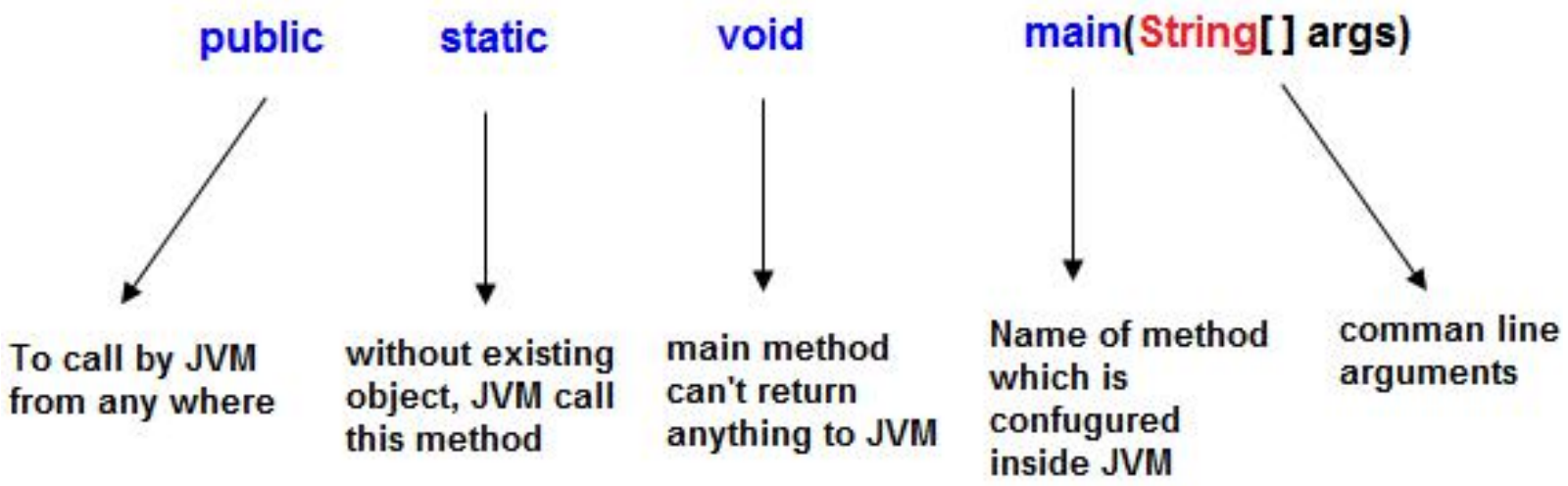


User Input

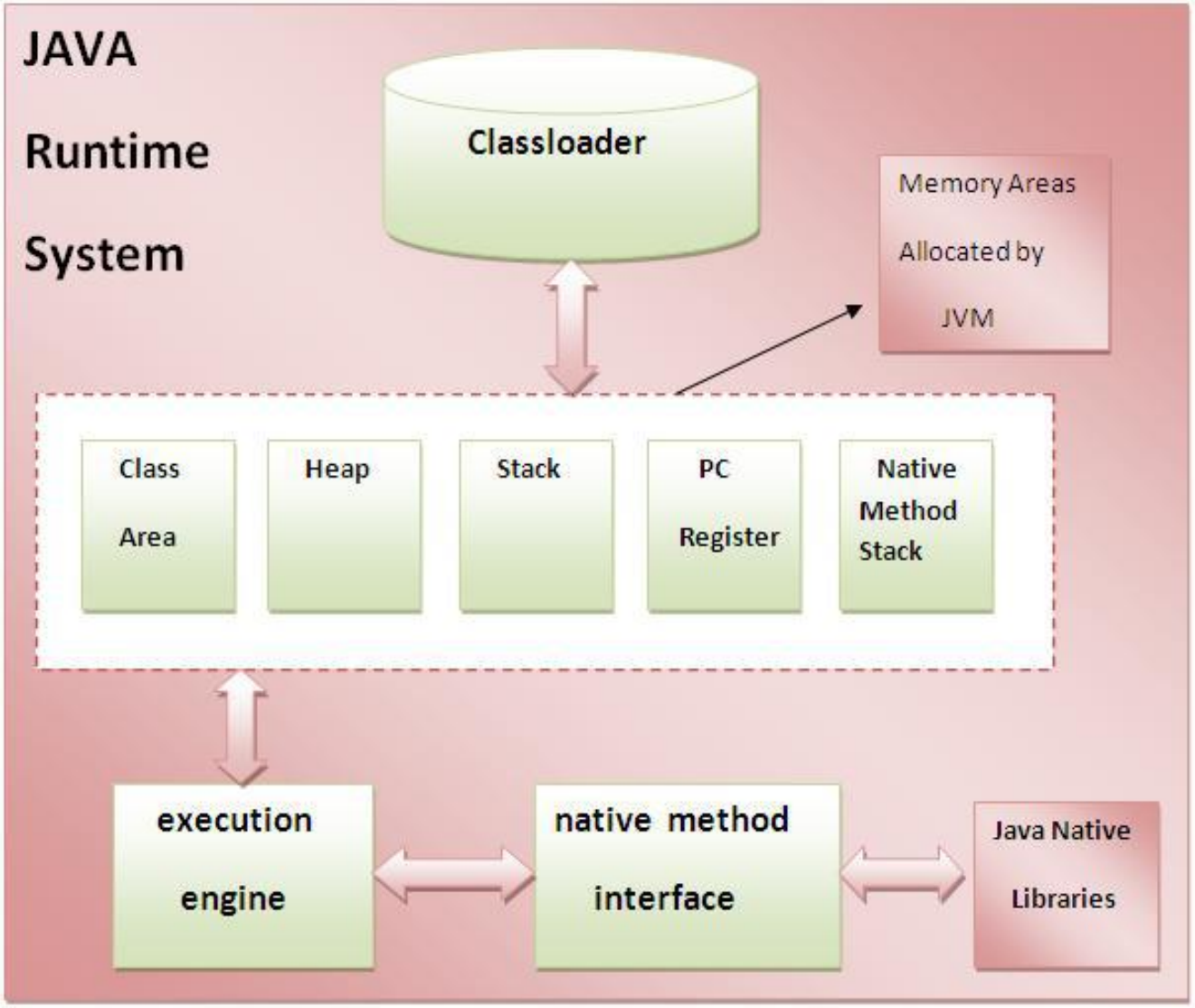
- Scanner class
- Command line arguments
- InputStreamReader
- BufferedReader



