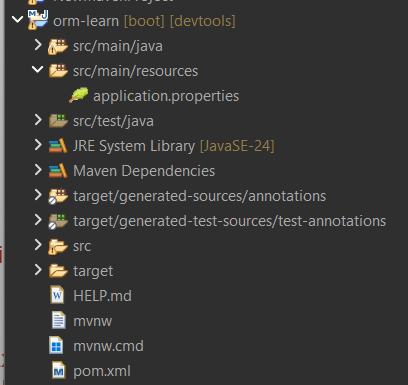
**Hands on 1**

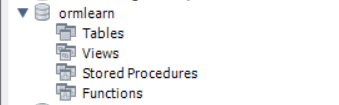
**Spring Data JPA - Quick Example** 

**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.



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

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=Ishita@sql1.

# Hibernate configuration

spring.jpa.hibernate.ddl-auto=update

spring.jpa.properties.hibernate.dialect=org.hibernate.dialect.MySQLDialect

* 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.

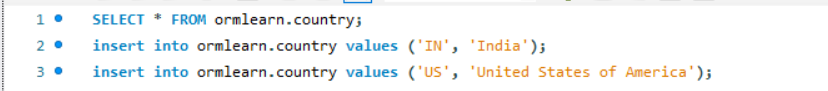


SME to walk through the following aspects related to the project created:

1. src/main/java - Folder with application code
2. src/main/resources - Folder for application configuration
3. src/test/java - Folder with code for testing the application
4. OrmLearnApplication.java - Walkthrough the main() method.
5. Purpose of @SpringBootApplication annotation
6. pom.xml
   1. Walkthrough all the configuration defined in XML file
   2. Open 'Dependency Hierarchy' and show the dependency tree.

**Country table creation**

* Create a new table country with columns for code and name. For sample, let us insert one country with values 'IN' and 'India' in this table.



**Persistence Class - com.cognizant.orm-learn.model.Country**

* Open Eclipse with orm-learn project
* Create new package com.cognizant.orm-learn.model
* Create Country.java, then generate getters, setters and toString() methods.
* Include @Entity and @Table at class level
* Include @Column annotations in each getter method specifying the column name.
* package com.cognizant.orm\_learn.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="co\_code")
* private String code;
* *@Column*(name="co\_name")
* private String name;

* public String getCode() {
* return code;
* }
* public String getName() {
* return name;
* }
* public void setCode(String code) {
* this.code = code;
* }
* public void setName(String name) {
* this.name = name;
* }
* *@Override*
* public String toString() {
* return "Country [code=" + code + ", name=" + name + "]";
* }




* }

**Repository Class - com.cognizant.orm-learn.CountryRepository**

* Create new package com.cognizant.orm-learn.repository
* Create new interface named CountryRepository that extends JpaRepository<Country, String>
* Define @Repository annotation at class level
* package com.cognizant.orm\_learn.repository;
* import org.springframework.data.jpa.repository.JpaRepository;
* import org.springframework.stereotype.Repository;
* import com.cognizant.orm\_learn.model.Country;
* *@Repository*
* public interface CountryRepository extends JpaRepository<Country, String>{
* }

