Spring-REST using Spring Boot 3

Hands on 1

- ## Create a Spring Web Project using Maven

➔solution:

Dependencies

Spring boot dev tools, Spring web

SpringLearnApplication.java

```
package com.cognizant.spring_learn;
import org.slf4j.*;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@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("application running");
	}
}
```

```
INFO 16632 --- [spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : Starting SpringLearnApplication using Ja
INFO 16632 --- [spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : No active profile set, falling back to 1
INFO 16632 --- [spring-learn] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : Devtools property defaults active! Set '
INFO 16632 --- [spring-learn] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : For additional web related logging consi
INFO 16632 --- [spring-learn] [  restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with port 8080 (http)
INFO 16632 --- [spring-learn] [  restartedMain] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
INFO 16632 --- [spring-learn] [  restartedMain] o.apache.catalina.core.StandardEngine    : Starting Servlet engine: [Apache Tomcat/
INFO 16632 --- [spring-learn] [  restartedMain] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embedded WebApplicat
INFO 16632 --- [spring-learn] [  restartedMain] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initializati
INFO 16632 --- [spring-learn] [  restartedMain] o.s.b.d.a.OptionalLiveReloadServer       : LiveReload server is running on port 357
INFO 16632 --- [spring-learn] [  restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port 8080 (http) with
INFO 16632 --- [spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : Started SpringLearnApplication in 2.283
INFO 16632 --- [spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : application running
```

Hands on 4

- ## Spring Core – Load Country from Spring Configuration XML

➔Solution:

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>
```

Country.java

```
package com.cognizant.spring_learn;
import org.slf4j.*;

public class Country {
        private String code;
        private String name;
