**1.** **Spring Data JPA**

**OrmApplication.java**

package com.cognizant.ormlearn;

import java.util.List;

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;

*@SpringBootApplication*

public class OrmLearnApplication {

public static void main(String[] args) {

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

CountryService countryService = context.getBean(CountryService.class);

System.***out***.println("Inside main");

List<Country> countries = countryService.getAllCountries();

for (Country country : countries) {

System.***out***.println(country);

}

}

}

**Country.java**

package com.cognizant.ormlearn.model;

import jakarta.persistence.Column;

import jakarta.persistence.Entity;

import jakarta.persistence.Id;

import jakarta.persistence.Table;

*@Entity*

*@Table*(name = "country")

public class Country {

*@Id*

*@Column*(name = "code")

private String code;

*@Column*(name = "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 + "]";

}

}

**CountryService.java**

package com.cognizant.ormlearn.service;

import java.util.List;

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;

*@Service*

public class CountryService {

*@Autowired*

private CountryRepository countryRepository;

*@Transactional*(readOnly = true)

public List<Country> getAllCountries() {

return countryRepository.findAll();

}

}

**CountryRepository.java**

package com.cognizant.ormlearn.repository;

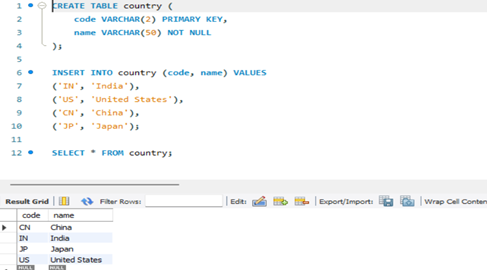
import org.springframework.data.jpa.repository.JpaRepository;

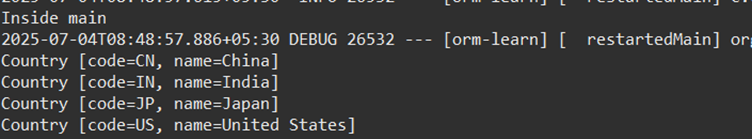
import com.cognizant.ormlearn.model.Country;

public interface CountryRepository extends JpaRepository<Country, String> {

}

**SQL:**

****

**Output:**

**4. Difference between JPA, Hibernate and Spring Data JPA**

**EmployeeDemoApplication.java**

package com.example.employeedemo;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

*@SpringBootApplication*

public class EmployeeDemoApplication {

public static void main(String[] args) {

SpringApplication.*run*(EmployeeDemoApplication.class, args);

}

}

**Employee.java**

package com.example.employeedemo.model;

import jakarta.persistence.\*;

*@Entity*

*@Table*(name = "employee")

public class Employee {

*@Id*

*@GeneratedValue*(strategy = *GenerationType*.***IDENTITY***)

private Long id;

*@Column*(name = "first\_name")

private String firstName;

*@Column*(name = "last\_name")

private String lastName;

private String email;

// Getters and setters

public Long getId() {

return id;

}

public void setId(Long id) {

this.id = id;

}

public String getFirstName() {

return firstName;

}

public void setFirstName(String firstName) {

this.firstName = firstName;

}

public String getLastName() {

return lastName;

}

public void setLastName(String lastName) {

this.lastName = lastName;

}

public String getEmail() {

return email;

}

public void setEmail(String email) {

this.email = email;

}

// toString

*@Override*

public String toString() {

return "Employee [id=" + id + ", firstName=" + firstName +

", lastName=" + lastName + ", email=" + email + "]";

}

}

**EmployeeRepository.java**

package com.example.employeedemo.repository;

import com.example.employeedemo.model.Employee;

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

import org.springframework.stereotype.Repository;

*@Repository*

public interface EmployeeRepository extends JpaRepository<Employee, Long> {

}

**EmployeeService.java**

package com.example.employeedemo.service;

import com.example.employeedemo.model.Employee;

import java.util.List;

public interface EmployeeService {

Employee addEmployee(Employee employee);

