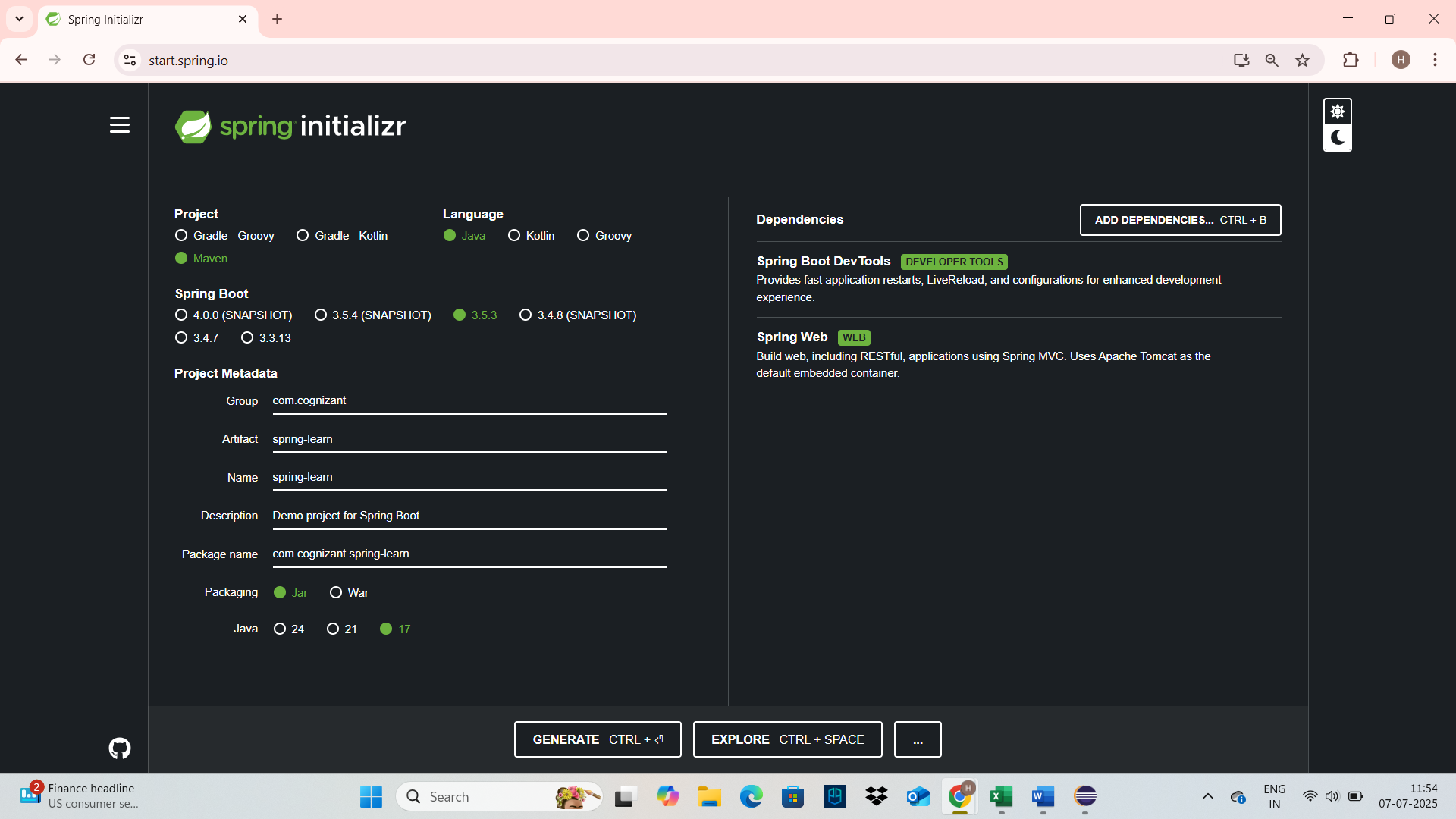
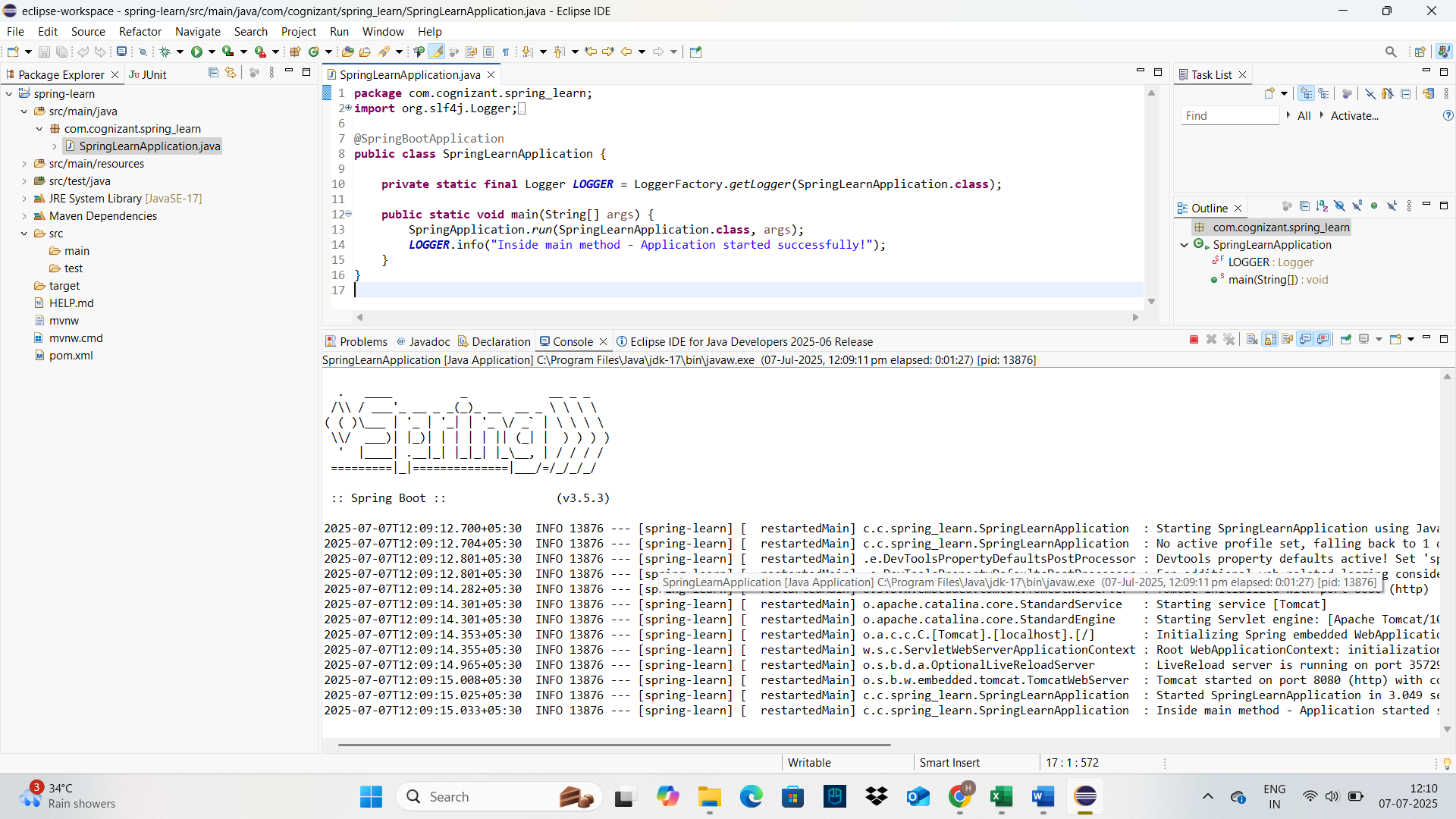
**Spring REST using Spring Boot 3**

