**Cognizant Deep Skilling - Digital Nurture 4.0**

**Hands on 1**

**Create a Spring Web Project using Maven**

**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

http://maven.apache.org/xsd/maven-4.0.0.xsd">

<modelVersion>4.0.0</modelVersion>

<groupId>com.cognizant</groupId>

<artifactId>spring-learn</artifactId>

<version>0.0.1-SNAPSHOT</version>

<name>spring-learn</name>

<description>Spring Learn Application</description>

<parent>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-parent</artifactId>

<version>2.7.4</version> <!-- Use any Spring Boot version -->

<relativePath/> <!-- Lookup parent from repository -->

</parent>

<properties>

<java.version>21</java.version> <!-- Update to your Java version -->

</properties>

<dependencies>

<!-- Spring Boot Web Starter -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-web</artifactId>

</dependency>

<!-- (Optional) Spring Security for JWT or login auth -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-security</artifactId>

</dependency>

<!-- (Optional) JSON Web Token support -->

<dependency>

<groupId>io.jsonwebtoken</groupId>

<artifactId>jjwt</artifactId>

<version>0.9.1</version>

</dependency>

<!-- (Optional) Spring Boot DevTools -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-devtools</artifactId>

<scope>runtime</scope>

</dependency>

<!-- For unit testing -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-test</artifactId>

<scope>test</scope>

</dependency>

</dependencies>

<build>

<plugins>

<!-- Spring Boot Maven Plugin -->

<plugin>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-maven-plugin</artifactId>

<version>2.7.4</version>

</plugin>

</plugins>

</build>

</project>

**SpringLearnApplication.java**

package com.cognizant.springlearn;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication

public class SpringLearnApplication {

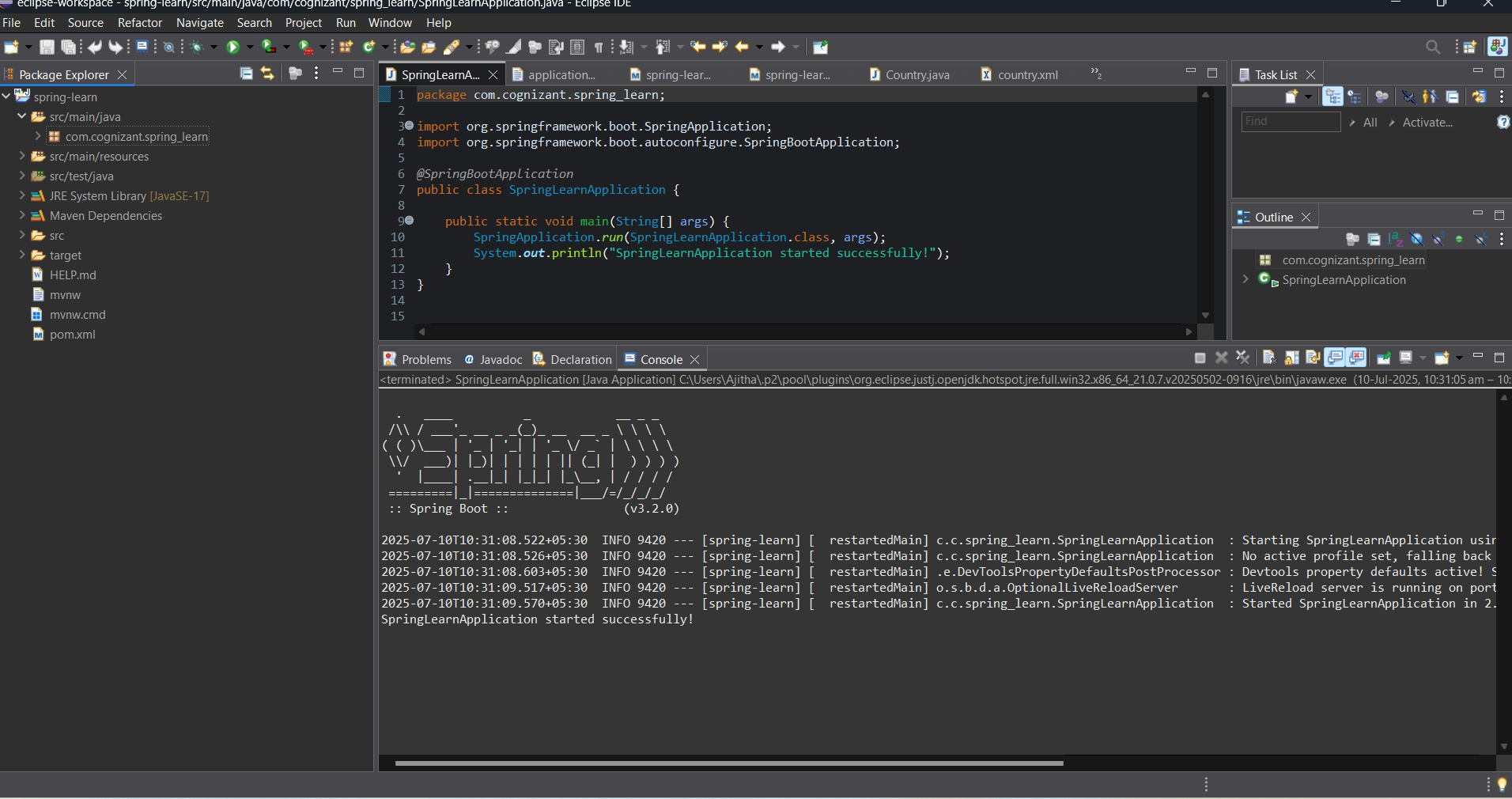
public static void main(String[] args) {