**Service Class - com.cognizant.orm-learn.service.CountryService**

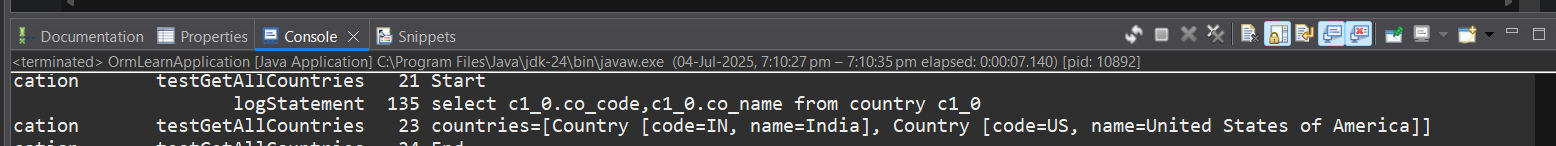
* Create new package com.cognizant.orm-learn.service
* Create new class CountryService
* Include @Service annotation at class level
* Autowire CountryRepository in CountryService
* Include new method getAllCountries() method that returns a list of countries.
* Include @Transactional annotation for this method
* In getAllCountries() method invoke countryRepository.findAll() method and return the result
* package com.cognizant.orm\_learn.service;
* import java.util.List;
* import org.springframework.beans.factory.annotation.Autowired;
* import org.springframework.stereotype.Service;
* import com.cognizant.orm\_learn.model.Country;
* import com.cognizant.orm\_learn.repository.CountryRepository;
* import jakarta.transaction.Transactional;
* *@Service*
* public class CountryService {
* *@Autowired*
* private CountryRepository countryRepository;
* *@Transactional*
* public List<Country> getAllCountries() {
* return countryRepository.findAll();
* }


* }

**Testing in OrmLearnApplication.java**

* Include a static reference to CountryService in OrmLearnApplication class
* Define a test method to get all countries from service.
* Modify SpringApplication.run() invocation to set the application context and the CountryService reference from the application context.
* Execute main method to check if data from ormlearn database is retrieved.
* package com.cognizant.orm\_learn;
* import com.cognizant.orm\_learn.model.Country;
* import com.cognizant.orm\_learn.service.CountryService;
* import java.util.List;
* import org.slf4j.Logger;
* import org.slf4j.LoggerFactory;
* import org.springframework.boot.SpringApplication;
* import org.springframework.boot.autoconfigure.SpringBootApplication;
* import org.springframework.context.ApplicationContext;
* *@SpringBootApplication*
* public class OrmLearnApplication {
* private static CountryService *countryService*;
* private static void testGetAllCountries()
* {
* ***LOGGER***.info("Start");
* List<Country> countries=*countryService*.getAllCountries();
* ***LOGGER***.debug("countries={}",countries);
* ***LOGGER***.info("End");
* }
* private static final Logger ***LOGGER*** = LoggerFactory.*getLogger*(OrmLearnApplication.class);
* OrmLearnApplication(CountryService countryService) {
* this.*countryService* = countryService;
* }
* public static void main(String[] args) {
* ApplicationContext context=SpringApplication.*run*(OrmLearnApplication.class, args);
* *countryService*=context.getBean(CountryService.class);
* *testGetAllCountries*();
* SpringApplication.*run*(OrmLearnApplication.class, args);
* ***LOGGER***.info("Inside main");
* }
* }