Main method


public
static
void
main(String[ ] args)
To call by JVM from any where
without existing object, JVM call this method
main method can't return anything to JVM
Name of method which is confugured inside JVM
comman line arguments

JVM Architecture

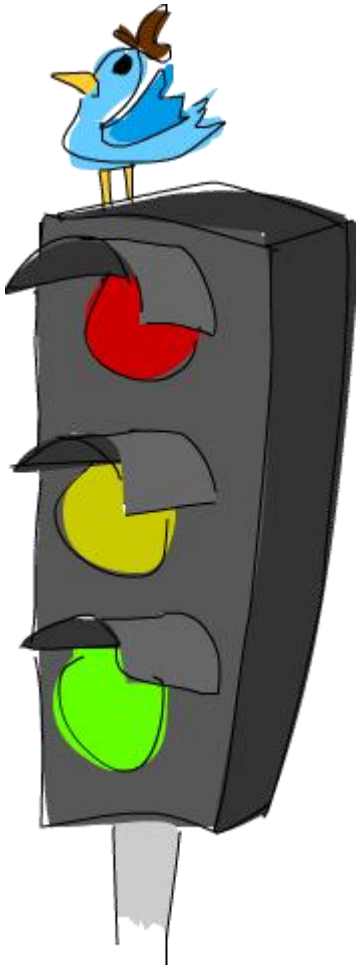


Shadowing and this keyword

- Shadowing : local variables hide instance variables in local scope
- Solution : this keyword
- To exlicitly point to current invoking object
- It is final variable so can't assign values i.e this=new Student()
- Applicable to only non-static variables

Enum

- Set of constants
- datatype in java
- Can be used with if,switch case,for loop,variable and method
- Supports constructors and methods

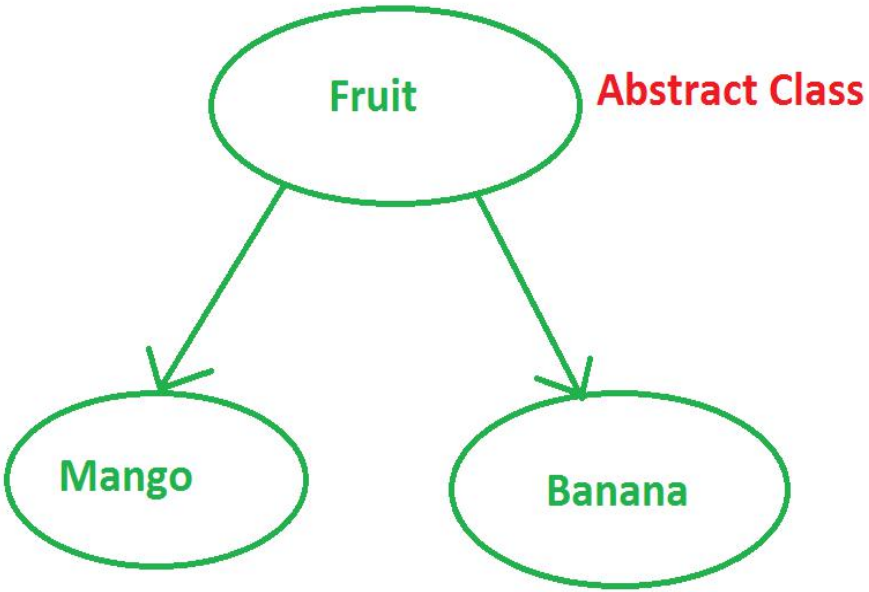


Types of Inheritance

- Parent-child relationship
- Usage : Code reusability
- Types : Single,multiple,multilevel,hierarchical,hybrid
- Java directly doesn't support multiple inheritance
- Super : to invoke properties of parent from child class

