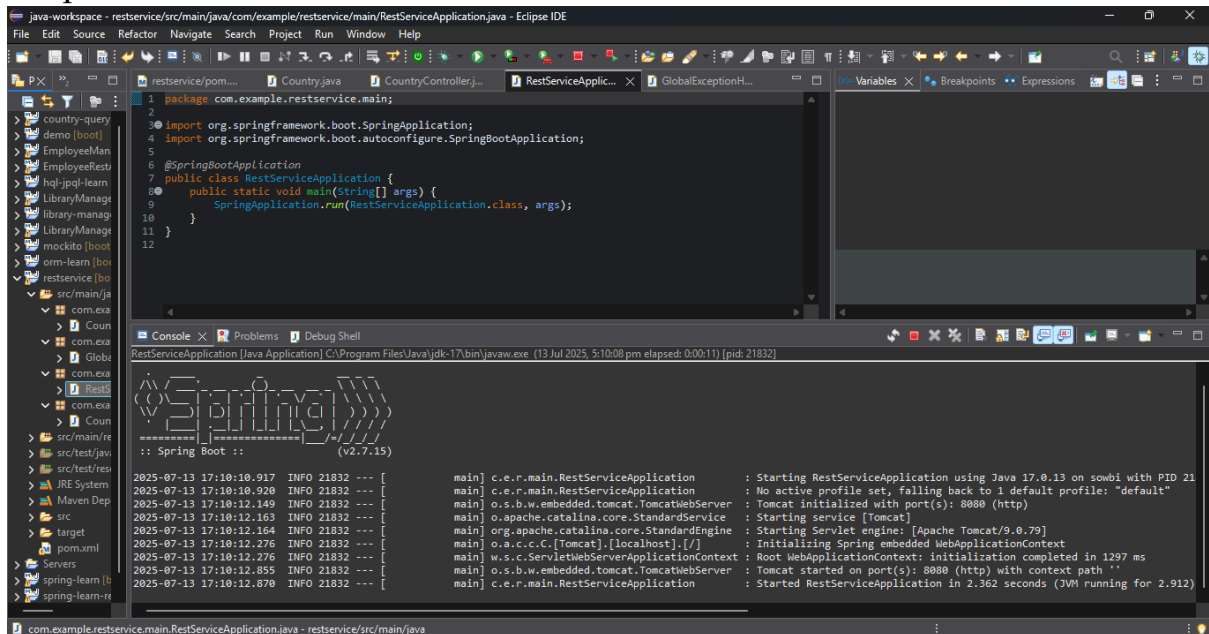


# Significance of HTTP Method Types in RESTful Web Services

Output:



The screenshot shows the Eclipse IDE with the `RestServiceApplication.java` file open. The code is as follows:

```
1 package com.example.restservice.main;
2
3 import org.springframework.boot.SpringApplication;
4 import org.springframework.boot.autoconfigure.SpringBootApplication;
5
6 @SpringBootApplication
7 public class RestServiceApplication {
8     public static void main(String[] args) {
9         SpringApplication.run(RestServiceApplication.class, args);
10    }
11 }
12
```

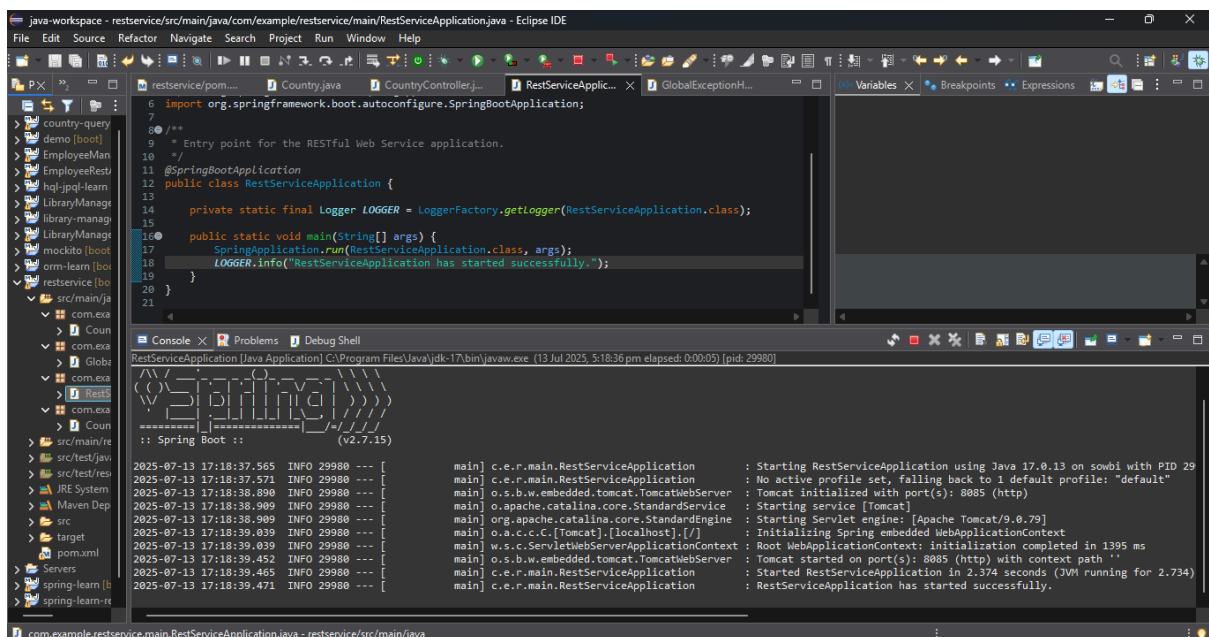
The console output shows the application starting successfully on port 8080:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:10:08 pm elapsed: 0:00:11) [pid: 21832]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:10:10.917 INFO 21832 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 21
2025-07-13 17:10:10.920 INFO 21832 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:10:12.149 INFO 21832 --- [main] o.s.b.w.e.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8080 (http)
2025-07-13 17:10:12.163 INFO 21832 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:10:12.164 INFO 21832 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:10:12.276 INFO 21832 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:10:12.276 INFO 21832 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1297 ms