**Output**



​​​​​​​

​​​​​​**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

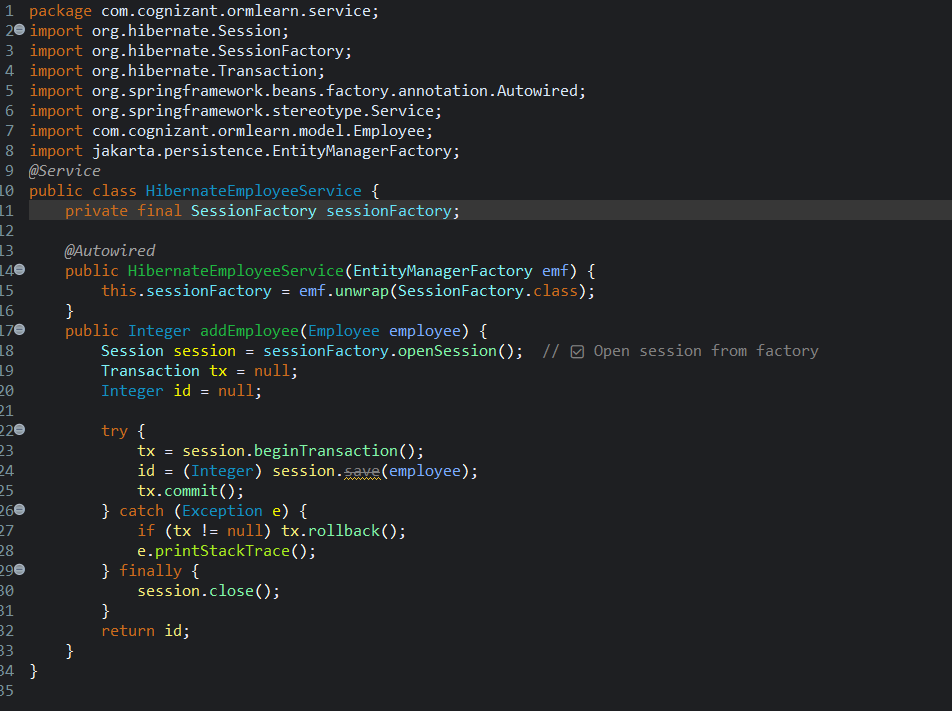
* ORM Tool that implements JPA

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**

HibernateEmployee.java



   /\* 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 {

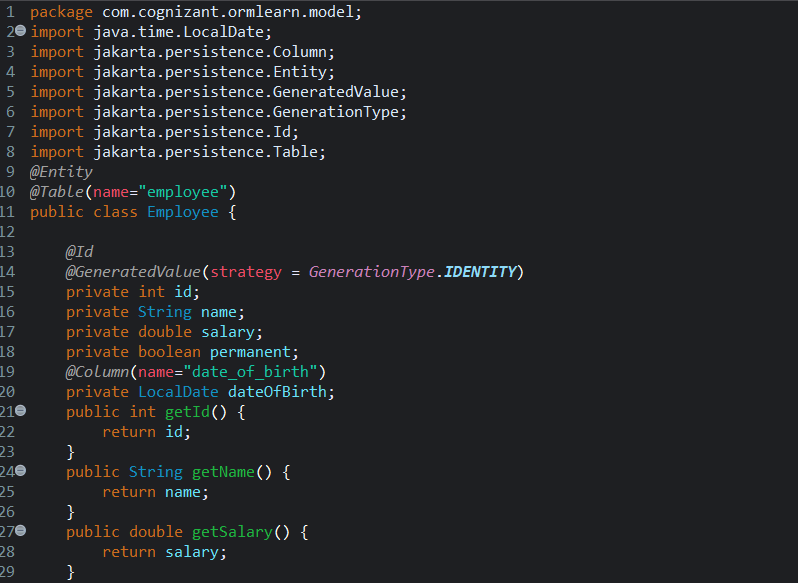
         session.close();

      }

      return employeeID;