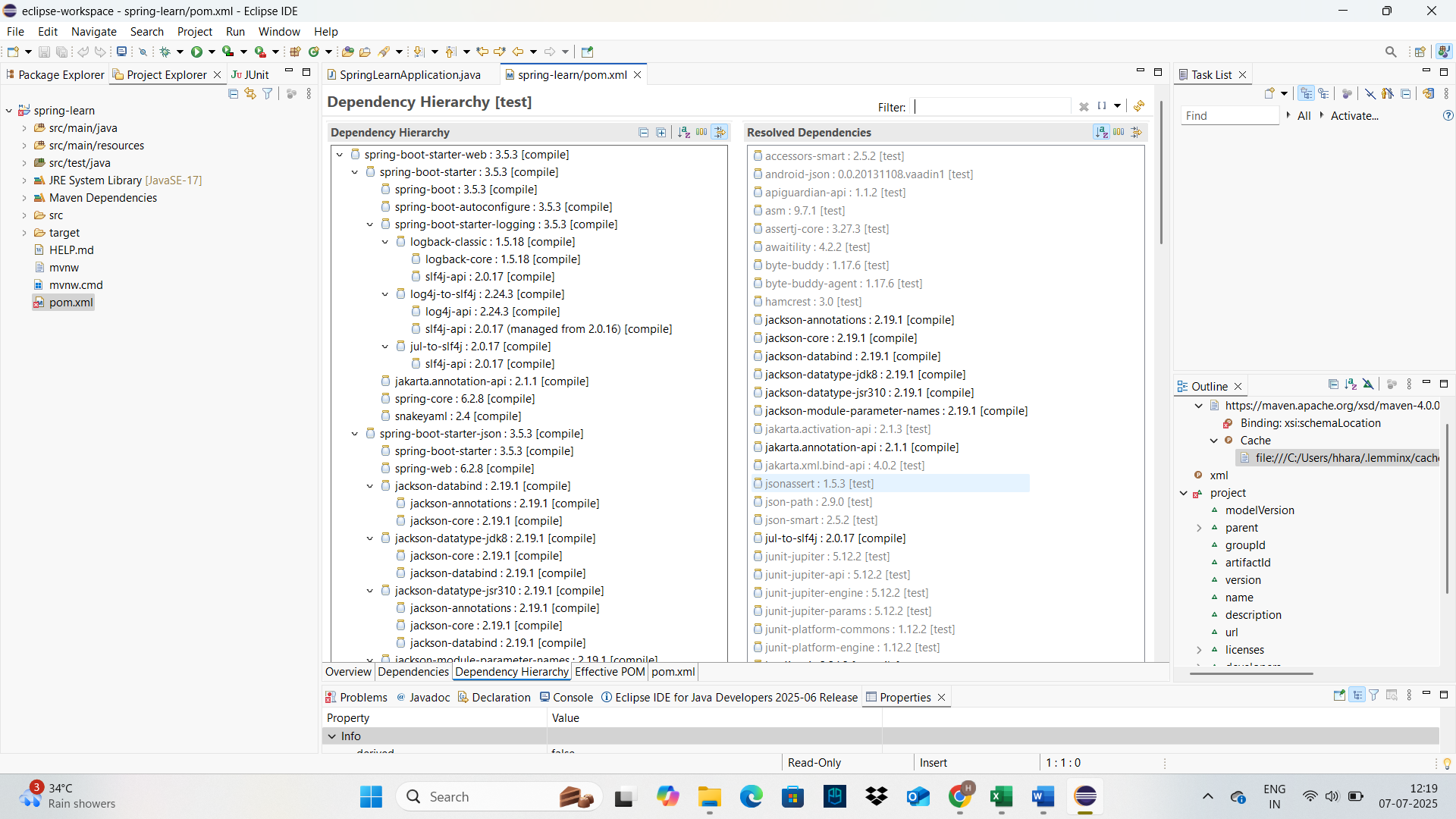
**Create a Spring Web Project using Maven**

