

Understanding Java: How it Works

This article is a complementary resource to the [Learn Java Basics](#) course.

Java is a programming language used primarily for developing mobile and desktop applications, big data processing and embedded systems.

Most IT industries that rely on developing stable systems and applications use Java as their goto language. So, if you are looking for a job in programming, you can never go wrong with learning Java.

What Separates Java From Other Languages?

Java is platform-independent, meaning it can run seamlessly on any operating system or hardware platform without requiring modification or recompilation.

In short, Java embodies WORA — Write Once, Run Anywhere.

But how does Java achieve this ?

Java achieves this by using the Java Virtual Machine (JVM).

Since Java is both a compiled and interpreted language, the Java programs written by developers are first compiled into **bytecode** by the Java compiler. This bytecode is platform-independent and can be run on any system with a compatible JVM.

The JVM then interprets these bytecodes and executes them on the host machine. This two-step process ensures Java's portability and security, making it an ideal choice for cross-platform applications.

Java Code

```
class Main {  
    public static void main(String[] args) {  
        System.out.println("Hello, World!");  
    }  
}
```



Java Compiler



convert to byte code

```
01010101010101010101010101010101  
01010101010101010101010101010101  
01010101010101010101010101010101
```



JVM



interprets bytecode



Where is Java Used ?

Java provides rich APIs and has fantastic developer support. So it should come as no surprise when we say Java is used almost everywhere. Some popular real life use cases of Java include:

Web Servers:

Frameworks like Spring MVC and Apache Tomcat enable high-performance web servers that can handle millions of requests concurrently.

Big Data:

Java-based frameworks like Apache Hadoop and Apache Kafka are extensively used in Big Data processing to manage and analyze large datasets for businesses such as LinkedIn, eBay, and Yahoo.

Android App Development:

Java is the core language for building Android applications. Popular apps like Spotify, Twitter, and Netflix leverage Java for creating scalable and interactive mobile experiences.

Why Industries Refuse to Move On From Java ?

Whether it be to keep electronic health records in hospitals or handle customer interactions in e-commerce, industries always prefer Java when handling large amounts of data.

This is because of the scalability and performance of Java programs.

Java has inbuilt **multithreading** support i.e. it can perform multiple operations simultaneously. So even if the user base grows, the system developed in Java won't likely crash.

On top of that Java itself optimizes the memory management using its highly efficient **garbage collection** system. This not only boosts the performance but also prevents memory leaks supporting large-scale applications.

Is it Hard to Write Codes in Java?

Java's syntax is often said to be overly complex, but this is largely exaggerated. While Java may require more lines of code than Python for similar tasks, it's nothing to be intimidated by.

You don't need to memorize all the syntax—practice will make it second nature.

In fact, the extra lines in Java serve a purpose. They enable **Object-Oriented Programming (OOP)**, which promotes code reusability and allows different parts of the program to share properties. This is especially helpful in large projects, where reusable code simplifies development.

Java Community Support

You'll never be alone when learning Java.

Java has excellent community support, with extensive documentation, active forums like Stack Overflow, numerous open-source libraries, and local Java User Groups (JUGs). Its widespread use ensures quick solutions and abundant learning resources for developers at all levels.