Hands on 1 - Spring Data JPA - Quick Example

Software Pre-requisites

- MySQL Server 8.0
- MySQL Workbench 8
- Eclipse IDE for Enterprise Java Developers 2019-03 R
- Maven 3.6.2

Create a Eclipse Project using Spring Initializr

- Go to https://start.spring.io/
- Change Group as “com.cognizant”
- Change Artifact Id as “orm-learn”
- In Options > Description enter "Demo project for Spring Data JPA and Hibernate"
- Click on menu and select "Spring Boot DevTools", "Spring Data JPA" and "MySQL Driver"
- Click Generate and download the project as zip
- Extract the zip in root folder to Eclipse Workspace
- Import the project in Eclipse "File > Import > Maven > Existing Maven Projects > Click Browse and select extracted folder > Finish"
- Create a new schema "ormlearn" in MySQL database. Execute the following commands to open MySQL client and create schema.

```
> mysql -u root -p

mysql> create schema ormlearn;
```

- In orm-learn Eclipse project, open src/main/resources/application.properties and include the below database and log configuration.

```
# Spring Framework and application log

logging.level.org.springframework=info
```

```
logging.level.com.cognizant=debug



# Hibernate logs for displaying executed SQL, input and output

logging.level.org.hibernate.SQL=trace

logging.level.org.hibernate.type.descriptor.sql=trace



# Log pattern

logging.pattern.console=%d{dd-MM-yy} %d{HH:mm:ss.SSS} %-20.20thread %5p
%-25.25logger{25} %25M %4L %m%n



# Database configuration

spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver

spring.datasource.url=jdbc:mysql://localhost:3306/ormlearn

spring.datasource.username=root

spring.datasource.password=root



# Hibernate configuration

spring.jpa.hibernate.ddl-auto=validate

spring.jpa.properties.hibernate.dialect=org.hibernate.dialect.MySQL5Dialect
```

- Build the project using 'mvn clean package -Dhttp.proxyHost=proxy.cognizant.com -Dhttp.proxyPort=6050 -Dhttps.proxyHost=proxy.cognizant.com -Dhttps.proxyPort=6050 -Dhttp.proxyUser=123456' command in command line
- Include logs for verifying if main() method is called.

```
import org.slf4j.Logger;

import org.slf4j.LoggerFactory;
```

```
private static final Logger LOGGER =
LoggerFactory.getLogger(OrmLearnApplication.class);



public static void main(String[] args) {

 SpringApplication.run(OrmLearnApplication.class, args);

  LOGGER.info("Inside main");

}
```

- Execute the OrmLearnApplication and check in log if main method is called

SOLUTION

pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
https://maven.apache.org/xsd/maven-4.0.0.xsd">

	<modelVersion>4.0.0</modelVersion>
	<parent>
		<groupId>org.springframework.boot</groupId>
		<artifactId>spring-boot-starter-parent</artifactId>
		<version>3.5.3</version>
		<relativePath/> <!-- lookup parent from repository -->
	</parent>

	<groupId>com.cognizant</groupId>
	<artifactId>orm-learn</artifactId>
	<version>0.0.1-SNAPSHOT</version>
	<name>orm-learn</name>

	<description>Demo project for Spring Data JPA and Hibernate</description>
	<url/>

	<licenses>
		<license/>
	</licenses>
	<developers>
		<developer/>
	</developers>
```

```
	<scm>
		<connection/>
		<developerConnection/>
		<tag/>
		<url/>
	</scm>
	<properties>
		<java.version>17</java.version>
	</properties>
	<dependencies>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-data-jpa</artifactId>
		</dependency>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-devtools</artifactId>
			<scope>runtime</scope>
			<optional>true</optional>
		</dependency>
		<dependency>
			<groupId>com.mysql</groupId>
			<artifactId>mysql-connector-j</artifactId>
			<scope>runtime</scope>
		</dependency>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-test</artifactId>
			<scope>test</scope>
		</dependency>
	</dependencies>
	<build>
		<plugins>
			<plugin>
				<groupId>org.springframework.boot</groupId>
				<artifactId>spring-boot-maven-plugin</artifactId>
			</plugin>
		</plugins>
	</build>
</project>
```

application.properties