2025-07-13 17:10:12.855 INFO 21832 --- [main] o.s.b.w.e.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http) with context path ''
2025-07-13 17:10:12.870 INFO 21832 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.362 seconds (JVM running for 2.912)
```

## RESTful Web Service resource naming guidelines

Output:



The screenshot shows the Eclipse IDE with the `RestServiceApplication.java` file open. The code is as follows:

```
6 import org.springframework.boot.autoconfigure.SpringBootApplication;
7
8 /**
9  * Entry point for the RESTful Web Service application.
10  */
11 @SpringBootApplication
12 public class RestServiceApplication {
13
14     private static final Logger LOG = LoggerFactory.getLogger(RestServiceApplication.class);
15
16     public static void main(String[] args) {
17         SpringApplication.run(RestServiceApplication.class, args);
18         LOG.info("RestServiceApplication has started successfully.");
19     }
20 }
21
```

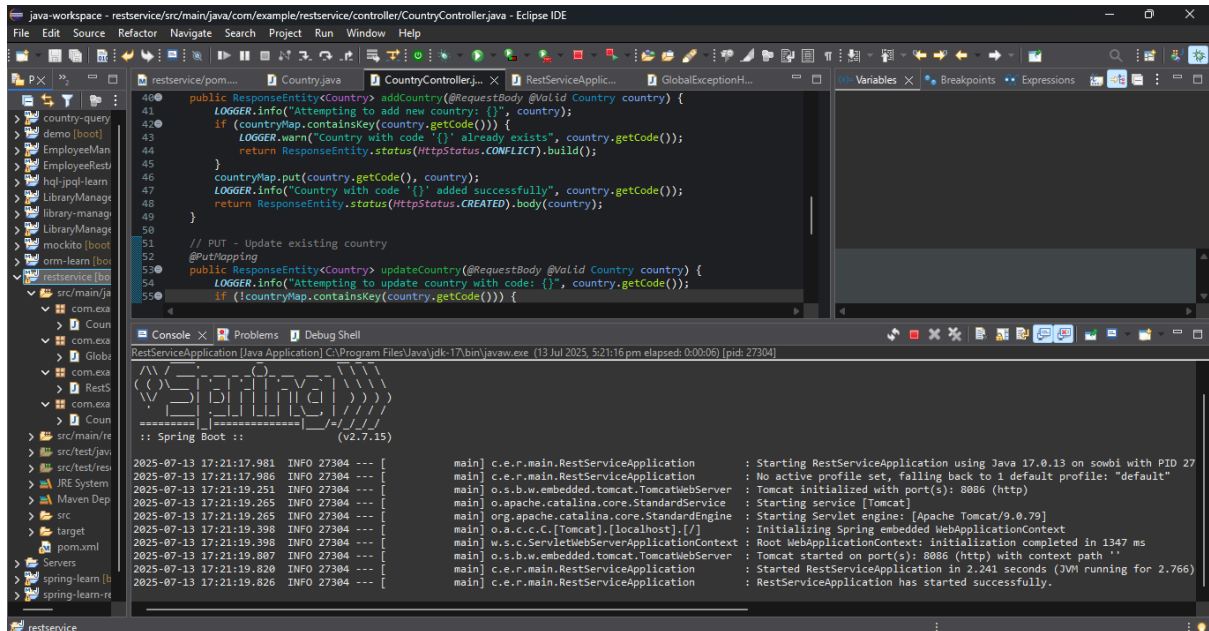
The console output shows the application starting successfully on port 8080:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:18:36 pm elapsed: 0:00:05) [pid: 29980]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:18:37.565 INFO 29980 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 29
2025-07-13 17:18:37.571 INFO 29980 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:18:38.890 INFO 29980 --- [main] o.s.b.w.e.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8085 (http)
