Training: Capstone Courseware
191 Introduction to Java Testing

TRAINING GOALS:

This course introduces the experienced Java programmer to testing and test-driven development practices using **JUnit**. We work from the basics of JUnit as a tool, to best practices for writing effective and maintainable tests. The course is not strictly a TDD course, but we introduce TDD and take students through an illustrative case study. We discuss the importance of mocking and explore testing techniques using Mockito. Finally, we discuss concerns and strategies for testing enterprise components in the **Java EE** context.

Learning Objectives

- Build unit tests for Java classes using JUnit.
- Write effective tests, and design classes for testability.
- Understand test-driven development (TDD) and use dynamic mocking to support isolated testing.
- Develop effective testing strategies for Java-EE components.

CONSPECT:

- Automated Unit Testing with JUnit
  - Automated Testing
  - JUnit and Related Tools
  - The @Test Annotation
  - The Assert Class Utility
  - Test Runners
  - Lifecycle Methods
  - Expecting Exceptions
  - Test Suites
- Writing Tests
  - Test Granularity
  - Reusing Test Logic
  - Recording and Comparing Output
  - Test Isolation

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- Controlling the Test Environment
- Managing Dependencies
- Non-Invasive Testing
- Designing for Testability
- Factories
- Testing and Threads

- Test-Driven Development
  - Writing the Test First
  - The TDD Cycle
  - Advantages of TDD
  - Resistance to TDD
  - A Case Study
- Mocking
  - Mock Objects in Testing
  - Mock Objects in Test-Driven Development
  - Static vs. Dynamic Mocks
  - Stubbing
  - Verifying
  - Matching and Capturing
  - Using a Spy
  - Partial Mocking
- Testing Enterprise Components
  - Challenges in Java-EE Testing
  - The Java Naming and Directory Interface
  - Mocking JNDI
  - Java-EE Dependency Injection
  - Testing Persistence Components
  - Mocking JDBC and JPA
  - Test Databases
  - Auto-Rollback
  - Verifying Transactionality and Cleanup
  - Web Components
  - Mocking the Web Container
  - Asynchronous Messaging
  - Mocking the JMS Session
  - Web-Services APIs: JAX-WS and JAX-RS

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REQUIREMENTS:

Solid **Java programming** experience is essential -- especially object-oriented use of the language. Language features and techniques that are integral to some lab exercises include interfaces and abstract classes, threading, generics and collections, and recursive methods. Course 103 **Java Programming**, is excellent preparation.

Difficulty level

CERTIFICATE:

The participants will obtain certificates signed by Capstone Courseware.

TRAINER:

Authorized Capstone Courseware Trainer.

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