```
spring.application.name=orm-learn

# Spring Framework and application log
logging.level.org.springframework=info
logging.level.com.cognizant=debug

# Hibernate logs for displaying executed SQL, input and output
```

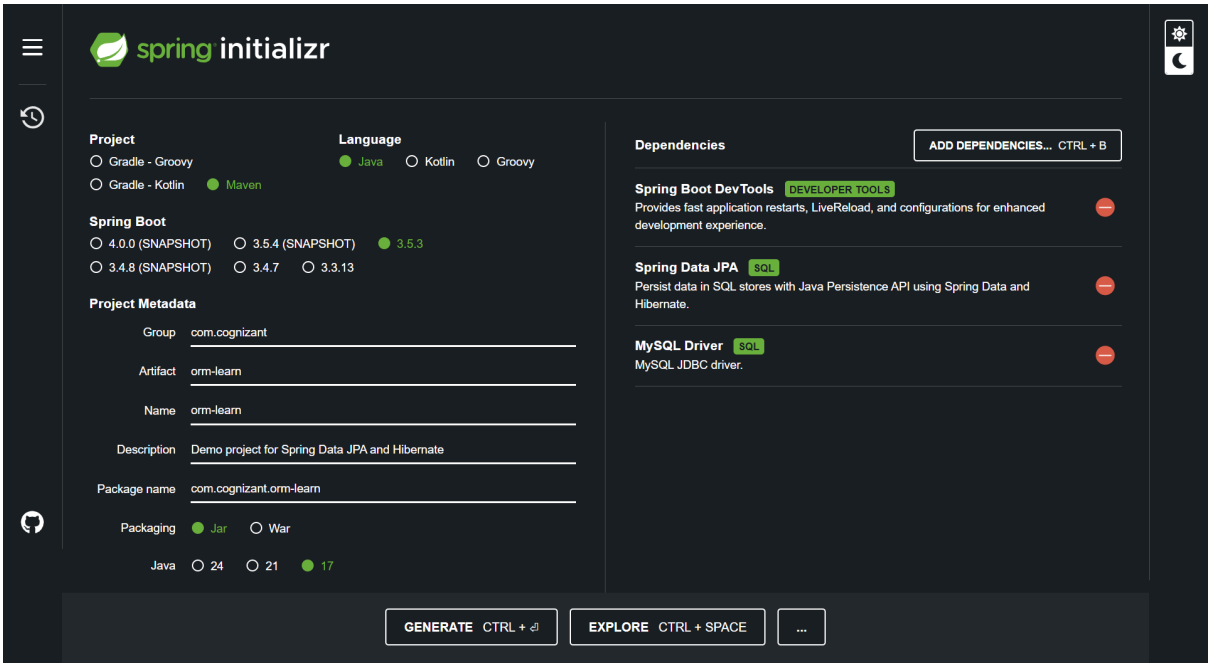
```
logging.level.org.hibernate.SQL=trace
logging.level.org.hibernate.type.descriptor.sql=trace

# Log pattern
logging.pattern.console=%d{dd-MM-yy} %d{HH:mm:ss.SSS} %-20.20thread %5p
%-25.25logger{25} %25M %4L %m%n

# Database configuration
spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver
spring.datasource.url=jdbc:mysql://localhost:3306/ormlearn
spring.datasource.username=root
spring.datasource.password=[redacted]

# Hibernate configuration
spring.jpa.hibernate.ddl-auto=validate
spring.jpa.properties.hibernate.dialect=org.hibernate.dialect.MySQLDialect
```

OrmLearnApplication.java

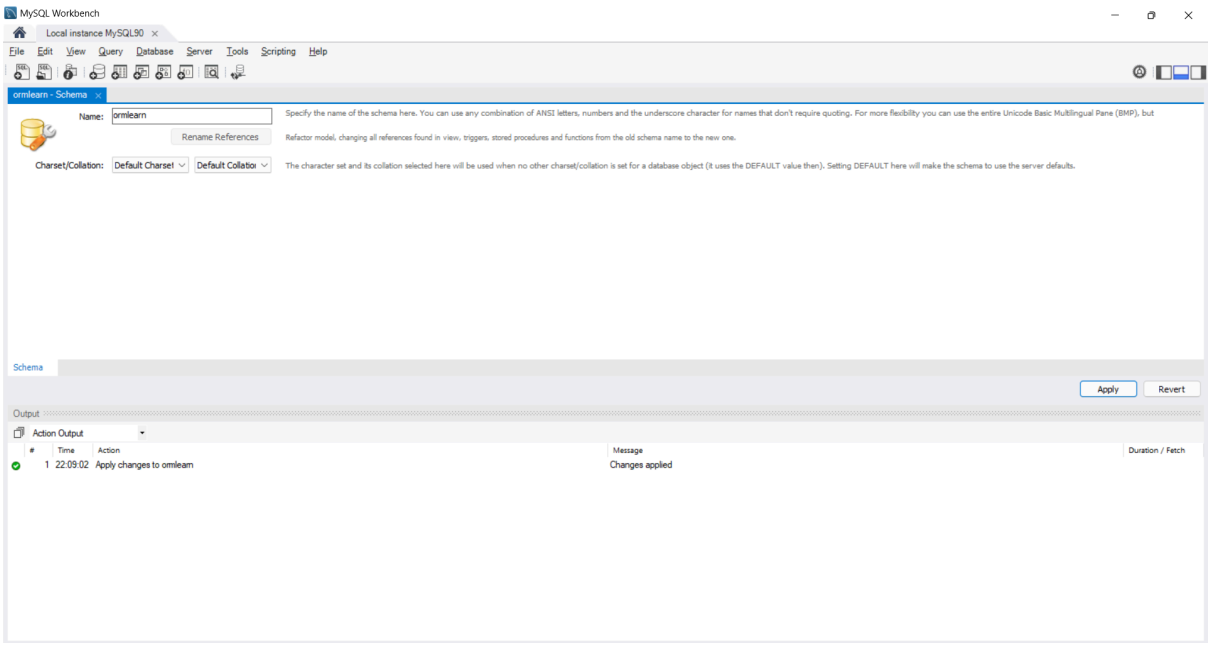
```
package com.cognizant.orm_learn;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;


@SpringBootApplication
public class OrmLearnApplication {

private static final Logger LOGGER =
LoggerFactory.getLogger(OrmLearnApplication.class);