Follow steps below to create a project:

1. Go to <https://start.spring.io/>
2. Change Group as “com.cognizant”
3. Change Artifact Id as “spring-learn”
4. Select Spring Boot DevTools and Spring Web
5. Create and download the project as zip
6. Extract the zip in root folder to Eclipse Workspace
7. 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
8. Import the project in Eclipse "File > Import > Maven > Existing Maven Projects > Click Browse and select extracted folder > Finish"
9. Include logs to verify if main() method of SpringLearnApplication.
10. Run the SpringLearnApplication class.



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. SpringLearnApplication.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.

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

SimpleDateFormat with the pattern ‘dd/MM/yyyy’ is created in multiple places of an application. To avoid creation of SimpleDateFormat in multiple places, define a bean in Spring XML Configuration file and retrieve the date.  
  
 Follow steps below to implement:

* Create spring configuration file date-format.xml in src/main/resources folder of 'spring-learn' project
* Open https://docs.spring.io/spring-framework/docs/current/spring-framework-reference/core.html#beans-factory-metadata
* Copy the XML defined in the section of previous step URL and paste it into date-format.xml
* Define bean tag in the XML with for date format. Refer code below.

**1. Create XML Configuration File**

Date-format.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="dateFormat" class="java.text.SimpleDateFormat">

<constructor-arg value="dd/MM/yyyy"/>

</bean>

</beans>

SpringLearnApplication.java

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

**import** org.slf4j.Logger;

**import** org.slf4j.LoggerFactory;

**import** org.springframework.boot.SpringApplication;

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

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

**import** java.text.SimpleDateFormat;

**import** java.util.Date;

@SpringBootApplication

**public** **class** SpringLearnApplication {

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

**public** **static** **void** main(String[] args) {

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

***LOGGER***.info("Inside main method");

*displayDate*();

}

**public** **static** **void** displayDate() {

**try** (ClassPathXmlApplicationContext context = **new** ClassPathXmlApplicationContext("date-format.xml")) {

SimpleDateFormat format = context.getBean("dateFormat", SimpleDateFormat.**class**);