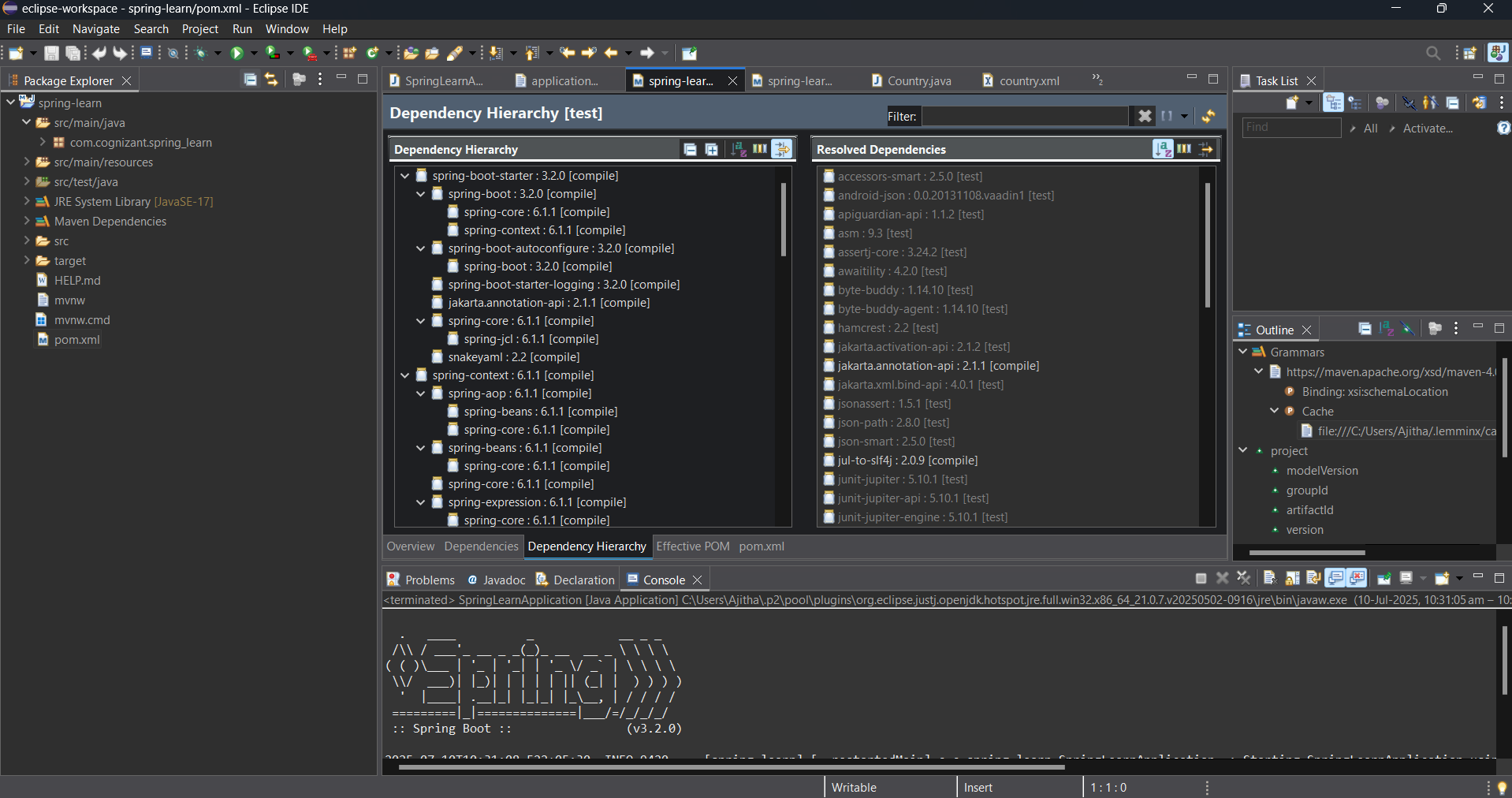
SpringApplication.run(SpringLearnApplication.class, args);

System.out.println("SpringLearnApplication started successfully!");

}

}

**Output:**  
****



**Hands on 4**

**Spring Core – Load Country from Spring Configuration XML**

**SpringLearnApplication.java**  
package com.cognizant.spring\_learn;

import org.slf4j.LoggerFactory;

import org.slf4j.Logger;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

import org.springframework.context.support.ClassPathXmlApplicationContext;

import org.springframework.boot.CommandLineRunner;

@SpringBootApplication

public class SpringLearnApplication implements CommandLineRunner {

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

public static void main(String[] args) {

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

}

@Override

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

*LOGGER*.debug("START");

displayCountry();

*LOGGER*.debug("END");

}

public void displayCountry() {

try (ClassPathXmlApplicationContext context = new ClassPathXmlApplicationContext("country.xml")) {

Country = context.getBean("country", Country.class);

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

}

}

}

**Country.java**

package com.cognizant.spring\_learn;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

public class Country {

private String code;

private String name;

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

public Country() {

*LOGGER*.debug("Inside Country Constructor.");

}

public String getCode() {

*LOGGER*.debug("Inside getCode()");

return code;

}

public void setCode(String code) {

*LOGGER*.debug("Inside setCode()");

this.code = code;

}

public String getName() {

*LOGGER*.debug("Inside getName()");

return name;

}

public void setName(String name) {

*LOGGER*.debug("Inside setName()");

this.name = name;

}

@Override

public String toString() {

return "Country{" +

"code='" + code + '\'' +

", name='" + name + '\'' +

'}';

}

}

**Country.xml**

<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.springframework.org/schema/beans

http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="country" class="com.cognizant.spring\_learn.Country">