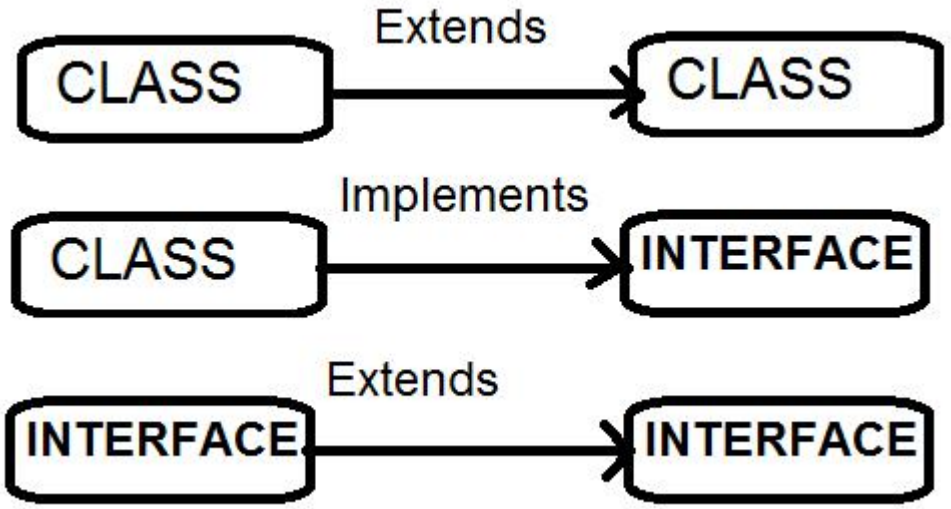
Abstract class

- Atleast one abstract method
- no object
- can have constructors
- extends keyword

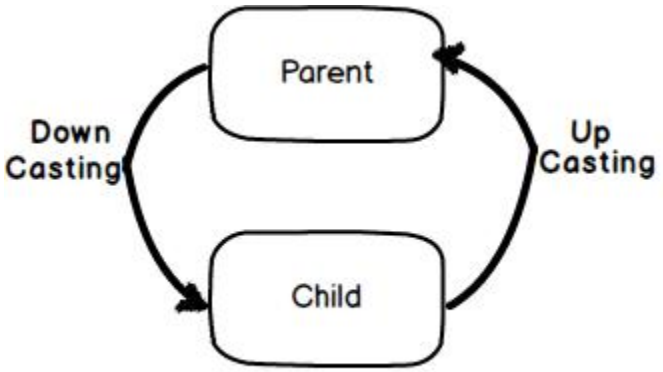


Interface

- 100% abstract class
- no object
- can't have constructors
- implements keyword



Polymorphism



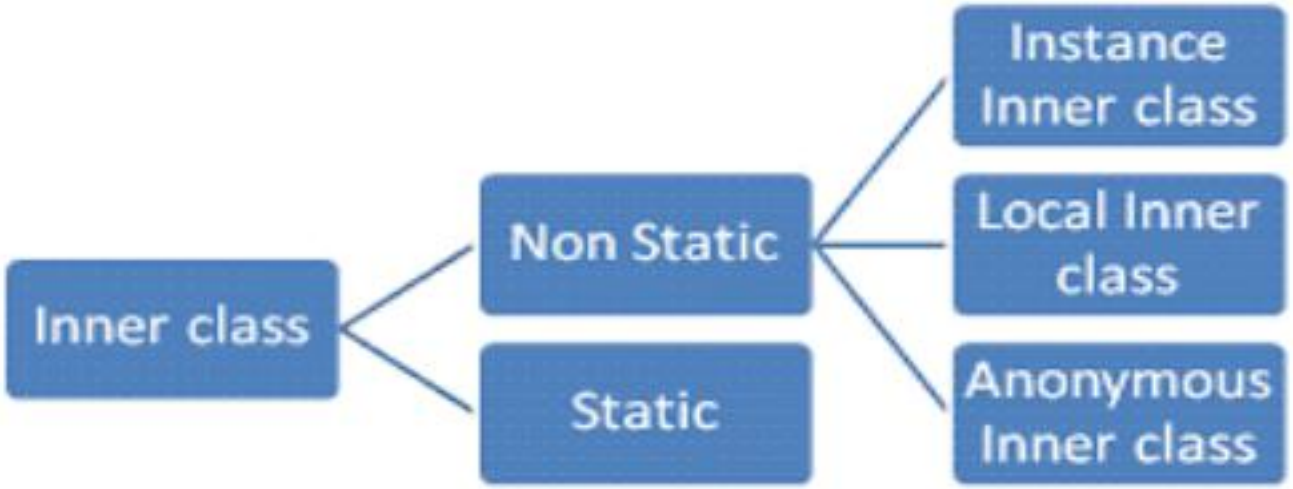
- One thing in multiple forms
- Method overloading : same method with different signature - static polymorphism
- Method overloading : same method with same signature - dynamic polymorphism
- Upcasting : Dog d=new Dog() ; Animal a=(Animal) dog
- Downcasting : Animal a = new Dog() ; Dog d=(Dog) a

Anonymous class

- Class having no name
- Way of creating an instance without actually creating subclass
- It is declared and initialized simultaneously
- Since it has no name,it can be used only once
- Format of anonymous class name : MainClassName$Id