public static void main(String[] args) {
          SpringApplication.run(OrmLearnApplication.class, args);
          LOGGER.info("*************** Hello from Inside main!!
**************");
}
}
```

OUTPUT SCREENSHOTS

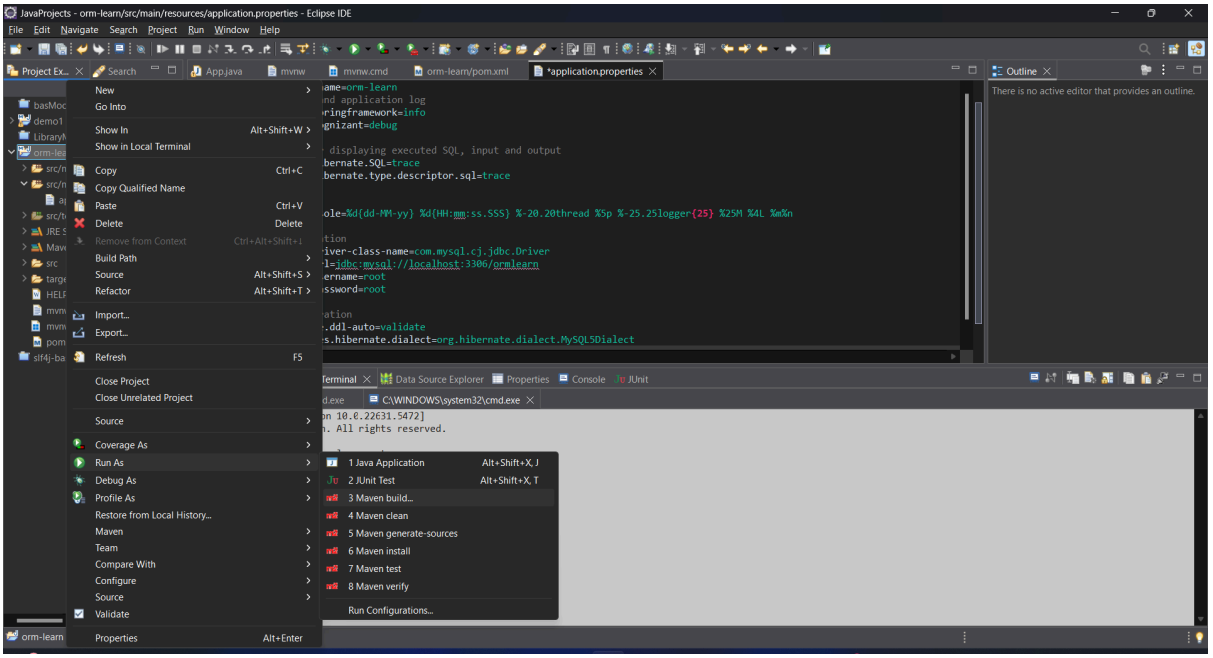
Creating the project in [Spring Initializr]



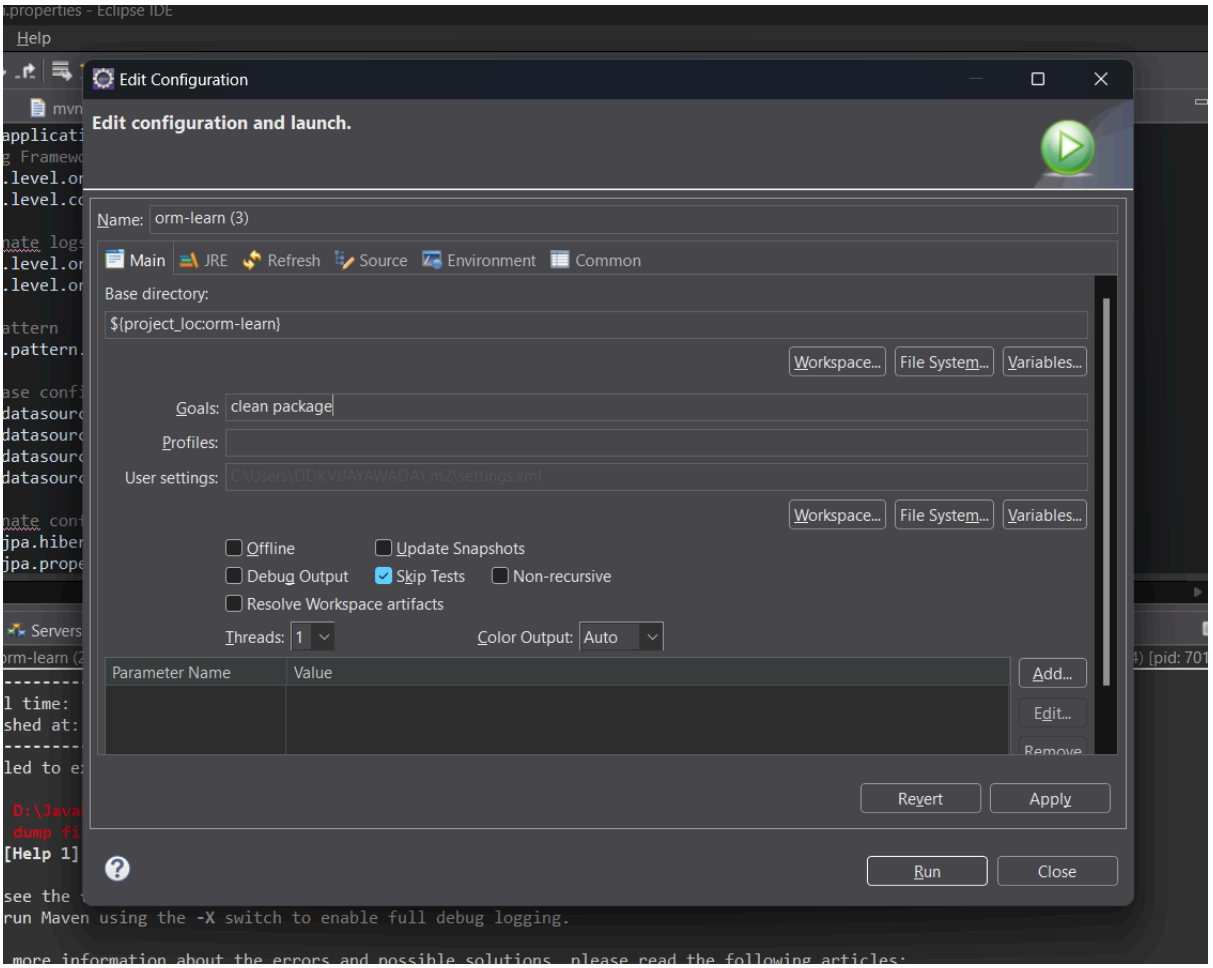
Creating the schema in MySQL Workbench



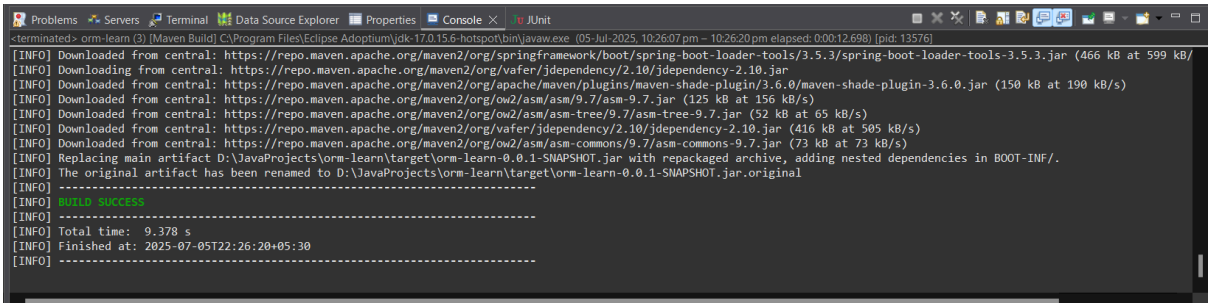
Building the project



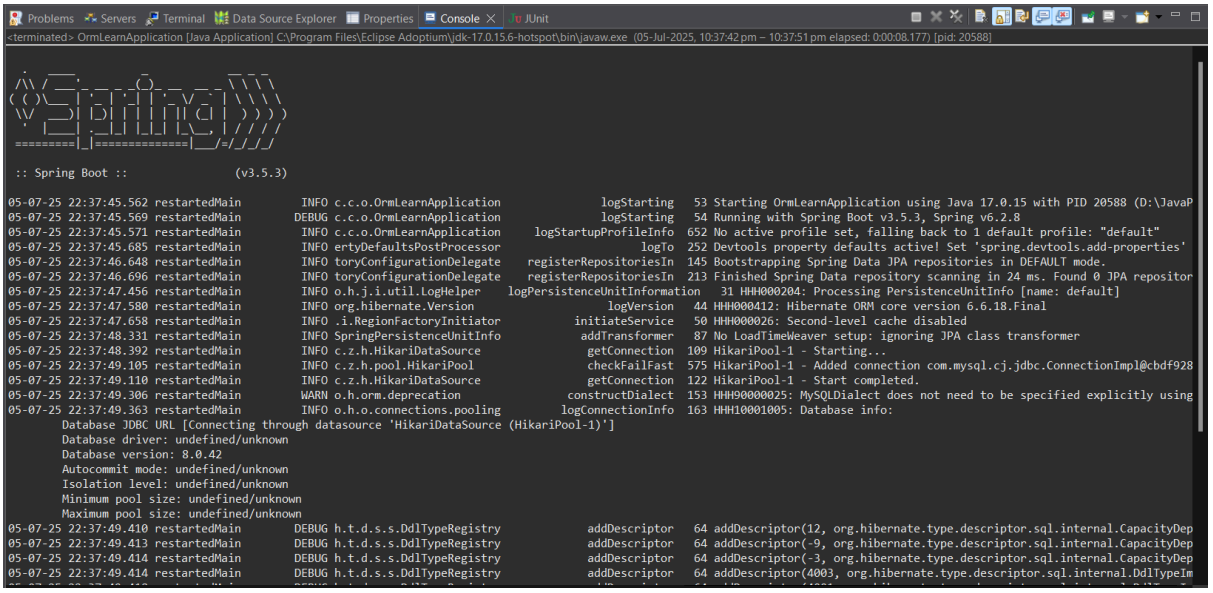
Setting up Maven Configuration

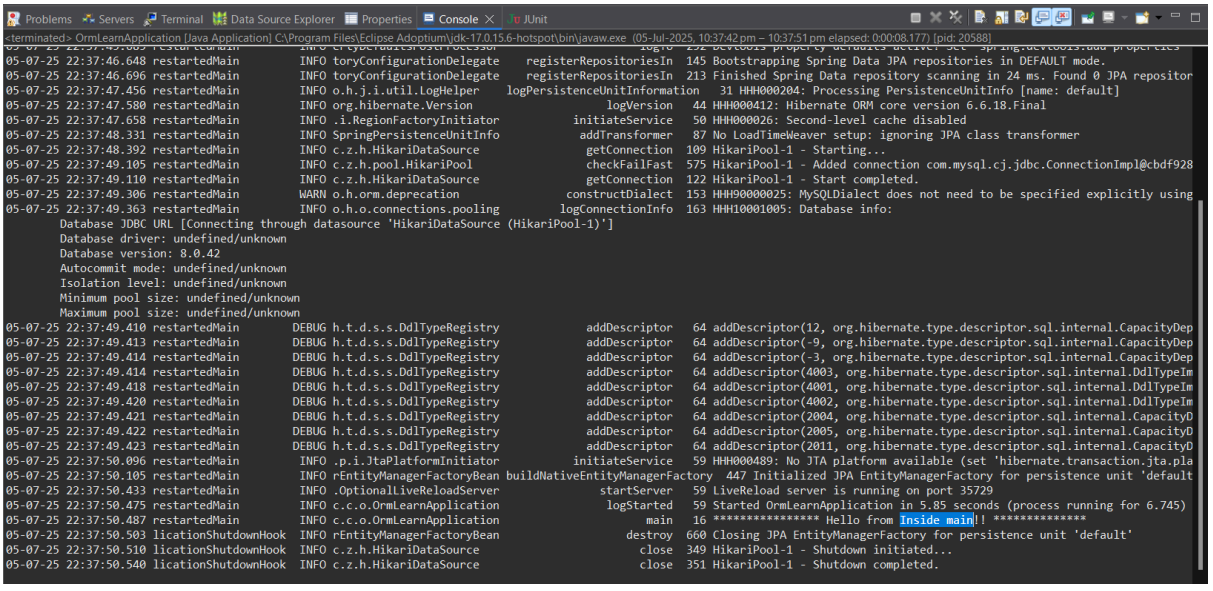


Successful build output



Successful Run of OrmLearnApplication.java





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

Java Persistence API (JPA)

- JSR 338 Specification for persisting, reading and managing data from Java objects
- Does not contain concrete implementation of the specification
- Hibernate is one of the implementation of JPA

Hibernate

- ORM Tool that implements JPA

Spring Data JPA

- Does not have JPA implementation, but reduces boiler plate code
- This is another level of abstraction over JPA implementation provider like Hibernate
- Manages transactions

Refer code snippets below on how the code compares between Hibernate and Spring Data JPA

Hibernate