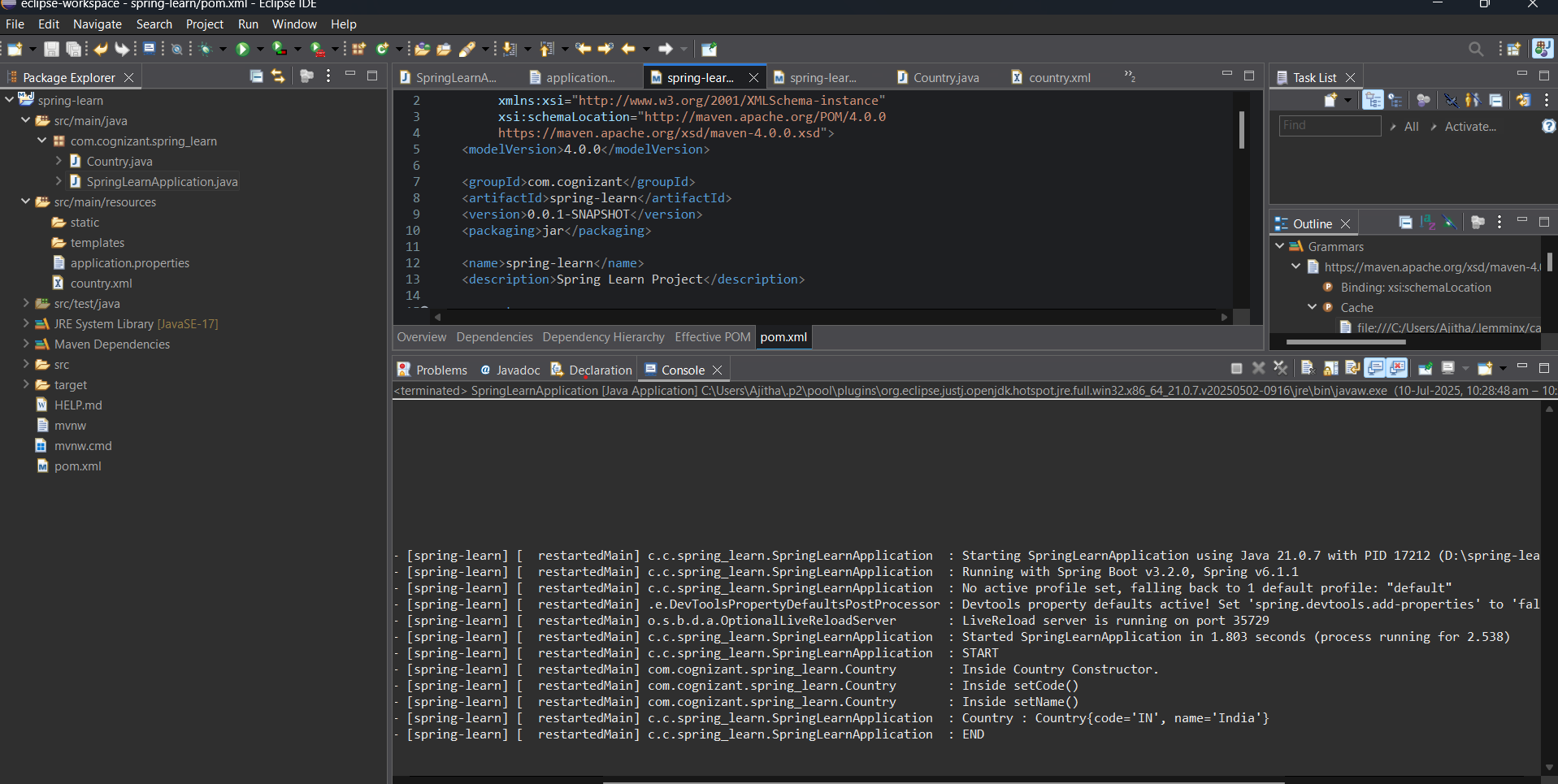
<property name="code" value="IN" />

<property name="name" value="India" />

</bean>

</beans>

**Output:**

****

**Hello World RESTful Web Service**

**Scenario:**

Write a REST service in the spring learn application created earlier, that returns the text "Hello World!!" using Spring Web Framework.

**Pom.xml**

<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

http://maven.apache.org/xsd/maven-4.0.0.xsd">

<modelVersion>4.0.0</modelVersion>

<groupId>com.cognizant</groupId>

<artifactId>spring-learn</artifactId>

<version>1.0</version>

<packaging>jar</packaging>

<parent>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-parent</artifactId>

<version>2.7.18</version> <!-- You can also use 3.x if on Java 17+ -->

</parent>

<dependencies>

<!-- Spring Boot Web -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-web</artifactId>

</dependency>

<!-- For Logging -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-logging</artifactId>

</dependency>

<!-- Testing -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-test</artifactId>

<scope>test</scope>

</dependency>

</dependencies>

<build>

<plugins>

<!-- Plugin to build Spring Boot app -->

<plugin>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-maven-plugin</artifactId>

</plugin>

</plugins>

</build>

</project>

HelloController.java

package com.cognizant.springlearn.controller;

import org.slf4j.Logger;

import org.slf4j.LoggerFactory;

import org.springframework.web.bind.annotation.GetMapping;

import org.springframework.web.bind.annotation.RestController;

@RestController

public class HelloController {

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

@GetMapping("/hello")

public String sayHello() {

LOGGER.info("Start sayHello()");

String response = "Hello World!!";

LOGGER.info("End sayHello()");

return response;

