1. Spring Data JPA HandsOn

OBJECTIVE QUESTIONS:

1. Explain the need and benefit of ORM

What is ORM?

ORM (Object-Relational Mapping) is a technique that connects Java objects (classes) with relational database tables. It allows developers to work with databases using Java code instead of SQL.

Need for ORM:

- Writing SQL manually is error-prone and repetitive.
- Mapping between Java objects and tables manually is complex.
- Database operations should be abstracted for easier maintenance.

Benefits of ORM:

- Simplifies database access using objects.
- Reduces boilerplate SQL code.
- Automatically maps relationships (e.g., one-to-many).
- Enables database independence.
- Handles transactions and caching.

2. Demonstrate the need and benefit of Spring Data JPA

Spring Data JPA is a Spring-based framework built on top of JPA and Hibernate.

Need:

- JPA requires a lot of boilerplate code (like writing repositories and queries).
- Developers want a faster way to perform CRUD operations.

Benefits:

- Removes the need to write DAO implementations.
- Automatically generates repository methods (e.g., findByName).
- Supports pagination and sorting.
- Integrates easily with Spring Boot and Hibernate.
- Reduces time and errors in database operations.

3. Explain about core objects of hibernate framework

Core Object	Purpose
Session Factory	A factory for creating Session instances. Usually one per application.
Session	Main interface for interacting with the database. Manages CRUD operations.
Transaction	Represents a unit of work. Allows commit/rollback.
Connection Provider	Provides database connections used internally by Hibernate.

4. **Explain ORM implementation with Hibernate XML Configuration and Annotation Configuration**

a) XML Configuration:
- Mapping is defined in external XML files.
- Used in older Hibernate applications.
- Example files: hibernate.cfg.xml, *.hbm.xml

b) Annotation Configuration:
- Uses Java annotations (@Entity, @Table, @Column, etc.)
- Cleaner, easier to manage.
- Popular in Spring applications.

Steps in both cases:
- Define persistence class (e.g., Employee.java).
- Map fields to DB columns.
- Configure DB connection.
- Load session factory and perform DB operations.

5. **Explain the difference between Java Persistence API, Hibernate and Spring Data JPA**

Feature	JPA	Hibernate	Spring Data JPA
Type	Specification	Implementation of JPA	Abstraction over JPA
Developed By	Java EE	Red Hat	Spring Framework
Purpose	Defines API for ORM	Actual ORM engine	Reduces boilerplate for JPA
Features	@Entity, @Id, etc.	Session, advanced caching, dialects	Repository interfaces like findById, save, etc.
Code Style	Standard	Hibernate-specific APIs	Interface-driven, annotation-based

6. **Demonstrate implementation of DML using Spring Data JPA on a single database table**
DML Operations (Data Manipulation Language):
- **Insert:** save(entity)
- **Update:** save(modifiedEntity)
- **Delete:** deleteById(id)
- **Read:** findAll(), findById(id)

SPRING DATA JPA

```
// Insert or Update
countryRepository.save(new Country("IN", "India"));

// Delete
```

```
        countryRepository.deleteById("IN");

        // Read
        Optional<Country> c = countryRepository.findById("IN");
        List<Country> list = countryRepository.findAll();
```

Hands on 1

Spring Data JPA - Quick Example

File name: Country.java

```
package com.cognizant.orm_learn.model;


import jakarta.persistence.*;


@Entity
@Table(name = "country")
public class Country {


   @Id
   @Column(name = "co_code")
   private String code;


   @Column(name = "co_name")
   private String name;


   public String getCode() {
      return code;
   }


   public void setCode(String code) {
      this.code = code;
   }


   public String getName() {
      return name;
```

```
    }

    public void setName(String name) {
        this.name = name;
    }

    @Override
    public String toString() {
        return "Country [code=" + code + ", name=" + name + "]";
    }
}
```

File name: CountryRepository.java

```
package com.cognizant.orm_learn.repository;

import com.cognizant.orm_learn.model.Country;
import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;

@Repository
public interface CountryRepository extends JpaRepository<Country, String> {
}
```

File name: CountryService.java

```
package com.cognizant.orm_learn.service;

import com.cognizant.orm_learn.model.Country;
import com.cognizant.orm_learn.repository.CountryRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;
import org.springframework.transaction.annotation.Transactional;

import java.util.List;

@Service
public class CountryService {
```

```
    @Autowired
    private CountryRepository countryRepository;

    @Transactional
    public List<Country> getAllCountries() {
        return countryRepository.findAll();
    }
}
```

File name: **OrmLearnApplication.*java***

```
package com.cognizant.orm_learn;

import com.cognizant.orm_learn.model.Country;
import com.cognizant.orm_learn.service.CountryService;
import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.ApplicationContext;

import java.util.List;

@SpringBootApplication
public class OrmLearnApplication {

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

    public static void main(String[] args) {
        ApplicationContext context = SpringApplication.run(OrmLearnApplication.class, args);
        countryService = context.getBean(CountryService.class);
        testGetAllCountries();
    }
```

```
    private static void testGetAllCountries() {
        LOGGER.info("Start");
        List<Country> countries = countryService.getAllCountries();
        LOGGER.debug("countries={}", countries);
        LOGGER.info("End");
    }
}
```