Date date = format.parse("31/12/2018");

System.***out***.println("Parsed Date: " + date);

} **catch** (Exception e) {

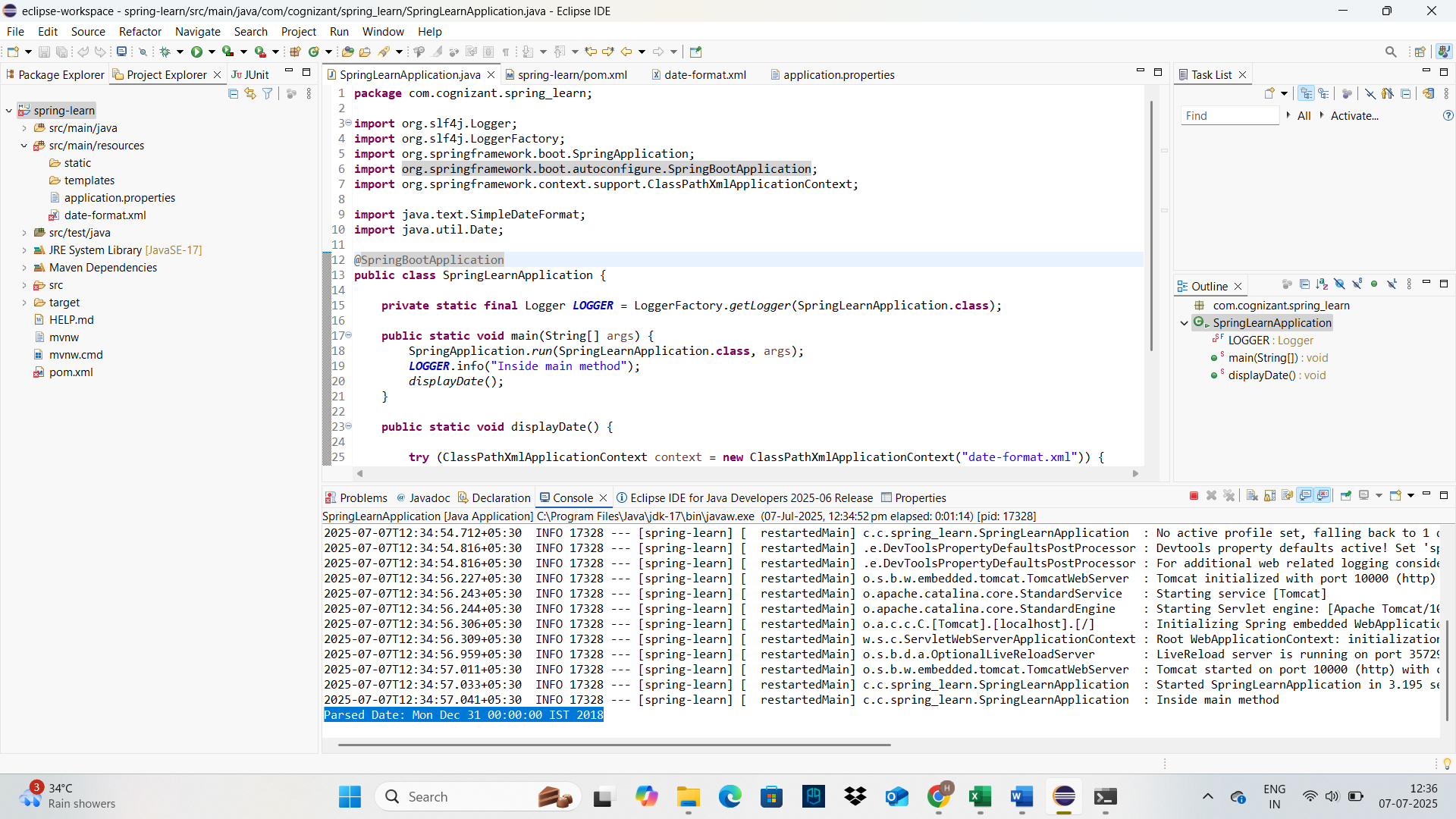
e.printStackTrace();

}

}

}

**OUTPUT:**



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

An airlines website is going to support booking on four countries. There will be a drop down on the home page of this website to select the respective country. It is also important to store the two-character ISO code of each country.

| **Code** | **Name** |
| --- | --- |
| US | United States |
| DE | Germany |
| IN | India |
| JP | Japan |

Above data has to be stored in spring configuration file. Write a program to read this configuration file and display the details.

