

Mastering Scala: Advanced Programming for Java Developers

Duration: 4 Day(s)

Course Overview

Step into the world of Scala, a robust language known for its versatility in supporting both object-oriented and functional programming. This course empowers developers with the hands-on expertise needed to excel in building scalable systems, from efficient backend processes to data-driven applications. Participants will explore significant tools and frameworks like Akka, Play, and Slick, blending theoretical insights with substantial lab work, enabling them to confidently apply Scala in professional settings and advance their career paths.

Review this course online at <https://www.alta3.com/courses/A3-SCL2104>

Objectives

- Craft dynamic Scala applications using both OO and functional programming paradigms.
- Utilize advanced Scala features for modular and maintainable code architectures.
- Implement robust web solutions and data integrations with Play and Slick.
- Achieve concurrency and reliability in programs using Akka and Scala Futures.

Who Should Attend

- Experienced Java Developers
- Aspiring Scala Engineers
- Data Science Professionals
- AI/ML Enthusiasts

Prerequisites

- Knowledge of OO principles
- Experience with any programming language
- Understanding of basic data structures

Course Outline

Introduction to Scala

1. Scala's main features and advantages
2. Comparing with Java and OO languages
3. Setup of Scala environment
4. Lab: Scala Environment and Basic Features

Object Oriented Programming in Scala

5. Classes and objects usage
6. Exploring traits and mixins
7. Companion objects and their role
8. Polymorphism and encapsulation in Scala

9. Lab: Simple OOP Application

Foundational Functional Programming

- 10. Principles of pure functions
- 11. Higher-order functions and currying
- 12. Understanding immutability
- 13. Pattern matching functionalities
- 14. Lab: Application of Functional Programming

Advanced Functional Data Structures

- 15. Lists, maps, and sets operations
- 16. Techniques for folding and reducing data
- 17. Stream processing methodologies
- 18. For-comprehensions
- 19. Lab: Application with Data Structures

Building Functional Web Applications

- 20. Play Framework introduction
- 21. Web routing and requests
- 22. Handling JSON with Play
- 23. Middleware and functions
- 24. Lab: Play-based Web Application

Database Integration

- 25. Using Slick with databases
- 26. Configuring database connections
- 27. Queries and updates in Slick
- 28. Transaction management
- 29. Lab: Database-Integrated Application

Modular and Scalable Components

- 30. Modular design patterns
- 31. Integrating with MacWire
- 32. Type-level programming
- 33. Implicit conversions
- 34. Lab: Scalable Scala Application

Concurrency with Akka

- 35. Akka and Actor model basics

- 36. Using actor systems
- 37. Futures and Promises
- 38. Supervision strategies
- 39. Lab: Concurrent Application with Akka

Testing for Confidence

- 40. Introduction to ScalaTest and ScalaCheck
- 41. Implementing unit and property tests
- 42. Test-driven development
- 43. Integration and mocking techniques
- 44. Lab: Testing with Scala

Bridging Scala and Java

- 45. Scala to Java interoperability
- 46. Utilizing Java libraries
- 47. Collections conversion
- 48. Cross-language projects
- 49. Lab: Integrating Java and Scala

Integrating Generative AI in Scala

- 50. GPT and AI overview
- 51. Embedding GPT in applications
- 52. Practical AI implementations
- 53. Lab: GPT-Integrated Application