

## Introduction to JPA

### Course Summary

#### Description

The Introduction to JPA training course provides an in-depth exploration of database driven development using JPA both inside and outside of an Java EE container.

The course begins with a review of common database programming techniques, including JDBC and RowSets. It then examines how ORM frameworks and technologies simplify database development. Once the foundational knowledge is created, then the course transitions into building database driven solutions using JPA.

Along the way, you'll learn key JPA concepts, like an EntityManager, how to create advanced queries using JPQL, and examine how to structure complex entity relationships. The course concludes with a discussion about transactions.

The Introduction to JPA training course can be taught using OpenJPA, Hibernate, or EclipseLink as the JPA provider.

#### Objectives

At the end of this course, students will be able to:

- Describe JPA and its capabilities
- Understand the advantages and disadvantages of ORM frameworks
- Configure persistence context inside and outside of a container
- Implement a basic CRUD application using JPA
- Map complex database schemas to JPA Entities
- Create robust queries using JPQL and Native-sql

#### Topics

- Review of database concepts
- What is JPA
- Core JPA Concepts
- Configuring JPA
- Creating a basic JPA CRUD application
- Overview of Mapping Concepts
- Implementing Mapping Concepts
- Object Relational Mappings
- Advance Mapping configurations
- Introduction to JPA QL
- Understanding types of queries supported by JPA QL
- Integrating JPA with Java EE

#### Prerequisites

There are no prerequisites for this course.

#### Duration

Two days

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### Course Outline

- I. Review of database concepts**
  - A. Review of using JDBC to perform CRUD operations
  - B. Advanced JDBC development using Meta-data capabilities
  - C. Performing ORM with JDBC and JavaBeans
- II. What is JPA**
  - A. Review of ORM problem
  - B. Examining industry attempts to solve problem
  - C. Resolving the relationship between Entity Beans, Hibernate, and JPA
- III. Core JPA Concepts**
  - A. What is JPA
  - B. Overview of key concepts and terms
  - C. Persistence units, Entities, and EntityManagers
  - D. EntityManagerFactories, JPA QL, and the JPA Criteria queries
- IV. Configuring JPA**
  - A. Setting up the environment to work with JPA and a persistence provider
  - B. Creating a persistence.xml file
  - C. Defining a persistence provider
  - D. Defining a persistence unit using JDBC connection strings and pooling
  - E. Defining a persistence unit using data sets
  - F. Using Hibernate as a Persistence Provider
  - G. Using EclipseLink as a Persistence Provider
  - H. Choosing the best configuration style
- V. Creating a basic JPA CRUD application**
  - A. Review of Java annotations
  - B. Review of Dependency Injection
  - C. Creating an Entity
  - D. Associating Entity with EntityManager
  - E. Performing CRUD with an EntityManager
  - F. Performing basic Primary Key querying
- VI. Overview of Mapping Concepts**
  - A. Types of relationships
  - B. Creating relationships using Primary Keys and Foreign Keys
  - C. Defining associations using cardinality
  - D. Identifying annotations used to build basic relationships
- VII. Implementing Mapping Concepts**
  - A. Mapping
  - B. 1-N Mapping
  - C. N-1 Mapping
  - D. N-N Mapping
- VIII. Object Relational Mappings**
  - A. Applying OO Design to Mappings
  - B. Collection Mapping
  - C. Inheritance Mappings
  - D. Over-riding "defaults"
- IX. Advance Mapping configurations**
  - A. Understanding "conventions"
  - B. Building a solution using "configuration over convention"
  - C. Working with configuration annotations
- X. Introduction to JPA QL**
  - A. Review of Querying concepts
  - B. Simple queries and conditions, Joins, Inner Joins, Outer Joins, Order by
  - C. What is JPA QL
  - D. JPA QL syntax, structure, and functions
- XI. Understanding types of queries supported by JPA QL**
  - A. Creating Dynamic Run-time queries
  - B. Creating Compile-time named queries
  - C. Creating native-queries
- XII. Integrating JPA with Java EE**
  - A. Configuring JPA with the app server
  - B. Using resource injection (CDI) to access a persistence unit
  - C. JPA within the JSP / Servlet container
  - D. JPA within the EJB container