List<Employee> getAllEmployees();

}

**EmployeeServiceImpl.java**

package com.example.employeedemo.service;

import com.example.employeedemo.model.Employee;

import com.example.employeedemo.repository.EmployeeRepository;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.stereotype.Service;

import jakarta.transaction.Transactional;

import java.util.List;

*@Service*

public class EmployeeServiceImpl implements EmployeeService {

*@Autowired*

private EmployeeRepository employeeRepository;

*@Override*

*@Transactional*

public Employee addEmployee(Employee employee) {

return employeeRepository.save(employee);

}

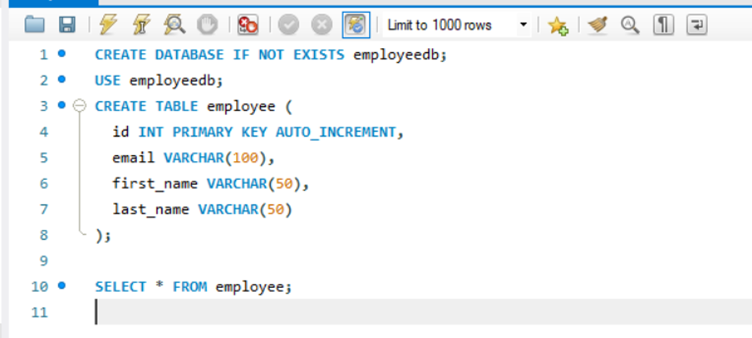
*@Override*

public List<Employee> getAllEmployees() {

return employeeRepository.findAll();

}

}

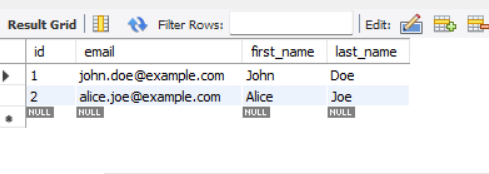


**Command to add data:**

curl -X POST http://localhost:8080/employees -H "Content-Type: application/json" -d "{\"firstName\":\"John\", \"lastName\":\"Doe\", \"email\":\"john.doe@example.com\"}"

curl -X POST http://localhost:8080/employees -H "Content-Type: application/json" -d "{\"firstName\":\"Alice\", \"lastName\":\"Joe\", \"email\":\"alice.joe@example.com\"}"

**Output:**

****

**5. Implement services for managing Country**

**Country.java**

package com.cognizant.ormlearn.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; }

}

**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);

}

**CountryService.java**

package com.cognizant.ormlearn.service;

import java.util.List;

import com.cognizant.ormlearn.model.Country;

public interface CountryService {

Country findCountryByCode(String code);

Country addCountry(Country country);

Country updateCountry(Country country);

void deleteCountry(String code);

List<Country> findCountriesByPartialName(String name);

}

**CountryServiceImpl.java**

package com.cognizant.ormlearn.service;

import java.util.List;

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 jakarta.persistence.EntityNotFoundException;

*@Service*

public class CountryServiceImpl implements CountryService {

*@Autowired*

private CountryRepository countryRepository;

*@Override*

public Country findCountryByCode(String code) {

return countryRepository.findById(code)

.orElseThrow(() -> new EntityNotFoundException("Country not found: " + code));

}

*@Override*

public Country addCountry(Country country) {

return countryRepository.save(country);

}

*@Override*

public Country updateCountry(Country country) {

if (!countryRepository.existsById(country.getCode())) {

throw new EntityNotFoundException("Country not found: " + country.getCode());

}

return countryRepository.save(country);

}

*@Override*

public void deleteCountry(String code) {

if (!countryRepository.existsById(code)) {

throw new EntityNotFoundException("Country not found: " + code);

}

countryRepository.deleteById(code);

}

*@Override*

public List<Country> findCountriesByPartialName(String name) {

return countryRepository.findByNameContainingIgnoreCase(name);