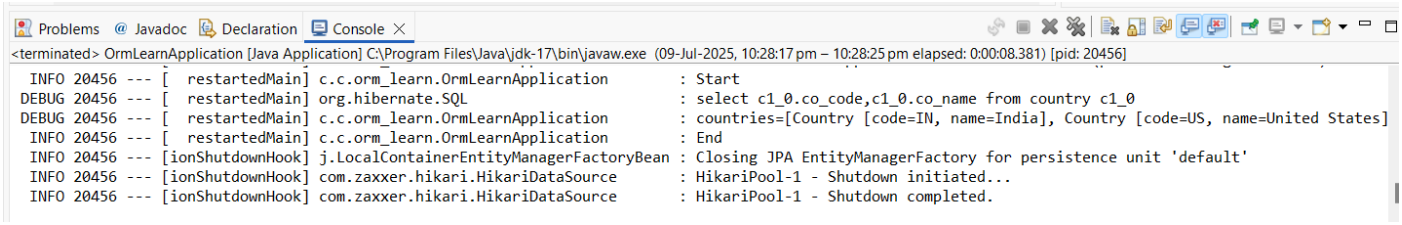
File name: **application.properties**

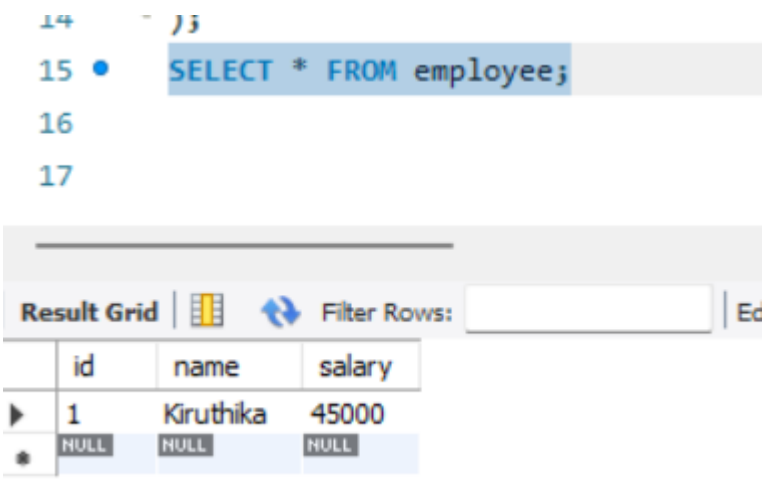
```
# Database connection
spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver
spring.datasource.url=jdbc:mysql://localhost:3306/ormlearn
spring.datasource.username=root
spring.datasource.password=Candy@07

# Hibernate config (Hibernate 6+)
spring.jpa.hibernate.ddl-auto=validate
spring.jpa.properties.hibernate.dialect=org.hibernate.dialect.MySQLDialect

# Logging
logging.level.org.springframework=info
logging.level.com.cognizant=debug
logging.level.org.hibernate.SQL=trace
logging.level.org.hibernate.type.descriptor.sql=trace
```

SQL FILE

```
CREATE DATABASE ormlearn;
USE ormlearn;
CREATE TABLE country (
  co_code VARCHAR(2) PRIMARY KEY,
  co_name VARCHAR(50)
);
INSERT INTO country VALUES ('IN', 'India'), ('US', 'United States');
SELECT * FROM country;
```

OUTPUT





Hands on 2

Hibernate XML Config implementation walk through

File name: **Employee.java**

```
package com.example.hibernatexml;

public class Employee {
    private int id;
    private String name;
    private double salary;

    // Getters & setters
    public int getId() { return id; }
    public void setId(int id) { this.id = id; }

    public String getName() { return name; }
    public void setName(String name) { this.name = name; }
```

```
    public double getSalary() { return salary; }
    public void setSalary(double salary) { this.salary = salary; }
}
```

File name: **Main.java**

```
package com.example.hibernatexml;

import org.hibernate.Session;
import org.hibernate.SessionFactory;
import org.hibernate.Transaction;
import org.hibernate.cfg.Configuration;

import java.util.List;

public class Main {
    public static void main(String[] args) {
        Configuration cfg = new Configuration().configure(); // loads hibernate.cfg.xml
        SessionFactory factory = cfg.buildSessionFactory();
        Session session = factory.openSession();

        //  1. INSERT with commit()
        try {
            Transaction tx = session.beginTransaction();
            Employee emp = new Employee();
            emp.setName("Kiruthika");
            emp.setSalary(55000);
            session.save(emp);
            tx.commit();
            System.out.println(" Record inserted and committed.");
        } catch (Exception e) {
            System.out.println(" Insert failed: " + e.getMessage());
        }

        //  2. SELECT all using createQuery().list()
        try {
```

```
    List<Employee> list = session.createQuery("from Employee", Employee.class).list();
    System.out.println(" Employee List:");
    for (Employee e : list) {
        System.out.println(e.getId() + " - " + e.getName() + " - " + e.getSalary());
    }
} catch (Exception e) {
    System.out.println("Error in list: " + e.getMessage());
}

// 3. FETCH using session.get()
try {
    Employee e = session.get(Employee.class, 1); // fetch by ID = 1
    if (e != null) {
        System.out.println(" Fetched: " + e.getName() + " - " + e.getSalary());
    } else {
        System.out.println(" No employee found with ID 1.");
    }
} catch (Exception e) {
    System.out.println("Get failed: " + e.getMessage());
}

//  DELETE with rollback demo
try {
    Transaction tx = session.beginTransaction();
    Employee empToDelete = session.get(Employee.class, 1);
    if (empToDelete != null) {
        session.delete(empToDelete);
        // Uncomment next line to simulate error:
        // int error = 10 / 0;
        tx.commit();
        System.out.println("Record deleted and committed.");
    } else {
        System.out.println("No employee found to delete.");
        tx.rollback(); // nothing to delete
```

```
            }
        } catch (Exception e) {
            System.out.println("Error during delete, rolling back: " + e.getMessage());
            session.getTransaction().rollback();
        }

        session.close();
        factory.close();
    }
}
```