2025-07-13 17:18:38.909 INFO 29980 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:18:38.909 INFO 29980 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:18:39.039 INFO 29980 --- [main] o.s.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:18:39.039 INFO 29980 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1395 ms
2025-07-13 17:18:39.452 INFO 29980 --- [main] o.s.b.w.e.tomcat.TomcatWebServer : Tomcat started on port(s): 8085 (http) with context path ''
2025-07-13 17:18:39.465 INFO 29980 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.374 seconds (JVM running for 2.734)
2025-07-13 17:18:39.471 INFO 29980 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Create RESTful Web Service to handle POST request of Country

Output:



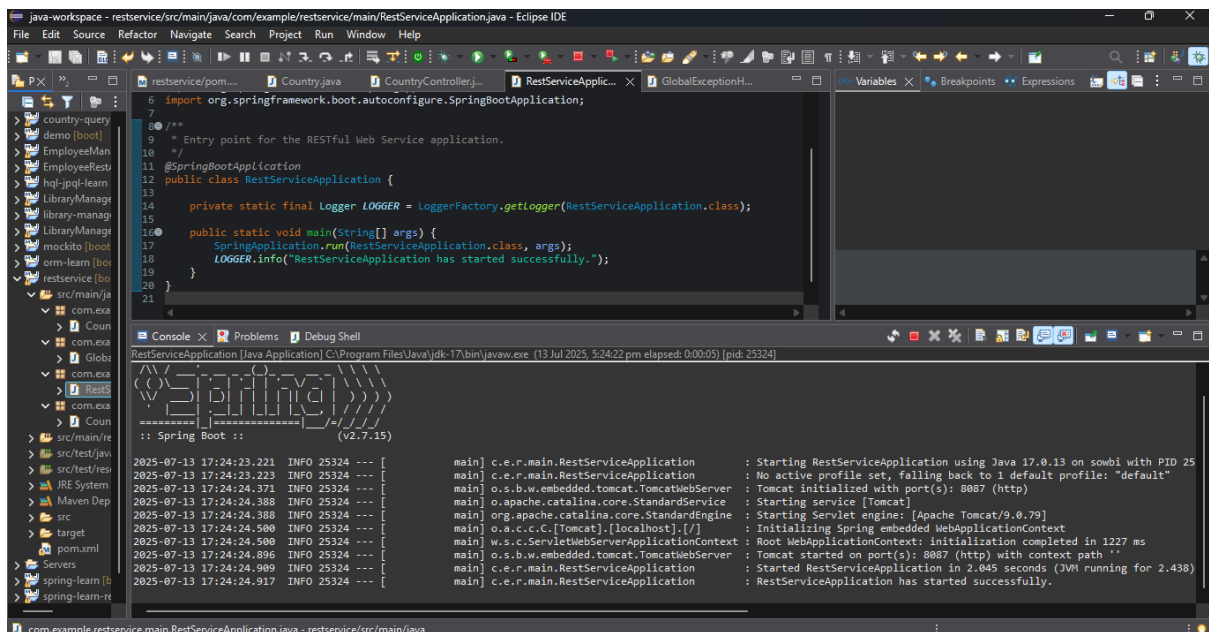
```
40 public ResponseEntity<Country> addCountry(@RequestBody @Valid Country country) {
41     LOGGER.info("Attempting to add new country: {}", country);
42     if (countryMap.containsKey(country.getCode())) {
43         LOGGER.warn("Country with code '{}' already exists", country.getCode());
44         return ResponseEntity.status(HttpStatus.CONFLICT).build();
45     }
46     countryMap.put(country.getCode(), country);
47     LOGGER.info("Country with code '{}' added successfully", country.getCode());
48     return ResponseEntity.status(HttpStatus.CREATED).body(country);
49 }
50
51 // PUT - Update existing country
52 @PutMapping
53 public ResponseEntity<Country> updateCountry(@RequestBody @Valid Country country) {
