

Basic Concepts of Java, Applet and Byte Code

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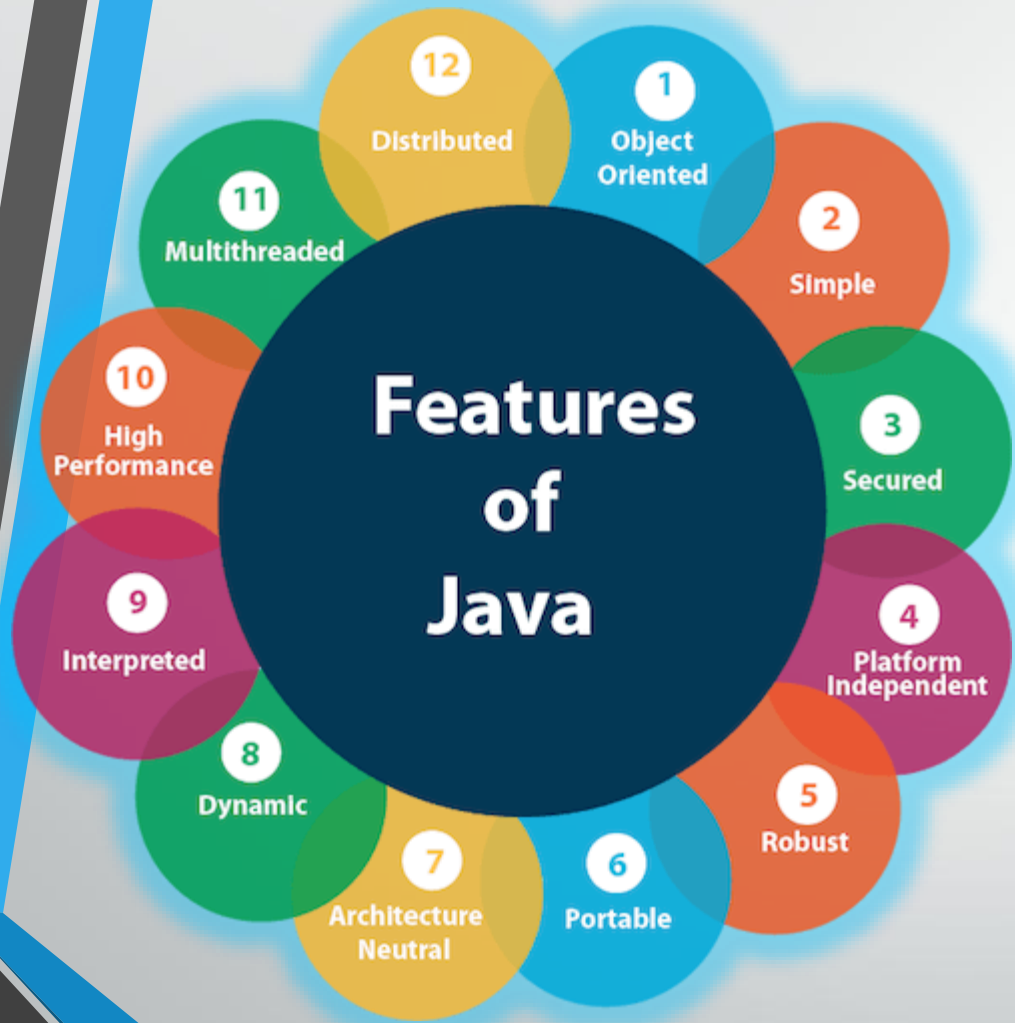
Stream : MCA

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***Subject : Object Oriented Programming
with Java***

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Features of Java



- **Object Oriented** – Java is an object-oriented programming language.
- **Simple** – Java is very easy to learn, and its syntax is simple, clean and easy to understand.
- **Secured** – With Java, we can develop virus-free systems.
- **Platform Independent** – Java is platform independent.
- **Robust** – Java is a robust programming language.
- **Portable** – Java is portable because it facilitates you to carry the Java bytecode to any platform
- **Architecture Neutral** – Java is architecture neutral because there are no implementation dependent features

How has Java changed the Internet?

Java significantly impacted the internet by enabling the development of dynamic and interactive web applications through features like applets, allowing developers to create cross-platform applications that could run on any operating system, thus making the web more accessible and paving the way for complex web functionalities

Applets:

