5. JWT-handson

Create authentication service that returns JWT

As part of first step of JWT process, the user credentials needs to be sent to authentication service request that generates and returns the JWT.

Ideally when the below curl command is executed that calls the new authentication service, the token should be responded. Kindly note that the credentials are passed using -u option.

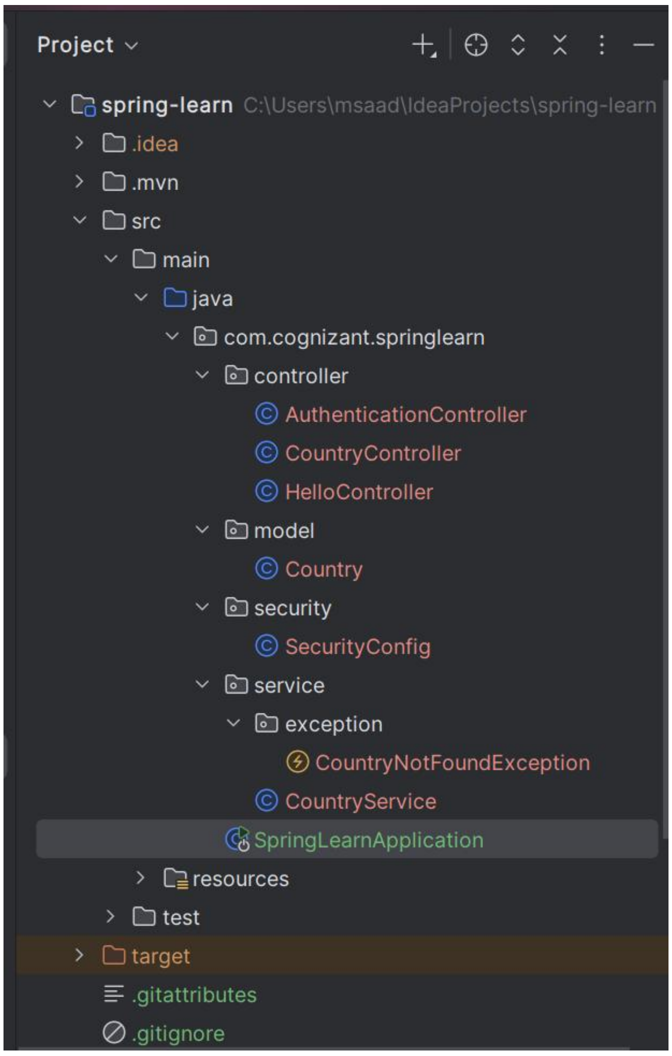
Request

```
curl -s -u user:pwd http://localhost:8090/authenticate
```

Response

```
{"token":"eyJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ1c2VyIiwiaWF0IjoxNTcwMzc5NDc0LCJleHAiOjE1NzAzODA2NzR9.t3LRvlCV-hwKfoqZYlaVQqEUiBloWcWn0ft3tgv0dL0"}
```

Folder Structure:



```
Project
spring-learn C:\Users\msaad\IdeaProjects\spring-learn
  .idea
  .mvn
  src
    main
      java
        com.cognizant.springlearn
          controller
            AuthenticationController
            CountryController
            HelloController
          model
            Country
          security
            SecurityConfig
          service
            exception
              CountryNotFoundException
            CountryService
          SpringLearnApplication
      resources
    test
  target
  .gitattributes
  .gitignore
```

Pom.xml

```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 https://maven.apache.org/xsd/maven-
4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>3.5.3</version>
        <relativePath/> <!-- lookup parent from repository -->
    </parent>
    <groupId>com.cognizant</groupId>
    <artifactId>spring-learn</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <name>spring-learn</name>
    <description>spring-learn</description>
    <url/>
    <licenses>
        <license/>
    </licenses>
    <developers>
        <developer/>
    </developers>
    <scm>
        <connection/>
        <developerConnection/>
        <tag/>
        <url/>
    </scm>
    <properties>
        <java.version>17</java.version>
    </properties>
    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>

        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-devtools</artifactId>
            <scope>runtime</scope>
            <optional>true</optional>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
        <!-- Spring Security -->
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-security</artifactId>
        </dependency>

        <!-- JWT Library -->
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-api</artifactId>
            <version>0.11.5</version>
        </dependency>
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-impl</artifactId>
            <version>0.11.5</version>
            <scope>runtime</scope>
        </dependency>
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-jackson</artifactId> <!-- or jjwt-gson -->
            <version>0.11.5</version>
            <scope>runtime</scope>
        </dependency>

    </dependencies>

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

</project>
```

