Core Java with Java 8 - Course Structure

Course Overview

This course provides a comprehensive introduction to Java programming, focusing on the core concepts and features introduced in Java 8. Students will gain hands-on experience with Java programming, object-oriented design, functional programming, and advanced features such as streams and lambdas.

Module 1: Introduction to Java

- Overview of Java: History, Features, and Platform Independence.
- Setup and Tools: Installing JDK, Setting up IDE (IntelliJ/Eclipse).
- First Program: Writing and executing a simple Java program.
- Java Basics:
- Data types and variables
- Operators and expressions
- Input and output (Scanner and System.out)

Module 2: Object-Oriented Programming (OOP) Concepts

- Core OOP Principles:

- Encapsulation, Inheritance, Polymorphism, and Abstraction.

- Classes and Objects:

- Declaring and using classes

- Constructors and initialization blocks

- Access Modifiers: Public, Private, Protected, and Default.

- Method Overloading and Overriding.

- Static and Final Keywords.

Module 3: Java 8 Enhancements

- Lambda Expressions:

- Syntax and use cases.

- Functional interfaces (e.g., Predicate, Consumer, Supplier).

- Streams API:

- Introduction to Streams.

- Stream operations: map, filter, reduce.

- Parallel streams and performance.

- Default and Static Methods in Interfaces.

- Optional Class: Avoiding null pointer exceptions.

Module 4: Exception Handling

- Types of Exceptions: Checked and Unchecked.

- Handling Exceptions: try-catch, finally, throw, and throws.

- Custom Exceptions: Defining user-defined exceptions.

- Best Practices for Exception Handling.

Module 5: Collections Framework

- Overview of Collections: Benefits and architecture.

- Key Interfaces and Classes:

- List, Set, Map

- ArrayList, LinkedList, HashMap, TreeMap, HashSet, TreeSet

- Iterators and Enhanced For Loops.

- Comparators and Comparables.

- Concurrency in Collections: Using ConcurrentHashMap and CopyOnWriteArrayList.

Module 6: Multithreading and Concurrency

- Thread Basics:

- Creating and running threads (Thread class and Runnable interface).

- Thread lifecycle.

- Synchronization:

- Locks and synchronized blocks.

- Deadlocks and avoiding them.

- Concurrency Utilities: Executors, Callable, Future, and Fork/Join framework.

Module 7: File Handling and I/O

- Java I/O Basics: InputStream, OutputStream, Reader, and Writer.

- Serialization and Deserialization.

- File Management using java.nio.file.

- Enhancements in File I/O with Java 8.

Module 8: JDBC and Database Connectivity

- Introduction to JDBC:

- Setting up the environment.

- Connecting to a database.

- Executing Queries:

- Statement and PreparedStatement.

- ResultSet for handling query results.

- Transaction Management: Commit and rollback.

Module 9: Introduction to Design Patterns

- Common Design Patterns:
- Singleton
- Factory
- Builder
- Observer
- Using Design Patterns with Java 8 Features.

Module 10: Project and Wrap-Up

- Capstone Project:
- Design and develop a real-world Java application.
- Incorporate Java 8 features such as lambdas and streams.
- Best Practices: Writing clean, maintainable, and efficient Java code.
- Preparation for Interviews and Certifications: Mock interviews and practice questions.

Learning Outcomes

By the end of this course, you will:

- Have a solid understanding of Java programming and Java 8

features.

- Be able to write efficient and maintainable Java code.

- Be prepared for Java interviews and certifications.

Contact us for more details and enrollment!

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