```
/* Method to CREATE an employee in the database */

public Integer addEmployee(Employee employee){

   Session session = factory.openSession();

   Transaction tx = null;

   Integer employeeID = null;



   try {

      tx = session.beginTransaction();

      employeeID = (Integer) session.save(employee);
```

```
        tx.commit();
    } catch (HibernateException e) {
        if (tx != null) tx.rollback();
        e.printStackTrace();
    } finally {
        session.close();
    }
    return employeeID;
 }
```

Spring Data JPA
EmployeeRespository.java

```
public interface EmployeeRepository extends JpaRepository<Employee, Integer> {


}
```

EmployeeService.java

```
        @Autowire
        private EmployeeRepository employeeRepository;


        @Transactional
        public void addEmployee(Employee employee) {
        employeeRepository.save(employee);
        }
```

Reference Links:
[Difference Between Hibernate and Spring Data JPA]

https://www.javaworld.com/article/3379043/what-is-jpa-introduction-to-the-java-persistence-api.html

Solution

Java Persistence API (JPA)	Hibernate	Spring Data JPA
A specification for ORM in Java	A concrete implementation of JPA	A spring abstraction over JPA
We write more code here	Lesser code here	Much less code
Transactions managed via Manual or Spring	Transactions managed via Manual or Spring	Transactions managed builtin via @Transactional
Session handling is not defined	Session handling is manual	Session handling is handled internally

ꕥ —— [Additional Important Hands-On] —— ꕥ

Hands on 5- Implement services for managing Country

An application requires for features to be implemented with regards to country. These features needs to be supported by implementing them as service using Spring Data JPA.

- Find a country based on country code
- Add new country
- Update country
- Delete country
- Find list of countries matching a partial country name

Before starting the implementation of the above features, there are few configuration and data population that needs to be incorporated. Please refer each topic below and implement the same.

Explanation for Hibernate table creation configuration

- Moreover the ddl-auto defines how hibernate behaves if a specific table or column is not present in the database.
    - create - drops existing tables data and structure, then creates new tables
    - validate - check if the table and columns exist or not, throws an exception if a matching table or column is not found
    - update - if a table does not exists, it creates a new table; if a column does not exists, it creates a new column
    - create-drop - creates the table, once all operations are completed, the table is dropped

```
# Hibernate ddl auto (create, create-drop, update, validate)

spring.jpa.hibernate.ddl-auto=validate
```

Populate country table

- Delete all the records in Country table and then use the below script to create the actual list of all countries in our world.

```
insert into country (co_code, co_name) values ("AF", "Afghanistan");
insert into country (co_code, co_name) values ("AL", "Albania");
insert into country (co_code, co_name) values ("DZ", "Algeria");
insert into country (co_code, co_name) values ("AS", "American Samoa");
insert into country (co_code, co_name) values ("AD", "Andorra");
insert into country (co_code, co_name) values ("AO", "Angola");
insert into country (co_code, co_name) values ("AI", "Anguilla");
insert into country (co_code, co_name) values ("AQ", "Antarctica");
insert into country (co_code, co_name) values ("AG", "Antigua and Barbuda");
insert into country (co_code, co_name) values ("AR", "Argentina");
insert into country (co_code, co_name) values ("AM", "Armenia");
insert into country (co_code, co_name) values ("AW", "Aruba");
insert into country (co_code, co_name) values ("AU", "Australia");
insert into country (co_code, co_name) values ("AT", "Austria");
insert into country (co_code, co_name) values ("AZ", "Azerbaijan");
insert into country (co_code, co_name) values ("BS", "Bahamas");
insert into country (co_code, co_name) values ("BH", "Bahrain");
insert into country (co_code, co_name) values ("BD", "Bangladesh");
insert into country (co_code, co_name) values ("BB", "Barbados");
insert into country (co_code, co_name) values ("BY", "Belarus");
insert into country (co_code, co_name) values ("BE", "Belgium");
insert into country (co_code, co_name) values ("BZ", "Belize");
insert into country (co_code, co_name) values ("BJ", "Benin");
insert into country (co_code, co_name) values ("BM", "Bermuda");
insert into country (co_code, co_name) values ("BT", "Bhutan");
insert into country (co_code, co_name) values ("BO", "Bolivia, Plurinational State of");
```