**SpringLearnApplication.java**

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

**import** com.cognizant.spring\_learn.model.Country;

**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** org.springframework.context.support.ClassPathXmlApplicationContext;

**import** java.util.List;

@SpringBootApplication

**public** **class** SpringLearnApplication {

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

**public** **static** **void** main(String[] args) {

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

*displayCountry*(); // Task 2

*displayCountries*(); // 👉 Task 4 (new)

}

/\*\* Task 2 – single bean \*\*/

**public** **static** **void** displayCountry() {

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

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

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

}

/\*\* Task 4 – list of beans \*\*/

**public** **static** **void** displayCountries() {

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

@SuppressWarnings("unchecked")

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

**for** (Country c : countryList) {

***LOGGER***.debug("Country (list): {}", c);

}

}

}

**CountryController.java**

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.Country;

**import** org.springframework.context.ApplicationContext;

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

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

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

@RestController

**public** **class** CountryController {

@GetMapping("/country")

**public** Country getCountry() {

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

**return** context.getBean("country", Country.**class**);

}

}

**Country.java**

**package** com.cognizant.spring\_learn.model;

**public** **class** Country {

**private** String code;

**private** String name;

**public** Country() {} // default ctor

**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 + "]";

}

}

**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">

<!-- single bean (used in Tasks 2 & 3) -->

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

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

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

</bean>

<!-- list of Country beans (for Task 4) -->

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

<constructor-arg>

<list>

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

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

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

</bean>

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

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

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

</bean>

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

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

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

</bean>

</list>

</constructor-arg>

</bean>

</beans>

**Application.properties**

[spring.application.name](http://spring.application.name)=spring-learn

**SpringLearnApplicationTests.java**

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

**import** org.junit.jupiter.api.Test;

**import** org.springframework.boot.test.context.SpringBootTest;

@SpringBootTest

**class** SpringLearnApplicationTests {

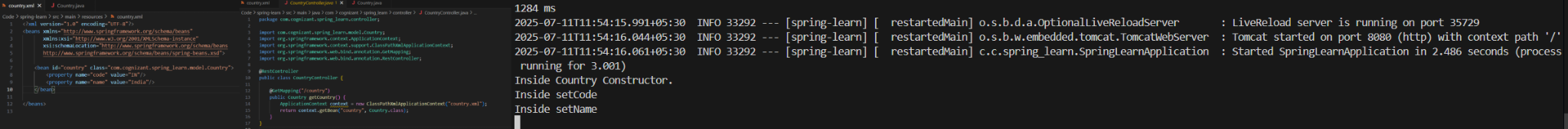
@Test

**void** contextLoads() {

}

}

**OUTPUT:**



**3—Hello World RESTful Web Service**

**SpringLearnApplication.java**

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

**import** org.junit.jupiter.api.Test;

**import** org.springframework.boot.test.context.SpringBootTest;

@SpringBootTest

**class** SpringLearnApplicationTests {

@Test

**void** contextLoads() {

}

}**package** com.cognizant.spring\_learn;

**import** com.cognizant.spring\_learn.model.Country;

**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** org.springframework.context.support.ClassPathXmlApplicationContext;

**import** java.util.List;

@SpringBootApplication

**public** **class** SpringLearnApplication {

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

**public** **static** **void** main(String[] args) {

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

displayCountry(); // Task 2

displayCountries(); // 👉 Task 4 (new)

}

/\*\* Task 2 – single bean \*\*/

**public** **static** **void** displayCountry() {

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

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

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

}

/\*\* Task 4 – list of beans \*\*/

**public** **static** **void** displayCountries() {

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

@SuppressWarnings("unchecked")

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

**for** (Country c : countryList) {

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

}

}

}

**CountryController.java**

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.Country;

**import** org.springframework.context.ApplicationContext;

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

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

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

@RestController

**public** **class** CountryController {

@GetMapping("/country")