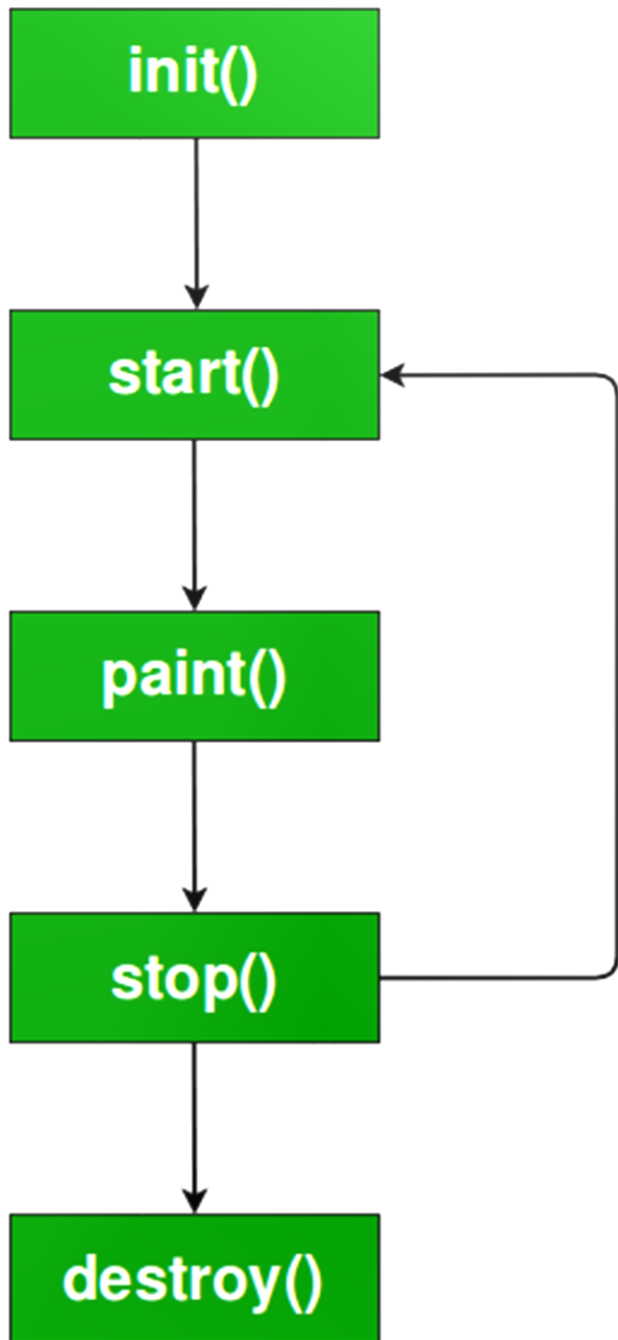
Java introduced the concept of applets, small programs that could be embedded directly into web pages, allowing for interactive elements like animations and mini-applications within the browser.

Platform independence:

Java's "**Write Once, Run Anywhere**" philosophy meant that applications developed in Java could run on any operating system with a Java Runtime Environment (JRE) installed, making it highly portable.

Security:

Java's built-in security features helped to protect users from malicious code when running applets on the web.



What is Applet?

Java Applets was once a very popular feature of web applications. Java Applets were small programs written in Java that ran inside a web browser.

Key Points:

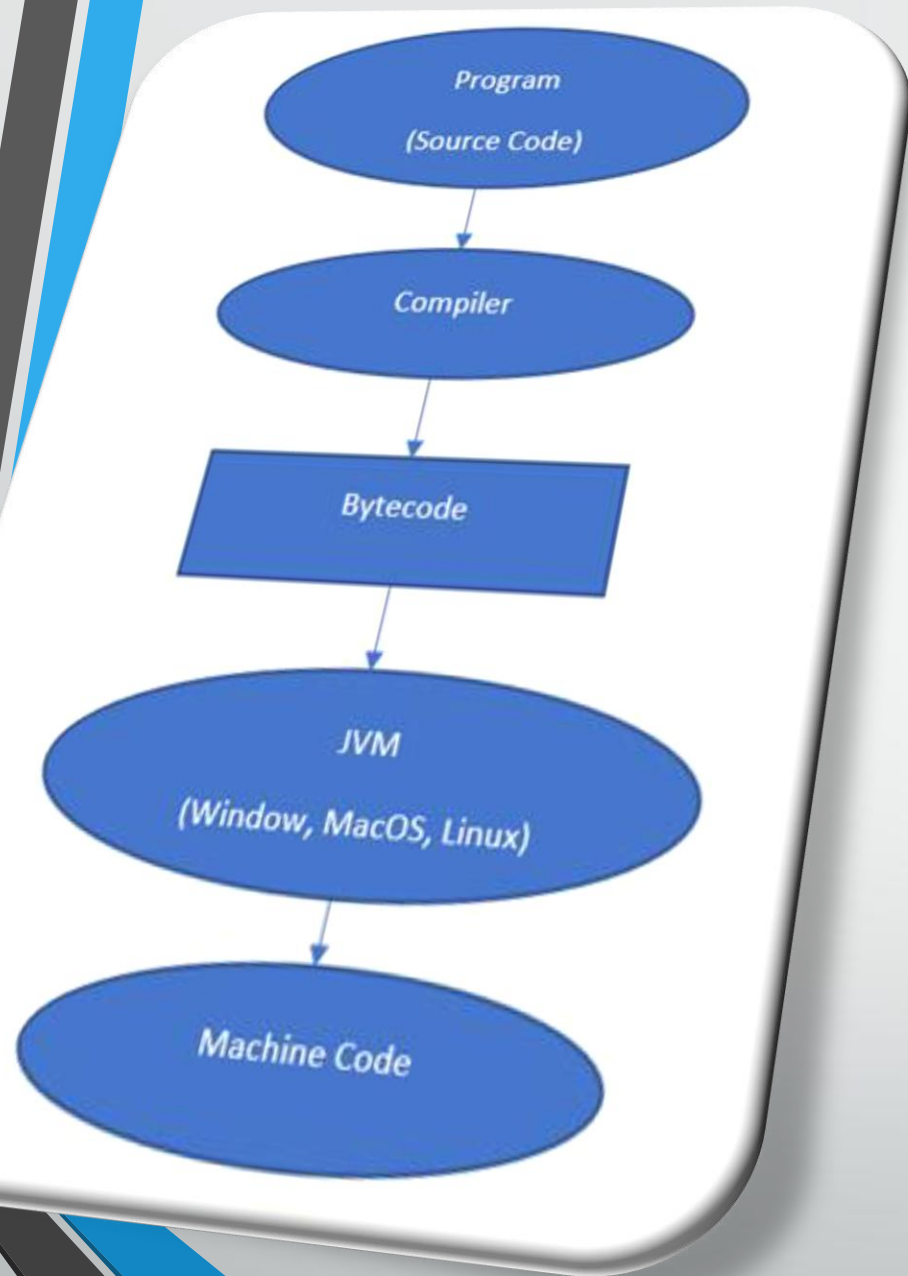
- **Applet Basics:** Every applet is a child/subclass of the `java.applet.Applet` class.
- **Not Standalone:** Applets don't run on their own like regular Java programs. They need a web browser or a special tool called the applet viewer (which comes with Java).
- **No main() Method:** Applets don't start with `main()` method.
- **Display Output:** Applets don't use `System.out.println()` for displaying the output, instead they use graphics methods like `drawString()`