}

}

SpringLearnApplication.java

package com.cognizant.springlearn;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication

public class SpringLearnApplication {

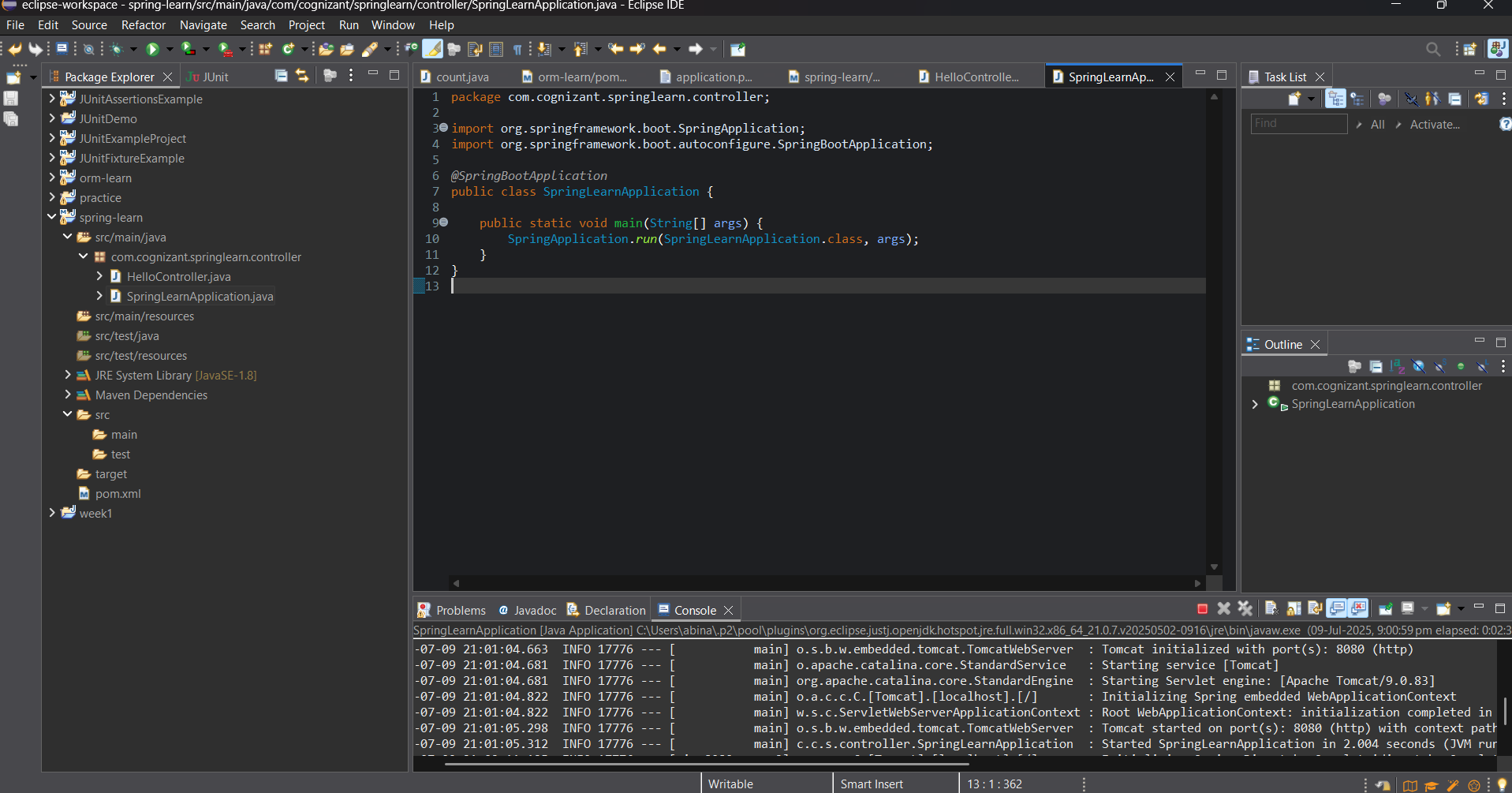
public static void main(String[] args) {

SpringApplication.run(SpringLearnApplication.class, args);

}

}

**Output:**

****

****

**REST - Country Web Service**

**Scenario:**

Write a REST service that returns India country details in the earlier created spring learn application.

**Pom.xml**

<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

http://maven.apache.org/xsd/maven-4.0.0.xsd">

<modelVersion>4.0.0</modelVersion>

<groupId>com.cognizant</groupId>

<artifactId>spring-learn</artifactId>

<version>1.0</version>

<packaging>jar</packaging>

<parent>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-parent</artifactId>

<version>2.7.18</version> <!-- You can also use 3.x if on Java 17+ -->

</parent>

<dependencies>

<!-- Spring Boot Web -->

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-web</artifactId>

</dependency>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-logging</artifactId>

</dependency>

<dependency>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-starter-test</artifactId>

<scope>test</scope>

</dependency>

</dependencies>

<build>

<plugins>

<!-- Plugin to build Spring Boot app -->

<plugin>

<groupId>org.springframework.boot</groupId>

<artifactId>spring-boot-maven-plugin</artifactId>

</plugin>

</plugins>

</build>

</project>

**Country.java**

package com.cognizant.spring\_learn.controller;

public class Country {

private String code;

private String name;

public Country() {}

public Country(String code, String name) {

this.code = code;

this.name = 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;

}

}

**CountryController.java**

package com.cognizant.springlearn.controller;

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

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

import org.springframework.web.bind.annotation.RequestMapping;

import org.springframework.web.bind.annotation.RestController;

@RestController

public class CountryController {

@RequestMapping("/country")

public Country getCountryIndia() {

ApplicationContext context = new ClassPathXmlApplicationContext("country.xml");

Country india = (Country) context.getBean("in");

return india;

}

}

**Country.xml**

<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.springframework.org/schema/beans

https://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="in" class="com.cognizant.springlearn.controller.Country">

