Introduction to Data Persistence with JPA

Description

The Java Persistence API Training Course is a step-by-step introduction to building applications using the new Java persistence framework. JPA Stands for Java Persistence API, also known as EJB3 Persistence or JEE 5 Persistence. It is a lightweight framework for creating Java database applications.
It lets you develop persistent classes and POJO objects to the relational database using following common Java idiom such as – association, inheritance, polymorphism, composition
and the Java collections framework.

Course Content

Module 1: Introduction to Java Persistence API (JPA)

- Lesson 1: Overview
  - Persistence Layers, Object-Relational Mapping (ORM), JDBC
  - JPA Overview
  - Lesson 2: Mapping with JPA
  - Entities and @Entity, ids and @Id,
  - Generated Id Values
  - Basic Mapping Types
- Lesson 3: Persistence Unit and EntityManager
  - Persisting to the DB, the EntityManager API
  - Persistence Units, Config, Persistence Context
  - Retrieving Persistent Entities with find()
- Lesson 4: More About Mappings
  - Default Mappings, @Basic, @Column
  - Field vs. Property Access
  - Temporal (Date/Time) Mappings
  - Lesson 5: Logging Options (Provider based)

Module 2: Updates and Queries

- Lesson 1: Inserting and Updating – Persisting new Entities, Updating an Instance, Removing an Instance
- Lesson 2: Querying and JPQL
  - Entity Based Queries, SELECT ,WHERE
  - Query Interface, Executing Queries, Generic Queries (JPA 2)
  - JPQL Operators, Expressions, and Parameters
  - Named Queries
- Lesson 3: Additional Query Capabilities
  - Projection query, Ordering, Aggregate Query, Build Update and Delete
- Lesson 4: Embedded Objects
  - @Embeddable, @Embedded
  - Defining and using Embedded Objects
  - Compound Primary Keys – @EmbeddedID, @IDClass, Defining Compound Keys

Module 3: The Persistence Lifecycle

- Lesson 1: Transaction Overview and Transactions in JPA
  - Transaction Overview

    - EntityTransaction API (including JTA and resource-local EntityManager)
- Lesson 2: The Persistence Lifecycle
    - JPA Entity States (New, Managed, Detached, Removed), and Entity State Diagram
    - Persistence Context – Lifespan, Propagation
    - Synchronization to the DB
- Lesson 3: Versioning and Optimistic Locking
    - Overview, Detached Instances
    - Versioning, @Version, Optimistic Locking
- Lesson 4: Lifecycle Callbacks
    - @PrePersist, @PostPersist, etc.
    - Entity Listeners, @EntityListeners

Module 4: Entity Relationships

- Lesson 1: Relationships Overview: Object Relationships, Participants, Roles, Directionality, Cardinality
- Lesson 2: Relationship Mapping
    - Mapping Overview (1-1, 1-N, N-1, N-N)
    - Unidirectional and Bidirectional
    - @ManyToOne, @OneToMany, Table Structures
    - Collection Types (List, Set, etc)
    - Cascading Over Relationships (including orphanRemoval – JPA 2)
    - @ManyToMany, @OneToOne
    - Lazy and Eager Loading
    - Queries Across Relationships (Inner Joins, Outer Joins, Fetch Joins)
- Lesson 3: Entity Inheritance Mapping
- Lesson 4: Overview
    - Single Table Mapping
    - Joined (Table per Subclass) Mapping
    - Table per Concrete Class Mapping
    - Pros and Cons
- Lesson 5: Element Collections (JPA 2)
    - Overview, Collections of Value Objects, @ElementCollection, @CollectionTable
    - Using Element Collections
    - Collections of Embeddables

Module 5: The Criteria API (JPA 2)

- Lesson 1: Overview of the Criteria API
- Lesson 2: Path Expressions, Building Queries (CriteriaBuilder, CriteriaQuery, Subquery, Predicate, Expression, Order, Selection, Join)
- Lesson 3: Executing Queries and Accessing Results

Module 6: Additional JPA Capabilities

- Lesson 1: XML Mapping Files
- Lesson 2: Bean Validation (JPA 2)
- Lesson 3: Best Practices
- Lesson 4: Primary Keys, Named Queries, Lazy/Eager Loading, Transactional Semantics, Encapsulation, Report Queries

Module 7: Integration

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Lesson 1: Data Access Objects (DAO) and Java SE Integration (Optional):
    - DAO Overview
    - JpaUtil Class for EntityManager management in Java SE
    - Lifecycle Considerations
- Lesson 2: Integration with EJB (Optional):
    - Using JPA with Session Beans
    - Container Managed (Injected) Entity Manger
    - JTA Transactions and Lifecycle Considerations
    - Extended Persistence Contexts
- Lesson 3: Using JPA with Java Web Apps
    - Using EntityManager in Web apps – request scoping
    - Lazy Loading – Open EntityManager in View Pattern
- Lesson 4: Integration with Spring (Optional)
    - Injection of EntityManger, EntityManagerFactory
    - LocalEntityManagerFactoryBean
    - JPA/Spring Based DAO

Documentation

- Digital courseware included

Participant profiles

- Beginner developers who want to develop POJO’s based-applications interacting with the relational database

Prerequisites

- Intermediate knowledge of Core Java programming
- Creating basic web applications using Servlet & JSP
- Some familiarity with SQL, relational databases, and the Java Database Connectivity (JDBC) interfaces will be helpful

Objectives

- Understand how to persist your class POJO's with relational database using JPA Object-Relational mapping technology
- Be confident for implementing and maintaining Object-Relational persistence in your JPA application, including all necessary client-side and server-side programming

Niveau
Intermédiaire
Classroom Registration Price (CHF)
2300
Virtual Classroom Registration Price (CHF)
2150
Duration (in Days)
3
Reference
JPA