Overview

This course covers two topics, an introduction to Java programming and how to use the popular Eclipse Integrated Development Environment (IDE). The Java programming language has been around since 1995 and has grown in popularity since then. This course teaches the fundamentals of Java and object oriented programming from a zero knowledge background. The course covers how to create and manipulate objects, control flow in a program and how to use many of the features of both Java and eclipse.

The course will be taught as a series of presentations, walk through examples and exercises to complete. The exercises start as walkthroughs to build basic Java projects and use the functionality in the eclipse IDE, and by the end we will be writing larger GUI and simple web-based Java applications.

Prerequisites

- This course doesn't require any previous experience of using any programming languages, just an interest in learning Java and Eclipse

Delegates will learn how to

- Install and setup Java and Eclipse IDE
- Write programs and run them from both the command line and the IDE
- Understand the basics of Java programming
  - Creating objects and methods
  - Control flow within methods
  - Manipulating data
  - Access control
- Write several programs starting from the very simple command line programs through to full GUI applications
- Build basic web applications using servlets and JSPs
- Use some of the aspects of functional programming in Java 8
- Packaging up java files to use as executables
- Create JavaFX user interfaces
- Implement Test Driven Development in Java

Course Outline

Introduction to Java and Eclipse

- Introduction to Java
- Installing Java and Eclipse
- Creating our first project

- Running Java programs from the command line and IDE

Basic Syntax

- Expressions, comments and blocks
- Variables
- Primitive Types
- Simple Maths and Logical Expressions
- Strings

Control Flow

- What is control flow?
- Conditionals
- Looping
- Nesting statements
- Debugging in Eclipse

Introduction to Objects

- What is an object
- Introduction to Java Objects
- Creating Objects
- Encapsulation
- Generating the boilerplate in eclipse

Inheritance

- Inheritance hierarchies in Java
- Abstract Classes
- Polymorphism

Interfaces

- Implementing interfaces
- Extending Interfaces

Collections and Generics

- What are collections
- Lists, Maps and Sets
- Iterating over collections
- Sorting collections
- Generics and Bounded Types

Exception Handling

- Exceptions
- The Try ... Catch ... Finally block
- Writing our own exceptions

UI/Swing and JavaFX

- AWT and Swing?
- Creating a UI
- GUI elements
- Layouts
- Events
- Eclipse's WindowBuilder
- JavaFX
- JavaFX layout managers
- Creating Java UIs

Functional Programming in Java 8

- What is functional programming?
- Lambda Expressions
- Virtual Extension Methods

Java Web Applications

- What are Web Applications?
- A brief introduction to presentation and service web applications
- Creating web applications in eclipse

Packaging it all up

- Distributing software
- Creating Jar files
- Build managers

Javadoc

- What is Javadoc?
- The Java API
- Writing our own documentation

Test Driven Development – Java

- Unit testing - JUnit
- Test Driven Development
- TDD Life Cycle – Red, Green, Refactor

- The TestCase and Assert classes
- POJO class under test
- Creating and executing the test cases
- JUnit 4 annotations