File name: **employee.hbm.xml**

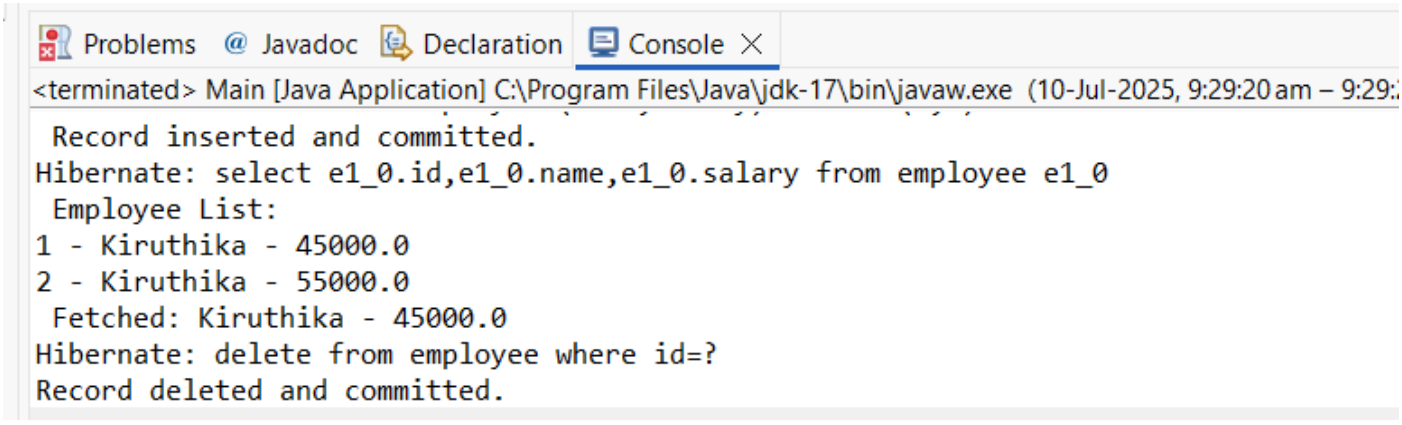
```
<?xml version="1.0"?>
<!DOCTYPE hibernate-mapping PUBLIC
 "-//Hibernate/Hibernate Mapping DTD 3.0//EN"
 "http://hibernate.org/dtd/hibernate-mapping-3.0.dtd">

<hibernate-mapping>
    <class name="com.example.hibernatexml.Employee" table="employee">
        <id name="id" column="id">
            <generator class="native"/>
        </id>
        <property name="name" column="name"/>
        <property name="salary" column="salary"/>
    </class>
</hibernate-mapping>
```

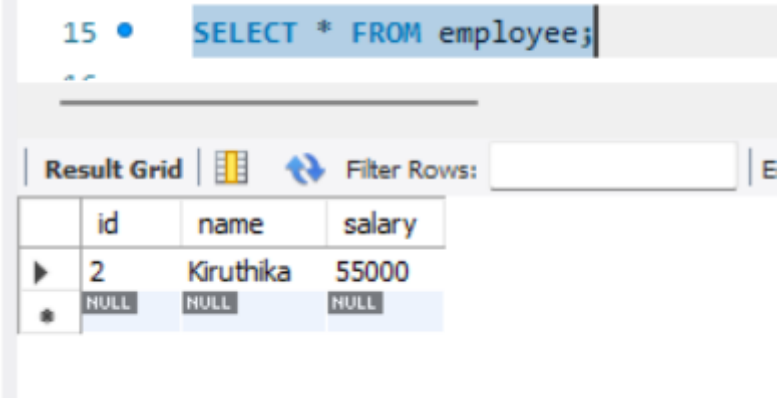
File name: **hibernate.cfg.xml**

```
<?xml version='1.0' encoding='utf-8'?>
<!DOCTYPE hibernate-configuration PUBLIC
 "-//Hibernate/Hibernate Configuration DTD 3.0//EN"
 "http://hibernate.org/dtd/hibernate-configuration-3.0.dtd">

<hibernate-configuration>
    <session-factory>
```

```
        <!-- DB Config -->
        <property name="hibernate.connection.driver_class">com.mysql.cj.jdbc.Driver</property>
        <property name="hibernate.connection.url">jdbc:mysql://localhost:3306/ormlearn</property>
        <property name="hibernate.connection.username">root</property>
        <property name="hibernate.connection.password">Candy@07</property>

        <!-- Hibernate Dialect -->
        <property name="hibernate.dialect">org.hibernate.dialect.MySQLDialect</property>

        <!-- Show SQL -->
        <property name="hibernate.show_sql">true</property>

        <!-- Mapping File -->
        <mapping resource="employee.hbm.xml"/>

    </session-factory>
</hibernate-configuration>
```

OUTPUT





Hands on 3

Hibernate Annotation Config implementation walk through

File name: **Main.java**

```
package com.example.hibernatexml;

import org.hibernate.Session;

import org.hibernate.SessionFactory;

import org.hibernate.Transaction;

import org.hibernate.cfg.Configuration;


public class Main {

   public static void main(String[] args) {

      Configuration cfg = new Configuration().configure().addAnnotatedClass(Employee.class);

      SessionFactory factory = cfg.buildSessionFactory();

      Session session = factory.openSession();


      // Insert a record

      Transaction tx = session.beginTransaction();

      Employee emp = new Employee();

      emp.setName("Annotation User");

      emp.setSalary(70000);

      session.save(emp);

      tx.commit();


      System.out.println("Record inserted using annotation-based config.");


      session.close();

      factory.close();

   }

}
```

