Week 6 SQL based RDBMS Handling.

JDBC API – Is a specification provided by Java creators to interact with any SQL based database programmatically. (Here we have more control on the Database entity, But needs to manage everything manually – Connection, Queries, Passing the parameters to Query, Processing the Result, Managing the connection, add drivers to the build path.)

JPA – Is also a Specification (But it’s built on top of JDBC)

It simplifies the process of interacting with any SQL/No-SQL based Databases.

Implementation of JPA

1. EclipseLink (Eclipse)
2. Hibernate (ORM – JPA with some Additional features like caching, pooling, validation)
3. OpenJPA

Spring Data JPA [Uses Hibernate with Annotated Classes]

1. Open Session/EntityManager.
2. Begin the Transaction
3. Do the process (CRUD)
4. Commit Transaction

Annotations of JPA (Jakarta.persistence package)

1. @Table
2. @Entity
3. @Id
4. @Column
5. @OneToOne
6. @OneToMany
7. @ManyToMany
8. @GeneratedValue
9. @JoinColumn
10. @JoinTable

<https://jakarta.ee/specifications/persistence/3.2/apidocs/jakarta.persistence/module-summary.html> JPA API Documentation URL

Hibernate API Doc URL -- <https://docs.jboss.org/hibernate/orm/7.1/javadocs/>

JPA Project using EclipseLink.

1. Create JPA Project in Eclipse EE IDE
2. Specify JPA implementation libs, add DB configurations
3. Create EntityManagerFactory & EntityManager Objects to interact with DB Table.
4. CRUD operations using BeginTransaction & commit()
5. Persistence.xml

Hibernate (Maven based Project – with dependencies of latest Hibernate & DB driver)

1. Hibernate.config.xml

JPA can be added to Stand-alone (core-Java) projects. [Did CRUD operations using Main method]. JPA can also be added to Enterprise applications (web/mobile based application)

DB Connection Exception.

Exception Code. – SQL Exception

Kibana – ELK Stack (Logging) – What happens when we run this particular program. (Which method is called, which exception is thrown, error, warning, info, debug)

Grafana – Prometheus (Monitoring) – Health & other metrics (CPU utilization, Memory Utilisation, Service Availability)

<https://docs.google.com/spreadsheets/d/1OsjnPBD3x9Zm-YMR69nAA5uiSlPAxAm_HNGhtAv9H9o/edit?gid=2098831421#gid=2098831421>

JPA – Java Persistence API ( javax.persistence – package name) Adv Java (Java EE)

Java Editions

1. Standard Edition (JSE/J2SE) – Core Java
2. Enterprise Edition (JEE) – Adv Java [Servlets, JSP, JMS, EJB, JNDI, JPA etc.,] – Server (Web/Enterprise Applications)
3. Mobile/Micro Edition (J2ME) – Portable and small size Java.

JAVA is also used in Cards

JPA version (Jakarta.persistence – package name used in latest versions of JPA)

Project (Multiple Java source Code) – pom.xml, application.properties. – JAR (Java Archieve)

Ars-v2.jar

To run this jar

Java -jar ars-v2.jar

HelloWorld.java

Java HelloWorld.java