54     LOGGER.info("Attempting to update country with code: {}", country.getCode());
55     if (!countryMap.containsKey(country.getCode())) {
```

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:21:16 pm elapsed: 0:00:06) [pid: 27304]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:21:17.981 INFO 27304 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 27
2025-07-13 17:21:17.986 INFO 27304 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:21:19.251 INFO 27304 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8086 (http)
2025-07-13 17:21:19.265 INFO 27304 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:21:19.265 INFO 27304 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:21:19.398 INFO 27304 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:21:19.398 INFO 27304 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1347 ms
2025-07-13 17:21:19.807 INFO 27304 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8086 (http) with context path ''
2025-07-13 17:21:19.820 INFO 27304 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.241 seconds (JVM running for 2.766)
2025-07-13 17:21:19.826 INFO 27304 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Read country data as a bean in RESTful Web Service

Output:



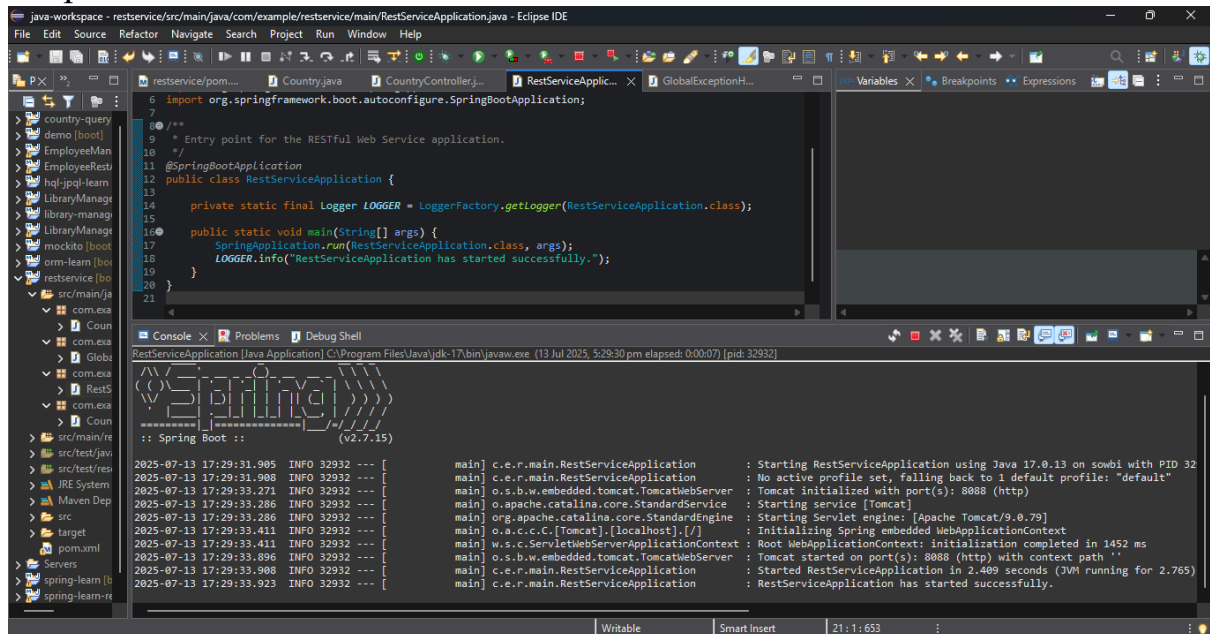
```
6 import org.springframework.boot.autoconfigure.SpringBootApplication;
7
8 /**
9  * Entry point for the RESTful Web Service application.