SecurityConfig.java (in package security)

```java
package com.cognizant.springlearn.security;

import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.config.annotation.authentication.configuration.AuthenticationConfiguration;
import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.web.SecurityFilterChain;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;

@Configuration
public class SecurityConfig {

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

    @Bean
    public PasswordEncoder passwordEncoder() {
        return new BCryptPasswordEncoder();
    }

    @Bean
    public InMemoryUserDetailsManager userDetailsService() {
        UserDetails admin = User
                .withUsername("admin")
                .password(passwordEncoder().encode("pwd"))
                .roles("ADMIN")
                .build();

        UserDetails user = User
                .withUsername("user")
                .password(passwordEncoder().encode("pwd"))
                .roles("USER")
                .build();

        return new InMemoryUserDetailsManager(admin, user);
    }

    @Bean
    public SecurityFilterChain filterChain(HttpSecurity http) throws Exception {
        http.csrf().disable()
                .httpBasic()
                .and()
                .authorizeHttpRequests()
                .requestMatchers("/authenticate").hasAnyRole("USER", "ADMIN")
                .anyRequest().authenticated();

        return http.build();
    }

    @Bean
    public AuthenticationManager authenticationManager(AuthenticationConfiguration config) throws
Exception {
        return config.getAuthenticationManager();
    }
}
```

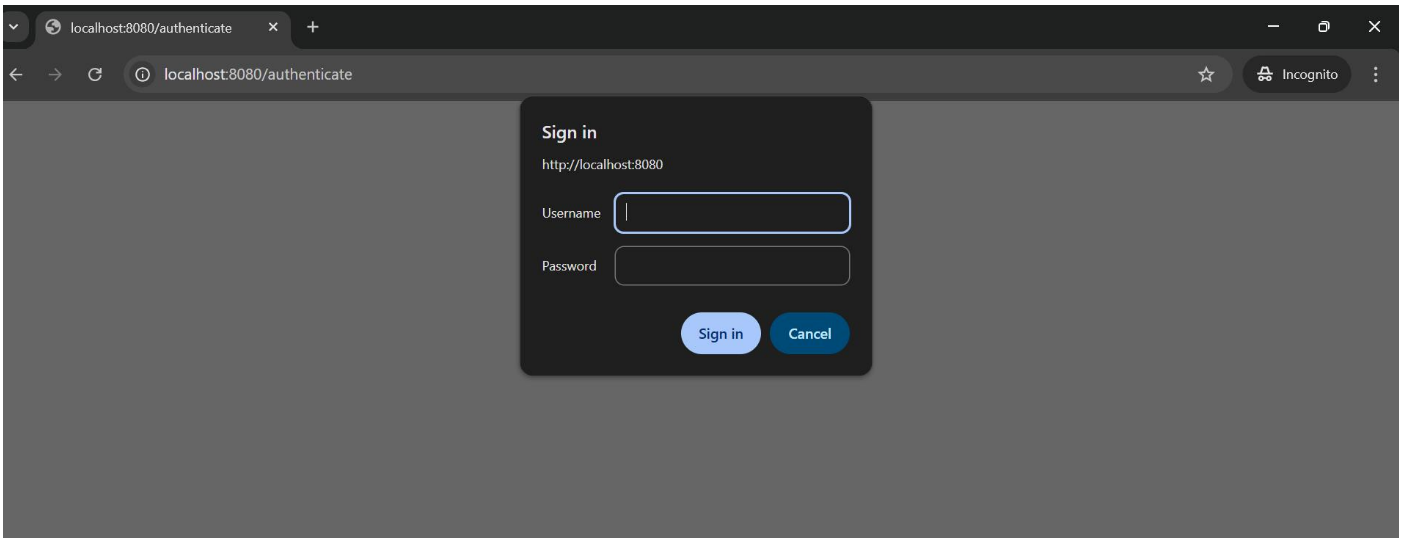
AuthenticationController.java (in the package controller)

```
package com.cognizant.springlearn.controller;

import io.jsonwebtoken.JwtBuilder;
import io.jsonwebtoken.Jwts;
import io.jsonwebtoken.SignatureAlgorithm;
import org.slf4j.Logger;
import org.slf4j.LoggerFactory;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RequestHeader;
import org.springframework.web.bind.annotation.RestController;
import io.jsonwebtoken.security.Keys;


import java.util.Base64;
import java.util.Date;
import java.util.HashMap;
import java.util.Map;

import io.jsonwebtoken.security.Keys;
import java.security.Key;

@RestController
public class AuthenticationController {

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

    @GetMapping("/authenticate")
    public Map<String, String> authenticate(@RequestHeader("Authorization") String authHeader) {
        LOGGER.info("START - authenticate()");
        LOGGER.debug("Authorization Header: {}", authHeader);

        String user = getUser(authHeader);
        String token = generateJwt(user);

        Map<String, String> map = new HashMap<>();
        map.put("token", token);

        LOGGER.info("END - authenticate()");
        return map;
    }

    private String getUser(String authHeader) {
        String encodedCredentials = authHeader.replace("Basic ", "");
        byte[] decodedBytes = Base64.getDecoder().decode(encodedCredentials);
        String decodedCredentials = new String(decodedBytes); // "user:pwd"
        LOGGER.debug("Decoded credentials: {}", decodedCredentials);
        return decodedCredentials.split(":")[0]; // return "user"
    }

    private String generateJwt(String user) {
        String secret = "my-secret-key-that-is-long-enough-123456"; // At least 32 chars
        Key key = Keys.hmacShaKeyFor(secret.getBytes());

        return Jwts.builder()
                .setSubject(user)
                .setIssuedAt(new Date())
                .setExpiration(new Date(System.currentTimeMillis() + 20 * 60 * 1000)) // 20 minutes
                .signWith(key, SignatureAlgorithm.HS256)
                .compact();
    }
}
```