**public** Country getCountry() {

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

**return** context.getBean("country", Country.**class**);

}

}

**Country.java**

**package com.cognizant.spring\_learn.model;**

**public class Country {**

**private String code;**

**private String name;**

**public Country() {} // default ctor**

**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 + "]";**

**}**

**}**

**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">

<!-- single bean (used in Tasks 2 & 3) -->

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

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

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

</bean>

<!-- list of Country beans (for Task 4) -->

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

<constructor-arg>

<list>

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

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

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

</bean>

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

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

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

</bean>

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

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

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

</bean>

</list>

</constructor-arg>

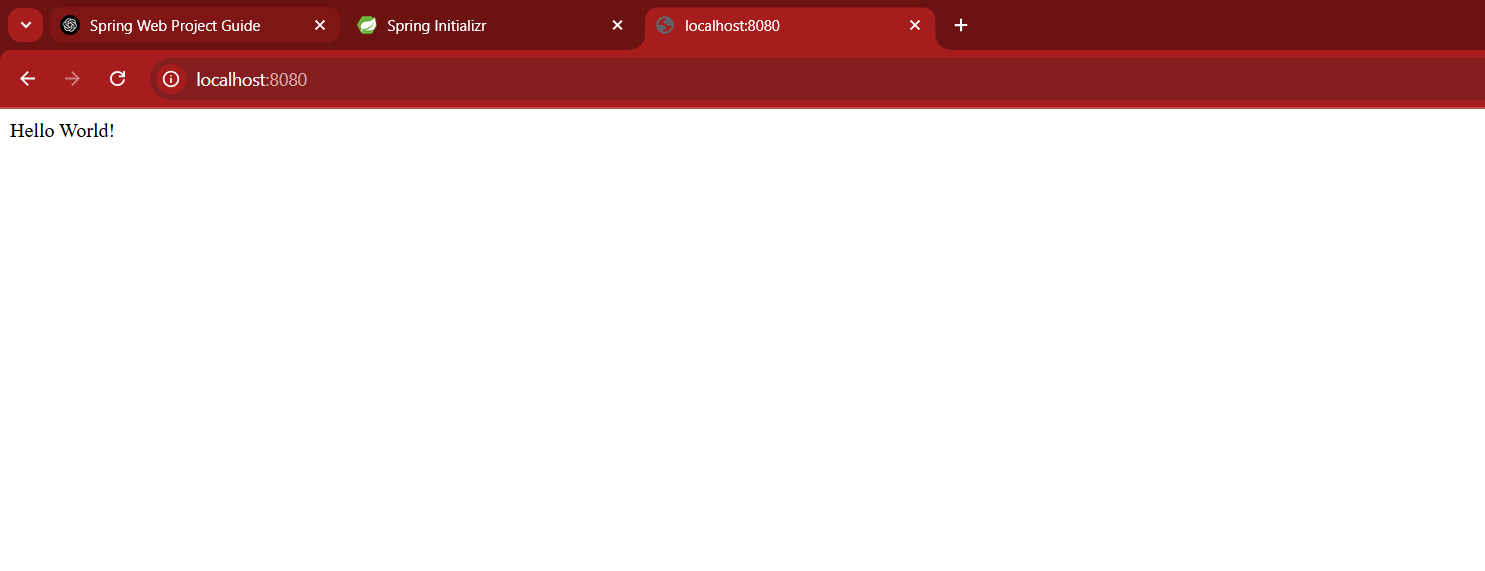
</bean>

</beans>

**Application.properties**

[spring.application.name](http://spring.application.name)=spring-learn

**OUTPUT:**



**REST - Country Web Service**

**CountryController.java**

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.Country;

**import** org.springframework.context.ApplicationContext;

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

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

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

@RestController

**public** **class** CountryController {

@GetMapping("/country")

