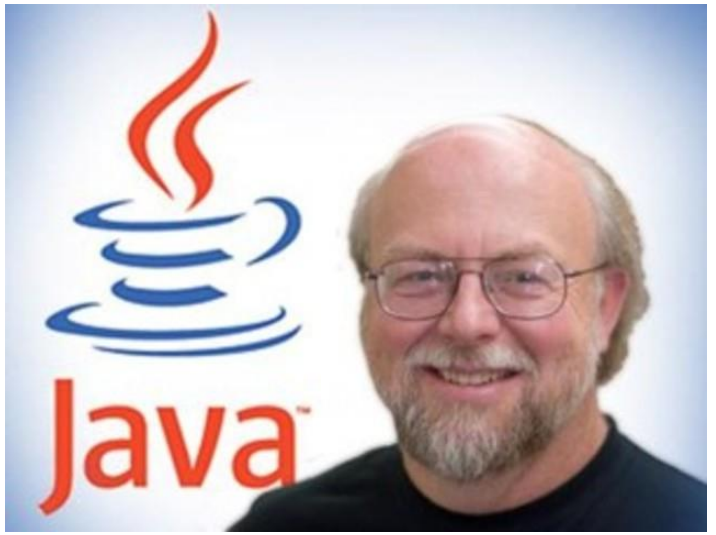
Department of Computer Science
Amrita School of Engineering
Amritapuri Campus

Chapter 1:
History and Evolution of Java

- **Java : " Write once, run anywhere** (WORA)"

19CSE204
Object Oriented Paradigm 2-0-3-3

History of Java



- In 1991 the " Green Team" of Sun Microsystem leaded by James Gosling developed Java Programming language
- James Gosling and his team called their project "Greentalk" and its file extension was .gt and later became to known as "OAK".
- In 1995 JDK alpha and beta versions were released.
- JDK 1.0 released in 1996
- Sun microsystem is now a subsidiary of Oracle Corporation

Green Project

Java is an island in Indonesia where the first coffee was produced "Java Coffee"

Image ref:www.javatpoint.com

The Green Team at Sun for Java Language Project

It was started in December ’90 by

James Gosling
Patrick Naughton,
Mike Sheridan and others

Java's main strength: Libraries -- that spans length and breadth of technologies:

- Core programming, GUI development, Event-driven programming,
- Networking, Web development, Enterprise development,
- Concurrency, Parallel and Distributed programming, Big data,
- Embedded, Mobile, gaming ..... the list never ends

Java Platform

Java Platform

A collection of programs that helps programmers to efficiently develop and run Java applications. It includes an execution engine, a compiler and a set of libraries in it. It is a set of computer software and specifications.

All Java platforms consist of a **Java Virtual Machine (VM)** and an **Application Programming interface (API)**

The Java Virtual Machine is a program, for a particular hardware and software platform, that runs Java technology applications.

An API is a collection of software components that you can use to create other software components or applications.