File name: **Employee.java**

```
package com.example.hibernatexml;
```

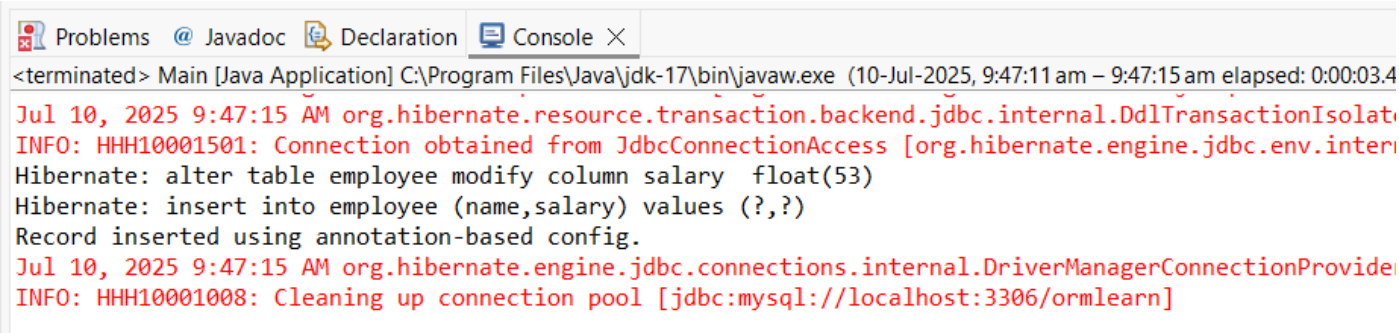
```
import jakarta.persistence.*;

@Entity
@Table(name = "employee")
public class Employee {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private int id;

    @Column(name = "name")
    private String name;

    @Column(name = "salary")
    private double salary;

    // Getters and setters
    public int getId() {
        return id;
    }
    public void setId(int id) {
        this.id = id;
    }
    public String getName() {
        return name;
    }
    public void setName(String name) {
        this.name = name;
    }
    public double getSalary() {
        return salary;
    }
    public void setSalary(double salary) {
        this.salary = salary;
```

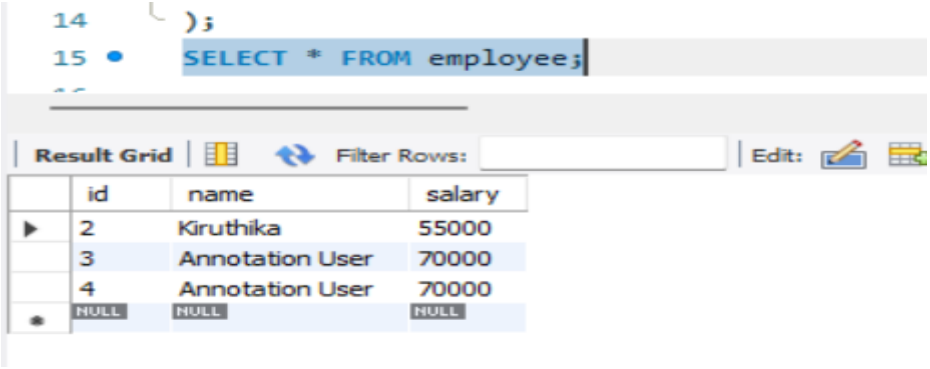
```
    }
}
```

File name: **hibernate.cfg.xml**

```
<?xml version='1.0' encoding='utf-8'?>
<!DOCTYPE hibernate-configuration PUBLIC
        "-//Hibernate/Hibernate Configuration DTD 3.0//EN"
        "http://hibernate.org/dtd/hibernate-configuration-3.0.dtd">

<hibernate-configuration>
    <session-factory>

        <property name="hibernate.connection.driver_class">com.mysql.cj.jdbc.Driver</property>
        <property name="hibernate.connection.url">jdbc:mysql://localhost:3306/ormlearn</property>
        <property name="hibernate.connection.username">root</property>
        <property name="hibernate.connection.password">Candy@07</property>
        <property name="hibernate.dialect">org.hibernate.dialect.MySQLDialect</property>

        <property name="hibernate.hbm2ddl.auto">update</property>
        <property name="show_sql">true</property>

    </session-factory>
</hibernate-configuration>
```

OUTPUT





Hands-on 4

Difference Between JPA, Hibernate, and Spring Data JPA

1. Java Persistence API (JPA)

• JPA is a specification (JSR 338) for persisting, reading, and managing data from Java objects.

• It does not contain any implementation — it just defines how ORM should work.

• It provides interfaces like EntityManager, but no concrete implementation.

2. Hibernate

• Hibernate is a popular ORM tool that implements the JPA specification.

• It provides a complete ORM framework, handling caching, lazy loading, dirty checking, etc.

• You write more code compared to Spring Data JPA, but you have more control.

3. Spring Data JPA

• Spring Data JPA is a higher-level abstraction on top of JPA (and often Hibernate).

• It reduces boilerplate by using interfaces like JpaRepository.

• It handles query generation, transaction management, and simplifies data access.

Hibernate Approach:

```
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 Approach:

```
public interface EmployeeRepository extends JpaRepository<Employee, Integer> { }
@Autowired
private EmployeeRepository employeeRepository;

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

Feature	**JPA**	**Hibernate**	**Spring Data JPA**
Type	Specification (JSR 338)	ORM Framework	Abstraction Layer on top of JPA
Ownership	Oracle (Java Community Process)	Red Hat	Spring Framework Team
Implementation	No (Just API)	Yes (Implements JPA)	No (Uses JPA/Hibernate underneath)
Boilerplate Code	High	Medium	Very Low (auto implementation)
Transactions	Manual via EntityManager	Manual or Spring-managed	Automatic via @Transactional
Query Writing	JPQL (manual)	JPQL / HQL (manual)	Auto-generated via method names or custom @Query
CRUD Operations	Manually implemented	Manually written using Session	Provided via JpaRepository
Ease of Use	Moderate	Moderate to Advanced	Very Easy
Learning Curve	High	Medium	Low
Popular Use Case	Standard API layer	Direct ORM control and optimization	Rapid application development

