

Course duration

- 5 days

Course Benefits

- Understand the core principles of Spring, and of Dependency Injection (DI) / Inversion of Control
- Use the Spring Core module and DI to configure and wire application objects (beans) together
- Know the different types of metadata (XML, annotations/@Component, and Java Configuration/@Configuration), and how and when to use them
- Understand and use the complete capabilities of the Core module, such as lifecycle events, bean scopes, and the Spring API
- Use Spring Boot to simplify dependency management and configuration
- Understand the benefits of JPA and the JPA Architecture
- Create JPA based applications
- Work with the ORM (Object-Relational Mapping) module to integrate Spring with JPA.
- Understand and use Spring's transaction support, including the easy-to-use Java annotation support, as well as the tx/aop XML configuration elements
- Understand and use JPA mapping to map persistent objects to the database
- Work with JPA queries and JPQL
- Understand and work with collections and associations (Value and entity types, unidirectional, bidirectional, 1-1, 1-N, N-N)
- Use JPA's versioning support
- Map inheritance hierarchies using JPA
- Integrate Spring/JPA with Java EE Web applications
- Use Spring Data to automatically generate JPA-based repositories with auto-generated queries

Available Delivery Methods

Public Class

Public expert-led online training from the convenience of your home, office or anywhere with an internet connection. Guaranteed to run .

Private Class

Private classes are delivered for groups at your offices or a location of your choice.

Course Outline

1. Introduction to Spring
 1. Overview of Spring Technology
 1. Motivation for Spring, Spring Architecture
 2. The Spring Framework
 2. Spring Introduction
 1. Declaring and Managing Beans
 2. ApplicationContexts - The Spring Container
 3. XML and @Component/@Named Config
 3. Dependencies and Dependency Injection (DI)
 1. Examining Dependencies
 2. Dependency Inversion / Dependency Injection (DI)
 3. DI in Spring - XML and @Autowired
2. Configuration in Depth
 1. Java Based Configuration (@Configuration)
 1. Overview, @Configuration, @Bean
 2. Dependency Injection
 3. Resolving Dependencies
 2. Integrating Configuration Types
 1. XML and @Component Pros/Cons
 2. @Configuration Pros/Cons
 3. Choosing a Configuration Style
 4. Integrating with @Import and <import>
 3. Bean Scope and Lifecycle
 1. Singleton, Prototype, and Other Scopes
 2. Configuring Scope
 3. Bean Lifecycle / Callbacks
 4. Externalizing Properties
 1. Properties Files
 2. @PropertySource, property-placeholder
 3. Using @Value
 4. SpEL
 5. Profiles
 1. Overview and Configuration
 2. Activating Profiles
3. Spring Boot Overview
 1. maven and Spring
 2. Spring Boot Structure
 3. Spring POMs with Boot Parents
 4. Spring Boot Starters
 5. Other Capabilities
4. Spring Testing
 1. Testing and JUnit Overview
 1. Writing Tests - Test Classes, asserts, Naming Conventions
 2. Running Tests - IDE, maven, ...
 3. Test Fixtures - setup and teardown

2. Spring TestContext Framework
 1. Overview
 2. Configuration
 3. Running Tests
5. Introduction to Java Persistence API (JPA2)
 1. Overview
 1. Persistence Layers, Object-Relational Mapping (ORM), JDBC
 2. JPA Overview
 2. Mapping with JPA
 1. Entities and @Entity, ids and @Id,
 2. Generated Id Values
 3. Basic Mapping Types
 3. Mapping with JPA
 4. Persistence Unit and EntityManager
 1. Persisting to the DB, the EntityManager API
 2. Persistence Units, Config, Persistence Context
 3. Retrieving Persistent Entities with find()
 5. Mapping with JPA
 6. More About Mappings
 1. Default Mappings, @Basic, @Column
 2. Field vs. Property Access
 3. Temporal (Date/Time) Mappings
 4. Java 8 Data/Time Mapping
 7. Mapping with JPA
 8. equals() and hashCode()
 9. Logging Options (Provider based)
6. Spring/JPA Integration
 1. Spring's DataSource Support
 2. Managing the EntityManager (EM)
 3. LocalContainerEntityManagerFactoryBean and Container-managed EMs
 4. JEE and JNDI Lookup of the EM
 5. Configuration and Vendor Adaptors
 6. Creating a JPA Repository/DAO Bean - @PersistenceUnit, @PersistenceContext
7. JPA Updates and Queries
 1. Inserting Updating, and Deleting Entities
 2. Querying and JPQL
 1. Entity Based Queries, SELECT ,WHERE
 2. Query Interface, Executing Queries, Generic Queries (JPA 2)
 3. JPQL Operators, Expressions, and Parameters
 4. Named Queries
 3. Additional Query Capabilities - Projection and Aggregate Query, Embedded Objects
8. Transactions
 1. TX Overview and JPA Transactions
 2. Spring's Declarative TX Management (REQUIRED, etc.)
 3. @Transactional

- 4. TX Scope and Propagation
- 5. Pointcut-based Configuration of Transactions
- 9. The JPA Persistence Lifecycle
 - 1. The Persistence Lifecycle
 - 1. JPA Entity States (New, Managed, Detached, Removed), and Entity State Diagram
 - 2. Persistence Context - Lifespan, Propagation
 - 3. Synchronization to the DB
 - 2. Versioning and Optimistic Locking
 - 1. Overview, Detached Instances
 - 2. Versioning, @Version, Optimistic Locking
 - 3. Versioning and Optimistic Locking
 - 4. Lifecycle Callback
 - 1. @PrePersist, @PostPersist, etc.
 - 2. Entity Listeners, @EntityListeners
 - 5. Versioning and Optimistic Locking
- 10. Relationships
 - 1. Relationships Overview: Object Relationships, Participants, Roles, Directionality, Cardinality
 - 2. Relationship Mapping
 - 1. Mapping Overview (1-1, 1-N, N-1, N-N)
 - 2. Unidirectional and Bidirectional
 - 3. @ManyToOne, @OneToMany, @ManyToMany, @OneToOne with Table Structures
 - 4. Relationship Inverse - Owning Side
 - 5. Collection Types (List, Set, etc)
 - 6. Cascading, Lazy and Eager Loading
 - 7. Queries Across Relationships (Inner Joins, Outer Joins, Fetch Joins)
 - 3. Entity Inheritance Mapping
 - 1. Overview
 - 2. Single Table, Joined (Table per Subclass), Table per Concrete Class Mappings
 - 3. Pros and Cons of Mapping Strategies
- 11. Spring Web Integration
 - 1. Integrating Spring with Java EE Web Apps
 - 1. ContextLoaderListener
 - 2. WebApplicationContext
 - 3. Using Spring beans in Web app controller logic
 - 2. Open EntityManager in View
 - 1. Lazy Loading Issue in Web Apps
 - 2. Open EntityManager in View Pattern
 - 3. Using Spring's OpenEntityManagerInViewFilter/Interceptor
- 12. Spring Data Introduction
 - 1. Spring Data Overview
 - 1. Overview and Architecture
 - 2. Configuring Spring Data
 - 3. Repositories and JPA Repositories

4. Using CrudRepository
2. Using Spring Data
 1. Naming Conventions for Querying
 2. Creating more Complex Queries
 3. Query Configuration
13. Additional Topics
 1. Spring 5: Core Updates
 2. JPA: Embedded Objects
 3. JPA: Compound Primary Keys
 4. JPA: Element Collections

Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.

Class Prerequisites

Experience in the following *is required* for this Spring class:

- Good practical Java programming skills, including use of inheritance and interfaces.
- Some familiarity with SQL and databases.