        private static final Logger logger = LoggerFactory.getLogger(Country.class);

        public Country() {
                logger.debug("inside country constructor");
        }
        public String getCode() {
                logger.debug("getCode method invoked");
                return code;
        }
        public void setCode(String code) {
                logger.debug("setCode method invoked");
                this.code = code;
        }
        public String getName() {
                logger.debug("getName method invoked");
                return name;
        }
```

```
	public void setName(String name) {
		logger.debug("setName method invoked");
		this.name = name;
	}

	@Override
	public String toString() {
		return "Country [code=" + code + ", name=" + name + "]";
	}
}
```

SpringBootApplication.java

```
package com.cognizant.spring_learn;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;
import org.slf4j.*;

@SpringBootApplication
public class SpringLearnApplication{

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

	public static void displayCountry() {

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

		Country country = context.getBean(Country.class);
		logger.debug(country.toString());
	}

	public static void main(String[] args) {
		SpringApplication.run(SpringLearnApplication.class, args)
		displayCountry();
	}
}
```

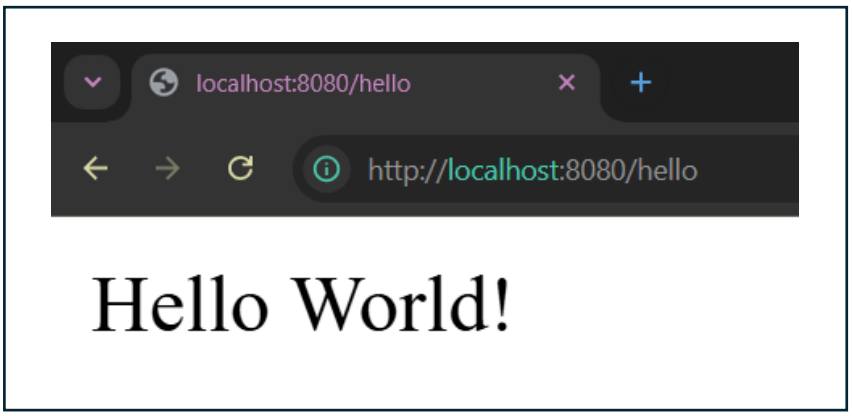
```
[spring-learn] [  restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port 8080 (http) with context
[spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : Started SpringLearnApplication in 0.347 seconds
[spring-learn] [  restartedMain] .ConditionEvaluationDeltaLoggingListener : Condition evaluation unchanged
[spring-learn] [  restartedMain] com.cognizant.spring_learn.Country       : inside country constructor
[spring-learn] [  restartedMain] com.cognizant.spring_learn.Country       : setCode method invoked
[spring-learn] [  restartedMain] com.cognizant.spring_learn.Country       : setName method invoked
[spring-learn] [  restartedMain] c.c.spring_learn.SpringLearnApplication  : Country [code=IN, name=India]
```

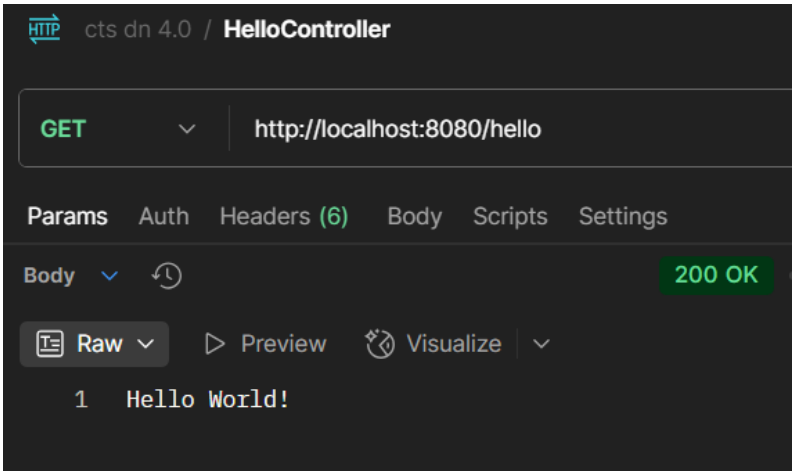
- **Hello World RESTful Web Service**

➔solution:

HelloController.java