Hands on 5

Implement services for managing Country

File name: **OrmLearnApplication.java**

```
package com.cognizant.ormlearn;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.context.ApplicationContext;


import org.slf4j.Logger;

import org.slf4j.LoggerFactory;


import java.util.List;


import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

import com.cognizant.ormlearn.service.exception.CountryNotFoundException;



@SpringBootApplication

public class OrmLearnApplication {


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


   private static CountryService countryService;


   public static void main(String[] args) {

      ApplicationContext context = SpringApplication.run(OrmLearnApplication.class, args);

      countryService = context.getBean(CountryService.class);


      testGetAllCountries();

      testAddCountry();

      testFindCountry();

      testUpdateCountry();

    //  testDeleteCountry();
```

```
    testSearchCountry();
}

private static void testGetAllCountries() {
    LOGGER.info("Start getAllCountries");
    List<Country> countries = countryService.getAllCountries();
    LOGGER.debug("Countries: {}", countries);
    LOGGER.info("End getAllCountries");
}

private static void testAddCountry() {
    LOGGER.info("Start addCountry");
    Country country = new Country();
    country.setCode("ZZ");
    country.setName("Zootopia");
    countryService.addCountry(country);
    LOGGER.info("End addCountry");
}

private static void testFindCountry() {
    LOGGER.info("Start findCountryByCode");
    try {
        Country country = countryService.findCountryByCode("ZZ");
        LOGGER.debug("Found Country: {}", country);
    } catch (CountryNotFoundException e) {
        LOGGER.error("Error: {}", e.getMessage());
    }
    LOGGER.info("End findCountryByCode");
}

private static void testUpdateCountry() {
    LOGGER.info("Start updateCountry");
    try {
        countryService.updateCountry("ZZ", "Zootopia Updated");
```

```
        Country country = countryService.findCountryByCode("ZZ");
        LOGGER.debug("Updated Country: {}", country);
      } catch (CountryNotFoundException e) {
        LOGGER.error("Error: {}", e.getMessage());
      }
      LOGGER.info("End updateCountry");
    }

   // private static void testDeleteCountry() {
      // LOGGER.info("Start deleteCountry");
      // countryService.deleteCountry("ZZ");
       //LOGGER.info("End deleteCountry");
    //}

    private static void testSearchCountry() {
      LOGGER.info("Start searchCountryByName");
      List<Country> countries = countryService.searchCountryByName("ind");
      LOGGER.debug("Search Result: {}", countries);
      LOGGER.info("End searchCountryByName");
    }
}
```

File name: CountryService.java

```
package com.cognizant.ormlearn.service;

import java.util.List;
import java.util.Optional;

import org.springframework.transaction.annotation.Transactional;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

import com.cognizant.ormlearn.model.Country;
import com.cognizant.ormlearn.repository.CountryRepository;
import com.cognizant.ormlearn.service.exception.CountryNotFoundException;
```

```
@Service
public class CountryService {

    @Autowired
    private CountryRepository countryRepository;

    @Transactional
    public List<Country> getAllCountries() {
        return countryRepository.findAll();
    }

    @Transactional
    public Country findCountryByCode(String code) throws CountryNotFoundException {
        Optional<Country> country = countryRepository.findById(code);
        if (!country.isPresent()) {
            throw new CountryNotFoundException("Country with code " + code + " not found");
        }
        return country.get();
    }

    @Transactional
    public void addCountry(Country country) {
        countryRepository.save(country);
    }

    @Transactional
    public void updateCountry(String code, String name) throws CountryNotFoundException {
        Optional<Country> optional = countryRepository.findById(code);
        if (!optional.isPresent()) {
            throw new CountryNotFoundException("Country with code " + code + " not found");
        }
        Country country = optional.get();
```

```
        country.setName(name);
        countryRepository.save(country);
    }

    @Transactional
    public void deleteCountry(String code) {
        countryRepository.deleteById(code);
    }

    @Transactional
    public List<Country> searchCountryByName(String namePart) {
        return countryRepository.findByNameContainingIgnoreCase(namePart);
    }
}
```

File name: Country.java

```
package com.cognizant.ormlearn.model;

import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.Id;
import javax.persistence.Table;

@Entity
@Table(name = "country")
public class Country {

    @Id
    @Column(name = "co_code")
    private String code;

    @Column(name = "co_name")
    private String name;

    // Getters and Setters
```

```
    public String getCode() {
        return code;
    }

    public void setCode(String code) {
        this.code = code;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    @Override
    public String toString() {
        return "Country [code=" + code + ", name=" + name + "]";
    }
}
```

File name: CountryNotFoundException.java

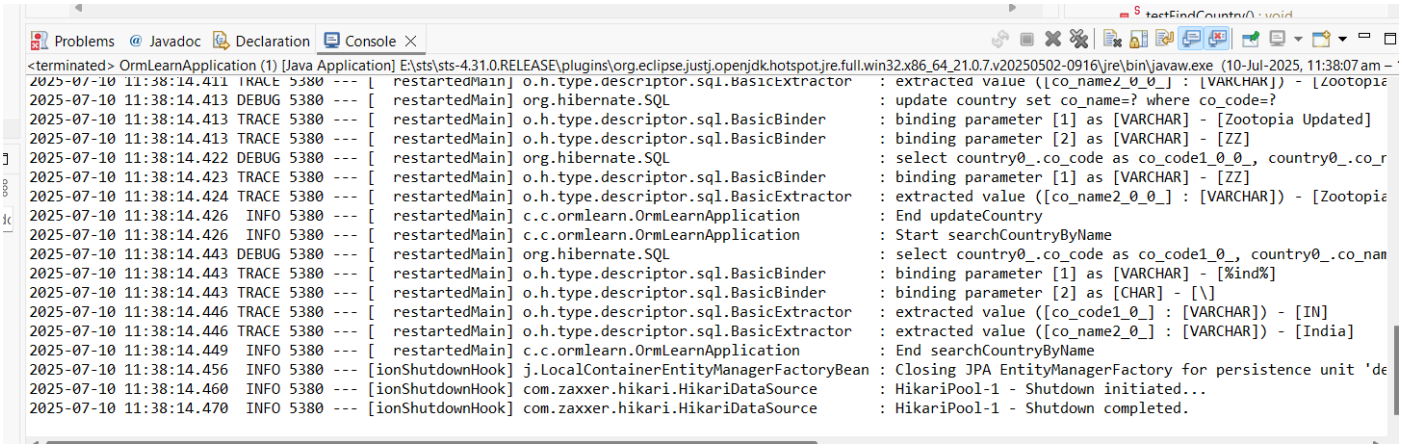
```
package com.cognizant.ormlearn.service.exception;

public class CountryNotFoundException extends Exception {
    public CountryNotFoundException(String message) {
        super(message);
    }
}
```

