**Hands on 4 - Difference between JPA, Hibernate and Spring Data JPA**

**Java Persistence API (JPA)**

* It is a Java specification for managing relational data in Java applications using Object-Relational Mapping (ORM).
* JPA is part of the Java EE (Jakarta EE) platform.
* It provides a set of interfaces and annotations (like @Entity, @Table, @Id, etc.) to map Java classes to database tables.
* JPA does not provide an implementation. It only defines how ORM should work.
* To use JPA, you need an implementation such as Hibernate, EclipseLink, or TopLink.
* It abstracts the underlying ORM implementation and allows you to switch providers with minimal code changes.

### ****Hibernate****

* Hibernate is a **popular open-source ORM tool** for Java that implements the JPA specification and adds additional advanced features.
* Hibernate is a **complete and robust framework** that enables developers to interact with databases using **Java objects**, without writing SQL queries directly.
* It serves as both:
  + A **JPA provider** (fulfills the JPA interfaces).
  + A **standalone ORM framework** with extra features like:
    - Lazy loading
    - Caching
    - Batch processing
* Developers use **SessionFactory** and **Session** objects to interact with the database.
* It handles object-to-table mapping, session management, and transaction control.

### ****Spring Data JPA****

* Spring Data JPA is a **part of the Spring Framework** that provides an **abstraction over JPA**, making it easier to interact with databases using repositories and less boilerplate code.
* Spring Data JPA **does not implement JPA** itself.
* It works **on top of a JPA provider** (like Hibernate) and **simplifies data access** by:
  + Automatically creating repository methods (like findById(), findByName())
  + Reducing the need for custom SQL or JPQL queries
  + Providing built-in support for pagination, sorting, and query derivation
* It uses Spring’s **Dependency Injection, @Transactional** annotation for transaction management, and **Spring Boot auto-configuration** for quick setup.
* Ideal for projects where **fast development and less manual setup** are important.