

# 1. Introduction to Java

## History and Features of Java

- **History:**
  - Java was developed by **James Gosling** at Sun Microsystems in **1995**.
  - Initially called **Oak**, it was later renamed Java due to trademark issues.
  - It was designed with a focus on portability, security, and simplicity.
- **Key Features:**
  1. **Platform Independence:** Write Once, Run Anywhere (WORA).
  2. **Object-Oriented:** Follows the principles of OOP.
  3. **Robust:** Strong memory management and exception handling.
  4. **Secure:** Features like bytecode verification and sandboxing.
  5. **Multithreaded:** Allows simultaneous execution of multiple threads.
  6. **High Performance:** Just-In-Time (JIT) compiler enhances performance.
  7. **Dynamic and Extensible:** Supports dynamic linking of new libraries.

## Java Development Kit (JDK), Java Runtime Environment (JRE), and Java Virtual Machine (JVM)

1. **JDK (Java Development Kit):**
  - A complete development environment to build Java applications.
  - Contains tools like javac (compiler), java (runtime), and libraries.
  - Includes JRE and development tools.
2. **JRE (Java Runtime Environment):**
  - Provides the runtime environment for executing Java applications.

- Includes JVM and standard libraries.
  - Does not include development tools like compilers.
- 3. JVM (Java Virtual Machine):**
- The engine that executes Java bytecode.
  - Converts bytecode to machine-specific code.
  - Manages memory through Garbage Collection (GC).
  - Ensures platform independence.

## Setting up the Java Environment

### 1. Installation Steps:

- Download the appropriate version of JDK from [Oracle's official site](#) or OpenJDK.
- Install the downloaded JDK by following the installation wizard.

### 2. Setting up the PATH Environment Variable:

- Locate the directory where JDK is installed (e.g., C:\Program Files\Java\jdk-XX.X.X\bin).
- Add this path to the system's **PATH** environment variable:
  - **Windows:**
    1. Right-click This PC > Properties > Advanced System Settings > Environment Variables.
    2. Under System Variables, find Path, and click Edit.
    3. Add the JDK bin directory to the list.
  - **Mac/Linux:**

Add the following to ~/.bash\_profile or ~/.zshrc:

    - export JAVA\_HOME=/path/to/jdk
    - export PATH=\$JAVA\_HOME/bin:\$PATH
    - Save and run source ~/.bash\_profile (or ~/.zshrc).

### 3. Verifying the Installation:

- Open a terminal or command prompt and type:
- java -version

This should display the installed Java version.

- Test javac (the compiler):
- javac -version

## About Sun Microsystems:

- **Founded:** February 24, 1982.
- **Founders:** Vinod Khosla, Andy Bechtolsheim, Scott McNealy, and Bill Joy.
- **Headquarters:** Santa Clara, California, USA.
- **Primary Focus:**
  - Sun Microsystems was known for developing computer hardware, software, and IT solutions.
  - They were innovators in areas such as **workstations**, **servers**, and **networking technologies**.

## Key Contributions:

1. **Java Programming Language:**
  - Java was developed at Sun Microsystems by James Gosling and his team in 1995.
2. **Solaris Operating System:**
  - A robust, UNIX-based operating system for enterprise environments.
3. **SPARC Processors:**
  - High-performance RISC processors designed for servers and workstations.
4. **Network File System (NFS):**
  - A widely adopted protocol for distributed file systems.
5. **Open Source Contributions:**
  - Sun Microsystems contributed significantly to the open-source community, releasing products like OpenOffice and MySQL.

## Acquisition:

- In **2010**, Sun Microsystems was acquired by **Oracle Corporation** for \$7.4 billion.
- After the acquisition, Oracle continued to support and develop Java and other technologies originally created by Sun.

## Fun Fact:

The name "**Sun**" stands for "**Stanford University Network**", as the company's founders were affiliated with Stanford University.