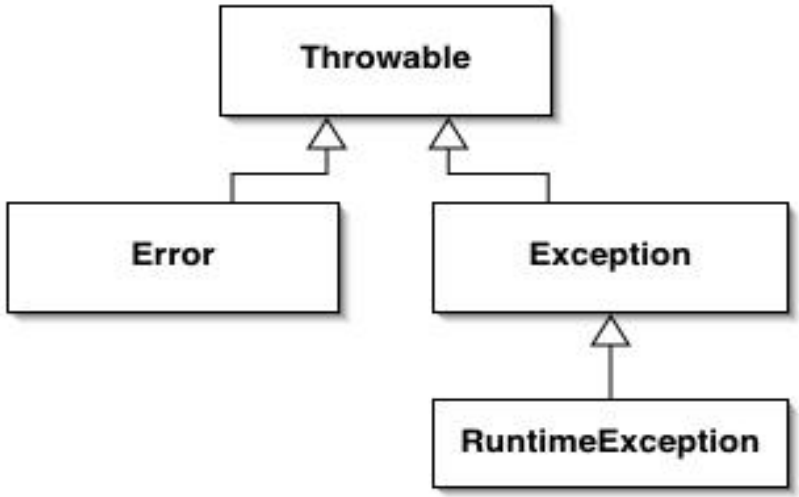
Inner class

- A class inside the class
- Logical group of classes having similar functionalities
- It can access private data of outer class
- Usage : security , database configuration



Exception handling

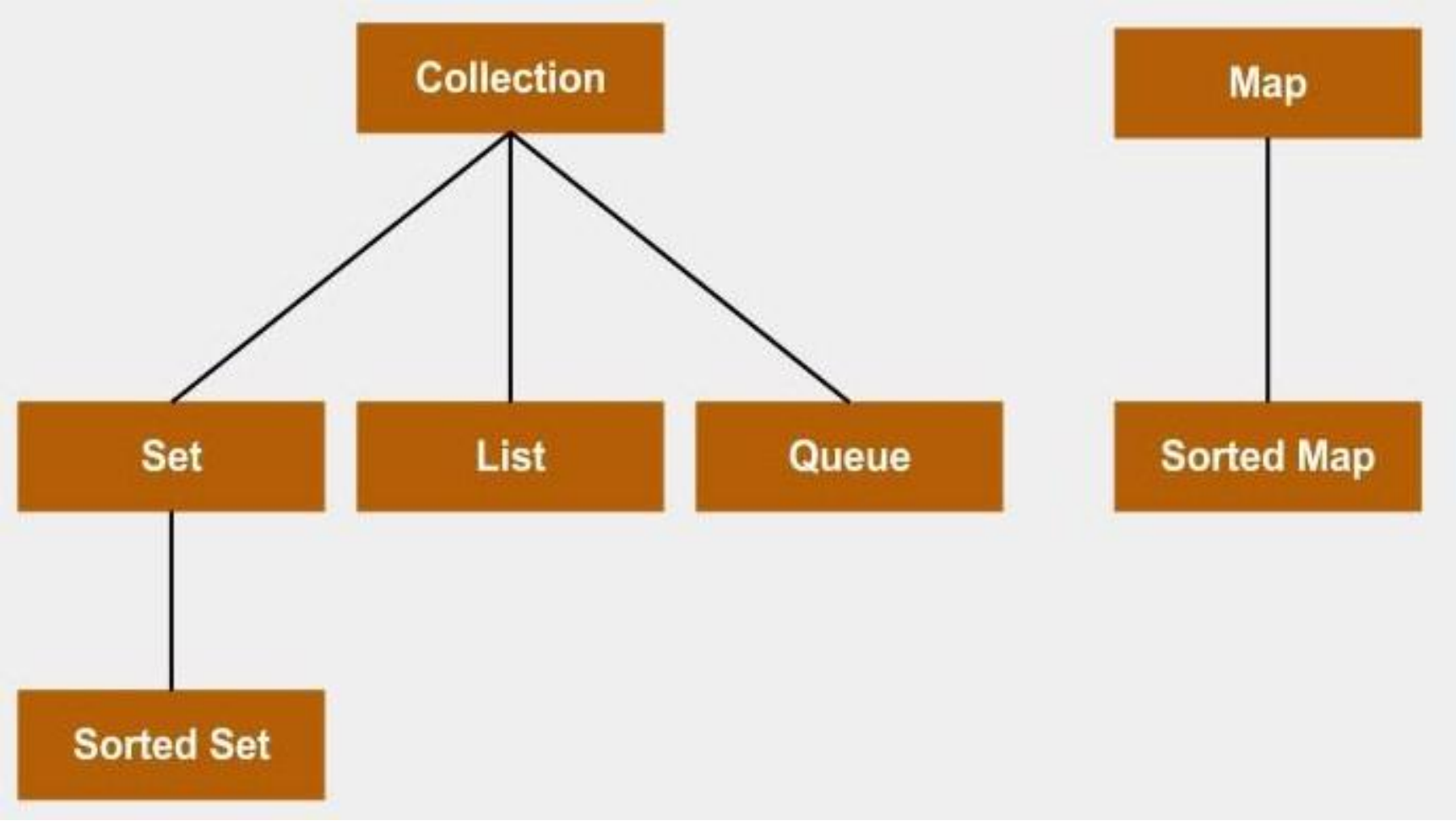
- Runtime error
- Two types : checked and unchecked exceptions
- Throwable : Error(unchecked) and Exception(checked)
- Exception : RuntimeException(unchecked)



