Cognizant - DN 4.0 Deep Skilling Java FSE

Week 04 - Spring REST using Spring Boot 3

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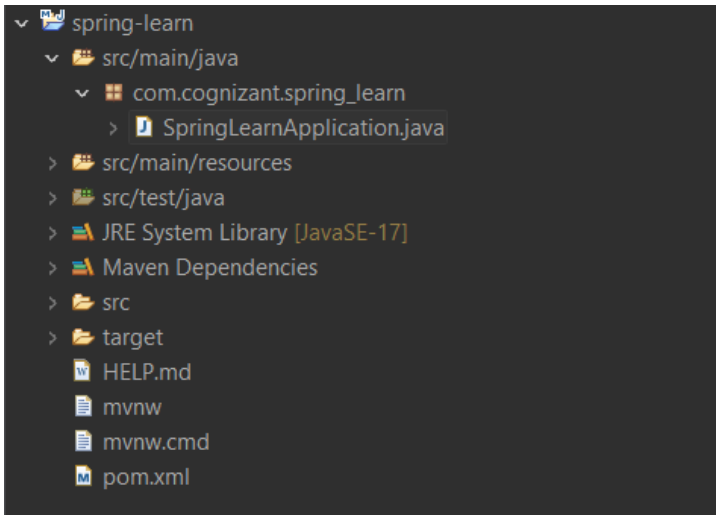
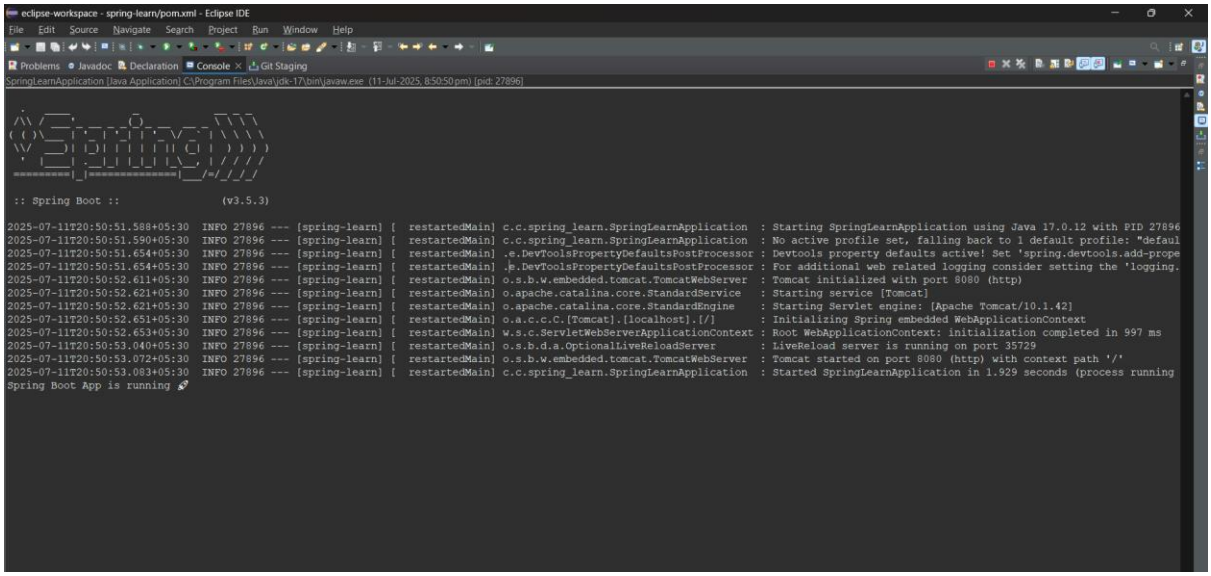
Exercise 1: Create a Spring Web Project using Maven




```
//SpringApplication.java
package com.cognizant.spring_learn;
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("Spring Boot App is running 🚀 ");
    }
}
```

Output:



Exercise 2: Spring Core – Load Country from Spring Configuration XML

//SpringLearnApplicationn

```
package com.cognizant.spring_learn;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class SpringLearnApplicationn {
   private static final Logger LOGGER =
LoggerFactory.getLogger(SpringLearnApplication.class);

   public static void main(String[] args) {
         System.out.println("Main method running...");
      LOGGER.debug("START of main()");
      displayCountry();
      LOGGER.debug("END of main()");
   }

   public static void displayCountry() {
      try {
         // Diagnostic print to check exact location
         java.net.URL url =
SpringLearnApplicationn.class.getClassLoader().getResource("country.xml");
         System.out.println("country.xml URL = " + (url != null ? url.toString() : "NOT
FOUND"));
```

```
        // Load Spring context from XML
        ClassPathXmlApplicationContext context = new
ClassPathXmlApplicationContext("country.xml");
        Country country = context.getBean("country", Country.class);
        LOGGER.debug("Country : {}", country.toString());
        context.close();
      } catch (Exception e) {
        System.out.println(" Error loading context or bean: " + e);
        e.printStackTrace();
      }
    }
}

//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="country" class="com.cognizant.spring_learn.Country">
      <property name="code" value="IN"/>
      <property name="name" value="India"/>
   </bean>

</beans>
```

//Output:

```
Main method running...
DEBUG com.cognizant.spring_learn.SpringLearnApplication - START of main()
DEBUG com.cognizant.spring_learn.Country - Inside Country Constructor.
DEBUG com.cognizant.spring_learn.Country - Setting country code to: IN
DEBUG com.cognizant.spring_learn.Country - Setting country name to: India
DEBUG com.cognizant.spring_learn.SpringLearnApplication - Country :
Country{code='IN', name='India'}
DEBUG com.cognizant.spring_learn.SpringLearnApplication - END of main()
```

Exercise 3: Hello World RESTful Web Service

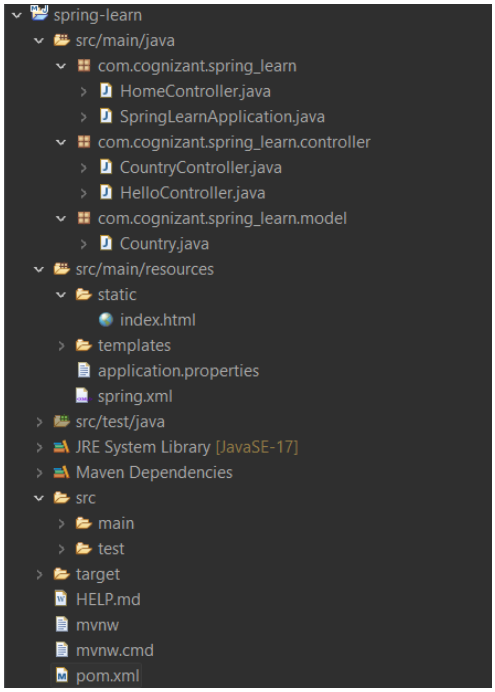
//SpringApplication.java

```
package com.cognizant.spring_learn;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import java.util.Collections;
```

```
@SpringBootApplication
public class SpringLearnApplication {
   public static void main(String[] args) {
      SpringApplication app = new SpringApplication(SpringLearnApplication.class);
      app.setDefaultProperties(Collections.singletonMap("server.port", "8083"));
      app.run(args);
   }
}

//spring-learn.properties
server.port=8083
spring.application.name=spring-learn
```

//Output:

Exercise 4: REST - Country Web Service




```
//CountryController.java

package com.cognizant.spring_learn.controller;

import com.cognizant.spring_learn.model.Country;
import org.springframework.beans.factory.BeanFactory;
import org.springframework.context.support.ClassPathXmlApplicationContext;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RestController;

@RestController
public class CountryController {

   private BeanFactory context;

         @GetMapping("/country")
   public Country getCountryIndia() {
      context = new ClassPathXmlApplicationContext("spring.xml");
      return (Country) context.getBean("in");
   }
}

//Country.java

package com.cognizant.spring_learn.model;

public class Country {
   private String code;
   private String name;
```

```
    public Country() {}

    public Country(String code, String name) {
        this.code = code;
        this.name = 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;
    }
}

//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.example</groupId>
    <artifactId>spring-learn</artifactId>
    <version>1.0.0</version>
    <packaging>jar</packaging>

    <name>spring-learn</name>
    <description>Spring Boot learning project</description>

    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>3.2.5</version>
        <relativePath/> <!-- lookup parent from repository -->
    </parent>
```

```
  <properties>
    <java.version>20</java.version>
  </properties>

  <dependencies>
    <!-- Add your app-specific dependencies here -->
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-web</artifactId>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <plugin>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-maven-plugin</artifactId>
      </plugin>
    </plugins>
  </build>
</project>
```

//Output:

Exercise 5: REST - Get country based on country code

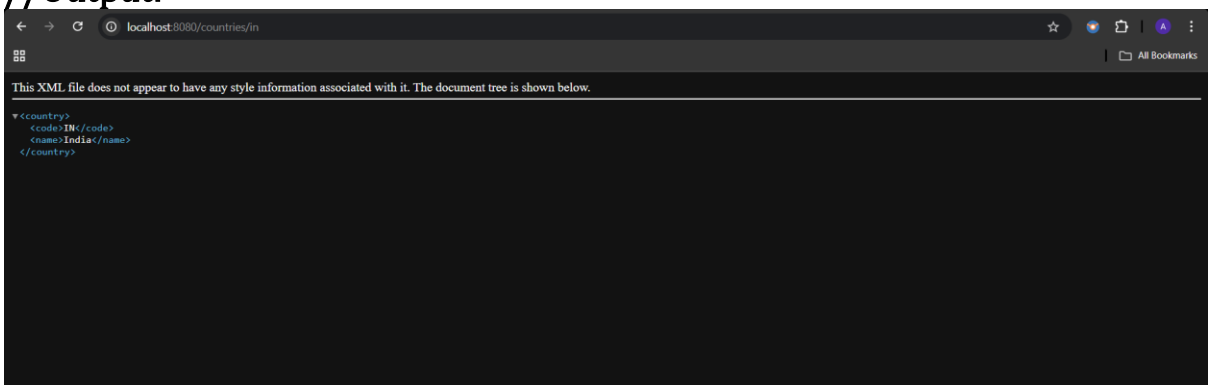
```
//CountryService.java
package com.cognizant.spring_learn.service;

import com.cognizant.spring_learn.model.Country;
import com.cognizant.spring_learn.model.Countries;
import jakarta.annotation.PostConstruct;
import org.springframework.core.io.ClassPathResource;
```

```
import org.springframework.oxm.jaxb.Jaxb2Marshaller;
import org.springframework.stereotype.Service;

import javax.xml.transform.stream.StreamSource;
import java.util.List;

@Service
public class CountryService {

   private List<Country> countryList;

   @PostConstruct
   public void loadCountries() throws Exception {
      Jaxb2Marshaller marshaller = new Jaxb2Marshaller();
      marshaller.setClassesToBeBound(Countries.class);
      marshaller.afterPropertiesSet(); //

      // Load XML from classpath
      ClassPathResource resource = new ClassPathResource("country.xml");

      if (!resource.exists()) {
         throw new RuntimeException("country.xml not found in classpath!");
      }

      // Use StreamSource with systemId
      StreamSource source = new StreamSource(resource.getInputStream());
      source.setSystemId(resource.getURL().toString());

      Countries countries = (Countries) marshaller.unmarshal(source);
      countryList = countries.getCountryList();
   }

   public Country getCountry(String code) {
      return countryList.stream()
            .filter(c -> c.getCode().equalsIgnoreCase(code))
            .findFirst()
            .orElse(null);
   }
}

//Countries.java
package com.cognizant.spring_learn.model;

import java.util.List;
import jakarta.xml.bind.annotation.XmlRootElement;
import jakarta.xml.bind.annotation.XmlAccessorType;
import jakarta.xml.bind.annotation.XmlAccessType;
import jakarta.xml.bind.annotation.XmlElement;
```

```
@XmlRootElement(name = "countries")
@XmlAccessorType(XmlAccessType.FIELD)
public class Countries {

    @XmlElement(name = "country")
    private List<Country> countryList;

    public List<Country> getCountryList() {
        return countryList;
    }

    public void setCountryList(List<Country> countryList) {
        this.countryList = countryList;
    }

    // Optional: Default constructor (JAXB requires it)
    public Countries() {
    }

    // Optional: toString for debugging
    @Override
    public String toString() {
        return "Countries{" +
                "countryList=" + countryList +
                '}';
    }
}

//Country.java
package com.cognizant.spring_learn.model;

import jakarta.xml.bind.annotation.XmlRootElement;
import jakarta.xml.bind.annotation.XmlAccessorType;
import jakarta.xml.bind.annotation.XmlAccessType;
import jakarta.xml.bind.annotation.XmlElement;

@XmlRootElement(name = "country")
@XmlAccessorType(XmlAccessType.FIELD)
public class Country {

    @XmlElement(name = "code")
    private String code;

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

    // Default constructor required for JAXB
    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:



Exercise 6: Create authentication service that returns JWT

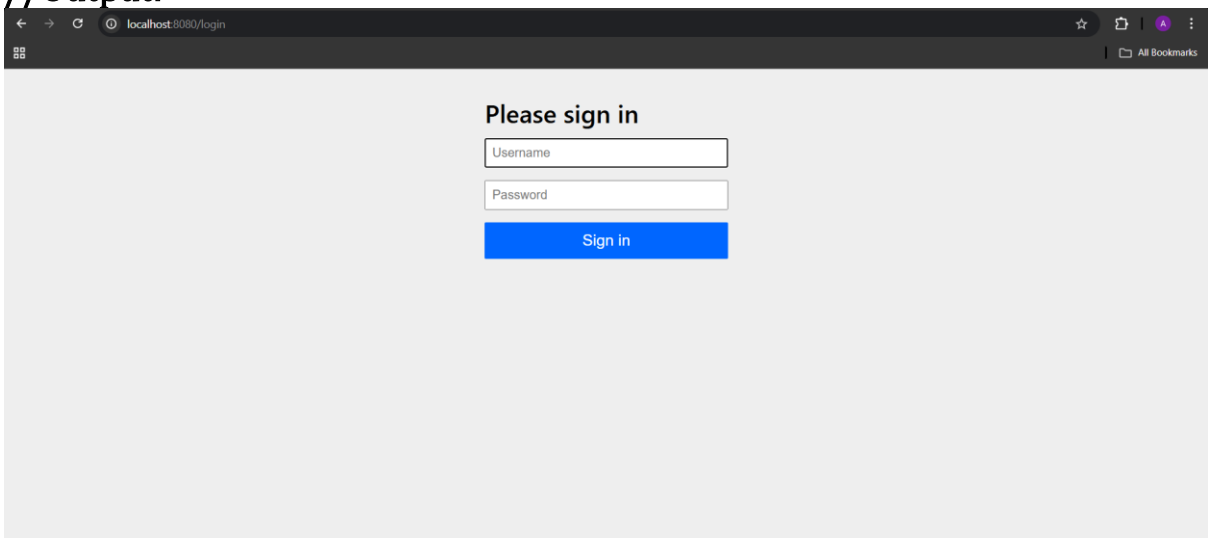
//AuthenticationController