10  */
11 @SpringBootApplication
12 public class RestServiceApplication {
13
14     private static final Logger LOGGER = LoggerFactory.getLogger(RestServiceApplication.class);
15
16     public static void main(String[] args) {
17         SpringApplication.run(RestServiceApplication.class, args);
18         LOGGER.info("RestServiceApplication has started successfully.");
19     }
20 }
21
```

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:24:22 pm elapsed: 0:00:05) [pid: 25324]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:24:23.221 INFO 25324 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 25
2025-07-13 17:24:23.223 INFO 25324 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:24:24.371 INFO 25324 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8087 (http)
2025-07-13 17:24:24.388 INFO 25324 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:24:24.388 INFO 25324 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:24:24.500 INFO 25324 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:24:24.500 INFO 25324 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1227 ms
2025-07-13 17:24:24.896 INFO 25324 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8087 (http) with context path ''
2025-07-13 17:24:24.909 INFO 25324 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.045 seconds (JVM running for 2.438)
2025-07-13 17:24:24.917 INFO 25324 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Validating country code

## Output:



The screenshot shows the Eclipse IDE with the `RestServiceApplication.java` file open. The code is as follows:

```
6 import org.springframework.boot.autoconfigure.SpringBootApplication;
7
8 /**
9  * Entry point for the RESTful Web Service application.
10 */
11 @SpringBootApplication
12 public class RestServiceApplication {
13
14     private static final Logger LOGGER = LoggerFactory.getLogger(RestServiceApplication.class);
15
16     public static void main(String[] args) {
17         SpringApplication.run(RestServiceApplication.class, args);
18         LOGGER.info("RestServiceApplication has started successfully.");
19     }
20 }
21
```

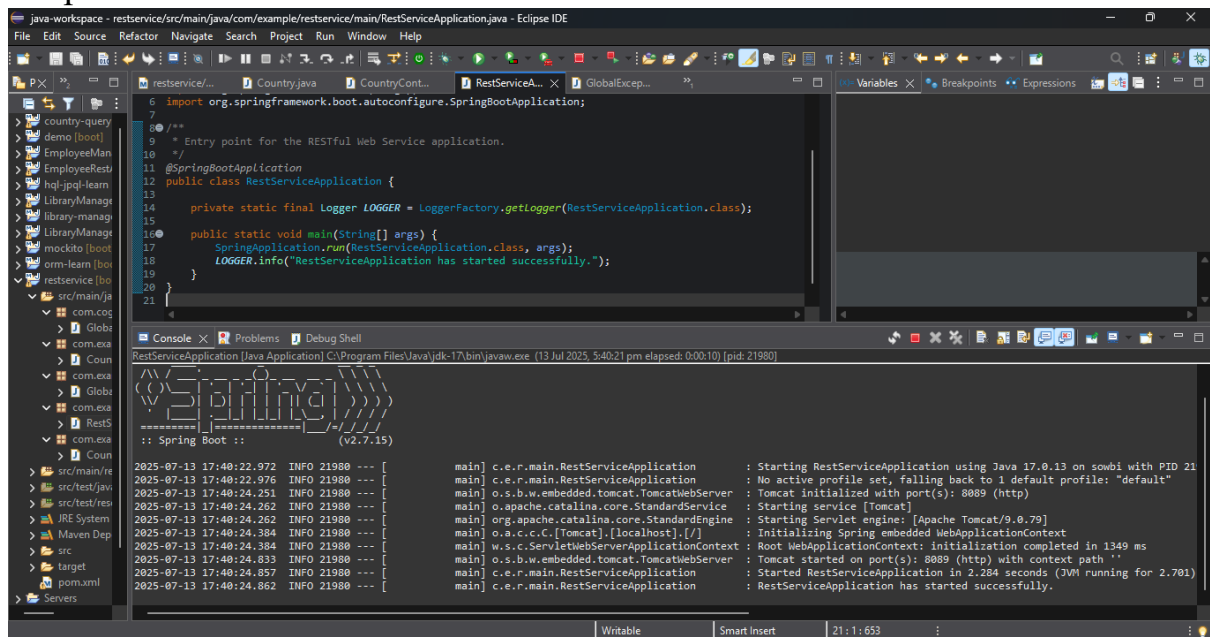
