

Java Programming Language

TCS-408

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Books

Text books:

1. Patrick Naughton and Herbert Schildt, “**Java 2 The Complete Reference**”, 9th edition, McGraw Hill Education, 2017.
2. Bruce Eckel, “**Thinking in Java**” 4th edition, Pearson Education India, 2008.
3. E. Balaguruswamy, “**Programming with Java a Primer**”, 4th edition, Tata McGraw Hill, 2009.

Reference Books:

1. Cay S Horstmann and Gary Cornell, “**Core Java Volume-I and II**”, Standard edition, Sun Microsystems, 2001
2. Harvey Deitel and Paul Deitel, “**Java How to Program**”, 4th edition, PHI Learning, 2004.

<https://github.com/aksiitbhu/Java-Programming>

Unit-I

Syllabus:

Introduction to Java: Importance and features of Java, Concepts of Java Virtual machine (JVM) Keywords, Constants, Variables and data types, operators and expressions, Control statements, Conditional statements, loops and iterations, Wrapper classes, Scanner Class: Scanner class methods (next(),nextLine()) etc.

Concept of class: Class definition, adding variables and methods, creating objects, constructors, defining methods, calling methods, Arrays,String Handling in java(String, StringBuffer classes)

Java Lecture-1

Introduction to Java Language

- ❖ Java was invented by James Gosling at Sun Microsystems, Inc. in 1991.
- ❖ This language was initially called “Oak,” but was renamed “Java” in 1995.
- ❖ The primary motivation was the need for a platform-independent (that is, architecture-neutral) language.
- ❖ It could be used to create software to be embedded in various consumer electronic devices, such as microwave ovens and remote controls.

- ❖ Gosling and others began work on a portable, platform-independent language that could be used to produce code that would run on a variety of CPUs under differing environments.
- ❖ This effort ultimately led to the creation of Java.
- ❖ Application of Java in Internet programming ultimately led to Java's large-scale success.

Java Evolution: https://en.wikipedia.org/wiki/Java_version_history

Latest Version: **JDK Development Kit 21.0.2**

The Bytecode

- ❖ *Bytecode* is a highly optimized set of instructions designed to be executed by the Java run-time system, which is called the *Java Virtual Machine (JVM)*.
- ❖ JVM was designed as an *interpreter for bytecode*.
- ❖ Translating a Java program into bytecode makes it much easier to run a program in a wide variety of environments because only the JVM needs to be implemented for each platform.
- ❖ JVM makes java portable and secure.

“write once; run anywhere, any time, forever”

Java Features

- ❖ Simple
- ❖ Secure
- ❖ Portable
- ❖ Object-oriented
- ❖ Robust
- ❖ Multithreaded
- ❖ Architecture-neutral
- ❖ Interpreted
- ❖ High performance
- ❖ Distributed: *Remote Method Invocation (RMI)*
- ❖ Dynamic

Two Paradigms

- ❖ All computer programs consist of two elements: code and data.
- ❖ A program can be conceptually organized around its code or around its data.

Process-oriented model (what is happening): This approach characterizes a program as a series of linear steps (that is, code).

- The process-oriented model can be thought of as *code acting on data*.
- Procedural languages such as **C** employ this model.

Object-oriented programming: Object-oriented programming organizes a program around its data (that is, objects) and a set of well-defined interfaces to that data.

- An object-oriented program can be characterized as *data controlling access to code*.
- Examples: Java, python