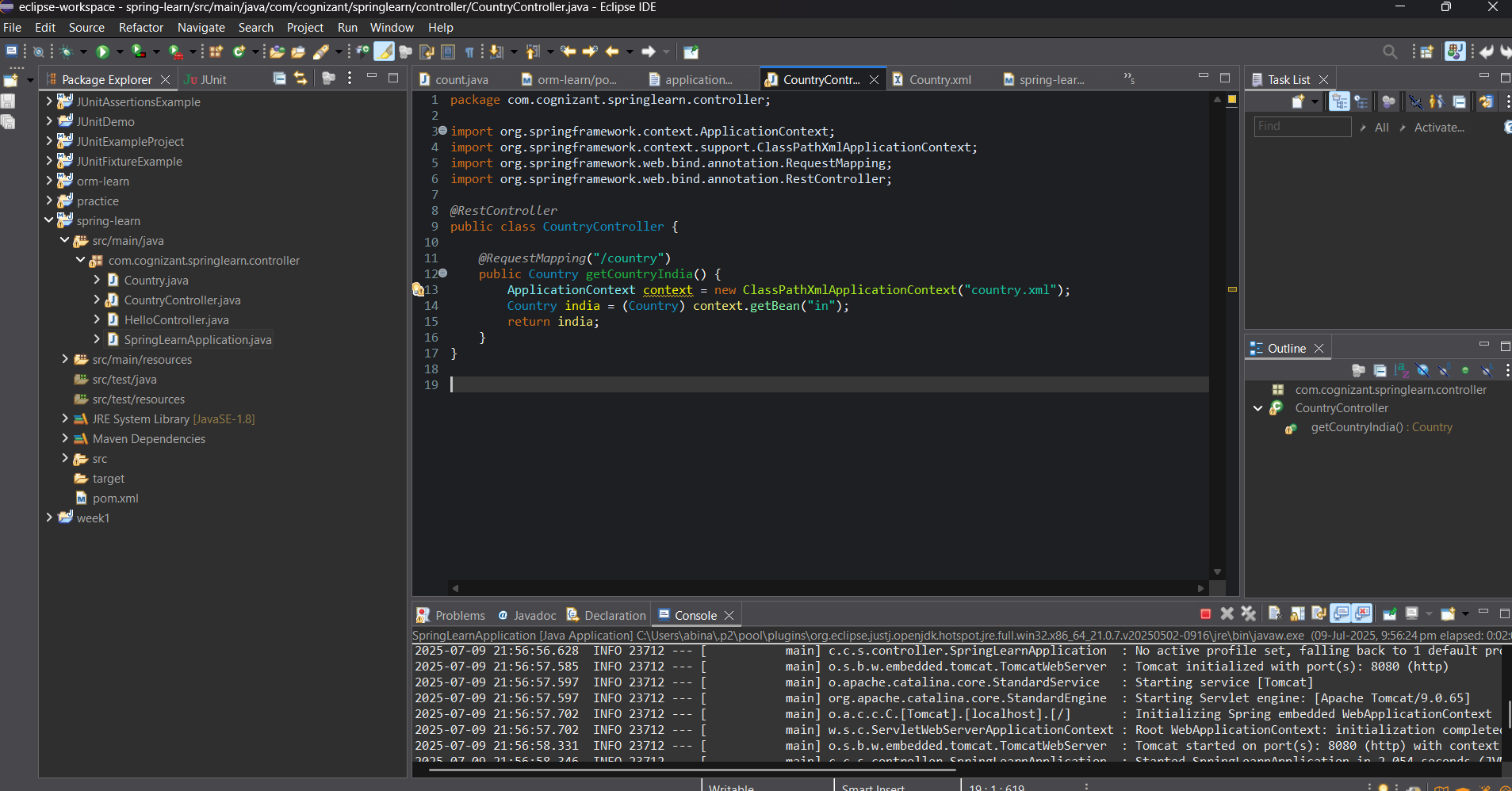
<property name="code" value="IN"/>

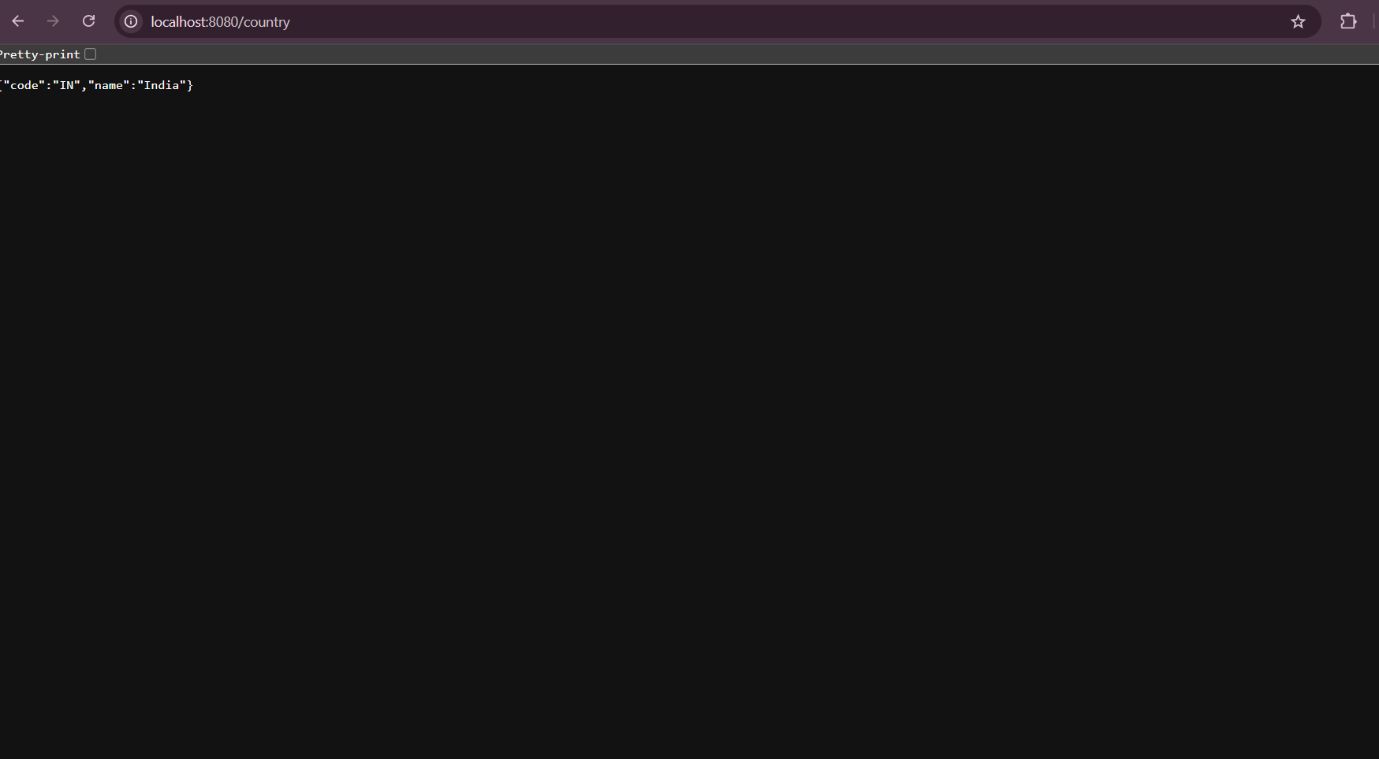
<property name="name" value="India"/>

</bean>

</beans>

**Output:**

****

****

**REST - Get country based on country code**

**Scenario:**

Write a REST service that returns a specific country based on country code. The country code should be case insensitive.

**Country.xml:**

<?xml version="1.0" encoding="UTF-8"?>

<beans xmlns="http://www.springframework.org/schema/beans"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.springframework.org/schema/beans

http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="countryList" class="java.util.ArrayList">

<constructor-arg>

<list>

<bean class="com.cognizant.springlearn.controller.Country">

<property name="code" value="IN"/>

<property name="name" value="India"/>

</bean>

<bean class="com.cognizant.springlearn.controller.Country">

<property name="code" value="US"/>

<property name="name" value="United States"/>

</bean>

<bean class="com.cognizant.springlearn.controller.Country">

<property name="code" value="CN"/>

<property name="name" value="China"/>

</bean>

</list>

</constructor-arg>

</bean>

</beans>

**CountryService.java**

package com.cognizant.springlearn.service;

import com.cognizant.springlearn.controller.Country;

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

import org.springframework.stereotype.Service;

import java.util.List;

@Service

public class CountryService {

public Country getCountry(String code) {

ApplicationContext context = new ClassPathXmlApplicationContext("country.xml");

List<Country> countries = context.getBean("countryList", List.class);

// Case-insensitive match using lambda

return countries.stream()

.filter(c -> c.getCode().equalsIgnoreCase(code))

.findFirst()

.orElse(null);

}

}

**CountryController.java**

package com.cognizant.springlearn.controller;

import com.cognizant.springlearn.controller.CountryService;

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

import org.springframework.context.ApplicationContext;

import org.springframework.context.support.ClassPathXmlApplicationContext;

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

import org.springframework.web.bind.annotation.GetMapping;

import org.springframework.web.bind.annotation.PathVariable;

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

*@RestController*

public class CountryController {

*@Autowired*

private CountryService;

*@RequestMapping*("/country")

public Country getCountryIndia() {

ApplicationContext context = new ClassPathXmlApplicationContext("country.xml");

Country india = (Country) context.getBean("in");

return india;

}

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

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

return countryService.getCountry(code);

}

}

**Country.java**

package com.cognizant.springlearn.controller;

import java.io.Serializable;

public class Country implements Serializable{

private String code;

private String name;

public Country() {}

public Country(String code, String name) {

this.code = code;

this.name = name;

}

public String getCode() {

return code;

}

public void setCode(String code) {

this.code = code;

}

public String getName() {

return name;