}

}

**OrmLearnApplication.java**

package com.cognizant.ormlearn;

import org.springframework.boot.CommandLineRunner;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.beans.factory.annotation.Autowired;

import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

*@SpringBootApplication*

public class OrmLearnApplication implements CommandLineRunner {

*@Autowired*

private CountryService countryService;

public static void main(String[] args) {

SpringApplication.*run*(OrmLearnApplication.class, args);

}

*@Override*

public void run(String... args) throws Exception {

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

System.***out***.println("Country: " + country.getName());

Country newCountry = new Country();

newCountry.setCode("ZZ");

newCountry.setName("Zootopia");

countryService.addCountry(newCountry);

newCountry.setName("Zamunda");

countryService.updateCountry(newCountry);

countryService.findCountriesByPartialName("land").forEach(c -> System.***out***.println(c.getName()));

countryService.deleteCountry("ZZ");

}

}

MySQL

CREATE TABLE country (

co\_code VARCHAR(2) PRIMARY KEY,

co\_name VARCHAR(50) NOT NULL

);

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");

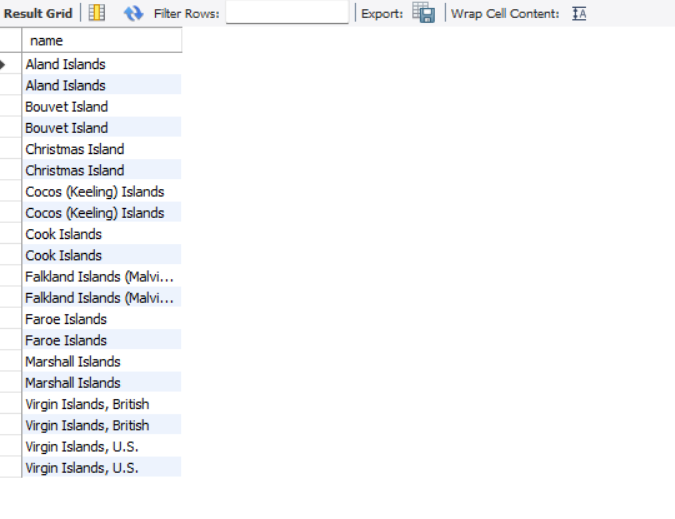
insert into country (co\_code, co\_name) values ("YE", "Yemen");

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");

**OUTPUT:**



**6. Find a country based on country code**

package com.cognizant.ormlearn;

import java.util.List;

import org.springframework.boot.CommandLineRunner;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.beans.factory.annotation.Autowired;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

*@SpringBootApplication*

public class OrmLearnApplication implements CommandLineRunner {

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

*@Autowired*

private CountryService countryService;

public static void main(String[] args) {

SpringApplication.*run*(OrmLearnApplication.class, args);

}

private void getAllCountriesTest() {

***LOGGER***.info("Start getAllCountriesTest");

List<Country> countries = countryService.getAllCountries();

countries.forEach(c -> ***LOGGER***.debug("Country: {}", c));

***LOGGER***.info("End getAllCountriesTest");

}

*@Override*

public void run(String... args) throws Exception {

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

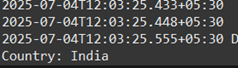
System.***out***.println("Country: " + country.getName());

getAllCountriesTest();

}

}

**Output:**

****

**7. Add a new country**

**CountryController.java**

package com.cognizant.ormlearn.controller;

import java.util.List;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.web.bind.annotation.\*;

import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

*@RestController*

*@RequestMapping*("/countries")

public class CountryController {

*@Autowired*

private CountryService countryService;

*@GetMapping*("/{code}")

public Country getCountryByCode(*@PathVariable* String code) {

return countryService.findCountryByCode(code);

}

*@PostMapping*

public Country addCountry(*@RequestBody* Country country) {

return countryService.addCountry(country);

}

*@PutMapping*

public Country updateCountry(*@RequestBody* Country country) {

return countryService.updateCountry(country);

}

*@DeleteMapping*("/{code}")

public void deleteCountry(*@PathVariable* String code) {

countryService.deleteCountry(code);

