

Core Java 8 Lesson 00: Java SE 8



Course Goals and Non Goals

➤ Course Goals

- Implementing OOPs features in Java
- Developing Java Desktop Applications
- Use of Core JDK 1.8 API
- Testing using Junit 4
- Implementing Multithreading

➤ Course Non Goals

- Developing GUI applications





Pre-requisites

Basic Programming Concepts

OOPs

XML

Intended Audience



Developers new to Java technology





Day Wise Schedule

Day 1

- Lesson 1: Introduction to Java
- Lesson 2: Eclipse 4.4 (Luna) as an IDE
- Lesson 3: Java Language Fundamentals

Day 2

- Lesson 4: Declaration And Access Control
- Lesson 4: Classes and Objects

Day 3

- Lesson 5: Exploring Basic Java Class Libraries
- Lesson 6: Array
- Lesson 7: Assignments
- Lesson 7: Regular Expressions

Day 4

- Lesson 8: Inheritance and Polymorphism

Day 5

- Lesson 9: Abstract Classes and Interfaces

Day 6 [[Online](#)] 4 Hrs

- Lesson 10: Exception Handling



Day Wise Schedule

Day 7

- MCQ Assessment 1 (20 questions)
- Lesson 11 CoreJava8 - Collection and Generics[Online]

Day 8

- Lesson 11 :Collection Recap[With Comparable, Comparator, equals ,Hash code]
- I/O and NIO [Self Reading]

Day 9

- Lesson 12: Multithreading
- Lesson 13: Concurrent Patterns In Java

Day 10

- Lesson 14: Concurrent Collections In Java.[Self Reading]
- Lesson 14: Stream API
- Lesson 14: Lambda
- Maven [Self Reading]

Day 11

- Lesson 15: TDD with Junit 5 [Online]

Day 12

- Oracle SQL[Online]
- Jdbc [Self Learning]



Day Wise Schedule

Day 13

- Jdbc [Self Learning]
- Core Java 8 practical Test on doselect
- MCQ Assessment 2 (20 questions)



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Lesson 1: Introduction to Java

- Introduction to Java
- Features of Java
- Simple Program in Java
- Developing software in Java

Lesson 2: Eclipse 4.4 (Luna) as an IDE

- Installation and Setting up Eclipse
- Introduction to Eclipse IDE
- Creating and Managing Java Projects
- Miscellaneous Options



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Lesson 3: Language Fundamentals

- Keywords
- Primitive Data Types
- Operators and Assignments
- Variables and Literals
- Flow Control: Java's Control Statements
- Best Practices

Lesson 4: Classes and Objects

- Classes and Objects
- Packages
- Access Specifiers
- Constructors - Default and Parameterized
- this reference
- Memory management in java
- using static keyword
- Enum
- Best Practices



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Lesson 5: Exploring Basic Java Class Libraries

- The Object Class
- Wrapper Classes
- Type casting
- Using Scanner Class
- System Class
- String Handling
- Date and Time API
- Best Practices

Lesson 6: Arrays

- Understand the different types of Arrays
- Implement one and multi dimensional arrays
- Iterate arrays using loops
- Use varargs
- Work with `java.util.Arrays`



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Lesson 7: Regular Expressions

- Regular Expressions
- Validating data
- Best Practices

Lesson 7: Assignments

- Stack and Heap—Quick Review
- Literals, Assignments, and Variables
- Assignment Operators
- Casting Primitives
- Using a Variable or Array Element That Is Uninitialized and Unassigned
- Local (Stack, Automatic) Primitives and Objects
- Passing Variables into Methods
- Passing Object Reference Variables



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Lesson 7: Assignments

- Does Java Use Pass-By-Value Semantics?
- Passing Primitive Variables
- Array Declaration, Construction, and Initialization
- Initializing Blocks
- Using Wrapper Classes and Boxing
- An Overview of the Wrapper Classes
- Creating Wrapper Objects
- Using Wrapper Conversion Utilities
- Auto Boxing
- Overloading
- Garbage Collection and memory Management
- Writing Code That Explicitly Makes Objects Eligible for Garbage Collection



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Lesson 8: Inheritance and Polymorphism