```
package com.cognizant.spring_learn.controller;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RestController;
import org.slf4j.*;

@RestController
public class HelloController {

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

	@GetMapping("/hello")
	public String sayHello() {
		logger.info("start");
		String msg = "Hello World!";
		logger.info("end");
		return msg;
	}
}
```





- **REST - Country Web Service**

  ➔solution

  CountryController.java

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

@RestController
public class CountryController {

	@RequestMapping("/country")
	public Country getCountryIndia() {
		ApplicationContext context = new
ClassPathXmlApplicationContext("Country.xml");
		Country country = context.getBean("country", Country.class);
		return country;
	}
}
```

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

➔solution:

Country.java

```
package com.cognizant.spring_learn;
import org.slf4j.*;

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;
    }

    @Override
    public String toString() {
            return "Country [code=" + code + ", name=" + name + "]";
    }
}
```

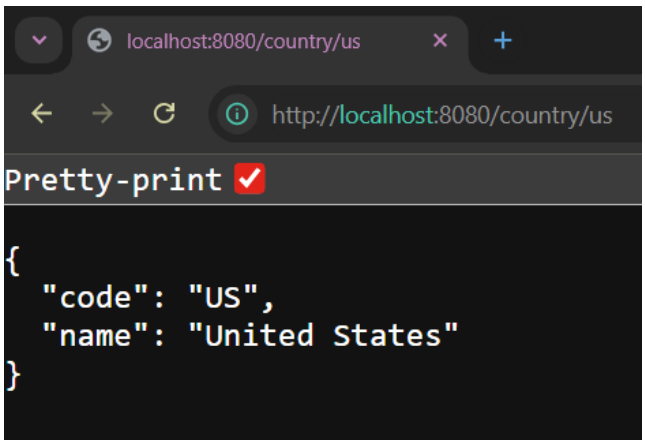
CountryController.java

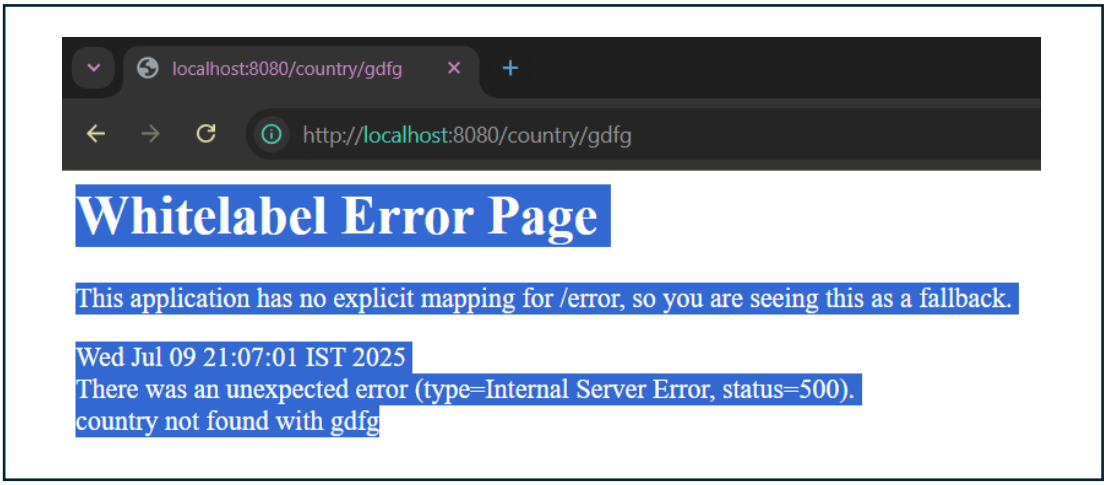
```
package com.cognizant.spring_learn.controller;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.PathVariable;
import org.springframework.web.bind.annotation.RestController;
import com.cognizant.spring_learn.Country;
import com.cognizant.spring_learn.service.CountryService;
```

```
@RestController
public class CountryController {

    @Autowired
    private CountryService countryService;

    @GetMapping("/country/{countryCode}")
    public Country getCountry(@PathVariable String countryCode) {
            return countryService.getCountry(countryCode);
    }
}
```

CountryService.java

```
package com.cognizant.spring_learn.service;
import java.util.Arrays;
import java.util.List;
import org.springframework.stereotype.Service;
import com.cognizant.spring_learn.Country;

@Service
public class CountryService {
    public List<Country> getCountries(){
            return Arrays.asList(
                    new Country("IN", "India"),
                    new Country("US", "United States")
            );
    }
    public Country getCountry(String countryCode) {
            List<Country> countries = getCountries();
            return countries.stream()
                            .filter(c-> c.getCode().equalsIgnoreCase(countryCode))
                            .findFirst()
                            .orElseThrow(()-> new RuntimeException("country not found with " +
countryCode));
    }
}
```





- **Create authentication service that returns JWT**

  ➔solution

  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.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;
import org.springframework.security.web.SecurityFilterChain;

@Configuration
public class SecurityConfig {

  @Bean
  public SecurityFilterChain filterChain(HttpSecurity http) throws Exception {
    http
      .csrf(csrf -> csrf.disable())
      .authorizeHttpRequests(auth -> auth
        .requestMatchers("/authenticate").permitAll()
        .anyRequest().authenticated()
      )
      .httpBasic(org.springframework.security.config.Customizer.withDefaults());

    return http.build();
  }
```

```
  @Bean
  public UserDetailsService userDetailsService() {
    UserDetails user = User.builder()
      .username("user")
      .password(passwordEncoder().encode("pwd"))
      .roles("USER")
      .build();
    return new InMemoryUserDetailsManager(user);
  }