**public** Country getCountry() {

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

**return** context.getBean("country", Country.**class**);

}

}

**Country.java**

**package com.cognizant.spring\_learn.model;**

**public class Country {**

**private String code;**

**private String name;**

**public Country() {} // default ctor**

**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 + "]";**

**}**

**}**

**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">

<!-- single bean (used in Tasks 2 & 3) -->

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

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

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

</bean>

<!-- list of Country beans (for Task 4) -->

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

<constructor-arg>

<list>

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

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

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

</bean>

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

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

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

</bean>

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

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

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

</bean>

</list>

</constructor-arg>

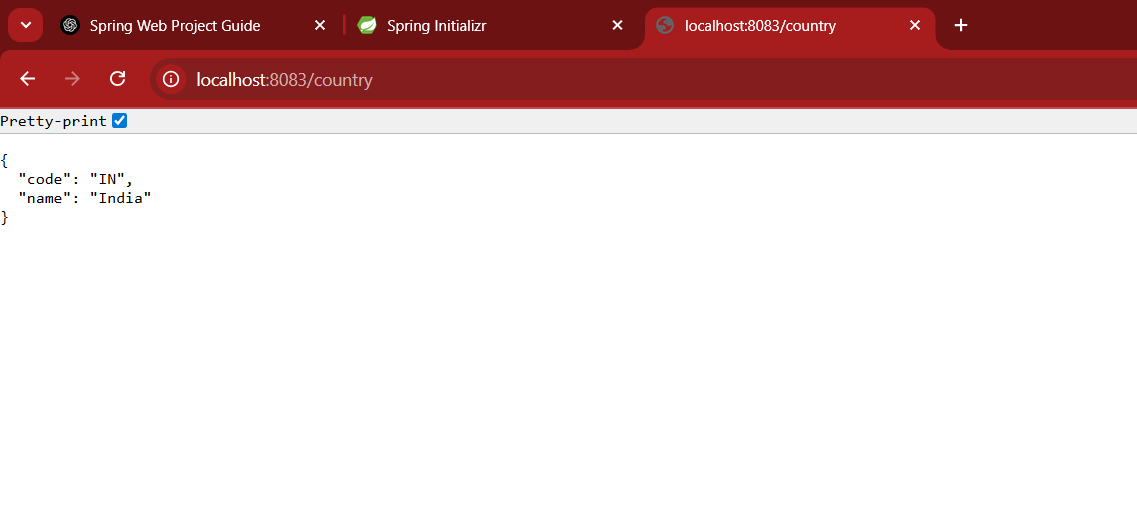
</bean>

</beans>

**Application.properties**

[spring.application.name](http://spring.application.name)=spring-learn

**OUTPUT:**



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

**SpringLearnApplication.java**

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

**import** org.junit.jupiter.api.Test;

**import** org.springframework.boot.test.context.SpringBootTest;

@SpringBootTest

**class** SpringLearnApplicationTests {

@Test

**void** contextLoads() {

}

}**package** com.cognizant.spring\_learn;

**import** com.cognizant.spring\_learn.model.Country;

**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** org.springframework.context.support.ClassPathXmlApplicationContext;

**import** java.util.List;

@SpringBootApplication

**public** **class** SpringLearnApplication {

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

**public** **static** **void** main(String[] args) {

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

displayCountry(); // Task 2

displayCountries(); // 👉 Task 4 (new)

}

/\*\* Task 2 – single bean \*\*/

**public** **static** **void** displayCountry() {

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

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

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

}

/\*\* Task 4 – list of beans \*\*/

**public** **static** **void** displayCountries() {

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

@SuppressWarnings("unchecked")

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

**for** (Country c : countryList) {

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

}

}

}

**CountryController.java**

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.Country;

**import** org.springframework.context.ApplicationContext;

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

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

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

@RestController

**public** **class** CountryController {

@GetMapping("/country")

