



**JAVA**

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## Detailed Syllabus

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## 1) Introduction to Java

- ⌚ What is Java?
- ⌚ Background/History of Java
- ⌚ The Internet and Java's place in it
- ⌚ Applications and Applets
- ⌚ Java Virtual Machine
- ⌚ Byte code - not an executable code
- ⌚ Procedure-Oriented vs. Object-Oriented Programming
- ⌚ Basics of OOP
  - Abstraction
  - Inheritance
  - Encapsulation
  - Classes, subclasses and super classes
  - Polymorphism and Overloading
- ⌚ Compiling and running a simple "Hello World" program
  - Setting Up Your Computer
  - Writing a Program
  - Compiling, Interpreting and Running the program
  - Common errors

## 2) Holding Data

- ⌚ Primitive Data Types
  - Integers
  - Floating-Point types
  - Characters
  - Booleans
- ⌚ User-Defined Data Types
- ⌚ Declarations <sup>3</sup>/<sub>4</sub> Constants
- ⌚ Identifiers, Literals
- ⌚ Type Conversion and Casting
- ⌚ Objects and Wrapper Classes
- ⌚ Variables
  - Variable Definition and Assignment
  - Default Variable Initializations
- ⌚ Command-Line Arguments
- ⌚ Arrays of Primitive Data Types
- ⌚ Comment Syntax
- ⌚ Garbage Collection

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### 3) **Controlling the flow**

- ⌚ Expressions
- ⌚ Using Operators
  - Arithmetic, Bitwise, Relational, Logical, Assignment, Conditional, Shift, Ternary
  - Auto-increment and Auto-decrement
- ⌚ Using control statements
  - Selection statements  
*f* If, Switch
  - Loops and loop options  
*f* While, do-while, for
  - Jump statements  
*f* Break, continue and return

### 4) **Object Oriented Programming Concepts**

- ⌚ Abstraction
- ⌚ Encapsulation
- ⌚ Polymorphism and Overloading
- ⌚ Fundamentals of Classes
  - A simple class
  - Creating Class Instances
  - Adding methods to a class
  - Calling Functions/Methods
- ⌚ Using 'this' keyword
- ⌚ Constructors
  - Default constructors
  - Parameterized constructors
- ⌚ More on methods
  - Passing by Value, by Reference
  - Access Control
  - Methods that Return Values
  - Method Overloading
  - Recursion
- ⌚ Nested and Inner classes

### 5) **Inheritance & Packaging**

- ⌚ Inheritance
  - Using 'extends' keyword
  - Subclasses and Superclasses

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- 'super' keyword usage
- Overriding Methods
- Dynamic Method Dispatch

- ⌚ The Object class
- ⌚ abstract and final Classes
- ⌚ Packages
  - Defining a package
  - Importing a package
  - Access Control
- ⌚ Interfaces
  - Defining an interface
  - Implementing and applying interfaces

#### 6) **Handling Error/Exceptions**

- ⌚ Basic Exceptions
- ⌚ Proper use of exceptions  $\frac{3}{4}$  User defined Exceptions
- ⌚ Catching Exception
  - try
  - catch
- ⌚ Throwing and re-throwing
  - throw
  - throws
- ⌚ Cleaning up using the finally clause

#### 7) **Handling Strings**

- ⌚ Creation, Concatenation and conversion of a string
- ⌚ Changing case
- ⌚ Character Extraction  $\frac{3}{4}$  String Comparison  $\frac{3}{4}$  Searching strings
- ⌚ Modifying strings
- ⌚ String Buffer

#### 8) **Threads**

- ⌚ Create/instantiate/start new threads
  - Extending java.lang.Thread
  - Implementing java.lang.Runnable Interface
- ⌚ Understand thread execution
- ⌚ Thread Priorities
- ⌚ Synchronization
- ⌚ Inter-thread communication, Deadlock

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## 10) I/O and Streams <sup>3</sup>/<sub>4</sub>

java.io package

- ⌚ Files and directories
- ⌚ Streams
  - Byte Streams and Character Streams
- ⌚ Reading/Writing Console Input/Output
- ⌚ Reading and Writing files
- ⌚ The Serialization Interface

## 10) Understanding core packages

- ⌚ Using java.lang Package
  - java.lang.Math
  - Wrapper classes and associated methods
- ③ Number
- ③ Double, Float *f* Integer, Byte *f* Short, Long *f* Character
- ③ Boolean
- ⌚ Using java.util package
  - Core classes *f*
    - Vector *f*
    - Stack
  - ③ Dictionary *f* Hashtable
  - ③ Enumerations
  - ③ Random Number Generation

## 12) Holding Collection of data

- ⌚ Arrays and collection classes/interfaces
- ⌚ Map/List/Set implementations
  - f* Map interface, List interface, Set interface
- ⌚ Collection classes
  - ArrayList, LinkedList, HashSet and TreeSet
- ⌚ Accessing collections/use of an Iterator
- ⌚ Comparator

## 13) Java Applications <sup>3</sup>/<sub>4</sub> Intro to AWT and Swing

- ⌚ Working with Frame, windows, graphics, color, fonts
- ⌚ AWT controls
  - Buttons, Checkbox, Choice, List and TextField
- ⌚ Layout Managers
  - Flow Layout, Grid Layout and Border Layout
- ⌚ JFrame and JPanel containers
- ⌚ User Interface Events

- Event Classes and Event Listener Interfaces
- ⌚ Adapter Classes

**14) Introduction to Java Applets**

- ⌚ What is a Java applet?
- ⌚ Applet lifecycle methods ¾ Build a simple applet ¾ Using AppletViewer ¾ Adding Controls
- ⌚ Animation Concepts

**15) Basic Networking Concepts ¾ What is a Client/Server Application?**

- ⌚ Manipulating URL's
- ⌚ Establishing a simple server
- ⌚ Establishing a simple client
- ⌚ Client/Server Interaction using TCP
- ⌚ Connectionless Client/Server Interaction using Datagram(UDP)

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