Collection

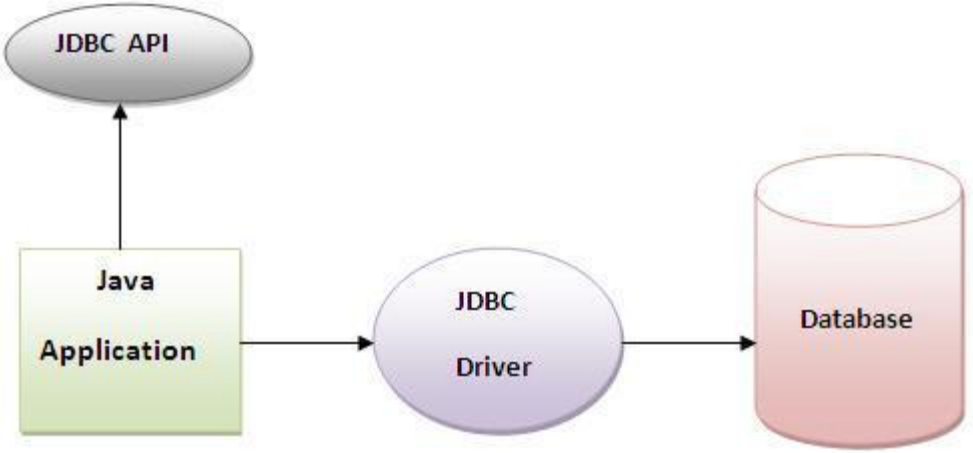
- A framework which is used for data storage
- Common operations : create,insert,update,delete,search,sort
- Main interfaces : List,Set and Map
- List : ArrayList,Vector,LinkedList
- Set : TreeSet,Hashset,LinkedHashSet
- Map : Hashtable,HashMap
- Object sorting
- Comparable,comparator

Collection Hierarchy



JDBC

- Java to DataBase Connectivity
- Driver class for MySQL - com.jdbc.mysql.Driver
- Connection object
- Statement v/s PreparedStatement
- ResultSet
- SQL queries

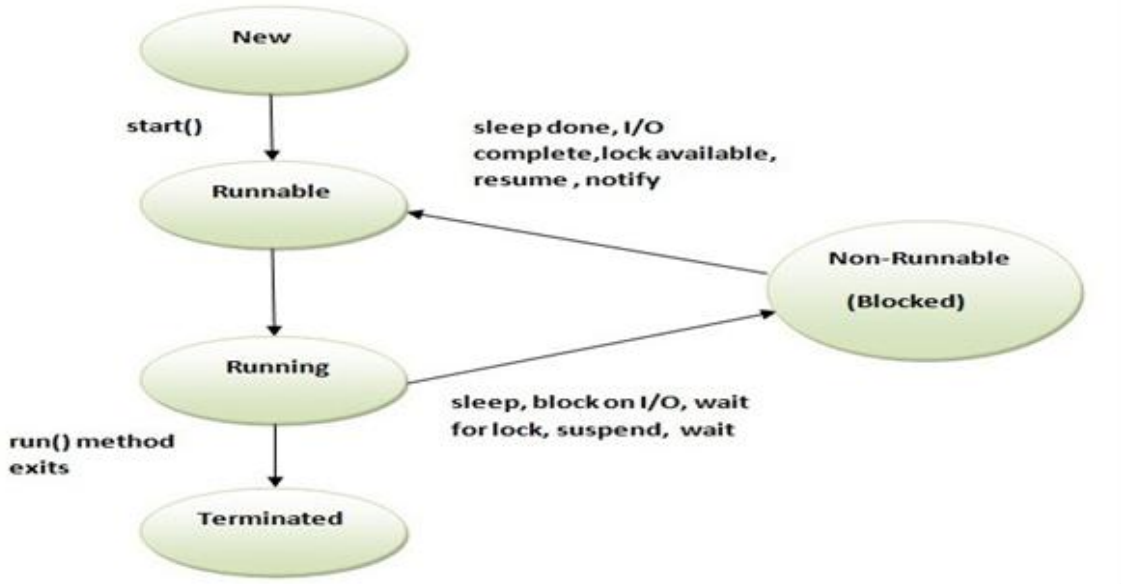


File I/O

- FileReader and FileWriter classes
- Character-basedclasses
- BuferedReader and BufferedWriter
- To buffer input and improve efficiency
- Faster compare to FileReader
- APIs available to get metadata of a file