}

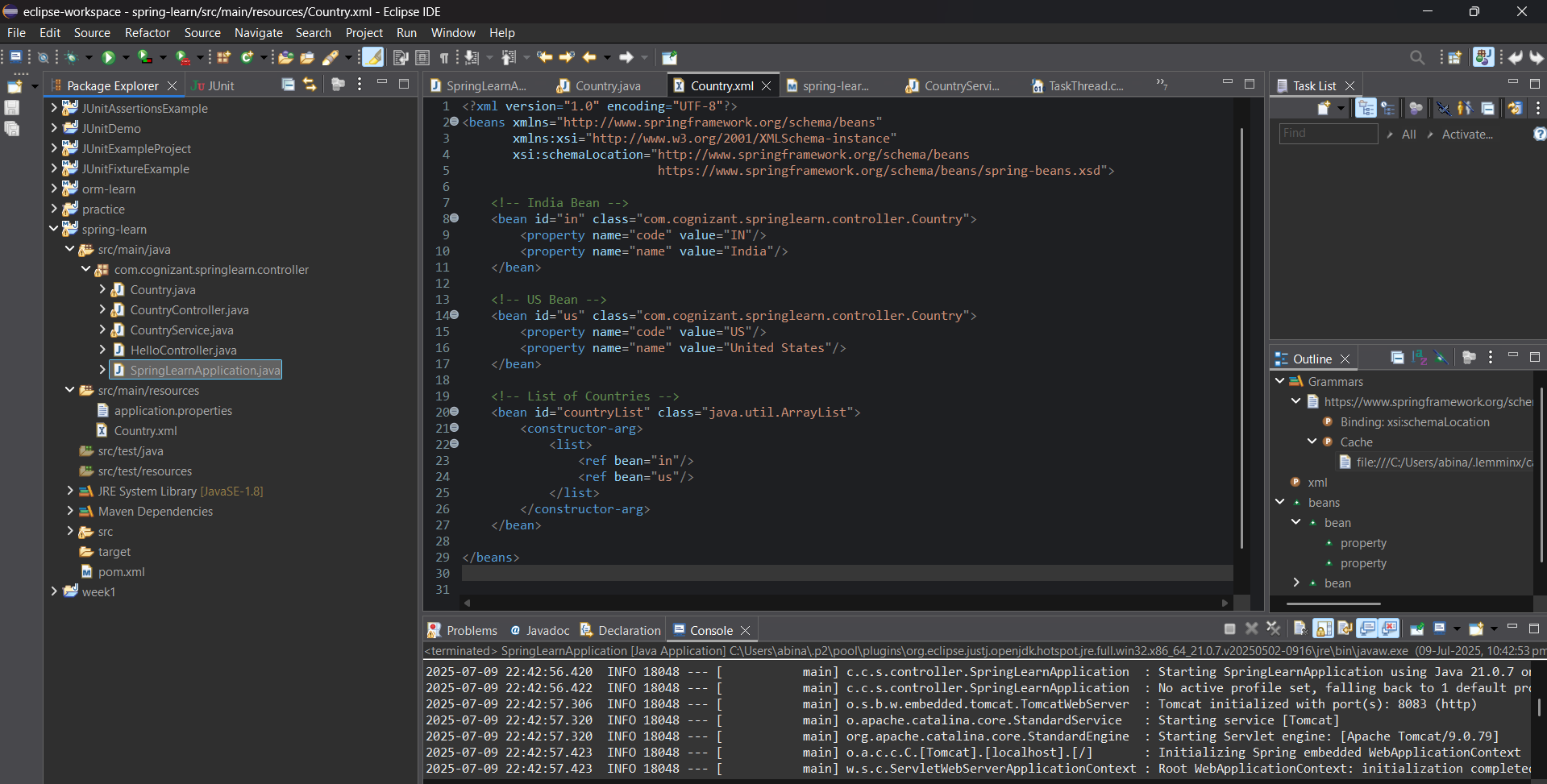
public void setName(String name) {

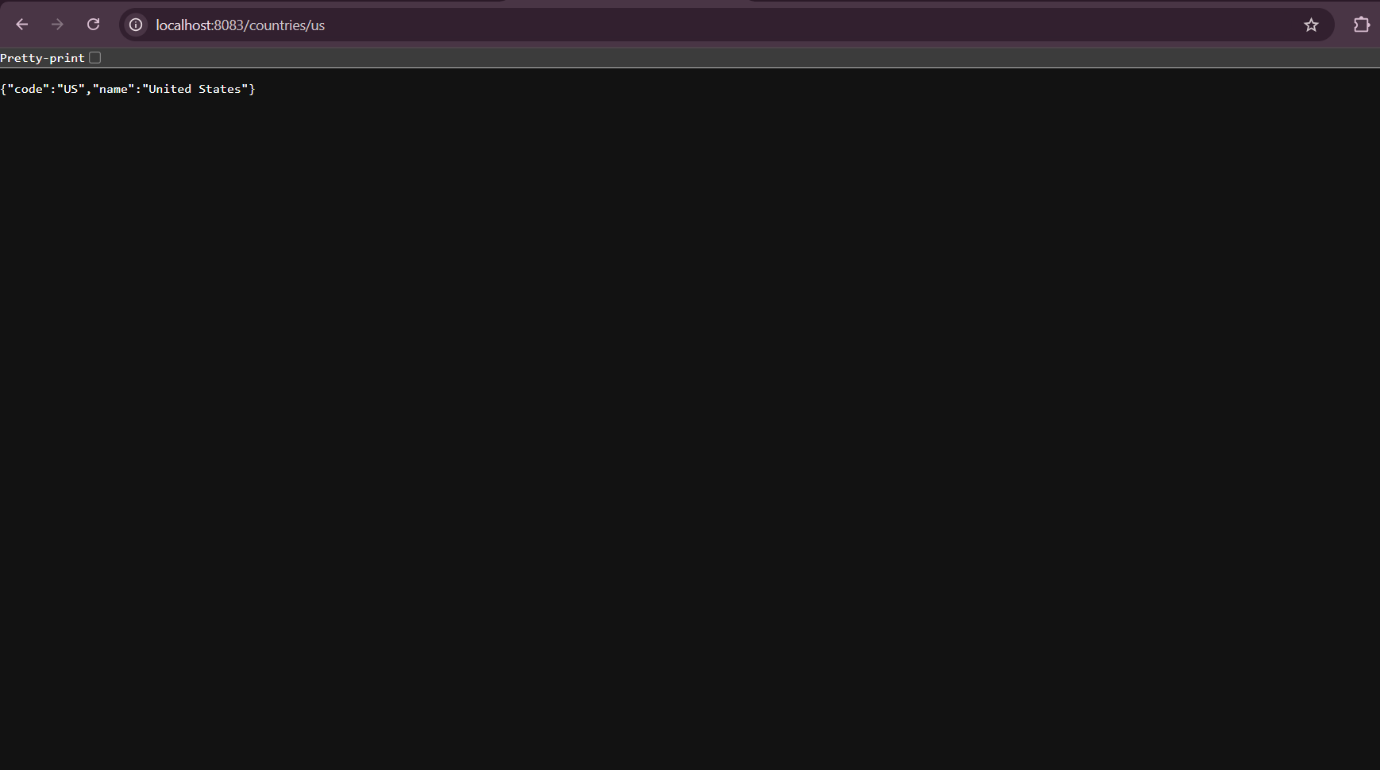
this.name = name;

}

}

**Output:**

****

****

**Create Authentication Service that returns JWT**

**SecurityConfig.java**

package com.cognizant.spring\_learn.config;

import org.springframework.context.annotation.Bean;

import org.springframework.context.annotation.Configuration;

import org.springframework.security.config.annotation.web.builders.HttpSecurity;

import org.springframework.security.web.SecurityFilterChain;

import org.springframework.security.core.userdetails.User;

import org.springframework.security.core.userdetails.UserDetailsService;

import org.springframework.security.provisioning.InMemoryUserDetailsManager;

import org.springframework.security.crypto.password.NoOpPasswordEncoder;

import org.springframework.security.crypto.password.PasswordEncoder;