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

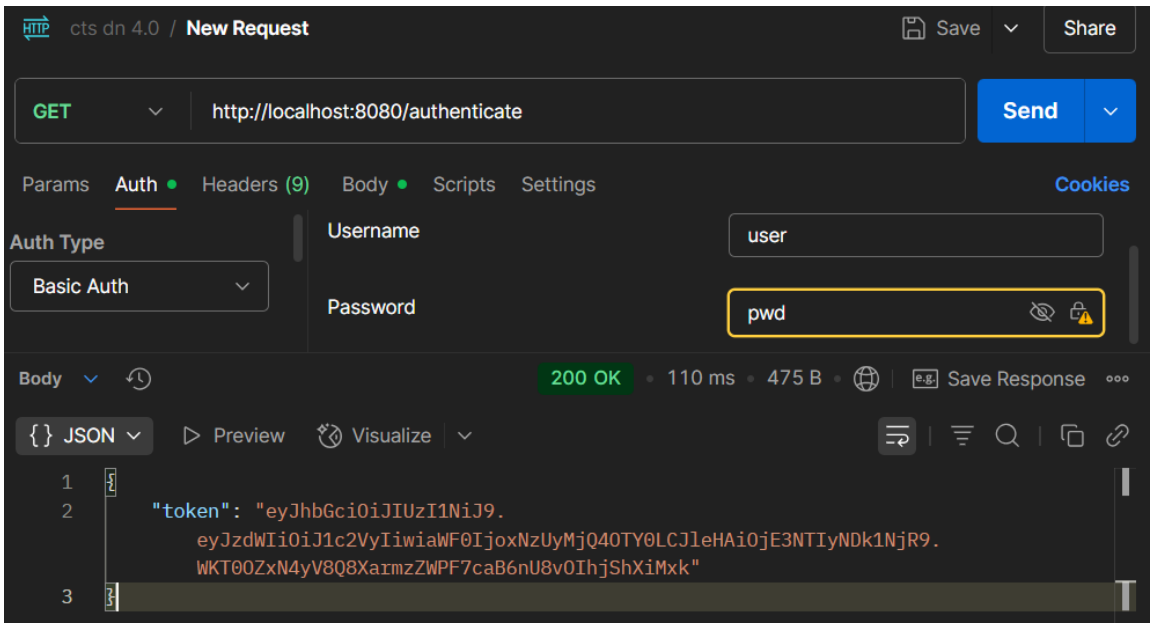
JwtUtil.java

```
package com.cognizant.spring_learn.util;
import java.util.Date;
import org.springframework.stereotype.Component;
import io.jsonwebtoken.Jwts;
import io.jsonwebtoken.SignatureAlgorithm;

@Component
public class JwtUtil {
        private static final String SECRET_KEY =
"fdjaknfkje456j3k4rtrteqt45tio5o5o4qtoohrhfgfdsgfg";

  public String generateToken(String username) {
    return Jwts.builder()
      .setSubject(username)
      .setIssuedAt(new Date(System.currentTimeMillis()))
      .setExpiration(new Date(System.currentTimeMillis() + 1000 * 60 * 10))
      .signWith(SignatureAlgorithm.HS256, SECRET_KEY)
      .compact();
  }
}
```

AuthenticationController.java

```
package com.cognizant.spring_learn.controller;
import java.nio.charset.StandardCharsets;
import java.util.Base64;
import java.util.Map;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RequestHeader;
import org.springframework.web.bind.annotation.RestController;
import com.cognizant.spring_learn.util.JwtUtil;

@RestController
public class AuthenticationController {

  @Autowired
  private JwtUtil jwtUtil;

  @GetMapping("/authenticate")
  public ResponseEntity<?> authenticate(@RequestHeader("Authorization") String
authHeader) {

    String base64Credentials = authHeader.substring("Basic ".length());
    byte[] decodedBytes = Base64.getDecoder().decode(base64Credentials);
    String credentials = new String(decodedBytes, StandardCharsets.UTF_8);
    String[] values = credentials.split(":", 2);
    String username = values[0];
    String password = values[1];

    if (!"user".equals(username) || !"pwd".equals(password)) {
      return ResponseEntity.status(HttpStatus.UNAUTHORIZED).body("Invalid username
or password");
    }

    String token = jwtUtil.generateToken(username);
    return ResponseEntity.ok(Map.of("token", token));
  }
}
```

```
C:\Windows\System32>curl -s -u user:pwd http://localhost:8080/authenticate
{"token":"eyJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ1c2VyIiwiaWF0IjoxNzUyMjQ4NTUzLCJleHAiOjE3NTIyND
kxNTN9.Liw8P00sv0wfvks5CI5sQACdgJJ0gq3Jxo5g2Zc7wqc"}
```


cts dn 4.0 / New Request
Save
Share
GET
http://localhost:8080/authenticate
Send
Params
Auth
Headers (9)
Body
Scripts
Settings
Cookies
Auth Type
Basic Auth
Username
user
Password
pwd
Body
200 OK
110 ms
475 B
Save Response
JSON
Preview
Visualize
1
2
"token": "eyJhbGciOiJIUzI1NiJ9.
eyJzdWIiOiJ1c2VyIiwiaWF0IjoxNzUyMjQ4OTY0LCJleHAiOjE3NTIyNDk1NjR9.
WKT0OZxN4yV8Q8XarmzZWPF7caB6nU8vOIhjShXiMxk"
3