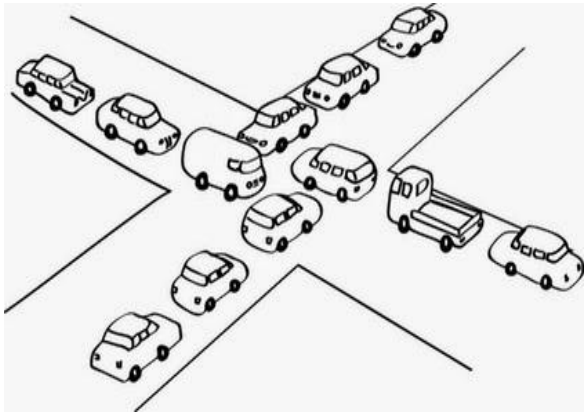
Multithreading

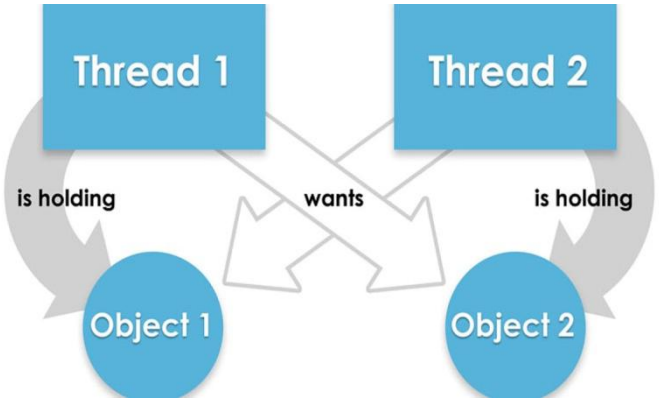
- Parallel execution
- Thread : light-weight and small unit of process
- Use : Video games and animation
- Lifecycle



Multithreading(Cont…)

- Two ways to create a thread : By extending Thread class and by implementing Runnable interface
- APIs
- start()
- run()
- sleep()
- join()
- wait()
- notify()
- notifyall()
- synchronization

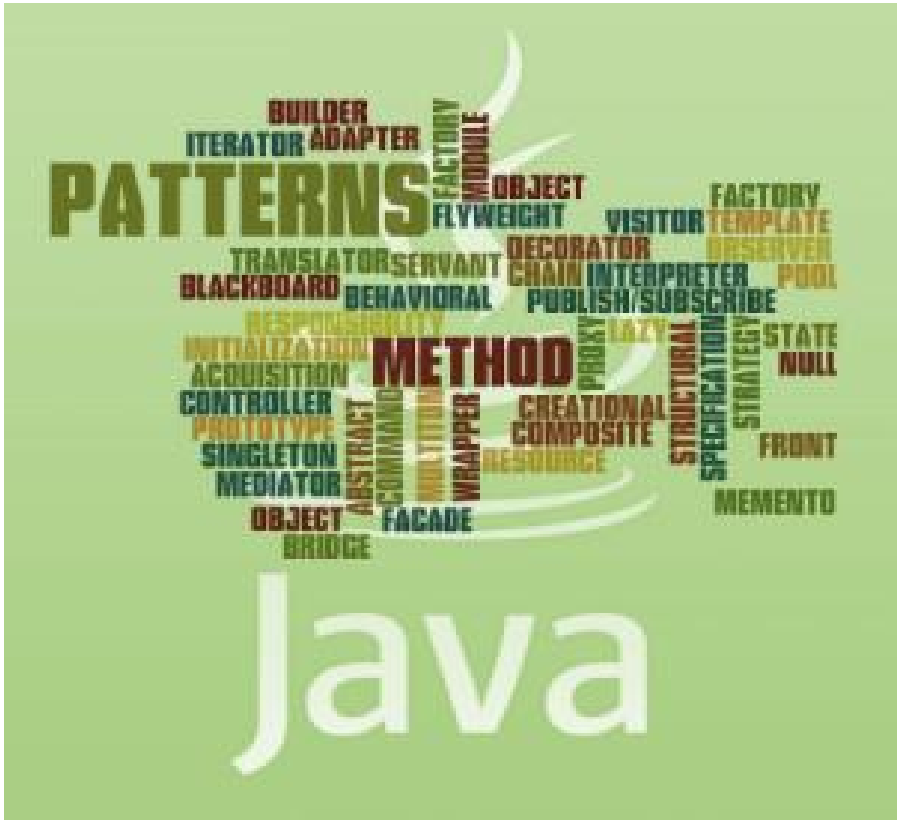




Design Patterns

1.Creational Design Pattern

- Factory Pattern
- Abstract Factory Pattern
- Singleton Pattern
- Prototype Pattern
- Builder Pattern.



Design Pattern(Cont...)

2. Structural Design Pattern

- Adapter Pattern
- Bridge Pattern
- Composite Pattern
- Decorator Pattern
- Facade Pattern
- Flyweight Pattern
- Proxy Pattern

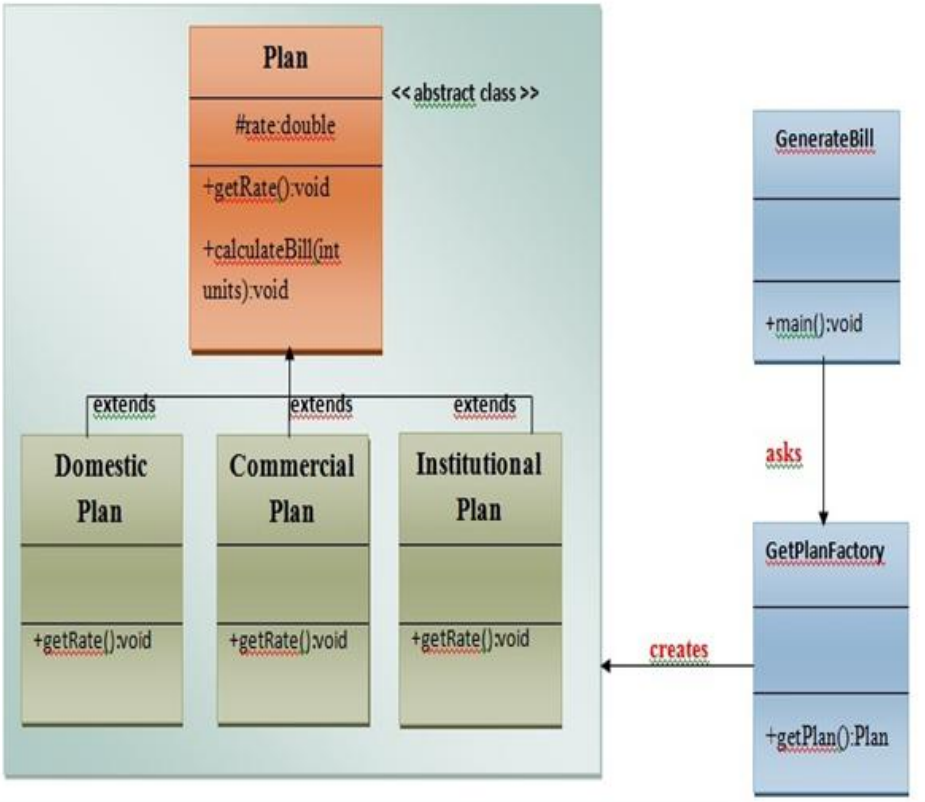
Design Pattern(Cont...)