}

*@GetMapping*

public List<Country> getAllCountries() {

return countryService.getAllCountries();

}

*@GetMapping*("/search/{name}")

public List<Country> searchByPartialName(*@PathVariable* String name) {

return countryService.findCountriesByPartialName(name);

}

}

**CountryService.java**

package com.cognizant.ormlearn.service;

import java.util.List;

import com.cognizant.ormlearn.model.Country;

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

public interface CountryService {

Country findCountryByCode(String code) throws CountryNotFoundException;

Country addCountry(Country country);

Country updateCountry(Country country);

void deleteCountry(String code);

List<Country> findCountriesByPartialName(String name);

List<Country> getAllCountries();

}

**CountryServiceImpl.java**

package com.cognizant.ormlearn.service;

import java.util.List;

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 CountryServiceImpl implements CountryService {

*@Autowired*

private CountryRepository countryRepository;

*@Override*

*@Transactional*(readOnly = true)

public Country findCountryByCode(String code) throws CountryNotFoundException {

return countryRepository.findById(code)

.orElseThrow(() -> new CountryNotFoundException("Country not found: " + code));

}

*@Override*

*@Transactional*

public Country addCountry(Country country) {

return countryRepository.save(country);

}

*@Override*

*@Transactional*

public Country updateCountry(Country country) throws CountryNotFoundException {

if (!countryRepository.existsById(country.getCode())) {

throw new CountryNotFoundException("Country not found: " + country.getCode());

}

return countryRepository.save(country);

}

*@Override*

*@Transactional*

public void deleteCountry(String code) throws CountryNotFoundException {

if (!countryRepository.existsById(code)) {

throw new CountryNotFoundException("Country not found: " + code);

}

countryRepository.deleteById(code);

}

*@Override*

*@Transactional*(readOnly = true)

public List<Country> findCountriesByPartialName(String name) {

return countryRepository.findByNameContainingIgnoreCase(name);

}

*@Override*

*@Transactional*(readOnly = true)

public List<Country> getAllCountries() {

return countryRepository.findAll();

}

}

**CountryNotFoundException.java**

package com.cognizant.ormlearn.service.exception;

public class CountryNotFoundException extends RuntimeException {

public CountryNotFoundException(String message) {

super(message);

}

}

**OrmLearnApplication.java**

package com.cognizant.ormlearn;

import java.util.List;

import org.springframework.boot.CommandLineRunner;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.beans.factory.annotation.Autowired;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

import com.cognizant.ormlearn.model.Country;

import com.cognizant.ormlearn.service.CountryService;

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

*@SpringBootApplication*

public class OrmLearnApplication implements CommandLineRunner {

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

*@Autowired*

private CountryService countryService;

public static void main(String[] args) {

SpringApplication.*run*(OrmLearnApplication.class, args);

}

private void getAllCountriesTest() {

***LOGGER***.info("Start getAllCountriesTest");

List<Country> countries = countryService.getAllCountries();

countries.forEach(c -> ***LOGGER***.debug("Country: {}", c));

***LOGGER***.info("End getAllCountriesTest");

}

private void testAddCountry() {

***LOGGER***.info("Start testAddCountry");

Country newCountry = new Country();

newCountry.setCode("ZZ");

newCountry.setName("Zootopia");

countryService.addCountry(newCountry);

try {

Country retrievedCountry = countryService.findCountryByCode("ZZ");

***LOGGER***.debug("Added Country: {}", retrievedCountry);

} catch (CountryNotFoundException e) {

***LOGGER***.error("Country not found after adding: {}", e.getMessage());

}

***LOGGER***.info("End testAddCountry");

}

*@Override*

public void run(String... args) throws Exception {

try {

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

System.***out***.println("Country: " + country.getName());

} catch (CountryNotFoundException e) {

System.***err***.println("Country not found: IN");

}

getAllCountriesTest();

testAddCountry();

}

}

**Output :**