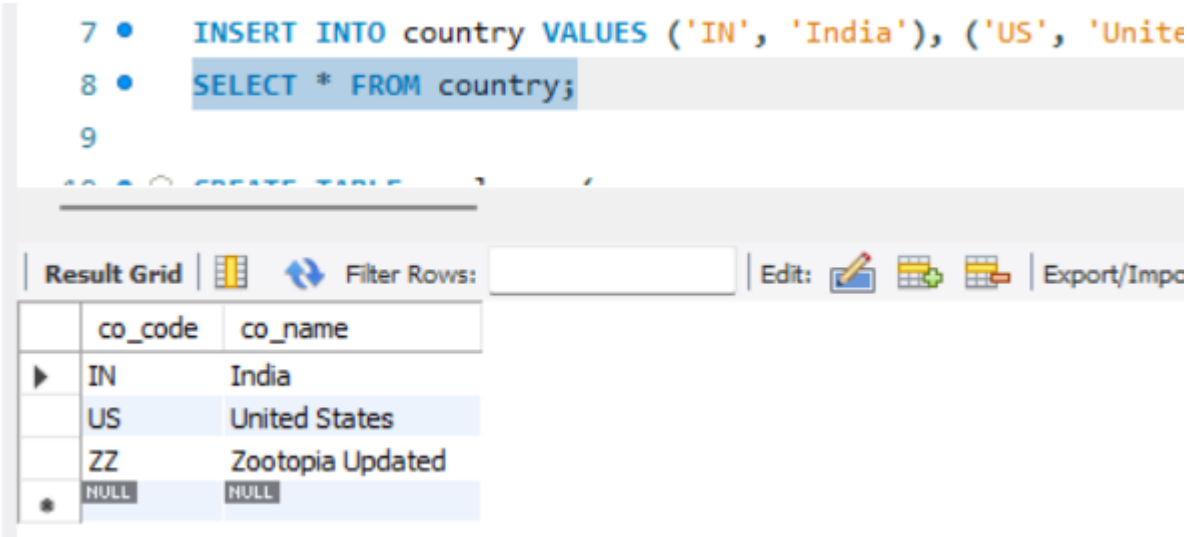
File name: CountryRepository.java

```
package com.cognizant.ormlearn.repository;

import java.util.List;
```

```
import org.springframework.data.jpa.repository.JpaRepository;

import org.springframework.stereotype.Repository;


import com.cognizant.ormlearn.model.Country;


@Repository

public interface CountryRepository extends JpaRepository<Country, String> {

   List<Country> findByNameContainingIgnoreCase(String namePart);

}
```

OUTPUT





Hands on 6

Find a country based on country code

File name: OrmLearnApplication.java

```
package com.cognizant.ormlearn;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.ApplicationContext;
import com.cognizant.ormlearn.model.Country;
import com.cognizant.ormlearn.service.CountryService;
import com.cognizant.ormlearn.service.exception.CountryNotFoundException;

@SpringBootApplication
public class OrmLearnApplication {

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

   public static void main(String[] args) {
      ApplicationContext context = SpringApplication.run(OrmLearnApplication.class, args);
      countryService = context.getBean(CountryService.class);

      getAllCountriesTest();
   }

   private static void getAllCountriesTest() {
      LOGGER.info("Start");
      try {
         Country country = countryService.findCountryByCode("IN");
         LOGGER.debug("Country: {}", country);
      } catch (CountryNotFoundException e) {
         LOGGER.error("Error: {}", e.getMessage());
```

```
        }
        LOGGER.info("End");
    }
}
```

File name: CountryService.java

```
package com.cognizant.ormlearn.service;

import java.util.Optional;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;
import org.springframework.transaction.annotation.Transactional;
import com.cognizant.ormlearn.model.Country;
import com.cognizant.ormlearn.repository.CountryRepository;
import com.cognizant.ormlearn.service.exception.CountryNotFoundException;

@Service
public class CountryService {

    @Autowired
    private CountryRepository countryRepository;

    @Transactional
    public Country findCountryByCode(String countryCode) throws CountryNotFoundException {
        Optional<Country> result = countryRepository.findById(countryCode);
        if (!result.isPresent()) {
            throw new CountryNotFoundException("Country with code " + countryCode + " not found");
        }
        return result.get();
    }

    // (Optional) other methods like add, update, delete...
}
```

File name: Country.java

```
package com.cognizant.ormlearn.model;

import javax.persistence.*;

@Entity
@Table(name = "country")
public class Country {

   @Id
   @Column(name = "co_code")
   private String code;

   @Column(name = "co_name")
   private String name;

   public String getCode() {
      return code;
   }

   public void setCode(String code) {
      this.code = code;
   }

   public String getName() {
      return name;
   }

   public void setName(String name) {
      this.name = name;
   }

   @Override
   public String toString() {
```

```
        return "Country [code=" + code + ", name=" + name + "]";
    }
}
```

File name: CountryNotFoundException.java

```
package com.cognizant.ormlearn.service.exception;


public class CountryNotFoundException extends Exception {
    public CountryNotFoundException(String message) {
        super(message);
    }
}
```

File name: CountryRepository.java

```
package com.cognizant.ormlearn.repository;


import java.util.List;
import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;
import com.cognizant.ormlearn.model.Country;


@Repository
public interface CountryRepository extends JpaRepository<Country, String> {
    List<Country> findByNameContainingIgnoreCase(String name);
}
```

