

Core Java Topics

Total Hours(23 hours)

Prerequisite : A basic knowledge on java syntax and object oriented concepts would be good to have not mandatory.

- Jdk, jre, jvm basic understanding , Installing jdk, ide eclipse (1 and 1/2 hr)
- Class ,Object Concepts , this,super, Variables , Interface (2 hr)
- Operators , Loops , Methods ,Constructors. (1 hr)
- Annotation (1 hr)
- Garbage collection (1/2 hr)
- Exception handling (try, catch , throws , throw Exception hierarchy) (1 and 1/2 hr)
- File Handling , Input Handling , String Handling (1 hr)
- Multi Threading , Executor Framework , Thread pooling (1 and 1/2 hr)
- Serialization Deserialization ,Reflection (2 hr)
- Collections(Lists,Sets,Maps,Array, queues). Concurrency package (2 and 1/2 hour)
- JVM memory understanding (1/2 hour)
- Networking in java (Socket server, socket client) (1/2 hr)

Below is java 8 topics

New Features in Java language (2 hr)

Lambdas and Functional Interfaces
Interface's Default and Static Methods
Method References
Repeating annotations
Better Type Inference
Extended Annotations Support

New Features in Java compiler (1/2 hr)

Parameter names

New Features in Java libraries (3 hr)

Optional
Streams
Date/Time API (JSR 310)
Nashorn JavaScript engine
Base64
Parallel Arrays
Concurrency

New Java tools (1 hr)

Nashorn engine: jjs
Class dependency analyzer: jdeps

New Features in Java runtime (JVM)

(1/2 hr)

The JVM options **-XX:PermSize** and **-XX:MaxPermSize** have been replaced by **-XX:MetaSpaceSize** and **-XX:MaxMetaspaceSize** respectively.

- Best practices in Java

(1/2 hr)

Hibernate

Total : 16-18 hrs

Basic Concepts

(1 and 1/2hour)

- Pros and Cons of JDBC
- Why Object Relational Mapping (ORM)?
- What is ORM?
- Hibernate Overview
- Hibernate Advantages
- Supported Databases
- Hibernate Architecture(Configuration Object, SessionFactory Object ,Session Object,Transaction Object , Query Object,Criteria Object)

Use case example(Hibernate with MySQL Database, Hibernate Sessions, Session Interface Methods)A simple POJO example with environment setup

(1 and 1/2 hour)

- Object mapping to database table using hibernate annotation(@Entity Annotation, @Table Annotation, @Id and @GeneratedValue,@Column Annotation)

Types in Hibernate (Primitive types , Date and time types, Binary and large object types,JDK-related types) with example

(1 hr)

Advance Concepts:

- Collections Mappings Using annotation(Set Mappings, SortedSet Mappings,List Mapping, Bag Mapping, Map Mappings, SortedMap Mappings with example **(2 hr)**
- Association Mappings Using annotation(Hibernate Many-to-One Mappings, One-to-One Mappings One-to-Many Mappings, Many-to-Many Mappings,Component Mappings) **(2 hr)**

- Hibernate Query Language (FROM Clause , AS Clause , SELECT Clause , WHERE Clause ,ORDER BY Clause , GROUP BY Clause, Using Named Paramters, UPDATE Clause ,DELETE Clause, INSERT Clause,Aggregate Methods,Pagination using Query)
with Examples **(2 hr)**
- Hibernate Criteria Queries(Restrictions with Criteria ,Pagination using Criteria,Sorting the Results, Projections & Aggregations, Criteria Queries Example) **(1 hr)**
- Hibernate Native SQL (Scalar queries example,Entity queries example,Named SQL queries example,Native SQL Example example) **(2 and 1/2 hr)**
- Hibernate Caching (First-level cache,Second-level cache,Query-level cache) Example for caching with caching setup(ehcache) **(1 hr)**
- Concurrency strategies Lock mechanism **(1/2 hr)**
- Hibernate Batch Processing with Example **(1/2 hr)**
- Hibernate Interceptors How to use Interceptors? Create Interceptors **(1/2 hr)**

Spring Core, ORM, Security, MVC, REST services: A complete package

User story: A user having role admin should view admin page and a simple user should view only user page. Admin can have a report generation in pdf of all listed user.

Spring : Total hours: 16-20 hrs

- Understanding design for Spring, Inversion control, Dependency Injection **(1/2 hr)**
- Overview of different modules and architecture **(1/2 hr)**
- life cycle of spring beans: init, destroy, pre post processors, interfaces like Initializable, Disposable) **(1 hr)**
- (Dependency Injection: setter injection, constructor injection, method injection)Which to use when ? **(1/2 hr)**
- (Autowiring(resource or autowired annotation), scope) which to use when? **(1/2 hour)**
- understanding application context, bean factory) **(1/2 hr)**
- Reading properties file from spring(Resource properties, property place holder configurer, Reloadable resource properties **(1/2 hr)**
- Understanding common Annotation in Spring **(1/2 hr)**
- Using Spring Bootstrap **(1 hr)**

- Spring AOP (After before around) **(1 hr)**

Spring MVC and Transaction management:

- Application context revisited, context loader listener.(property place holder configurer, Reloadable resource properties) **(1 hr)**
- Model view, controller, validation using annotation with one use case of CRUD. **(2 hr)**
- Internal view resolver and multiple view concept in spring MVC(expose rest services, display jasper view as use case). **(1/2 hr)**

- Transaction management: Different level of transaction in spring. **(1 hr)**

- Exposing Rest services through Spring MVC/
consuming web services(Rest template). **(1 and 1/2 hr)**

Spring Security: At a higher level with one use case

Understanding spring security concepts. Use case login and session management using spring security.

- Concepts of filter, spring security context holder

(2 hr)

Spring ORM: At a higher level

How to integrate spring with hibernate. Hibernate Template usage, local session factory, annotation entity.

(1 and 1/2 hr)

Spring Web Services: 18 hrs including basic on xml,xsd, soap, wsd

Case study : add a user, list the users, delete the users

First try to understand the xml structure for request and response.

Create the xsd for this request and response

Think about the different operation for this case study

Configure the end points, marshaller in spring web service

Exceptional handling and customised soap:fault

Auto generate the wsd download it and then store the wsd as static file.

Create a client for web service exposed based on wsd

Apply WS- Security on the web service

Modify the client and put security credentials

- **Understanding XML** 4 hr
- **Understanding XSD** 4 hr
- **Understanding SOAP** 2 hr
- **Understanding WSDL** 2 hr
- **Understanding Marshaller** 1 hr
- **Understanding Contract first approach for web service design** 1 hr
- **Interceptors in spring web service(logger , exception handler)** 1/2 hr
- **End points Declaration** 1/2 hr
- **Use case implementation for CRUD example web services** 1 hr
- **WSDL auto generation or static WSDL configuration** 1/2 hr
- **Consuming web services** 1/2 hr
- **WS security implementation** 1/2hr
- **Standards for SOA architecture** 1/2 hr