Portability

Portability means that Java programs can run on any operating system without modification. This is possible because Java code is compiled into bytecode, which can be executed on any system with a JVM.

Security

Security in Java prevents unauthorized access and protects data. Java uses **bytecode verification, sandboxing, and access control** to prevent harmful programs from running.

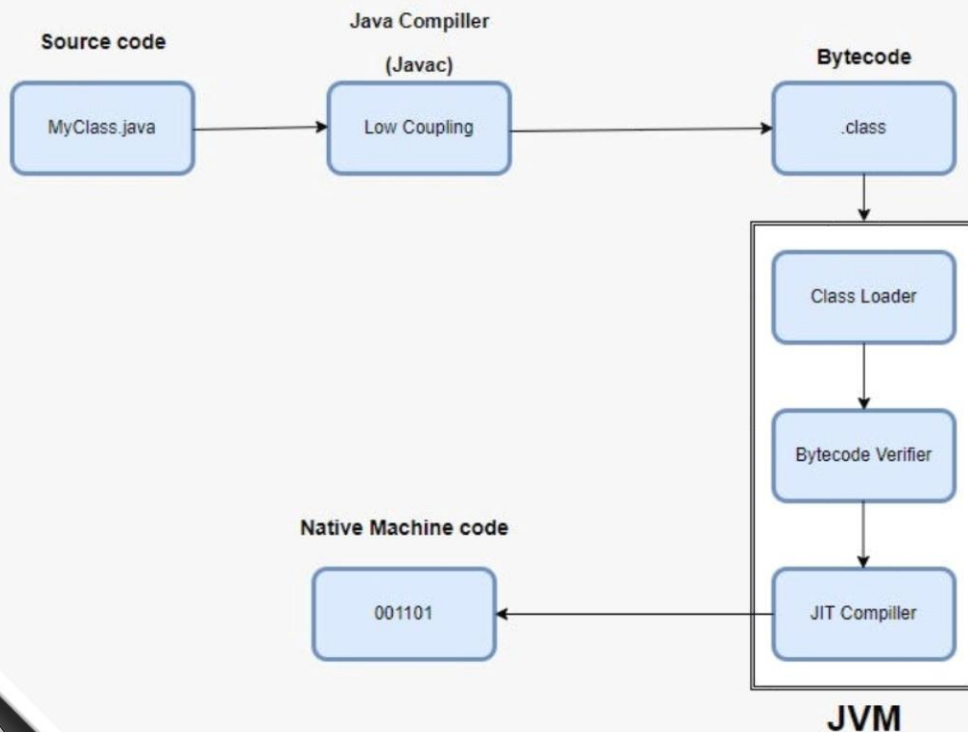


What is Byte Code?

Bytecode in Java is an intermediate, platform-independent representation of a Java program. When a Java program is compiled, it is not converted directly into machine code (which is specific to a particular processor and operating system). Instead, it is converted into bytecode (.class files), which can be executed on any system with a Java Virtual Machine (JVM).

How java ensures both portability and security by introducing bytecode and JVM?

The compilation process in Java ensures that source code is transformed into an optimized, secure, and platform-independent format (bytecode), ready to be executed by the JVM. This multi-step process includes writing the source code, invoking the compiler, generating bytecode, and verifying the bytecode, culminating in execution on the JVM.





Thank You!