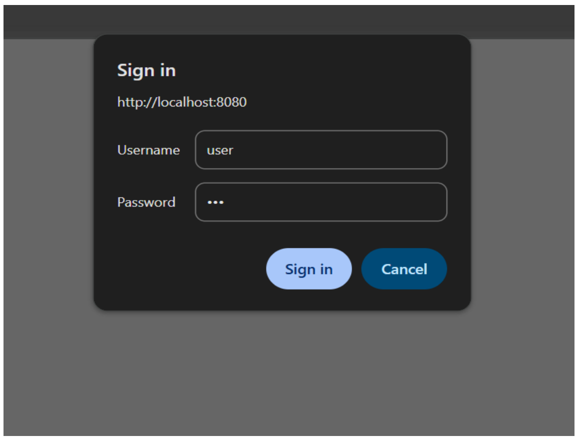
Run the SpringLearnApplication.java and go to browser and type,

http://localhost:8080/authenticate

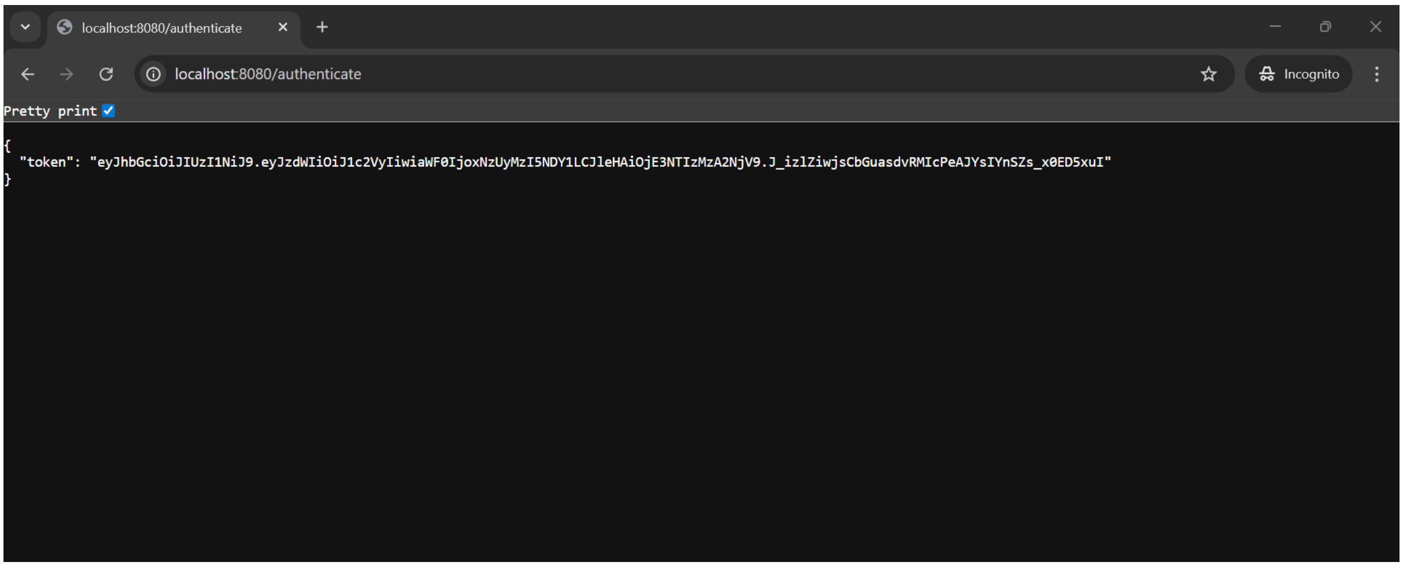
You will get a prompt to enter credentials,



I have entered "user" for username and "pwd" for password


Sign in
http://localhost:8080
Username: user
Password: •••

Output:



```
Pretty print ✓
{
  "token": "eyJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ1c2VyIiwiaWF0IjoxNzUyMzI5NDY1LCJleHAiOjE3NTIzMzA2NjV9.J_izlZiwjsCbGuasdvRMIcPeAJYsIYnSZs_x0ED5xuI"
}
```

We have fetched the JWT successfully!

Thank You