**public** Country getCountry() {

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

**return** context.getBean("country", Country.**class**);

}

}

**Country.java**

**package com.cognizant.spring\_learn.model;**

**public class Country {**

**private String code;**

**private String name;**

**public Country() {} // default ctor**

**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 + "]";**

**}**

**}**

**CountryNotFoundException.java**

**package com.cognizant.spring\_learn.controller;**

**public class CountryNotFoundException extends RuntimeException {**

**public CountryNotFoundException(String message) {**

**super(message);**

**}**

**}**

**GlobalExceptionHandler.java**

**package com.cognizant.spring\_learn.controller;**

**import org.springframework.http.HttpStatus;**

**import org.springframework.http.ResponseEntity;**

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

**@ControllerAdvice**

**public class GlobalExceptionHandler {**

**@ExceptionHandler(CountryNotFoundException.class)**

**public ResponseEntity<String> handleNotFound(CountryNotFoundException ex) {**

**return new ResponseEntity<>(ex.getMessage(), HttpStatus.*NOT\_FOUND*);**

**}**

**}**

**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">

<!-- single bean (used in Tasks 2 & 3) -->

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

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

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

</bean>

<!-- list of Country beans (for Task 4) -->

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

<constructor-arg>

<list>

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

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

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

</bean>

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

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

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

</bean>

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

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

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

</bean>

</list>

</constructor-arg>

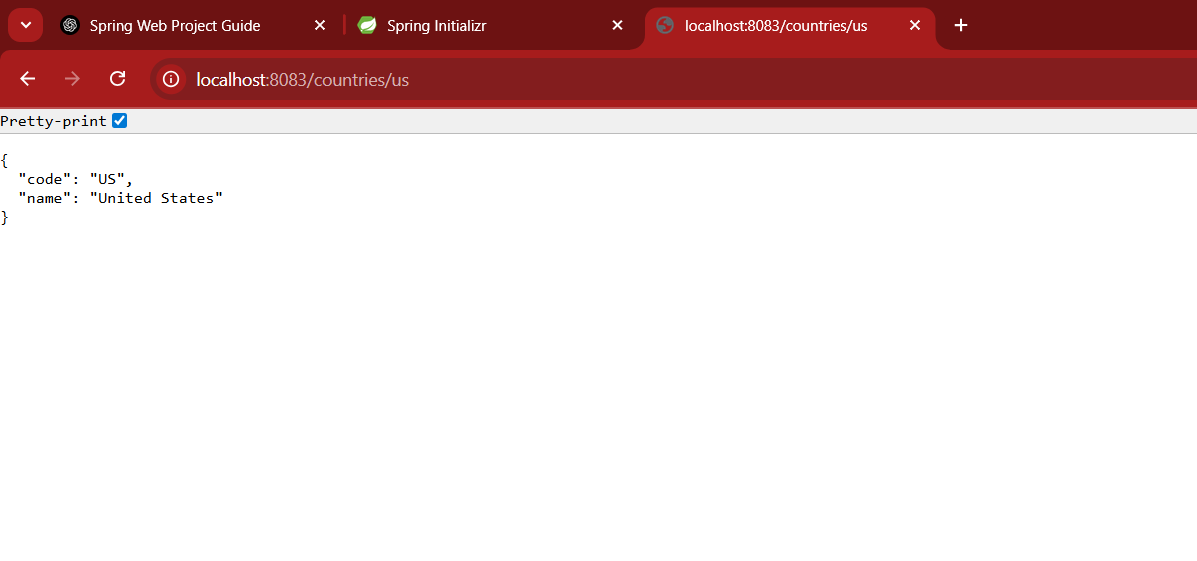
</bean>

</beans>

**Application.properties**

[spring.application.name](http://spring.application.name)=spring-learn

**OUTPUT:**



**Create authentication service that returns JWT**

AuthenticationController.java

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.User;

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

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

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

@RestController

**public** **class** AuthenticationController {

@Autowired

**private** JwtUtil jwtUtil;

@PostMapping("/authenticate")

**public** String authenticate(@RequestBody User user) {

**if** ("admin".equals(user.getUsername()) && "password".equals(user.getPassword())) {

**return** jwtUtil.generateToken(user.getUsername());

} **else** {

**return** "Invalid credentials";

}

}

}

CountryController.java

**package** com.cognizant.spring\_learn.controller;

**import** com.cognizant.spring\_learn.model.Country;

**import** org.springframework.context.ApplicationContext;

**import** org.springframework.context.support.ClassPathXmlApplicationContext;

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

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

@RestController

**public** **class** CountryController {

@GetMapping("/country")

**public** Country getCountry() {

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

**return** context.getBean("country", Country.**class**);

}

}

Country.java

**package** com.cognizant.spring\_learn.model;

**public** **class** Country {

**private** String code;

**private** String name;

**public** Country() {} // default ctor

**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 + "]";

}

}

User.java

**package** com.cognizant.spring\_learn.model;

**public** **class** User {

**private** String username;

**private** String password;

// Constructors

**public** User() {}

**public** User(String username, String password) {

**this**.username = username;

**this**.password = password;

}

// Getters & Setters

**public** String getUsername() {

**return** username;

}

**public** **void** setUsername(String username) {

**this**.username = username;

}

**public** String getPassword() {

**return** password;

}

**public** **void** setPassword(String password) {

**this**.password = password;

}

}

JwtUtil.java

**package** com.cognizant.spring\_learn.util;

**import** io.jsonwebtoken.Jwts;

**import** io.jsonwebtoken.SignatureAlgorithm;

**import** org.springframework.stereotype.Component;

**import** java.util.Date;

@Component

**public** **class** JwtUtil {

**private** String secret = "secretkey"; // Change to stronger in real app

**public** String generateToken(String username) {

**return** Jwts.builder()

.setSubject(username)

.setIssuedAt(**new** Date(System.*currentTimeMillis*()))

.setExpiration(**new** Date(System.*currentTimeMillis*() + 1000 \* 60 \* 60 \* 10)) // 10 hrs

.signWith(SignatureAlgorithm.HS256, secret)

.compact();

}

}

SpringLearnApplication.java

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

**import** com.cognizant.spring\_learn.model.Country;

**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** org.springframework.context.support.ClassPathXmlApplicationContext;

**import** java.util.List;

@SpringBootApplication

**public** **class** SpringLearnApplication {

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

**public** **static** **void** main(String[] args) {

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

*displayCountry*(); // Task 2

*displayCountries*(); // 👉 Task 4 (new)

}

/\*\* Task 2 – single bean \*\*/

**public** **static** **void** displayCountry() {

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

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

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

}

/\*\* Task 4 – list of beans \*\*/

**public** **static** **void** displayCountries() {

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

@SuppressWarnings("unchecked")

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

**for** (Country c : countryList) {

***LOGGER***.debug("Country (list): {}", c);

}

}

}

**OUTPUT:**

