

Hibernate Learning Roadmap

1. Introduction to Hibernate

- Overview of Hibernate and its role in Java applications.
- Understanding Object-Relational Mapping (ORM).
- Comparison with JDBC and benefits of using Hibernate.

2. Setting Up Hibernate

- Configuring Hibernate with Maven or Gradle.
- Creating a Hibernate configuration file (`hibernate.cfg.xml`).
- Setting up database connections (using connection pools).

3. Hibernate Core Concepts

- Understanding Session, SessionFactory, and Transaction.
- Lifecycle of a Hibernate entity.
- Mapping Java classes to database tables.

4. Entity Mapping

- Annotations vs XML mapping.
- Defining entity classes using annotations (`@Entity`, `@Table`, etc.).
- Configuring primary keys (`@Id`, `@GeneratedValue`).

5. CRUD Operations

- Performing Create, Read, Update, and Delete operations.
- Using `Session.save()`, `Session.get()`, `Session.update()`, and `Session.delete()`.
- Understanding the concept of dirty checking.

6. Querying with Hibernate

- Introduction to HQL (Hibernate Query Language).
- Using Criteria API for building queries.
- Named queries and native SQL queries.

7. Fetching Strategies

- Understanding different fetching strategies (eager vs lazy loading).

- Using `@Fetch` annotation for optimization.

8. Transactions and Concurrency

- Managing transactions in Hibernate.
- Understanding isolation levels and transaction propagation.
- Optimistic vs pessimistic locking.

9. Relationships in Hibernate

- Mapping one-to-one, one-to-many, many-to-one, and many-to-many relationships.
- Using cascade operations and orphan removal.

10. Caching in Hibernate

- Understanding first-level and second-level caching.
- Configuring second-level cache providers (e.g., Ehcache).
- Managing cache regions.

11. Error Handling and Debugging

- Handling exceptions in Hibernate (e.g., `HibernateException`).
- Logging and debugging Hibernate queries.
- Best practices for error handling.

12. Hibernate Best Practices

- Avoiding common pitfalls (e.g., N+1 problem).
- Designing a clean architecture (separating concerns).
- Performance tuning and optimization tips.

13. Spring and Hibernate Integration

- Using Hibernate with Spring Framework.
- Configuring Spring's `@Transactional` for Hibernate.
- Best practices for integration.