Scala Programming

By Dr. Vishwanath Rao

Day 1

Introduction to Scala Programming

- ¥ Scala and Java - which to use, when and why
- ¥ Overview of Scala development tools (Eclipse, Scalac, Sbt, Maven, REPL)
- ¥ Overview of Scala Frameworks

Introduction to Functional Programming

- ¥ Strategy Pattern
- ¥ Generic Strategy
- ¥ Functions as values, and Higher order functions
- ¥ Lambdas syntax
- ¥ Difference between Methods and Functions
- ¥ Recursive functions
- ¥ Currying and partial function application and positional notation
- ¥ Tail recursion
- ¥ Val, var, lazy val, pass-by-value and pass-by-name

Scala Syntax Fundamentals

- ¥ Data types
- ¥ Variables
- ¥ Operators
- ¥ Functions and lambdas
- ¥ Scala Statements / Loops / Expressions
- ¥ Extending Builtins
- ¥ Easy I/O in Scala

Object-Oriented Programming with Scala

- ¥ Classes, Objects, and Traits
- ¥ Case classes as Functional Objects
- ¥ Immutable objects
- ¥ Accessors
- ¥ Class extension, overriding vals, dynamic dispatch
- ¥ Name based dependency resolution
- ¥ Object hierarchy
- ¥ Exceptions, Nothing and Null types, unit
- ¥ Infix notation

- ¥ Operators as methods
- ¥ Tuples

Day 2

Types:

- ¥ Type parameterization
- ¥ Covariance
- ¥ Contravariance
- ¥ Type Upper Bounds
- ¥ 'Nothing' Type

Collections and Generics

- ¥ Java and Scala Collections
- ¥ Mutable and immutable collections
- ¥ Using generic types
- ¥ Lists, tuples and dictionaries
- ¥ Functional programming and collections
- ¥ map, fold and filter
- ¥ Flattening collections and flatMap
- ¥ The "For Comprehension"

Pattern Matching with Scala

- ¥ Using "Match"
- ¥ Case Classes
- ¥ Wildcards
- ¥ Case Constructors and Deep Matching
- ¥ Using Extractors

Day 3

Files and Processes

Introduction

How to Open and Read a Text File

Writing Text Files

Reading and Writing Binary Files

How to Process Every Character in a Text File

How to Process a CSV File

Pretending that a String Is a File

Using Serialization

Listing Files in a Directory

Listing Subdirectories Beneath a Directory

Executing External Commands

Executing External Commands and Using STDOUT

Handling STDOUT and STDERR for External Commands

Building a Pipeline of Commands

Redirecting the STDOUT and STDIN of External Commands

Using AND (&&) and OR (||) with Processes

Handling Wildcard Characters in External Commands

How to Run a Process in a Different Directory

Setting Environment Variables When Running Commands

An Index of Methods to Execute External Commands

Day4

Databases and Persistence

Introduction

Connecting to MySQL with JDBC

Connecting to a Database with the Spring Framework

Connecting to MongoDB and Inserting Data

Inserting Documents into MongoDB with insert, save, or +=

Searching a MongoDB Collection

Updating Documents in a MongoDB Collection

Accessing the MongoDB Document ID Field

Deleting Documents in a MongoDB Collection

A Quick Look at Slick

Interacting with Java

Introduction

Going to and from Java Collections

Add Exception Annotations to Scala Methods to Work with Java

Using @SerialVersionUID and Other Annotations

Using the Spring Framework

Annotating varargs Methods

When Java Code Requires JavaBeans

Wrapping Traits with Implementations

Serialization using Scala and XML

- ¥ Parsing XML
- ¥ Native Scala XML API
- ¥ Converting objects to and from XML

Day 5

Scala and Concurrency with Akka

- ¥ Creating and using threads
- ¥ Futures and promises
- ¥ Introduction to actors and Akka
- ¥ Creating actor systems
- ¥ Handling errors
- ¥ Using Routers

Actions
Actions with parameters
Request parsers
Asynchronous actions
Content Negotiation
Filters
Routes
Working with JSON's

Day 6

Introduction to Play

- ¥ Key advantages of Play over other frameworks
- ¥ A quick look at the Play architecture
- ¥ Installing Play and configuring your IDE
- ¥ Launching a website in under 5 seconds
- ¥ Working with the Play console
- ¥ Folder Layout of Play
- ¥ Creating Public Assets

Starting with Play Development

- ¥ Action & Controllers
- ¥ Rendering and Redirecting
- ¥ Routers
- ¥ Scopes
- ¥ Play Ingredients: Iteratees, Enumerators, Enumeratees

Templating

- ¥ Templating Syntax

Forms

- ¥ Creating forms
- ¥ Tying form to the controllers
- ¥ Validation
- ¥ Creating and reusing custom fields
- ¥ File Upload

LAB Set UP

8 GB RAM , Win10 64 BITS , JDK 8 Latest, Spark SDK , Spark eclipse ID repl , Node JS latest (10and above)