

Java Specialization

Duration: 150 Hrs.

Course Highlights :

Core Java

Basics of Java

- What is Java?
- History and Features of Java
- C++ vs. Java
- Hello Java Program
- Internal How to set the path?
- JDK, JRE, and JVM (Java Virtual Machine)
- JVM Memory Management
- Internal details of JVM
- Unicode System, Operators, Keywords, and Control Statements like if-else, switch, For loop, while loop, etc.

Class, Object, and Types of classes

- Naming convention of Java
- Classes, Objects, and Features.
- Object declaration and initialization
- Life cycle of an object

Data types in Java

- Data types in Java
- Primitive data types
- Non-primitive data types
- Memory allocation of primitive and non-primitive data types, etc.
- Type Conversion
- Auto-Boxing and Unboxing

Variables, Constants, and Literals

- Variable declaration & initialization
- Naming convention
- Types of variables such as local variables, instance variables, and static variables
- Scope and memory allocation of variables.
- Command line argument

Methods in Java

- Methods in Java
- Use of method in Java
- Method declaration, method signature
- Types of methods in Java: predefined method, user-defined methods: instance method, static method
- Calling of method
- Java main method
- Return type in Java.

Constructor in Java

- What is Constructor in Java?
- Types of constructors: Default and Parameterized constructors
- Java constructor overloading
- Constructor chaining in java
- Copy constructor in Java

Modifiers in Java

- What is Access modifier and Non-access modifier in Java
- Types of access modifiers like private, default, protected, and public
- Types of Non-access modifiers like abstract, final, native, static, synchronized modifier, transient, volatile.

Static Keyword

- What is Static keyword?
- Static variable
- Static method
- Static block, Instance block

- Static Nested Class in Java
- Difference between static variable and instance variable, static method and instance method, static block, and instance block.
- Static import

Final Keyword

- Final keyword
- Final variable
- Final method
- Final class.

Inner Class in Java

- Definition of Inner class in Java, Properties of inner class, Instantiating inner class.
- Types of inner class in Java: Normal inner class, Method local inner class, Anonymous inner class, and Static nested class.

Super and this Keyword

- Super keyword
- Calling of superclass instance variable
- Superclass constructor
- Superclass method.
- This keyword
- Calling of current class constructor, and method.

OOPs concepts

OOPs concepts comprises of class, object, encapsulation, inheritance, polymorphism, and abstraction

Encapsulation

- Encapsulation in Java
- How to achieve Encapsulation
- Data hiding
- Tightly encapsulated class

- Getter and setter method in Java
- Naming convention of getter and setter method

Inheritance

- Inheritance in Java
- Is-A Relationship
- Aggregation and Composition (HAS-A)
- Types of inheritance: Single level, Multilevel, Hierarchical, Multiple, and Hybrid inheritance.

Polymorphism

- Polymorphism in Java,
- Types of polymorphism: Compile-time polymorphism and Run-time polymorphism
- Static and Dynamic Binding
- Method overloading
- Method overriding
- Rules of method overloading and method overriding, various example programs related to rules of overloading and overriding.
- Covariant Return type

Abstraction

- Abstraction in Java
- Abstract class
- Abstract method
- Interface in Java
- Nested interface, rules, and example programs.

Garbage Collection

Input and output

- FileOutputStream, FileInputStream
- BufferedOutputStream, BufferedInputStream
- SequenceInputStream
- ByteArrayOutputStream, ByteArrayInputStream

- DataOutputStream, DataInputStream
- Java FilterOutputStream, Java FilterInputStream
- Java ObjectOutputStream, Java ObjectStreamField
- Console
- FilePermissionWriter, Reader, FileWriter, FileReader
- BufferedWriter, BufferedReader
- PrintStream, PrintWriter
- OutputStreamWriter, InputStreamReader
- StringWriter, StringReader
- FilterWriter, FilterReader, File FileDescriptor, RandomAccessFile, and java.util.Scanner.