Java Platforms

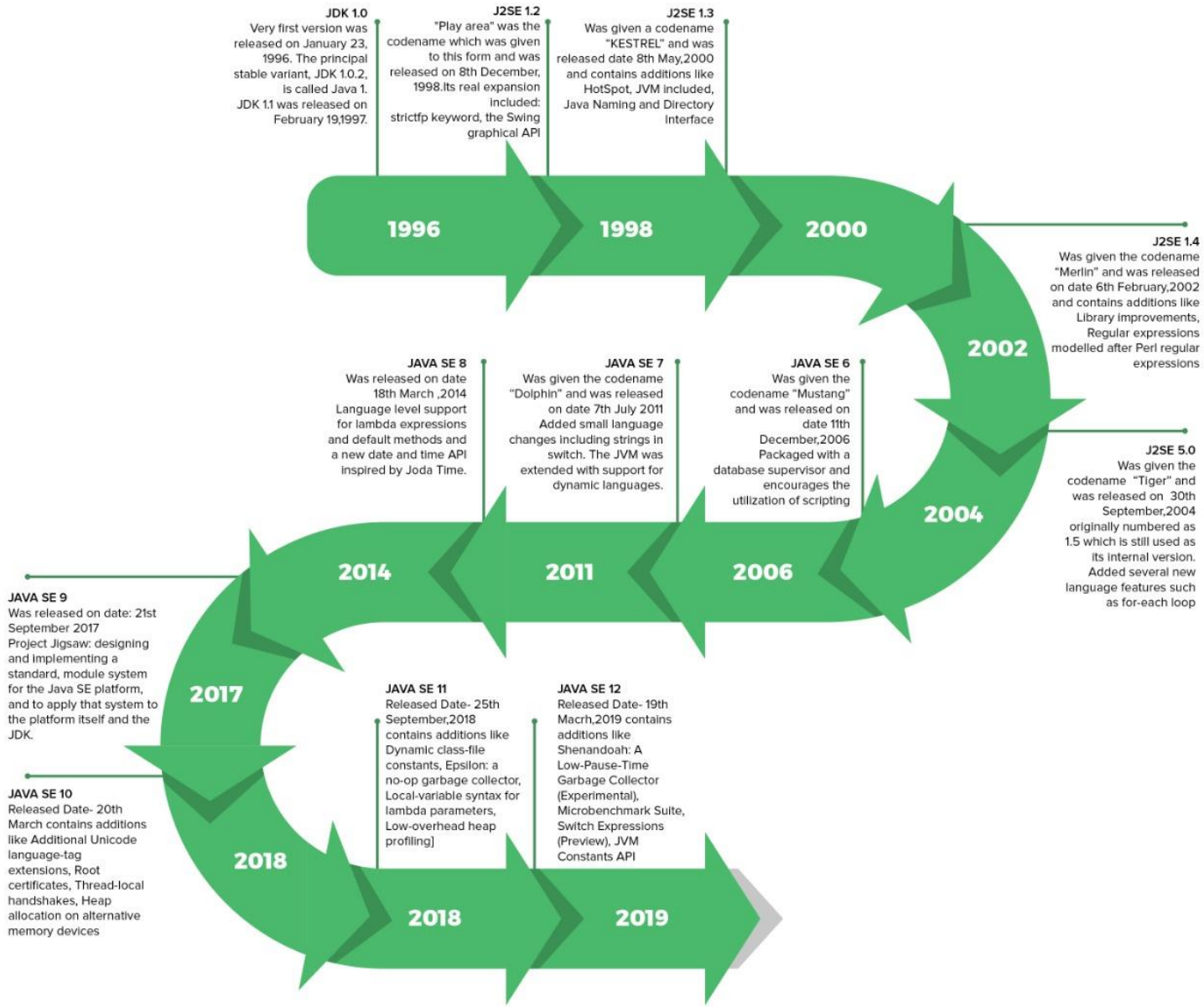
There are four platforms of the Java programming language:

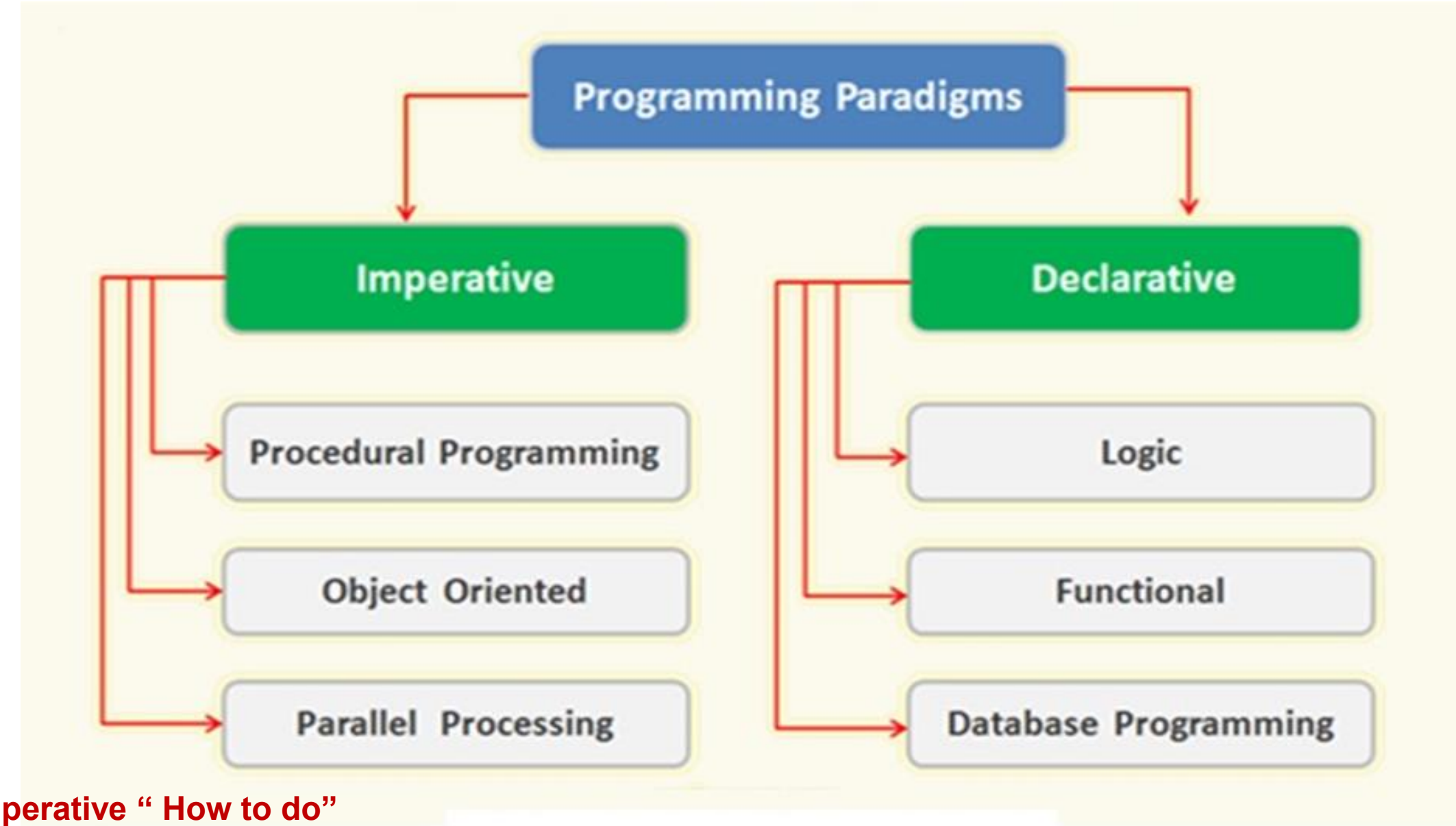
- **Java Platform, Standard Edition (Java SE)**
  - Java SE's API provides the core functionality of the Java programming language. It defines everything from the basic types and objects of the Java programming language to high-level classes that are used for networking, security, database access, graphical user interface (GUI) development, and XML parsing
- **Java Platform, Enterprise Edition (Java EE)**
  - The Java EE platform provides an API and runtime environment for developing and running large-scale, multi-tiered, scalable, reliable, and secure network applications.
- **Java Platform, Micro Edition (Java ME)**
  - Java ME platform provides an API and a small-footprint virtual machine for running Java programming language applications on small devices, like mobile phones
- **Java FX**
  - platform for creating rich internet applications written in Java FX Script

Java: Evolution

- In 1990 Green Team initiated this project to develop a language for **digital devices such as set-top boxes, television**, etc.
- Originally **C++ was considered to be used** in the project but the **idea was rejected** for several reasons (For instance C++ required more memory). Gosling endeavoured to alter and expand C++
- Java was created on the principles like **Robust, Portable, Platform Independent, High Performance, Multithread**, etc. and was called one of the **Ten Best Products of 1995** by the **TIME MAGAZINE**
- Currently, Java is used in **internet programming, mobile devices, games, e-business solutions, etc.**