The console output shows the application starting successfully:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:29:30 pm elapsed: 0:00:07) [pid: 32932]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:29:31.905 INFO 32932 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 32
2025-07-13 17:29:31.908 INFO 32932 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:29:33.271 INFO 32932 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8088 (http)
2025-07-13 17:29:33.286 INFO 32932 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:29:33.286 INFO 32932 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:29:33.411 INFO 32932 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:29:33.411 INFO 32932 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1452 ms
2025-07-13 17:29:33.896 INFO 32932 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8088 (http) with context path ''
2025-07-13 17:29:33.908 INFO 32932 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.409 seconds (JVM running for 2.765)
2025-07-13 17:29:33.923 INFO 32932 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Include global exception handler for validation errors

## Output:



The screenshot shows the Eclipse IDE with the `RestServiceApplication.java` file open. The code is as follows:

```
6 import org.springframework.boot.autoconfigure.SpringBootApplication;
7
8 /**
9  * Entry point for the RESTful Web Service application.
10 */
11 @SpringBootApplication
12 public class RestServiceApplication {
13
14     private static final Logger LOGGER = LoggerFactory.getLogger(RestServiceApplication.class);
15
16     public static void main(String[] args) {
17         SpringApplication.run(RestServiceApplication.class, args);
18         LOGGER.info("RestServiceApplication has started successfully.");
19     }
20 }
21
```

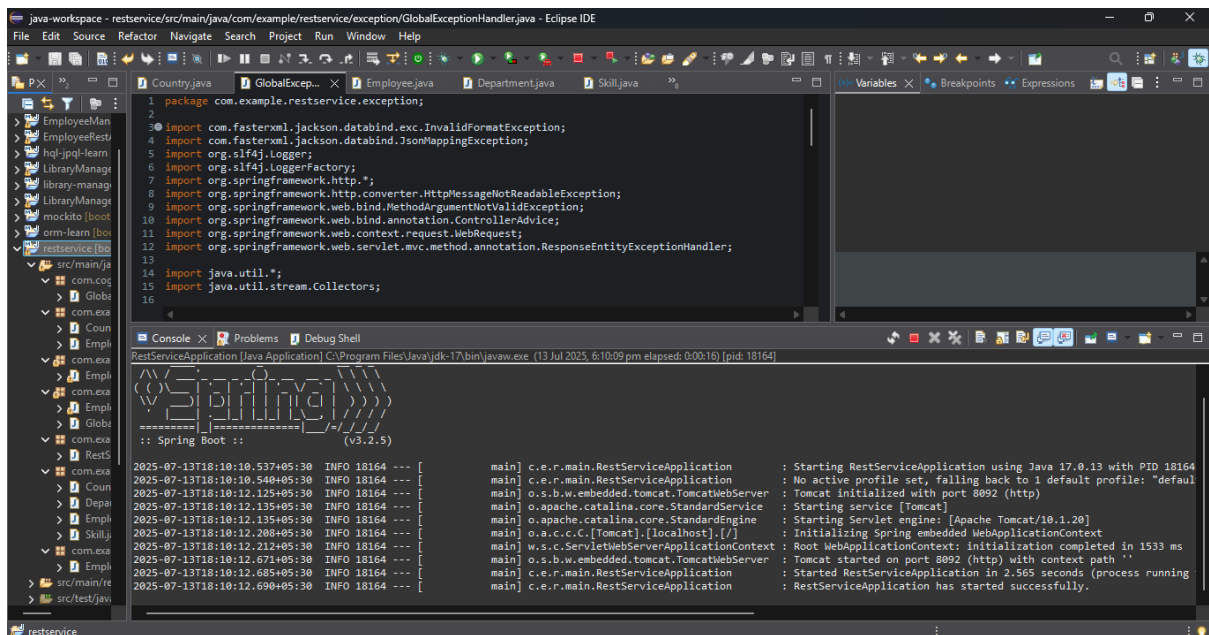
The console output shows the application starting successfully:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 5:40:21 pm elapsed: 0:00:10) [pid: 21980]
:: Spring Boot ::
(v2.7.15)

2025-07-13 17:40:22.972 INFO 21980 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 on sowbi with PID 21
2025-07-13 17:40:22.976 INFO 21980 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13 17:40:24.251 INFO 21980 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8089 (http)