OUTPUT

```
terminated> OrmLearnApplication (1) [Java Application] E:\sts\sts-4.31.0.RELEASE\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_21.0.7.v20250502-0916\jre\bin\javaw.exe  (10-Jul-2025, 11:48:59 am –
025-07-10 11:49:03.582  INFO 20828 --- [  restartedMain] o.hibernate.jpa.internal.util.LogHelper  : HHH000204: Processing PersistenceUnitInfo [name: default
025-07-10 11:49:03.677  INFO 20828 --- [  restartedMain] org.hibernate.Version                    : HHH000412: Hibernate ORM core version 5.6.15.Final
025-07-10 11:49:03.939  INFO 20828 --- [  restartedMain] o.hibernate.annotations.common.Version   : HCANN000001: Hibernate Commons Annotations {5.1.2.Final}
025-07-10 11:49:04.160  INFO 20828 --- [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Starting...
025-07-10 11:49:04.650  INFO 20828 --- [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Start completed.
025-07-10 11:49:04.673  INFO 20828 --- [  restartedMain] org.hibernate.dialect.Dialect            : HHH000400: Using dialect: org.hibernate.dialect.MySQL5Di
025-07-10 11:49:05.445  INFO 20828 --- [  restartedMain] o.h.e.t.j.p.i.JtaPlatformInitiator       : HHH000490: Using JtaPlatform implementation: [org.hiberr
025-07-10 11:49:05.456  INFO 20828 --- [  restartedMain] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence uni
025-07-10 11:49:05.995  INFO 20828 --- [  restartedMain] o.s.b.d.a.OptionalLiveReloadServer       : LiveReload server is running on port 35729
025-07-10 11:49:06.018  INFO 20828 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : Started OrmLearnApplication in 4.029 seconds (JVM runnir
025-07-10 11:49:06.022  INFO 20828 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : Start
025-07-10 11:49:06.078 DEBUG 20828 --- [  restartedMain] org.hibernate.SQL                        : select country0_.co_code as co_code1_0_0_, country0_.co_
025-07-10 11:49:06.085 TRACE 20828 --- [  restartedMain] o.h.type.descriptor.sql.BasicBinder      : binding parameter [1] as [VARCHAR] - [IN]
025-07-10 11:49:06.104 TRACE 20828 --- [  restartedMain] o.h.type.descriptor.sql.BasicExtractor   : extracted value ([co_name2_0_0_] : [VARCHAR]) - [India]
025-07-10 11:49:06.147  INFO 20828 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : End
025-07-10 11:49:06.159  INFO 20828 --- [ionShutdownHook] j.LocalContainerEntityManagerFactoryBean : Closing JPA EntityManagerFactory for persistence unit 'd
025-07-10 11:49:06.163  INFO 20828 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Shutdown initiated...
025-07-10 11:49:06.182  INFO 20828 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Shutdown completed.
```

Hands on 7

Add a new country

```
package com.cognizant.ormlearn;


import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.context.ApplicationContext;

import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

import com.cognizant.ormlearn.service.exception.CountryNotFoundException;


@SpringBootApplication

public class OrmLearnApplication {


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

  private static CountryService countryService;


  public static void main(String[] args) {

    ApplicationContext context = SpringApplication.run(OrmLearnApplication.class, args);

    countryService = context.getBean(CountryService.class);


    testAddCountry(); // 👈 This is for Hands-On 7

  }


  private static void testAddCountry() {

    LOGGER.info("Start testAddCountry");


    Country country = new Country();

    country.setCode("JP");

    country.setName("Japan");
```

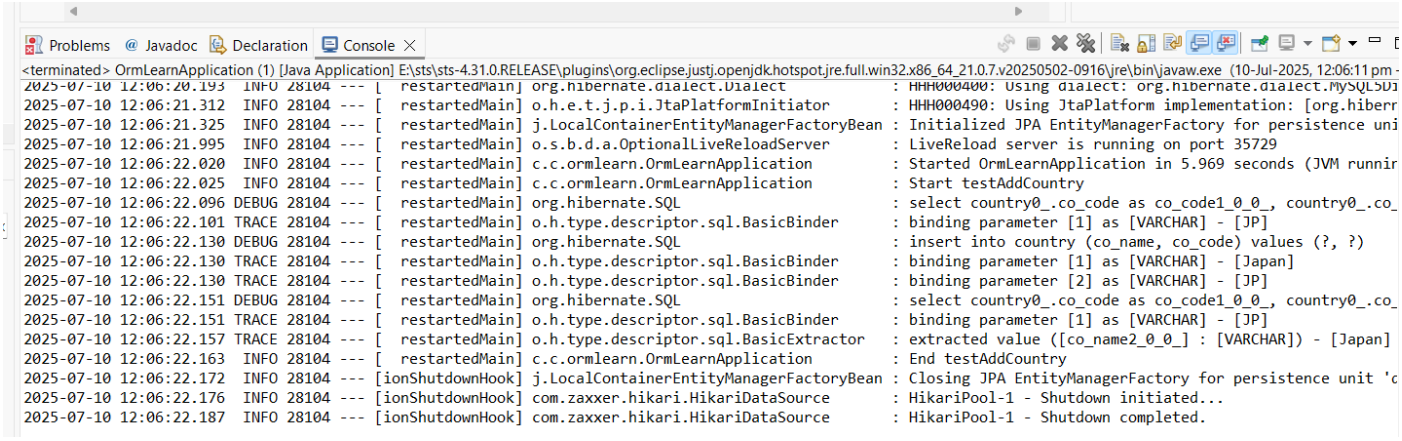
```
        countryService.addCountry(country);

        try {
            Country added = countryService.findCountryByCode("JP");
            LOGGER.debug("Added Country: {}", added);
        } catch (CountryNotFoundException e) {
            LOGGER.error("Error: {}", e.getMessage());
        }

        LOGGER.info("End testAddCountry");
    }
}
package com.cognizant.ormlearn.service;
import java.util.Optional;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;
import org.springframework.transaction.annotation.Transactional;
import com.cognizant.ormlearn.model.Country;
import com.cognizant.ormlearn.repository.CountryRepository;
import com.cognizant.ormlearn.service.exception.CountryNotFoundException;
@Service
public class CountryService {
    @Autowired
    private CountryRepository countryRepository;
    @Transactional
    public Country findCountryByCode(String code) throws CountryNotFoundException {
        Optional<Country> result = countryRepository.findById(code);
        if (!result.isPresent()) {
            throw new CountryNotFoundException("Country with code " + code + " not found");
        }
        return result.get();
    }
    @Transactional
    public void addCountry(Country country) {
```

```
        countryRepository.save(country);
    }
}
package com.cognizant.ormlearn.model;
import javax.persistence.*;
@Entity
@Table(name = "country")
public class Country {
    @Id
    @Column(name = "co_code")
    private String code;
    @Column(name = "co_name")
    private String name;
    public String getCode() {
        return code;
    }
    public void setCode(String code) {
        this.code = code;
    }
    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }
    @Override
    public String toString() {
        return "Country [code=" + code + ", name=" + name + "]";
    }
}
package com.cognizant.ormlearn.service.exception;

public class CountryNotFoundException extends Exception {
```