   }

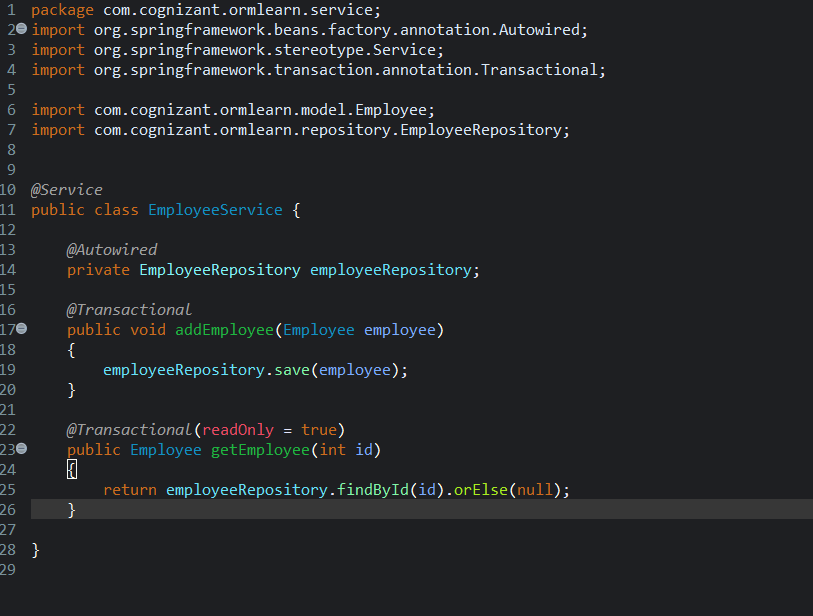
Employee.java



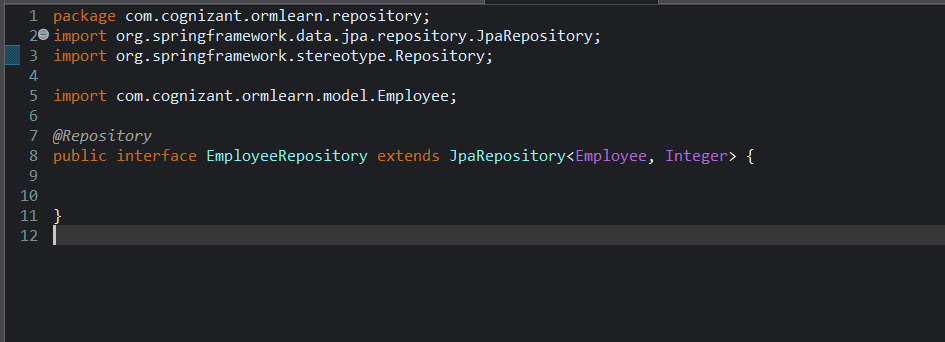


**Spring Data JPA**

EmployeeService.java



EmployeeRespository.java



public interface EmployeeRepository extends JpaRepository<Employee, Integer> {

}

EmployeeService.java

@Autowire

  private EmployeeRepository employeeRepository;