- Versions of Java
  - **JDK Alpha and Beta (1995)**
  - **JDK 1.0 (23rd Jan 1996)**
  - **JDK 1.1 (19th Feb 1997)**
  - **J2SE 1.2 (8th Dec 1998)**
  - **J2SE 1.3 (8th May 2000)**
  - **J2SE 1.4 (6th Feb 2002)**
  - **J2SE 5.0 (30th Sep 2004)**
  - **Java SE 6 (11th Dec 2006)**
  - **Java SE 7 (28th July 2011)**
  - **Java SE 8 (18th Mar 2014)**
  - **Java SE 9 (21st Sep 2017)**
  - **Java SE 10 (20th Mar 2018)**
  - **Java SE 13 (25 September 2018)**
  - **Java SE 12 (March 2019)**
  - **Java SE 13 (17 September 2019)**
  - **Java SE 14 (March, 17th 2020)**


JDK 1.0
Very first version was released on January 23, 1996. The principal stable variant, JDK 1.0.2, is called Java 1. JDK 1.1 was released on February 19,1997.
J2SE 1.2
"Play area" was the codename which was given to this form and was released on 8th December, 1998.Its real expansion included: strictfp keyword, the Swing graphical API
J2SE 1.3
Was given a codename "KESTREL" and was released date 8th May,2000 and contains additions like HotSpot, JVM included, Java Naming and Directory Interface
1996
1998
2000
J2SE 1.4
Was given the codename "Merlin" and was released on date 6th February,2002 and contains additions like Library improvements, Regular expressions modelled after Perl regular expressions
2002
J2SE 5.0
Was given the codename "Tiger" and was released on 30th September,2004 originally numbered as 1.5 which is still used as its internal version. Added several new language features such as for-each loop
2004
JAVA SE 6
Was given the codename "Mustang" and was released on date 11th December,2006 Packaged with a database supervisor and encourages the utilization of scripting
2006
JAVA SE 7
Was given the codename "Dolphin" and was released on date 7th July 2011 Added small language changes including strings in switch. The JVM was extended with support for dynamic languages.
2011
JAVA SE 8
Was released on date 18th March ,2014 Language level support for lambda expressions and default methods and a new date and time API inspired by Joda Time.
2014
JAVA SE 9
Was released on date: 21st September 2017 Project Jigsaw: designing and implementing a standard, module system for the Java SE platform, and to apply that system to the platform itself and the JDK.
2017
JAVA SE 10
Released Date- 20th March contains additions like Additional Unicode language-tag extensions, Root certificates, Thread-local handshakes, Heap allocation on alternative memory devices
2018
JAVA SE 11
Released Date- 25th September,2018 contains additions like Dynamic class-file constants, Epsilon: a no-op garbage collector, Local-variable syntax for lambda parameters, Low-overhead heap profiling]
2018
JAVA SE 12
Released Date- 19th Macrh,2019 contains additions like Shenandoah: A Low-Pause-Time Garbage Collector (Experimental), Microbenchmark Suite, Switch Expressions (Preview), JVM Constants API
2019



Imperative " How to do"

Declarative – " What to do to solve a problem"

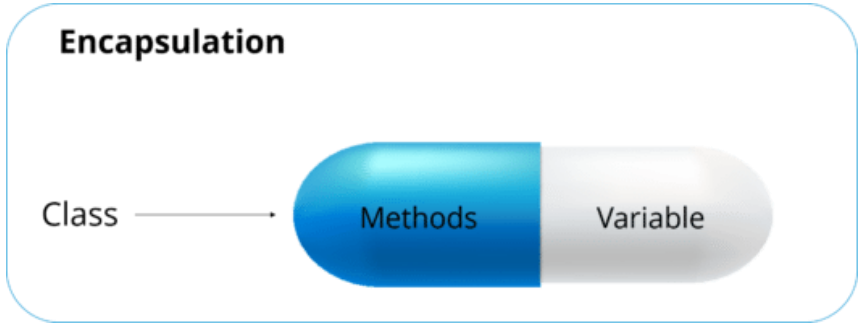
Kinds of programming paradigms

- **Imperative: (How to Do)** **The order of the steps is crucial, because a given step will have different consequences depending on the current values of variables when the step is executed**
  1. **Procedural:** emphasizes on procedure **(C,Pascal, FORTRAN, ALGOL,COBOL)**
  2. **Object Oriented:** emphasis is on data rather procedure. Supports encapsulation and logical grouping of program aspects **(Simula,C++, Java, Python, Ruby)**
  3. **Parallel Processing:** processing of program instructions by dividing them among multiple processors **(NESL, C,C++)**
- **Declarative (What to do)** **expresses logic of computation without talking about its control flow.**
  1. **Functional:** main emphasize is on knowledge base and the problem. would solve logical problems like puzzles, series etc **(Scheme, Lisp, Scala)**
  2. **Logic:** very much like proof of mathematical statement, Based on axioms, inference rules and queries **(Prolog)**
  3. **Database programming:** developed mostly for database application.**(SQL)**

Java is Object Oriented

Data is more important than function.