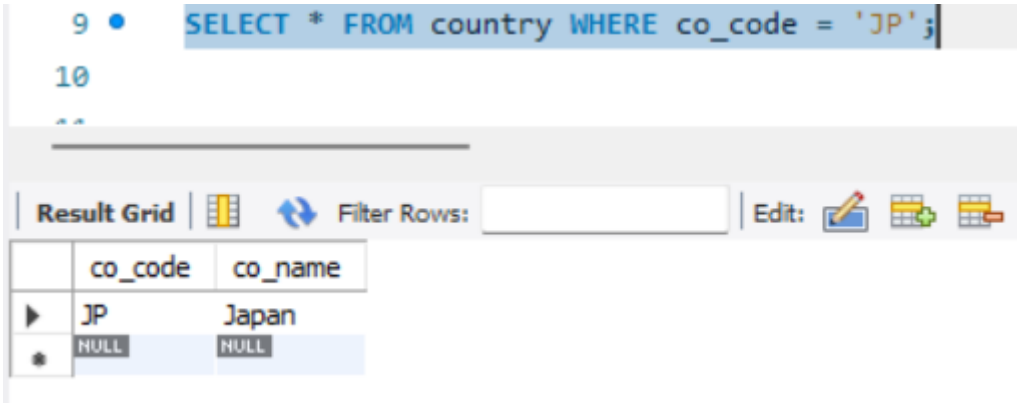
```
    public CountryNotFoundException(String message) {
        super(message);
    }
}
```

```
package com.cognizant.ormlearn.repository;

import java.util.List;

import org.springframework.data.jpa.repository.JpaRepository;

import org.springframework.stereotype.Repository;

import com.cognizant.ormlearn.model.Country;

@Repository

public interface CountryRepository extends JpaRepository<Country, String> {

    List<Country> findByNameContainingIgnoreCase(String name);

}
```

OUTPUT



```
Problems  Javadoc  Declaration  Console
<terminated> OrmLearnApplication (1) [Java Application] E:\sts\sts-4.31.0.RELEASE\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_21.0.7.v20250502-0916\jre\bin\javaw.exe  (10-Jul-2025, 12:06:11 pm -
2025-07-10 12:06:20.193  INFO 28104 --- [  restartedMain] org.hibernate.dialect.Dialect            : HHH000400: Using dialect: org.hibernate.dialect.MySQL5Di
2025-07-10 12:06:21.312  INFO 28104 --- [  restartedMain] o.h.e.t.j.p.i.JtaPlatformInitiator       : HHH000490: Using JtaPlatform implementation: [org.hiberr
2025-07-10 12:06:21.325  INFO 28104 --- [  restartedMain] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence uni
2025-07-10 12:06:21.995  INFO 28104 --- [  restartedMain] o.s.b.d.a.OptionalLiveReloadServer       : LiveReload server is running on port 35729
2025-07-10 12:06:22.020  INFO 28104 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : Started OrmLearnApplication in 5.969 seconds (JVM runnir
2025-07-10 12:06:22.025  INFO 28104 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : Start testAddCountry
2025-07-10 12:06:22.096 DEBUG 28104 --- [  restartedMain] org.hibernate.SQL                        : select country0_.co_code as co_code1_0_0_, country0_.co_
2025-07-10 12:06:22.101 TRACE 28104 --- [  restartedMain] o.h.type.descriptor.sql.BasicBinder      : binding parameter [1] as [VARCHAR] - [JP]
2025-07-10 12:06:22.130 DEBUG 28104 --- [  restartedMain] org.hibernate.SQL                        : insert into country (co_name, co_code) values (?, ?)
2025-07-10 12:06:22.130 TRACE 28104 --- [  restartedMain] o.h.type.descriptor.sql.BasicBinder      : binding parameter [1] as [VARCHAR] - [Japan]
2025-07-10 12:06:22.130 TRACE 28104 --- [  restartedMain] o.h.type.descriptor.sql.BasicBinder      : binding parameter [2] as [VARCHAR] - [JP]
2025-07-10 12:06:22.151 DEBUG 28104 --- [  restartedMain] org.hibernate.SQL                        : select country0_.co_code as co_code1_0_0_, country0_.co_
2025-07-10 12:06:22.151 TRACE 28104 --- [  restartedMain] o.h.type.descriptor.sql.BasicBinder      : binding parameter [1] as [VARCHAR] - [JP]
2025-07-10 12:06:22.157 TRACE 28104 --- [  restartedMain] o.h.type.descriptor.sql.BasicExtractor   : extracted value ([co_name2_0_0_] : [VARCHAR]) - [Japan]
2025-07-10 12:06:22.163  INFO 28104 --- [  restartedMain] c.c.ormlearn.OrmLearnApplication         : End testAddCountry
2025-07-10 12:06:22.172  INFO 28104 --- [ionShutdownHook] j.LocalContainerEntityManagerFactoryBean : Closing JPA EntityManagerFactory for persistence unit 'd
2025-07-10 12:06:22.176  INFO 28104 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Shutdown initiated...
2025-07-10 12:06:22.187  INFO 28104 --- [ionShutdownHook] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Shutdown completed.
```



```
9  SELECT * FROM country WHERE co_code = 'JP';
10
```

Result Grid | Filter Rows: | Edit:

co_code	co_name
JP	Japan
NULL	NULL