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Essential Java ++ using Eclipse - Course Contents (Duration 200 hours with Projects) Effective June 6th 2016

Core Java (OCJP compliant plus more)

- Introduction to Java
- The Java Architecture
- Object Oriented Programming Concepts
 - Software Object
 - State
 - Behavior
 - Abstraction
 - Inheritance
 - Encapsulation
 - Polymorphism
 - Runtime Polymorphism / Dynamic or Late binding / Method Slicing
- Primitive Data Types and Reference Variables (Objects)
 - Scope, Visibility and Shadowing
- Wrapper classes for Primitive types and their purpose
 - AutoBoxing and AutoUnboxing
- Operators : Assignment/Equality/Relational/Logical/Binary
- Constructors in Java : Default/Parameterized
- Class Members and Instance Members
- String, StringBuffer, StringBuilder
- Enums
- Static Data, Methods, Initializer Block and Classes
- final variables, methods and classes
- Deferred Implementations
 - Abstract Classes
 - Interface
- Concurrency
- Localization
- **Java 8 Features**

 - **Lambda Expressions**
 - **Functional Interfaces**

- **Default Methods**
- **Parallel Sort Operations**
- **Method References**
- **Stream API**
- **New Date/Time API**

- Java Naming Convention

- Class/Data/Method Names
- Camel Casing Rule

- Java packages

- Creating and working with Package
 - package statement
 - import statement
 - creating user-defined libraries in jar files
- CLASSPATH and PATH settings when using Packages
 - -classpath and -cp options while compiling an running.

- Arrays in Java

- Exception Handling in Java

- Java Bean Specification

- Definition
- Mutators(Setters) and Assessors(Getters)

- Threads

- Swings

- Introduction to Swings
- Thread Safety in Swings
- Using Swings Components to develop a Desktop Application
- Event Delegation Model
- Handling events using Inner Classes
- Handling events using Anonymous classes

- Collection Framework : Collections and Generics

- File I/O

- Directory & File Maintenance
- Input/Output with Disk Files
- Java Object Serialization

- NIO (New I/O) and NIO 2

- Introduction : Stream vs. Blocks
- Channels and Buffers
- Reading/Writing
- Path
- FileVisitor

- Socket Programming in Java

(Several assignments on basic logic building, OOPS concepts, Socket Programming and IO)

Oracle SQL

- Introduction
- Writing a Basic SQL Statement
- Restricting and Sorting Data
- Single Row Functions
- Displaying Data from Multiple Tables
- Writing Joins
- Using Group Functions
- Writing Sub queries
- Modifying Data
- Creating and Managing Tables
- Including Constraints
- Views
- Indexes
- Stored Procedures

JDBC

- Introduction to Database Connectivity
- Introduction to JDBC
- Types of JDBC drivers
- JDBC API
- The java.sql package
 - Statement/PreparedStatement/CallableStatement
 - Scrollable and Updatable ResultSet
- Developing a JDBC Application

(Assignment on writing JDBC application with IO)

Developing Web Applications using Java

- Introduction to HTML
- Introduction to CSS
- Introduction to Javascript
 - Examples on Javascript, understanding DOM model in Javascript
 - Introduction to JQuery
 - Some examples on JQuery
- **Web Application Architecture**
 - Web Servers and Application Servers
 - Component Architecture
 - Container Concept

- Java Web Application structure
 - War file
 - Deployment Descriptor file
- Request / Response Model

- Servlets

- Introduction to Servlets
- Servlet Architecture
- Servlet API
- Servlets Life Cycle Methods
- Developing Servlets
 - Handling Request Parameters
 - Handling Context : Context Listener
 - Generating Response
- Inter-Servlet Communication
 - Redirect
 - Request Dispatching
- State Management
 - Session
 - Cookies
- Filters
 - Understanding filters
 - Writing own Filters
- Authentication and Authorization

- JSP : Java Server Pages

- Introduction to JSP
- JSP Architecture
- JSP Tag library
- JSP Expression Language
- Using Java Beans in JSP
- Developing a Custom Tag in JSP

(One Project using JSP/Servlets with MVC design pattern)

- Distributed Technologies

- Web Services in Java
 - Creating a Web Service
 - Understanding WSDL
 - Consuming a web service
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Frameworks

- Struts 2.0

- Introduction to Struts 2.0

- Struts 2 Framework features
- Struts 2 Environment Setup
- Struts 2 Architecture
 - Understanding MVC model
 - Pull-MVC (MVC2)
 - The Five Core Components
 - Actions
 - Interceptors
 - Value Stack / OGNL
 - Results / Result Types
 - View Technologies
- Implementation of MVC model
- Developing a sample Struts application

- Hibernate

- What is ORM and need for it
- Introduction to Hibernate
 - The Paradigm and Impedance mismatch
 - High level Architecture
 - Hibernate Configuration, Entity classes and Mapping Documents
 - CRUD operations, and Retrieve entities by Primary Key
 - Using Annotations in Hibernate
 - Hibernate Query Language (HQL)
 - Using Query and Criteria Interface
 - Associations : OneToMany and ManyToOne
 - Level I & Level II Cache
- Creating a Model using Hibernate

- Spring

- Introduction to Spring
 - Benefits of Spring
 - Spring Architecture
 - Setup Spring Framework Libraries and Common Logging API
- Dependency Injection (IoC)
 - Wiring Beans
 - Spring Configuration File
 - Injection through Constructors, Bean Properties
 - Using Annotations
- Aspect Oriented Programming(AOP)
 - Introduction
 - Defining AOP terminology
 - JoinPoints and PointCuts
 - Declaring Aspects in XML
 - Using Annotations Aspects and Injecting AspectJ Aspects

○ Introduction to MVC

(One **Project** using **Struts**, **Spring** and **Hibernate**)

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