Packages in Java

- How to declare package in a company project
- Package naming conventions
- Sub packages
- Types of packages such as user-defined packages, built-in packages
- Importing packages in Java

Collections Framework

- What is Collections Framework?
- List, Set, SortedSet, Queue, Deque, Map, Iterator, ListIterator, and Enumeration.
- ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, ArrayDeque, PriorityDeque, EnumSet, AbstractCollection, AbstractList, AbstractQueue, AbstractSet, and AbstractSequentialList.
- Map, Map Entry, SortedMap, and NavigableMap
- HashMap, LinkedHashMap, TreeMap, IdentityHashMap, WeakHashMap, and EnumMap.
- Comparator, RandomAccess interfaces as well as Observable class.
- Wrapper Class

Serialization

- Serialization, Deserialization, and Java transient keyword.

Exception Handling in Java

- Exception Handling in Java
- Try-catch block
- Multiple Catch Block
- Nested try block
- Finally block
- Throw Keyword
- Throws Keyword
- Throw vs Throws, Final vs Finally vs Finalize
- Exception Handling with Method Overriding Java Custom Exceptions

Java Annotations

Built-In Java annotations like @Override, @SuppressWarnings, @Deprecated, @Target, @Retention, @Inherited, @Documented, Java custom annotations, and types of annotations.

Reflection in Java

- New Instance() & Determining the class object
- Creating applet viewer
- Accessing private method from outside the class

Java Array

- This chapter deals with
- Java Array
- Types of array: single dimensional array, multidimensional array, declaration, instantiation, and initialization of Java array
- Jagged Array
- Passing array to a method
- Cloning an array in Java

String, String Buffer, String Builder

- String, String Functions
- Immutable String
- String Comparison, String concatenation

- Substring
- StringBuffer class
- StringBuilder class
- toString method
- StringTokenizer class

Java Thread

- Java multithreading
- Multithreading life cycle of a thread creating
- Thread scheduler
- Sleeping a thread, Start a thread twice
- Calling run() method
- Joining a thread
- Naming a thread
- Thread priority,
- Daemon thread
- Thread pool
- Thread group
- Shutdownhook
- Java Synchronization: synchronized method, synchronized block, static synchronization
- Deadlock
- Inter-thread Communication
- Interrupting Thread

GUI Programming

- Designing Graphical User Interfaces in Java,
- Components and Containers
- Introduction to Applet
- Applet class hierarchy
- Applet Life cycle

- How to run applet using HTML and applet viewer tools
- Layout Managers
- AWT Components
- Extending GUI Features Using Swing Components
- Event Handling

Event-Driven Programming in Java

- Event- Handling Process
- Event Handling Mechanism

Advance Java

Basics of a Web application

- Web application
- Web client and web server
- Client and server communication
- HTTP protocol basics
- HTML language basics
- TCP/IP port, URL
- Need for a Web Container

Web Container and Web Application Project Set up

- To set up Tomcat Container on a machine
- To set up a Servlets JSP project in Eclipse
- To configure dependency of Servlet JSP APIs
- Web application project structure

Servlets

- Introduction to Servlets
- HTTP Methods; GET, POST, PUT, DELETE, TRACE, OPTIONS
- GET/POST request; differences between the two

- Servlet Lifecycle
- Servlet Context and Servlet Config
- Forwarding and Redirection of requestsSession Management
- Servlet Deployment
- Servlet Collaboration: sendRedirect & RequestDispatcher
- Introduction to session and need for session
- Session information passing between client and server
- Session information passing mechanisms - Cookies, Rewriting
- Destroying a session

Java Database Connectivity

- Uses of JDBC
- Database Connectivity

JSP

- Introduction to JSP and need for JSP
- Basic HTML tags
- JSP Lifecycle
- Jsp implicit Object
- Jsp:forward
- Jsp:include
- JSP Session
- JDBC Driver
- Java Bean: get & set Property, <jsp:useBean>.
- Session Beans: Stateless Session Beans, Stateful Session Beans, Singleton Session Beans.
- EJB: Overview of EJB, Types of EJBs, Introduction: Introduction to Java EE Applications, Architecture & Container.