```
insert into country (co_code, co_name) values ("BQ", "Bonaire, Sint Eustatius and Saba");

insert into country (co_code, co_name) values ("BA", "Bosnia and Herzegovina");

insert into country (co_code, co_name) values ("BW", "Botswana");

insert into country (co_code, co_name) values ("BV", "Bouvet Island");

insert into country (co_code, co_name) values ("BR", "Brazil");

insert into country (co_code, co_name) values ("IO", "British Indian Ocean Territory");

insert into country (co_code, co_name) values ("BN", "Brunei Darussalam");

insert into country (co_code, co_name) values ("BG", "Bulgaria");

insert into country (co_code, co_name) values ("BF", "Burkina Faso");

insert into country (co_code, co_name) values ("BI", "Burundi");

insert into country (co_code, co_name) values ("KH", "Cambodia");

insert into country (co_code, co_name) values ("CM", "Cameroon");

insert into country (co_code, co_name) values ("CA", "Canada");

insert into country (co_code, co_name) values ("CV", "Cape Verde");

insert into country (co_code, co_name) values ("KY", "Cayman Islands");

insert into country (co_code, co_name) values ("CF", "Central African Republic");

insert into country (co_code, co_name) values ("TD", "Chad");

insert into country (co_code, co_name) values ("CL", "Chile");

insert into country (co_code, co_name) values ("CN", "China");

insert into country (co_code, co_name) values ("CX", "Christmas Island");

insert into country (co_code, co_name) values ("CC", "Cocos (Keeling) Islands");

insert into country (co_code, co_name) values ("CO", "Colombia");

insert into country (co_code, co_name) values ("KM", "Comoros");

insert into country (co_code, co_name) values ("CG", "Congo");

insert into country (co_code, co_name) values ("CD", "Congo, the Democratic Republic of the");
```

```
insert into country (co_code, co_name) values ("CK", "Cook Islands");
insert into country (co_code, co_name) values ("CR", "Costa Rica");
insert into country (co_code, co_name) values ("HR", "Croatia");
insert into country (co_code, co_name) values ("CU", "Cuba");
insert into country (co_code, co_name) values ("CW", "Curaçao");
insert into country (co_code, co_name) values ("CY", "Cyprus");
insert into country (co_code, co_name) values ("CZ", "Czech Republic");
insert into country (co_code, co_name) values ("CI", "Côte d'Ivoire");
insert into country (co_code, co_name) values ("DK", "Denmark");
insert into country (co_code, co_name) values ("DJ", "Djibouti");
insert into country (co_code, co_name) values ("DM", "Dominica");
insert into country (co_code, co_name) values ("DO", "Dominican Republic");
insert into country (co_code, co_name) values ("EC", "Ecuador");
insert into country (co_code, co_name) values ("EG", "Egypt");
insert into country (co_code, co_name) values ("SV", "El Salvador");
insert into country (co_code, co_name) values ("GQ", "Equatorial Guinea");
insert into country (co_code, co_name) values ("ER", "Eritrea");
insert into country (co_code, co_name) values ("EE", "Estonia");
insert into country (co_code, co_name) values ("ET", "Ethiopia");
insert into country (co_code, co_name) values ("FK", "Falkland Islands (Malvinas)");
insert into country (co_code, co_name) values ("FO", "Faroe Islands");
insert into country (co_code, co_name) values ("FJ", "Fiji");
insert into country (co_code, co_name) values ("FI", "Finland");
insert into country (co_code, co_name) values ("FR", "France");
insert into country (co_code, co_name) values ("GF", "French Guiana");
insert into country (co_code, co_name) values ("PF", "French Polynesia");
```

```
insert into country (co_code, co_name) values ("TF", "French Southern Territories");

insert into country (co_code, co_name) values ("GA", "Gabon");

insert into country (co_code, co_name) values ("GM", "Gambia");

insert into country (co_code, co_name) values ("GE", "Georgia");

insert into country (co_code, co_name) values ("DE", "Germany");

insert into country (co_code, co_name) values ("GH", "Ghana");

insert into country (co_code, co_name) values ("GI", "Gibraltar");

insert into country (co_code, co_name) values ("GR", "Greece");

insert into country (co_code, co_name) values ("GL", "Greenland");

insert into country (co_code, co_name) values ("GD", "Grenada");

insert into country (co_code, co_name) values ("GP", "Guadeloupe");

insert into country (co_code, co_name) values ("GU", "Guam");

insert into country (co_code, co_name) values ("GT", "Guatemala");

insert into country (co_code, co_name) values ("GG", "Guernsey");

insert into country (co_code, co_name) values ("GN", "Guinea");

insert into country (co_code, co_name) values ("GW", "Guinea-Bissau");

insert into country (co_code, co_name) values ("GY", "Guyana");

insert into country (co_code, co_name) values ("HT", "Haiti");

insert into country (co_code, co_name) values ("HM", "Heard Island and McDonald
Islands");

insert into country (co_code, co_name) values ("VA", "Holy See (Vatican City State)");

insert into country (co_code, co_name) values ("HN", "Honduras");

insert into country (co_code, co_name) values ("HK", "Hong Kong");

insert into country (co_code, co_name) values ("HU", "Hungary");

insert into country (co_code, co_name) values ("IS", "Iceland");

insert into country (co_code, co_name) values ("IN", "India");

insert into country (co_code, co_name) values ("ID", "Indonesia");
```

```
insert into country (co_code, co_name) values ("IR", "Iran, Islamic Republic of");

insert into country (co_code, co_name) values ("IQ", "Iraq");

insert into country (co_code, co_name) values ("IE", "Ireland");

insert into country (co_code, co_name) values ("IM", "Isle of Man");

insert into country (co_code, co_name) values ("IL", "Israel");

insert into country (co_code, co_name) values ("IT", "Italy");

insert into country (co_code, co_name) values ("JM", "Jamaica");

insert into country (co_code, co_name) values ("JP", "Japan");

insert into country (co_code, co_name) values ("JE", "Jersey");

insert into country (co_code, co_name) values ("JO", "Jordan");