- A mechanism where you bind your data and code together as a single unit. : Encapsulation
- Java is based on declaring classes, creating objects from them and interacting between these objects.
- **Benefits of Object Oriented Programming?**
  - Improved productivity during software development
  - Improved software maintainability
  - Faster development sprints
  - Lower cost of development
  - Higher quality software

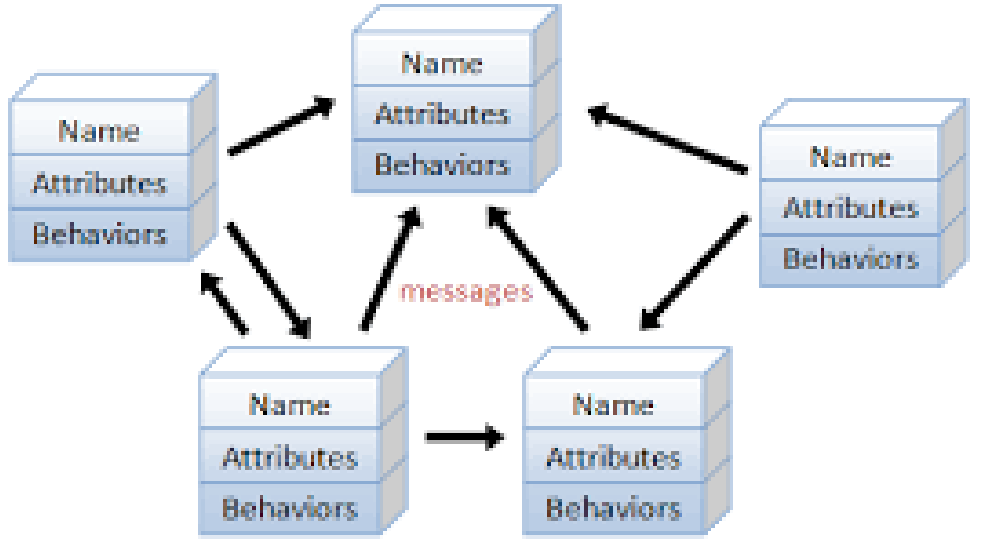



```
public class Car{
    private string _color;
    private string _model;
    private string _makeYear;
    private string _fuelType;

    public void Start(){
        ..
    }

    public void Stop(){
        ..
    }

    public void Accelerate(){
        ..
}
```



An object-oriented program consists of many well-encapsulated objects and interacting with each other by sending messages

C++	JAVA	PYTHON
Compiled Programming language	Compiled Programming Language	Interpreted Programming Language
Supports Operator overloading	Does not support Operator Overloading	Supports Operator overloading
Provide both single and multiple inheritance	Provide partial multiple inheritance using interfaces	Provide both single and multiple inheritance
Platform dependent	Platform Independent	Platform Independent
Does Not support threads	Has in build multithreading support	Supports multithreading
Has limited number of library support	Has library support for many concepts like UI	Has a huge set of libraries that make it fit for AI, datascience, etc.
Code length is a bit lesser, 1.5 times less than java.	Java has quite huge code.	Smaller code length, 3-4 times less than java.
Functions and variables are used outside the class	Every bit of code is inside a class.	Functions and variables can be declared and used outside the class also.
C++ program is a fast compiling programming language.	Java Program compiler a bit slower than C++	Due to the use of interpreter execution is slower.
Strictly uses syntax norms	Strictly uses syntax norms	Use of ; is not compulsory.
like ; and {}.	like punctuations , ; .	

Next Video on…..