- Inheritance
- Using super keyword
- Instance Of Operator
- Method & Constructor overloading
- Method overriding
- @override annotation
- Using final keyword

Lesson 9: Abstract Classes and Interfaces

- Abstract class
- Interfaces
- default methods
- static methods on Interface
- Interface rules
- Abstract class Vs Interface
- Runtime Polymorphism



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Lesson 10: Exception Handling

- Introduction
- Exception Types and Exception Hierarchy
- Try-catch-finally
- Try-with-resources
- Multi catch blocks
- Throwing exceptions using throw
- Declaring exceptions using throws
- User defined Exceptions
- Best Practices

Lesson 11: Collection

- Collections Framework
- Collection Interfaces
- Iterating Collections
- Implementing Classes
- Comparable and Comparator
- Map implementation
- Legacy classes
- Common Best Practices on Collections
- Generics
- Writing Generic Classes
- Using Generics with Collections



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Lesson 12: Multithreading

- Understanding Threads
- Thread life cycle
- Scheduling threads- Priorities
- Controlling threads using sleep(),join()

Lesson 13: Concurrent Patterns in Java

- Introducing Executors, What Is Wrong with the Runnable Pattern?
- Defining the Executor Pattern: A New Pattern to Launch Threads
- Defining the Executor Service Pattern, a First Simple Example
- Comparing the Runnable and the Executor Service Patterns
- Understanding the Waiting Queue of the Executor Service
- Wrapping-up the Executor Service Pattern
- From Runnable to Callable: What Is Wrong with Runnable?
- Defining a New Model for Tasks That Return Objects
- Introducing the Callable Interface to Model Task
- Introducing the Future Object to Transmit Objects Between Thread
- Wrapping-up Callable and Futures, Handling Exceptions



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Lesson 14: Concurrent Collections in Java

- Implementing Concurrency at the API Level
- Hierarchy of Collection and Map, Concurrent Interfaces
- What Does It Mean for an Interface to Be Concurrent?
- Why You Should Avoid Vectors and Stacks
- Understanding Copy On Write Arrays
- Introducing Queue and Deque, and Their Implementations
- Understanding How Queue Works in a Concurrent Environment
- Adding Elements to a Queue That Is Full: How Can It Fail?
- Understanding Error Handling in Queue and Deque
- Introducing Concurrent Maps and Their Implementations
- Atomic Operations Defined by the ConcurrentMap Interface



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Lesson 14: Concurrent Collections in Java

- Understanding Concurrency for a HashMap
- Understanding the Structure of the ConcurrentHashMap from Java 7
- Introducing the Java 8 ConcurrentHashMap and Its Parallel Methods
- Parallel Search on a Java 8 ConcurrentHashMap
- Parallel Map / Reduce on a Java 8 ConcurrentHashMap
- Parallel ForEach on a Java 8 ConcurrentHashMap
- Creating a Concurrent Set on a Java 8 ConcurrentHashMap
- Introducing Skip Lists to Implement ConcurrentMap
- Understanding How Linked Lists Can Be Improved by Skip Lists
- How to Make a Skip List Concurrent Without Synchronization



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Lesson 15 : Introduction to JUnit 4

- Types of Tests
- Why Unit Tests Are Important
- What's JUnit?
- JUnit 5 Architecture
- IDEs and Build Tool Support
- Setting up JUnit with Maven
- Lifecycle Methods
- Test Hierarchies
- Assertions
- Disabling Tests
- AssumptionsTest Interfaces and Default Methods
- Repeating Tests
- Dynamic Tests
- Parameterized Tests
- Argument Sources
- TDD Introduction
- Types of Testing
- Testing Frameworks and Tools
- Testing Concepts,Mockito



References

Books:

- Java, The Complete Reference; by Herbert Schildt
- Thinking in Java; by Bruce Eckel
- Beginning Java 8 Fundamentals by Kishori Sharan

Websites:

- Java home page: <http://java.sun.com/>
- JDK 1.8 documentation: <http://docs.oracle.com/javase/8/docs/>
- Multithreading :
<https://docs.oracle.com/javase/tutorial/essential/concurrency/index.html>



Next Step Courses



Servlets
JSP





Other Parallel Technology Areas

C ++

C#.Net

Visual Basic.Net