insert into country (co_code, co_name) values ("KZ", "Kazakhstan");

insert into country (co_code, co_name) values ("KE", "Kenya");

insert into country (co_code, co_name) values ("KI", "Kiribati");

insert into country (co_code, co_name) values ("KP", "Democratic People's Republic of
Korea");

insert into country (co_code, co_name) values ("KR", "Republic of Korea");

insert into country (co_code, co_name) values ("KW", "Kuwait");

insert into country (co_code, co_name) values ("KG", "Kyrgyzstan");

insert into country (co_code, co_name) values ("LA", "Lao People's Democratic
Republic");

insert into country (co_code, co_name) values ("LV", "Latvia");

insert into country (co_code, co_name) values ("LB", "Lebanon");

insert into country (co_code, co_name) values ("LS", "Lesotho");

insert into country (co_code, co_name) values ("LR", "Liberia");

insert into country (co_code, co_name) values ("LY", "Libya");

insert into country (co_code, co_name) values ("LI", "Liechtenstein");

insert into country (co_code, co_name) values ("LT", "Lithuania");
```

```
insert into country (co_code, co_name) values ("LU", "Luxembourg");

insert into country (co_code, co_name) values ("MO", "Macao");

insert into country (co_code, co_name) values ("MK", "Macedonia, the Former Yugoslav Republic of");

insert into country (co_code, co_name) values ("MG", "Madagascar");

insert into country (co_code, co_name) values ("MW", "Malawi");

insert into country (co_code, co_name) values ("MY", "Malaysia");

insert into country (co_code, co_name) values ("MV", "Maldives");

insert into country (co_code, co_name) values ("ML", "Mali");

insert into country (co_code, co_name) values ("MT", "Malta");

insert into country (co_code, co_name) values ("MH", "Marshall Islands");

insert into country (co_code, co_name) values ("MQ", "Martinique");

insert into country (co_code, co_name) values ("MR", "Mauritania");

insert into country (co_code, co_name) values ("MU", "Mauritius");

insert into country (co_code, co_name) values ("YT", "Mayotte");

insert into country (co_code, co_name) values ("MX", "Mexico");

insert into country (co_code, co_name) values ("FM", "Micronesia, Federated States of");

insert into country (co_code, co_name) values ("MD", "Moldova, Republic of");

insert into country (co_code, co_name) values ("MC", "Monaco");

insert into country (co_code, co_name) values ("MN", "Mongolia");

insert into country (co_code, co_name) values ("ME", "Montenegro");

insert into country (co_code, co_name) values ("MS", "Montserrat");

insert into country (co_code, co_name) values ("MA", "Morocco");

insert into country (co_code, co_name) values ("MZ", "Mozambique");

insert into country (co_code, co_name) values ("MM", "Myanmar");

insert into country (co_code, co_name) values ("NA", "Namibia");

insert into country (co_code, co_name) values ("NR", "Nauru");
```

```
insert into country (co_code, co_name) values ("NP", "Nepal");
insert into country (co_code, co_name) values ("NL", "Netherlands");
insert into country (co_code, co_name) values ("NC", "New Caledonia");
insert into country (co_code, co_name) values ("NZ", "New Zealand");
insert into country (co_code, co_name) values ("NI", "Nicaragua");
insert into country (co_code, co_name) values ("NE", "Niger");
insert into country (co_code, co_name) values ("NG", "Nigeria");
insert into country (co_code, co_name) values ("NU", "Niue");
insert into country (co_code, co_name) values ("NF", "Norfolk Island");
insert into country (co_code, co_name) values ("MP", "Northern Mariana Islands");
insert into country (co_code, co_name) values ("NO", "Norway");
insert into country (co_code, co_name) values ("OM", "Oman");
insert into country (co_code, co_name) values ("PK", "Pakistan");
insert into country (co_code, co_name) values ("PW", "Palau");
insert into country (co_code, co_name) values ("PS", "Palestine, State of");
insert into country (co_code, co_name) values ("PA", "Panama");
insert into country (co_code, co_name) values ("PG", "Papua New Guinea");
insert into country (co_code, co_name) values ("PY", "Paraguay");
insert into country (co_code, co_name) values ("PE", "Peru");
insert into country (co_code, co_name) values ("PH", "Philippines");
insert into country (co_code, co_name) values ("PN", "Pitcairn");
insert into country (co_code, co_name) values ("PL", "Poland");
insert into country (co_code, co_name) values ("PT", "Portugal");
insert into country (co_code, co_name) values ("PR", "Puerto Rico");
insert into country (co_code, co_name) values ("QA", "Qatar");
insert into country (co_code, co_name) values ("RO", "Romania");
```

```
insert into country (co_code, co_name) values ("RU", "Russian Federation");

insert into country (co_code, co_name) values ("RW", "Rwanda");

insert into country (co_code, co_name) values ("RE", "Réunion");

insert into country (co_code, co_name) values ("BL", "Saint Barthélemy");

insert into country (co_code, co_name) values ("SH", "Saint Helena, Ascension and
Tristan da Cunha");

insert into country (co_code, co_name) values ("KN", "Saint Kitts and Nevis");

insert into country (co_code, co_name) values ("LC", "Saint Lucia");

insert into country (co_code, co_name) values ("MF", "Saint Martin (French part)");

insert into country (co_code, co_name) values ("PM", "Saint Pierre and Miquelon");

insert into country (co_code, co_name) values ("VC", "Saint Vincent and the
Grenadines");

insert into country (co_code, co_name) values ("WS", "Samoa");

insert into country (co_code, co_name) values ("SM", "San Marino");

insert into country (co_code, co_name) values ("ST", "Sao Tome and Principe");