2025-07-13 17:40:24.262 INFO 21980 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13 17:40:24.262 INFO 21980 --- [main] org.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/9.0.79]
2025-07-13 17:40:24.384 INFO 21980 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13 17:40:24.384 INFO 21980 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1349 ms
2025-07-13 17:40:24.833 INFO 21980 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8089 (http) with context path ''
2025-07-13 17:40:24.857 INFO 21980 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.284 seconds (JVM running for 2.701)
2025-07-13 17:40:24.862 INFO 21980 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Implement REST service for updating an employee

Output:



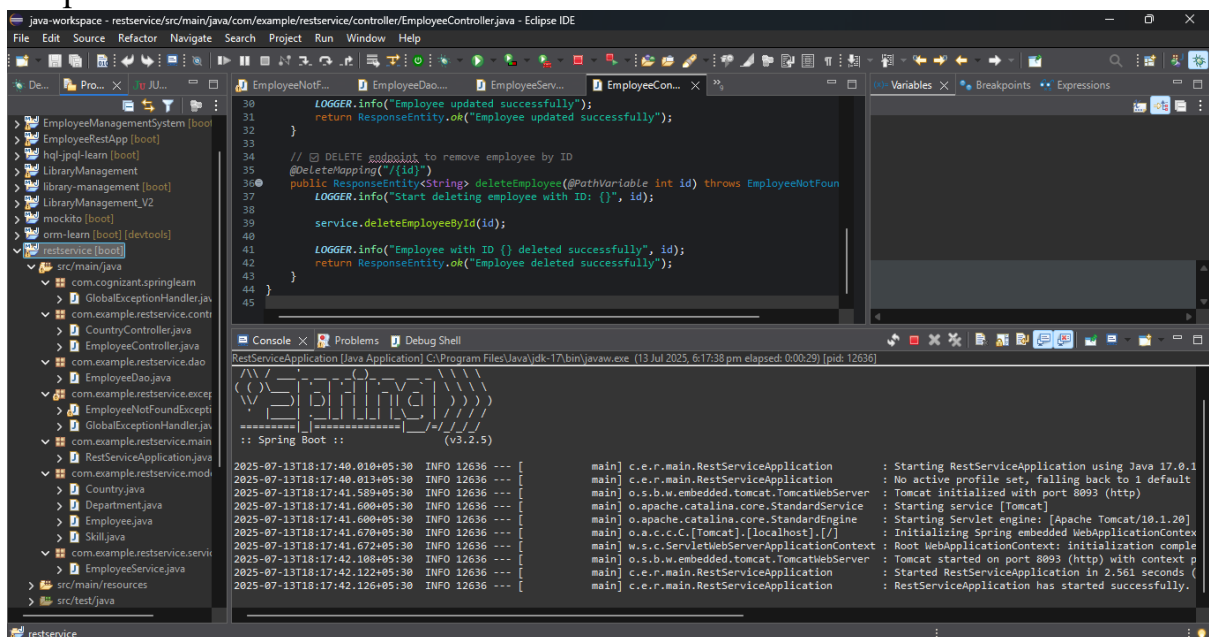
```
1 package com.example.restservice.exception;
2
3 import com.fasterxml.jackson.databind.exc.InvalidFormatException;
4 import com.fasterxml.jackson.databind.JsonMappingException;
5 import org.slf4j.Logger;
6 import org.slf4j.LoggerFactory;
7 import org.springframework.http.*;
8 import org.springframework.http.converter.HttpMessageNotReadableException;
9 import org.springframework.web.bind.MethodArgumentNotValidException;
10 import org.springframework.web.bind.annotation.ControllerAdvice;
11 import org.springframework.web.context.request.WebRequest;
12 import org.springframework.web.servlet.mvc.method.annotation.ResponseEntityExceptionHandler;
13
14 import java.util.*;
15 import java.util.stream.Collectors;
16
```

Console Output:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 6:10:09 pm elapsed: 0:00:16) [pid: 18164]
:: Spring Boot ::
(v3.2.5)
2025-07-13T18:10:10.537+05:30 INFO 18164 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.13 with PID 18164
2025-07-13T18:10:10.540+05:30 INFO 18164 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default profile: "default"
2025-07-13T18:10:12.125+05:30 INFO 18164 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8092 (http)
2025-07-13T18:10:12.135+05:30 INFO 18164 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13T18:10:12.135+05:30 INFO 18164 --- [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.20]