Features of Java

- Simple
- Object-Oriented
- Portable
- Platform independent
- Secured
- Robust
- Architecture neutral
- Interpreted
- High Performance
- Multithreaded
- Distributed
- Dynamic

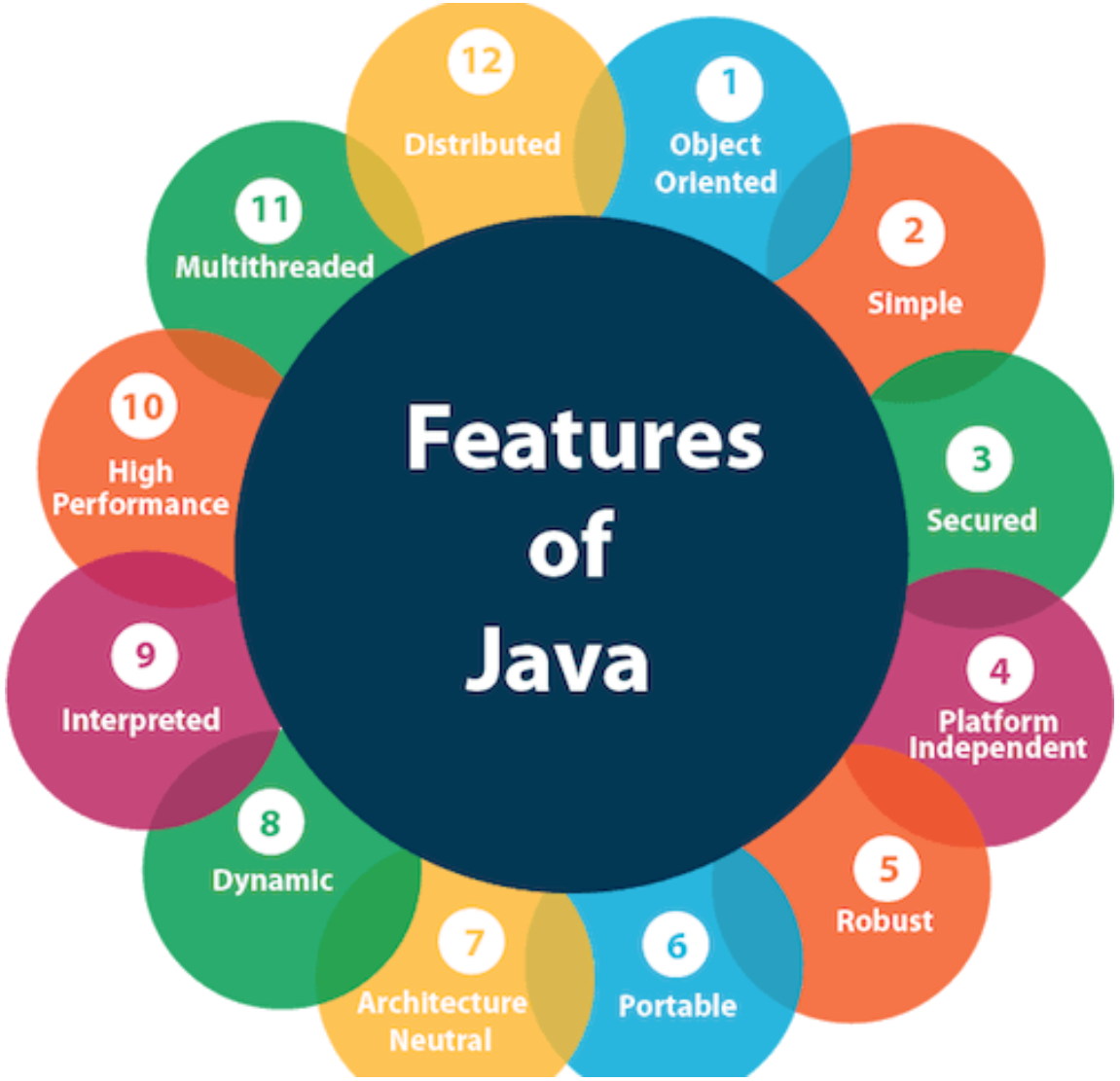


Image ref:www.javatpoint.com

Namah Shivaya!