insert into country (co_code, co_name) values ("SA", "Saudi Arabia");

insert into country (co_code, co_name) values ("SN", "Senegal");

insert into country (co_code, co_name) values ("RS", "Serbia");

insert into country (co_code, co_name) values ("SC", "Seychelles");

insert into country (co_code, co_name) values ("SL", "Sierra Leone");

insert into country (co_code, co_name) values ("SG", "Singapore");

insert into country (co_code, co_name) values ("SX", "Sint Maarten (Dutch part)");

insert into country (co_code, co_name) values ("SK", "Slovakia");

insert into country (co_code, co_name) values ("SI", "Slovenia");

insert into country (co_code, co_name) values ("SB", "Solomon Islands");

insert into country (co_code, co_name) values ("SO", "Somalia");

insert into country (co_code, co_name) values ("ZA", "South Africa");
```

```
insert into country (co_code, co_name) values ("GS", "South Georgia and the South Sandwich Islands");

insert into country (co_code, co_name) values ("SS", "South Sudan");

insert into country (co_code, co_name) values ("ES", "Spain");

insert into country (co_code, co_name) values ("LK", "Sri Lanka");

insert into country (co_code, co_name) values ("SD", "Sudan");

insert into country (co_code, co_name) values ("SR", "Suriname");

insert into country (co_code, co_name) values ("SJ", "Svalbard and Jan Mayen");

insert into country (co_code, co_name) values ("SZ", "Swaziland");

insert into country (co_code, co_name) values ("SE", "Sweden");

insert into country (co_code, co_name) values ("CH", "Switzerland");

insert into country (co_code, co_name) values ("SY", "Syrian Arab Republic");

insert into country (co_code, co_name) values ("TW", "Taiwan, Province of China");

insert into country (co_code, co_name) values ("TJ", "Tajikistan");

insert into country (co_code, co_name) values ("TZ", "Tanzania, United Republic of");

insert into country (co_code, co_name) values ("TH", "Thailand");

insert into country (co_code, co_name) values ("TL", "Timor-Leste");

insert into country (co_code, co_name) values ("TG", "Togo");

insert into country (co_code, co_name) values ("TK", "Tokelau");

insert into country (co_code, co_name) values ("TO", "Tonga");

insert into country (co_code, co_name) values ("TT", "Trinidad and Tobago");

insert into country (co_code, co_name) values ("TN", "Tunisia");

insert into country (co_code, co_name) values ("TR", "Turkey");

insert into country (co_code, co_name) values ("TM", "Turkmenistan");

insert into country (co_code, co_name) values ("TC", "Turks and Caicos Islands");

insert into country (co_code, co_name) values ("TV", "Tuvalu");

insert into country (co_code, co_name) values ("UG", "Uganda");
```

```
insert into country (co_code, co_name) values ("UA", "Ukraine");

insert into country (co_code, co_name) values ("AE", "United Arab Emirates");

insert into country (co_code, co_name) values ("GB", "United Kingdom");

insert into country (co_code, co_name) values ("US", "United States");

insert into country (co_code, co_name) values ("UM", "United States Minor Outlying Islands");

insert into country (co_code, co_name) values ("UY", "Uruguay");

insert into country (co_code, co_name) values ("UZ", "Uzbekistan");

insert into country (co_code, co_name) values ("VU", "Vanuatu");

insert into country (co_code, co_name) values ("VE", "Venezuela, Bolivarian Republic of");

insert into country (co_code, co_name) values ("VN", "Viet Nam");

insert into country (co_code, co_name) values ("VG", "Virgin Islands, British");

insert into country (co_code, co_name) values ("VI", "Virgin Islands, U.S.");

insert into country (co_code, co_name) values ("WF", "Wallis and Futuna");

insert into country (co_code, co_name) values ("EH", "Western Sahara");

insert into country (co_code, co_name) values ("YE", "Yemen");

insert into country (co_code, co_name) values ("ZM", "Zambia");

insert into country (co_code, co_name) values ("ZW", "Zimbabwe");

insert into country (co_code, co_name) values ("AX", "Åland Islands");
```

Refer subsequent hands on exercises to implement the features related to country.

Hands on 6- Find a country based on country code

- Create new exception class CountryNotFoundException in com.cognizant.spring-learn.service.exception
- Create new method findCountryByCode() in CountryService with @Transactional annotation
- In findCountryByCode() method, perform the following steps:
    - Method signature

```
@Transactional

public Country findCountryByCode(String countryCode) throws
CountryNotFoundException
```

    - Get the country based on findById() built in method

```
Optional<Country> result = countryRepository.findById(countryCode);
```

    - From the result, check if a country is found. If not found, throw CountryNotFoundException

```
if (!result.isPresent())
```

    - Use get() method to return the country fetched.

```
Country country = result.get();
```

- Include new test method in OrmLearnApplication to find a country based on country code and compare the country name to check if it is valid.

```
private static void getAllCountriesTest() {

    LOGGER.info("Start");

    Country country = countryService.findCountryByCode("IN");

        LOGGER.debug("Country:{}", country);

    LOGGER.info("End");

}
```

- Invoke the above method in main() method and test it.

NOTE: SME to explain the importance of @Transactional annotation. Spring takes care of creating the Hibernate session and manages the transactionality when executing the service method.

Hands on 7- Add a new country

- Create new method in CountryService.

```
@Transactional

public void addCountry(Country country)
```

- Invoke save() method of repository to get the country added.

```
countryRepository.save(country)
```

- Include new testAddCountry() method in OrmLearnApplication. Perform steps below:
    - Create new instance of country with a new code and name
    - Call countryService.addCountry() passing the country created in the previous step.
    - Invoke countryService.findCountryByCode() passing the same code used when adding a new country
    - Check in the database if the country is added