Programming with JAVA

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 4 Weeks

Course Summary

The Java course for beginners is designed for people who wish to learn how to produce meaningful Java code, how to interpret JAVA code written by others, and how to convert a literary description of a problem (requirement) to an application / library in Java. This is a fundamental level course is also suitable for people with no prior programming experience who intend to work as a professional Java engineer in the future.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

1. Has attended 90% of all classes held.
2. Has received an average grade of 80% on all assignments
3. Has received an average of 60% in assessments.
4. The tutor believes the student has grasped all of the concepts and is ready to go on to the next module.

Required Text Books

1. David J. Eck, “Introduction to Programming using Java”, Hobart and William Smith Colleges.
2. Patrick Naughton & Herbert Schildt, “Java 2: The Complete Reference”, Osborne Publishing.

Prerequisites

- Fundamental understanding of programming, bits/bytes, procedures, classes, and computer architecture. It's absolutely acceptable if you only have a theoretical understanding of programming, but you should be certain about what programming is and what you intend to gain from this session.
- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.

- If you have absolutely no idea about programming or do not see yourself doing programming in the next six-odd months, then this class may not be for you.

Course Details

WEEK 1

OVERVIEW OF JAVA LANGUAGE

- Introduction
- Hardware and Software Requirements
- Installation of JDK

PROGRAMMING WITH JAVA

- Class Declaration
- Members of Classes
- Structure of Java Classes
- Main Method
- Command Line Arguments
- Source Code Compilation
- Coding Convention

CONSTANT, VARIABLES AND DATA TYPES

- Primitive and Non-Primitive Variables

WEEK 2

DECISION AND BRANCHING

- If, Else, Switch, Break, Continue

LOOPING

- For, While, Do-While

FUNDAMENTALS OF LOOPS

- Initializing Objects
- Static Members
- Inheritance
- Polymorphism
- Encapsulation

WEEK 3

ABSTRACT CLASS AND INTERFACES

- Defining Interfaces
- Separating Interface and Implementation
- Implementing and Extending Interfaces
- Abstract Classes

EXCEPTION HANDLING

- Exceptions and the Exception Hierarchy
- Throwing Exceptions
- Catching Exceptions
- Chaining Exceptions
- The Finally Block

ADVANCE DATA STRUCTURES (JAVA COLLECTION CLASSES)

- Arrays
- List <e> Interface and its Implementation
- Map <k,v> Interface and Implementation
- Set <e> Interface and Implementation

WEEK 4

JDBC CONNECTION

- JDBC Overview
- Using Driver Manager, Connection, Statement, Prepared Statement and Result Set
- Create, Delete, Insert, Update Statements

JAVA DOC AND JAVA LIBRARIES

- Preparing Java Doc
- Exporting Java Doc
- Implementing Java Libraries
- String Class
- Math Class

Intermediate Java: Level 2

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 4 Weeks

Course Summary

The DTC - Java – Level 2 course is targeted for trainees who have had some prior beginner level hands on programming experience in Java programming language or in some other programming language and want to learn Java. This course is most appropriate for high school and university students who want to do coursework in JAVA, including those who are already working as a professional VB.NET developer and want to switch to Android.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

1. Has attended 90% of all classes held.
2. Has received an average grade of 80% on all assignments
3. Has received an average of 60% in assessments.
4. The tutor believes the student has grasped all of the concepts and is ready to go on to the next module.

Required Text Books

3. David J. Eck, “Introduction to Programming using Java”, Hobart and William Smith Colleges.
4. Patrick Naughton & Herbert Schildt, “Java 2: The Complete Reference”, Osborne Publishing.