```
package com.cognizant.spring_learn.controller;

import com.cognizant.spring_learn.util.JwtUtil;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.*;
import jakarta.servlet.http.HttpServletRequest;
import java.util.Base64;
```

```
import java.util.HashMap;
import java.util.Map;


@RestController
public class AuthenticationController {

   @GetMapping("/authenticate")
   public ResponseEntity<?> authenticate(HttpServletRequest request) {
      String authHeader = request.getHeader("Authorization");

      if (authHeader == null || !authHeader.startsWith("Basic ")) {
         return ResponseEntity.status(401).body("Missing or invalid Authorization
header");
      }

      try {
         // Decode base64 username:password
         String base64Credentials = authHeader.substring("Basic ".length());
         byte[] decoded = Base64.getDecoder().decode(base64Credentials);
         String credentials = new String(decoded);
         String[] values = credentials.split(":", 2);

         if (values.length != 2) {
            return ResponseEntity.status(401).body("Invalid Authorization format");
         }

         String username = values[0];
         String password = values[1];

         // Simple validation
         if ("user".equals(username) && "pwd".equals(password)) {
            String token = JwtUtil.generateToken(username);

            // Proper JSON response
            Map<String, String> response = new HashMap<>();
            response.put("token", token);
            return ResponseEntity.ok(response);
         } else {
            return ResponseEntity.status(401).body("Invalid credentials");
         }
      } catch (Exception e) {
         return ResponseEntity.status(500).body("Error decoding credentials");
      }
   }
}

//JwtUtil.java
```

```
package com.cognizant.spring_learn.util;

import io.jsonwebtoken.Jwts;
import io.jsonwebtoken.SignatureAlgorithm;

import java.util.Date;

public class JwtUtil {
   private static final String SECRET_KEY = "secretkey123";

   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(SignatureAlgorithm.HS256, SECRET_KEY)
            .compact();
   }
}

//SecurityConfig.java

package config;

import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.config.Customizer;
import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.web.SecurityFilterChain;


@Configuration
public class SecurityConfig {

   @Bean
   public SecurityFilterChain securityFilterChain(HttpSecurity http) throws Exception {
      http
         .csrf(csrf -> csrf.disable())
         .authorizeHttpRequests(auth -> auth
            .requestMatchers("/authenticate").permitAll()
            .anyRequest().authenticated()
         )
         .httpBasic(Customizer.withDefaults()); // Enables Basic Auth

      return http.build();
   }
}
```

//Output:


localhost:8080/login
All Bookmarks
Please sign in
Username
Password
Sign in