Java in 100 Seconds

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Language: English

Java in 100 Seconds: A Summary **Source:** Fireship (English) **Overview:** Java is a high-level, multi-paradigm programming language renowned for its platform independence, achieved through compilation to bytecode.

Developed by James Gosling at Sun Microsystems in the 1990s, Java powers a wide range of applications, from enterprise web applications and big data pipelines to mobile apps and even embedded systems like the Mars Rover controller.

Its "write once, run anywhere" philosophy stems from the Java Virtual Machine (JVM), which executes bytecode on any operating system with a Java Runtime Environment (JRE) installed.

Key Features & Concepts: * **Platform Independence:** Java's bytecode compilation allows it to run on any system with a JVM, eliminating the need for recompilation.

* **Object-Oriented:** Java is fundamentally object-oriented, utilizing classes and objects as core building blocks.

However, it has evolved to incorporate functional programming paradigms.

* **Strongly Typed:** Java enforces strict type checking, enhancing code reliability and maintainability.

* **Garbage Collection:** Automatic memory management simplifies development and prevents memory leaks.

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* **Runtime Type Checking:** Java performs type checking during program execution, catching potential errors.

* **Reflection:** Java allows inspection and modification of program structure at runtime.

* **JVM (Java Virtual Machine):** The JVM interprets bytecode, enabling platform independence.

* **JRE (Java Runtime Environment):** The JRE provides the necessary libraries and environment for running Java applications.

* **JDK (Java Development Kit):** The JDK includes the tools required for Java development, including the compiler.

Development Workflow / Process: 1.

Installation: Install the Java Development Kit (JDK).

2.

Create a Java File: Create a file with a `.java` extension.

The filename should match the class name declared within.

3.

Define a Class: Every Java program starts with a class declaration containing a `main` method.

4.

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Write the `main` Method: The `main` method is the entry point of execution.

It contains the initial code to be run.

5.

Define Variables: Declare variables with their respective types, names, and values.

6.

Print Output: Use `System.out.println()` to display output to the console.

7.

Define Methods: Create methods (functions) within the class.

Use `public` for external accessibility and `static` for class-level methods.

8.

Create Custom Classes: Define blueprints for objects by creating custom classes with attributes and methods.

9.

Instantiate Objects: Use the `new` keyword to create instances of classes (objects).

10.

Compile: Use the Java compiler (`javac`) to compile the `.java` file into a `.class` file containing bytecode.

11.

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Run: Execute the compiled bytecode using the `java` command, which invokes the JVM.

Conclusion: Java's platform independence, object-oriented nature, and robust features have made it a dominant programming language.

Its versatility allows it to power diverse applications, from enterprise systems to mobile apps and embedded devices.

Understanding the core concepts of Java, such as the JVM, JRE, JDK, and the development workflow, are essential for building robust and portable applications.