Prerequisites

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Course Details

WEEK 1

WEB APPLICATION BASICS

- How the Web Works
- HTTP Overview, HTML Review
- Overview of Java EE, Servlets & Web Applications

SERVLET API

- HTML Forms
- HTTP: Request-Response, Headers, GET, POST
- Overview: How Servlets Work
- Servlet Lifecycle: init(), service(), destroy()
- Requests and Responses
- HTTP Servlets: httpservletrequest, httpservletresponse and httpservlet
- Deployment Descriptor
- Accessing Parameters

WEEK 2

ADDITIONAL SERVLET CAPABILITIES

- Request dispatcher: Including and Forwarding
- Sharing Data with Request Object Attributes
- Sharing Data with Servlet Context and Application Context

JAVA SERVER PAGES

- Basics and Overview
- Lifecycle of a JSP
- Scriplet, Page Directive
- Model View Controller (MVC)
- Data Sharing among Servlets and JSP
- Request, Application, Session and Page Scope
- Predefined JSP Implicit Objects (Request, Session, Application, Page)

WEEK 3

USING CUSTOM TAGS

- Custom Tags to Reduce JSP Complexity
- The JSTL
- JSP Expression Language (EL)
- Using Custom Tags
- The C:URL, C:Param, C:Foreach, C:Out Tags

MORE JSP CAPABILITIES AND SESSION MANAGEMENT

- HTTP as a Stateless Protocol
- Hidden Form Fields
- Cookies Overview: API, Using Cookies
- Session Overview: Cookies and Session Tracking
- HTTP Session
- Putting Data into a Session Object
- Retrieving Data from a Session Object

WEEK 4

ADDITIONAL TOPICS

- Servlet Filter Overview
- Filtering Examples, Lifecycle & Filter Chains
- Filter API, modifying a Request, Modifying a Response

Advanced Java: Level 3

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 4 Weeks

Course Summary

This level of the course builds on the foundation required to prepare trainees for a career as a Java Software Engineer.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

5. Has attended 90% of all classes held.
6. Has received an average grade of 80% on all assignments
7. Has received an average of 60% in assessments.
8. The tutor believes the student has grasped all of the concepts and is ready to go on to the next module.

Required Text Books

5. David J. Eck, “Introduction to Programming using Java”, Hobart and William Smith Colleges.
6. Patrick Naughton & Herbert Schildt, “Java 2: The Complete Reference”, Osborne Publishing.

Prerequisites

- Fundamental understanding of programming, bits/bytes, procedures, classes, and computer architecture. It's absolutely acceptable if you only have a theoretical understanding of programming, but you should be certain about what programming is and what you intend to gain from this session.
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Course Details

WEEK 1

GROOVY FUNDAMENTALS

- Differences between Groovy and Java
- Closures
- Lists and Maps
- Ranges
- Lists, Maps and Sets

GRAILS PROJECT STRUCTURE

- Overview of a Grails Project
- Directories for Model Classes, Controllers and Views
- Data Source Configuration
- Command Line Utilities
- IDE Integration

WEEK 2

DOMAIN CLASSES

- Object-Relational Mapping with GORM
- Constraints and Validation
- Modeling Relationships
- Performing CRUD Operations
- Dynamic Queries

SCAFFOLDING

- Generating Controllers
- Generating Views

WEEK 3

CONTROLLERS

- Setting the Default Action
- Accessing Request Attributes
- Flash Scope
- Rendering a Response
- Redirects and Returns

GROOVY SERVER PAGES

- Built-In Grails Tags
- Layouts and Templates
- Creating Custom Tags

WEEK 4

ADDING AJAX SUPPORT

- Basics of AJAX
- AJAX-Supporting Tags
- Rendering JSON and XML Responses

SERVICES

- Transactions
- Services and Dependency Injection

LABS

Lab assignments will focus on the practice and mastery of contents covered in lectures; and introduce critical and fundamental problem-solving techniques to the students.

Learning Outcomes

- How to use Java to develop object-oriented designs.
- How to recognize Java language components and how they interact in applications.
- How to create stand-alone Java programs and program them.
- How to learn how to use Java Swing to create a graphical user interface (GUI) and APIs in the construction of programs.
- Will have a better understanding of how to employ exception handling in Java applications.
- Will become familiar with Java generics and the Java Collections API.
- How to create Java apps using threads and how to read and write files in Java.