3. Behavioral Design Pattern

- Chain Of Responsibility Pattern
- Command Pattern
- Interpreter Pattern
- Iterator Pattern
- Mediator Pattern
- Memento Pattern
- Observer Pattern
- State Pattern
- Strategy Pattern
- Template Pattern
- Visitor Pattern

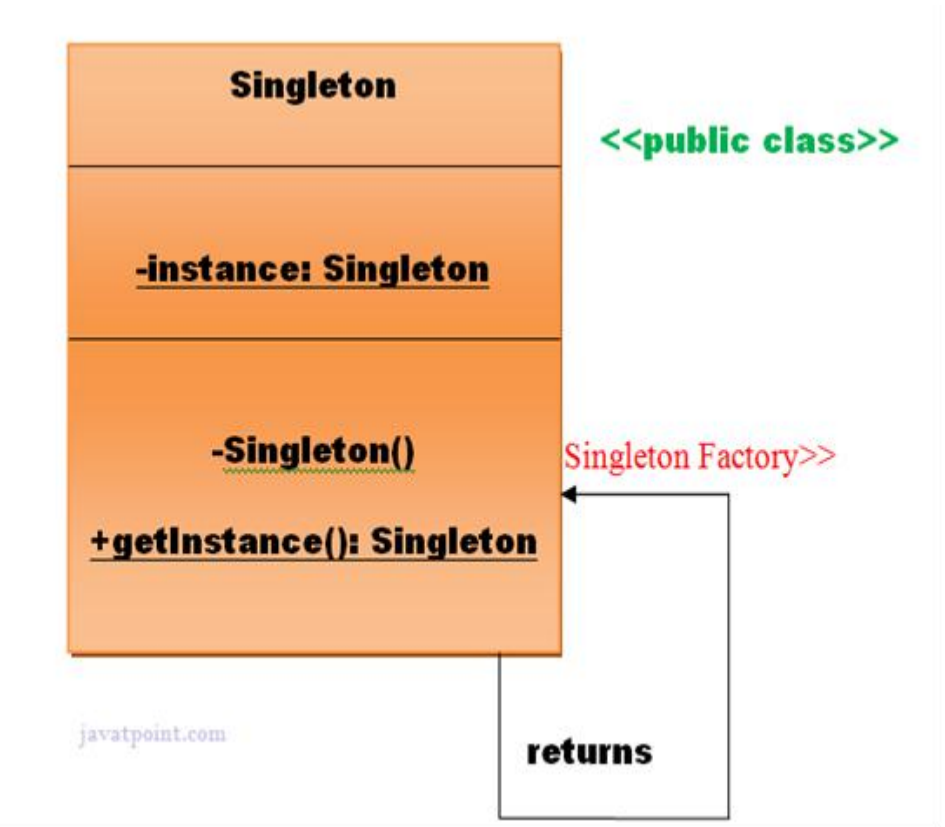
Factory Pattern

- Subclasses decide which class to instantiate
- Loose coupled approach
- Object creation task is assigned to subclass