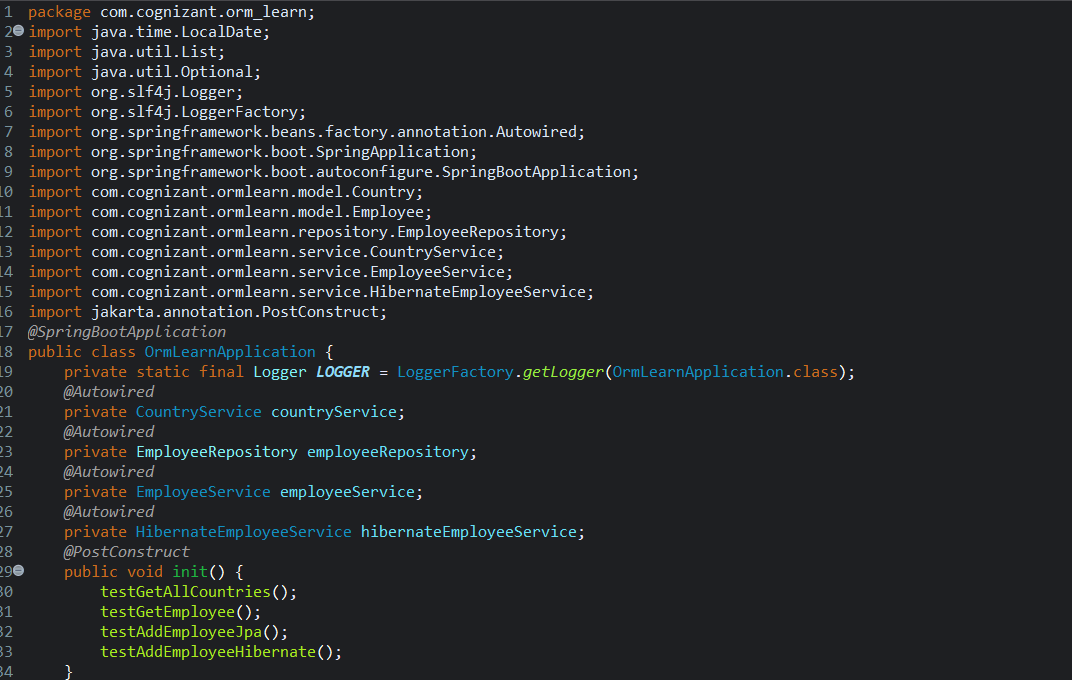
@Transactional

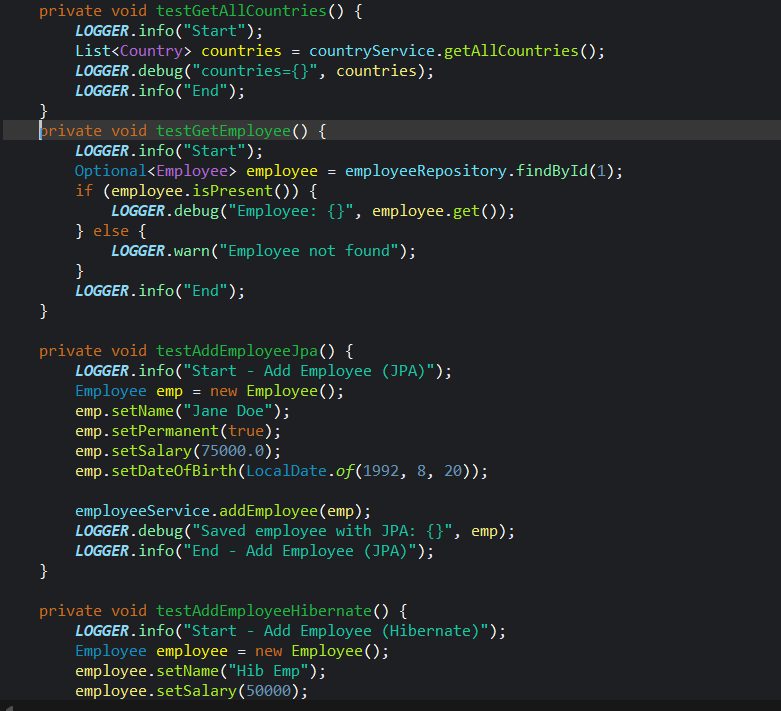
public void addEmployee(Employee employee) {

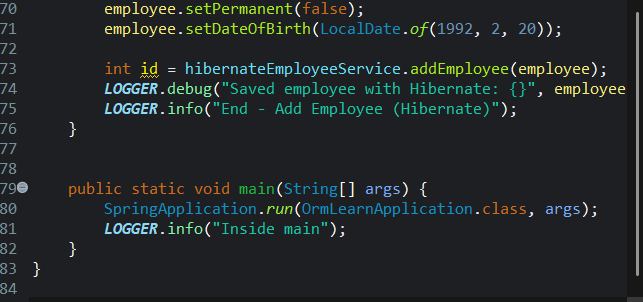
  employeeRepository.save(employee);

  }

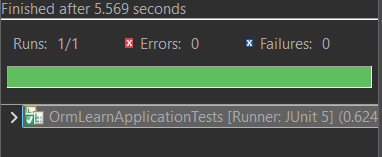
OrmLearnApplication.java



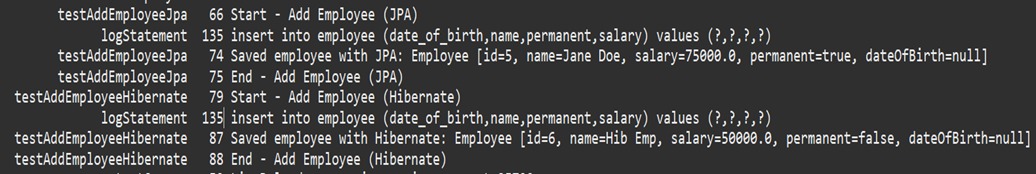




Testcase:



OUTPUT



​​​​​​​ 