@Configuration

public class SecurityConfig {

@Bean

public SecurityFilterChain filterChain(HttpSecurity http) throws Exception {

http.csrf(csrf -> csrf.disable())

.authorizeHttpRequests(auth -> auth

.requestMatchers("/authenticate").permitAll() // Make this public

.anyRequest().authenticated())

.httpBasic(); // Accept -u user:pwd

return http.build();

}

@Bean

public UserDetailsService userDetailsService() {

var userDetailsManager = new InMemoryUserDetailsManager();

userDetailsManager.createUser(

User.*withUsername*("admin")

.password("admin123")

.roles("USER")

.build()

);

return userDetailsManager;

}

@Bean

public PasswordEncoder passwordEncoder() {

return NoOpPasswordEncoder.getInstance(); // For demo only

}

}

**AuthenticationController.java**

package com.cognizant.spring\_learn.controller;

import com.cognizant.spring\_learn.util.JwtUtil;

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

import org.springframework.security.core.Authentication;

import org.springframework.web.bind.annotation.RestController;

import java.util.HashMap;

import java.util.Map;

@RestController

public class AuthenticationController {

@RequestMapping(value = "/authenticate", method = RequestMethod.*GET*)

public Map<String, String> authenticate(Authentication authentication) {

String username = authentication.getName();

String token = JwtUtil.*generateToken*(username);

Map<String, String> response = new HashMap<>();

response.put("token", token);

return response;

}

}

**JwtUtil.java**

package com.cognizant.spring\_learn.util;

import io.jsonwebtoken.Jwts;

import io.jsonwebtoken.SignatureAlgorithm;

import io.jsonwebtoken.security.Keys;

import java.security.Key;

import java.util.Date;

public class JwtUtil {

private static final Key *SECRET\_KEY* = Keys.*secretKeyFor*(SignatureAlgorithm.*HS256*);

public static String generateToken(String username) {

return Jwts.*builder*()

.setSubject(username)

.setIssuedAt(new Date())

.setExpiration(new Date(System.*currentTimeMillis*() + 60 \* 60 \* 1000)) // 1 hour

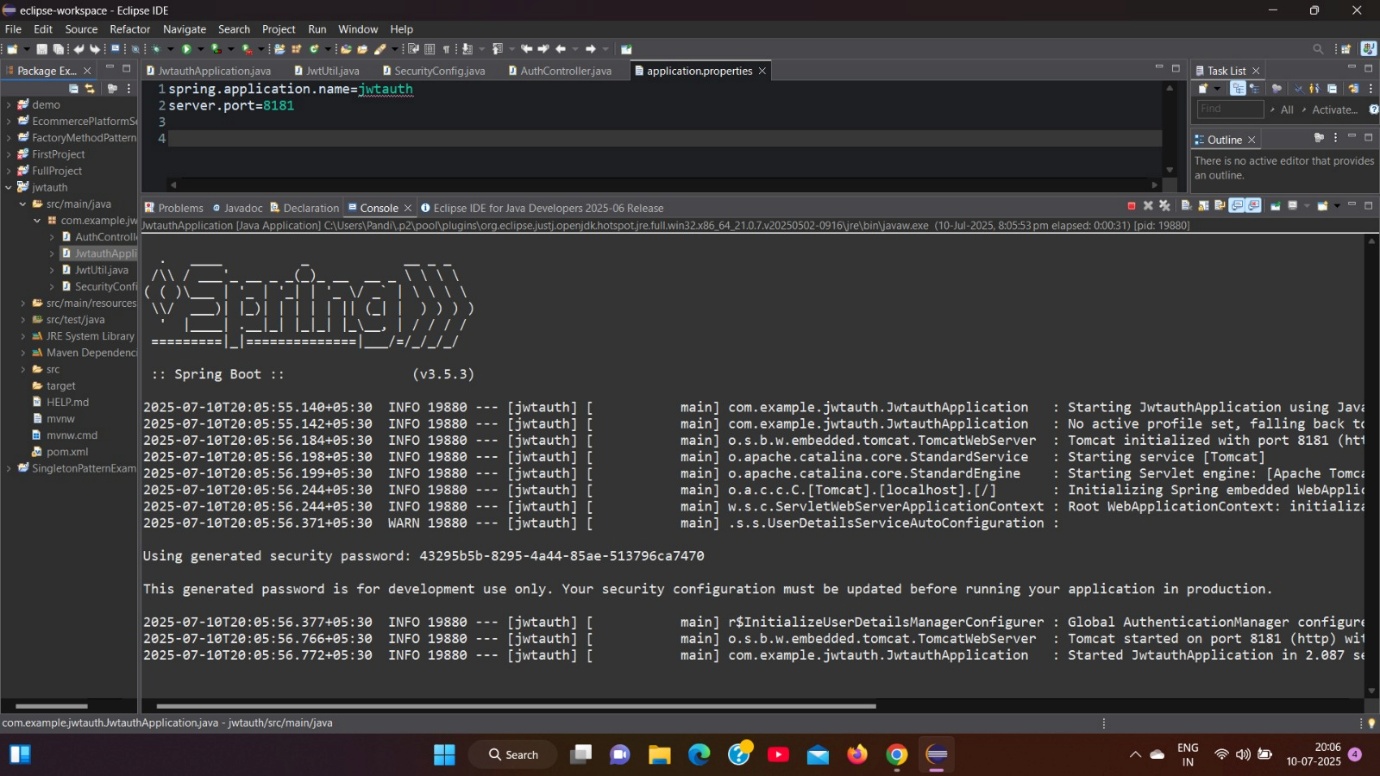
.signWith(*SECRET\_KEY*)

.compact();

}

}

**Output :**

****