JSP Elements

- Scriptlets
- Expressions
- Declarations
- Significance of above elements and fitment into the JSP Lifecycle
- What are Directives in JSP?
- Page Directive
- Include Directives
- Taglib Directive

JSP Tag library

- JSP Standard Actions
- Expression Language
- JSTL basics and it's usage
- Need for Custom Tag Library
- Custom Tag Library implementation

Java Framework

Struts Framework (version 2.x)

1. Basics of MVC

- What is MVC?
- MVC Type1 and Type2 architecture
- Why Struts framework?
- Struts 1 overview
- Struts 1 and Struts 2 comparison

2. Struts 2 Architecture

- Architecture Diagram explanation of following components:
- Components of Model, Views and Controller in Struts Framework
- Interceptors

- Model/Action classes
- Value Stack
- OGNL
- Introduction to configurations; framework and application architecture
- Declarative and Annotations configuration approaches

3. Struts 2 set up and first Action class

- Download JAR files
- Struts 2 project build up and Configuration files
- To build Action class
- To intercept an HTTP request via Struts2 framework using Action class
- Defining data and business logic in Action class
- Preparing and Forwarding control to Views

4. Struts 2 Interceptors

- What are Interceptors
- Responsibilities of an Interceptor
- Mechanism of Interceptor calling in Struts 2
- Defining Interceptors
- Defining Interceptor stacks
- Defining Custom Interceptors

5. Struts 2 Tag Library

- Introduction to tag library of Struts 2 and it's usage

6. Struts 2 Validations

- Validations using Validateable interface
- Workflow interceptor mechanism for validations
- Validations using Validateable interface
- Validation Framework introduction and architecture
- Validating user input with above two mechanisms

7. Struts 2 Tiles Frameworks

- Introduction to Tiles in a page
- Struts2 Tiles framework introduction
- Defining tiles.xml file
- Configuring pages for tiles
- A complete Tiles example with Struts2

Hibernate Framework (version 3.x)

1. Introduction

- What is ORM principle?
- Why ORM?
- ORM implementations

2. Hibernate Architecture

- Introduction to Hibernate
- Hibernate Architecture
- What are Persistent classes?

3. Hibernate CRUD

- Setting up Hibernate project
- Configuring all JARs and XML files
- Setting up connection to DB using Hibernate
- Performing basic CRUD operations using Hibernate API
- Object Identity; Generator type classes
- Using SQL with Hibernate
- Using HQL
- Using Criteria queries

4. Mapping Collections and Associations

- To define sets, mas, lists in Hibernate

- Association Mappings:
 1. One to one
 2. One to many
 3. Many to one
 4. Many to many
- Hibernate Caching
- What is caching?
- What are the types of caching in Hibernate?
- Explanation of various caching mechanisms in Hibernate

5. Using Hibernate Annotations

- Sample example of using Hibernate Annotations

Spring Framework (version 3.x)

1. Introduction to spring

- What is Spring?
- Spring Architecture explanation and all it's components

2. Introduction to all modules of Spring

- Spring Bean Factory
- Spring Application Context
- Spring DI
- Spring Integration; Spring messaging, Spring JMS
- Spring MVC
- Spring DAO

3. Setting up spring

- Setting up of Spring framework
- Download JARs
- Configure XML files

Project Work

Exit Profile : Java Coder

Certificate & Placement assistance will be provided after completion of the course & clearing exams.

Course Objective :

Java certification course is designed by experienced professionals to match the current industry requirements and demands. You will learn the importance of Java in real time environment and will be able to develop applications based on the Core Java Programming concept.