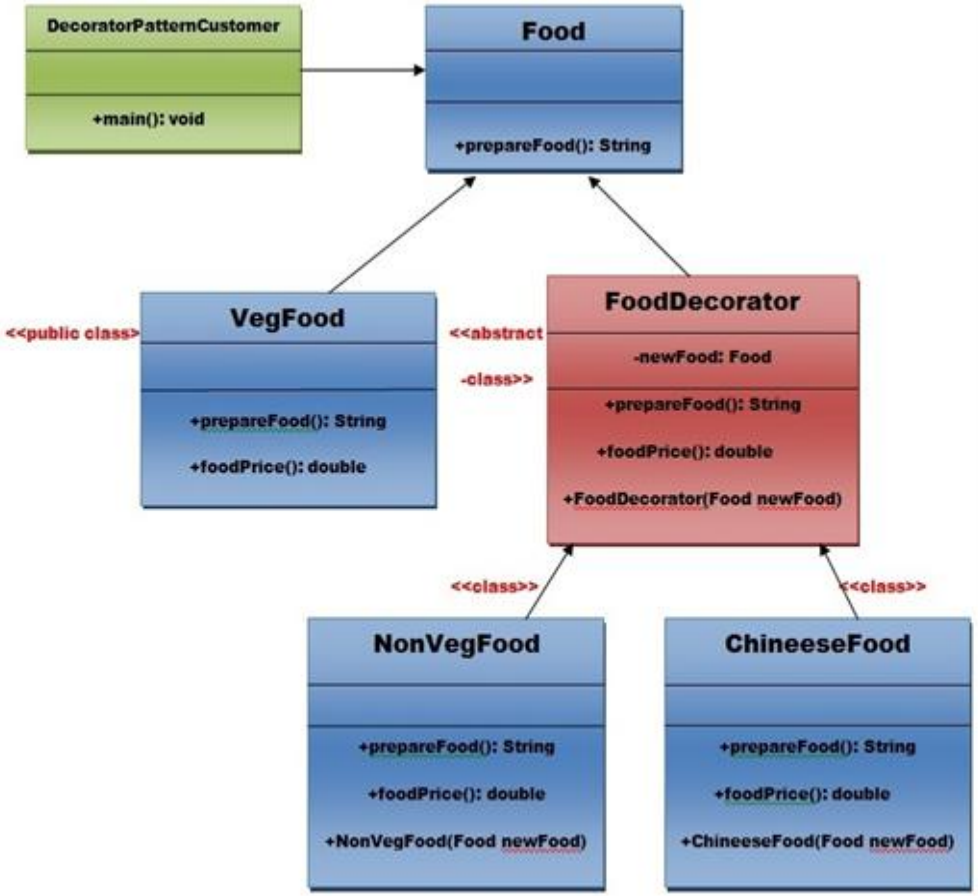
Singleton Pattern

- A class which has only one instance
- Single instance is reused again and again
- Saves memory
- It is used in logging,database and configuration settings



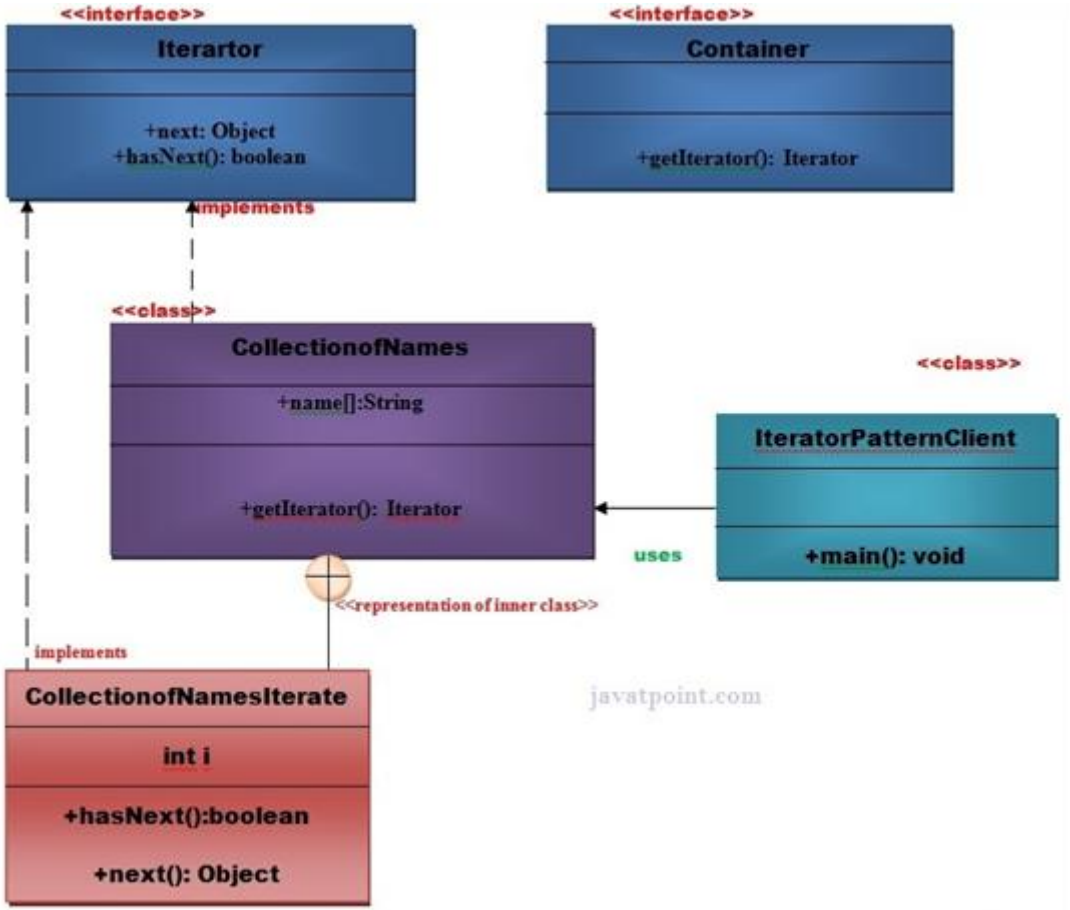
Decorator Pattern

- To add extra functionalities to an object dynamically
- To achieve flexibility
- Enhances extensibility of the object



Iterator Pattern

- To access elements o
  an object without
  exposing
  implementation
- It is used for traversa
  in collection




Thank You!