2025-07-13T18:10:12.208+05:30 INFO 18164 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13T18:10:12.212+05:30 INFO 18164 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 1533 ms
2025-07-13T18:10:12.671+05:30 INFO 18164 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8092 (http) with context path ''
2025-07-13T18:10:12.685+05:30 INFO 18164 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.565 seconds (process running for 2.565 seconds)
2025-07-13T18:10:12.690+05:30 INFO 18164 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```

# Implement REST DELETE Service

Output:



```
30 LOGGER.info("Employee updated successfully");
31 return ResponseEntity.ok("Employee updated successfully");
32 }
33
34 // DELETE endpoint to remove employee by ID
35 @DeleteMapping("/{id}")
36 public ResponseEntity<String> deleteEmployee(@PathVariable int id) throws EmployeeNotFoundException {
37     LOGGER.info("Start deleting employee with ID: {}", id);
38
39     service.deleteEmployeeById(id);
40
41     LOGGER.info("Employee with ID {} deleted successfully", id);
42     return ResponseEntity.ok("Employee deleted successfully");
43 }
44
45
```

Console Output:

```
RestServiceApplication [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (13 Jul 2025, 6:17:38 pm elapsed: 0:00:29) [pid: 12636]
:: Spring Boot ::
(v3.2.5)
2025-07-13T18:17:40.010+05:30 INFO 12636 --- [main] c.e.r.main.RestServiceApplication : Starting RestServiceApplication using Java 17.0.1
2025-07-13T18:17:40.013+05:30 INFO 12636 --- [main] c.e.r.main.RestServiceApplication : No active profile set, falling back to 1 default
2025-07-13T18:17:41.589+05:30 INFO 12636 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8093 (http)
2025-07-13T18:17:41.600+05:30 INFO 12636 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
2025-07-13T18:17:41.600+05:30 INFO 12636 --- [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.20]
2025-07-13T18:17:41.670+05:30 INFO 12636 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
2025-07-13T18:17:41.672+05:30 INFO 12636 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization comple
2025-07-13T18:17:42.100+05:30 INFO 12636 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8093 (http) with context p
2025-07-13T18:17:42.122+05:30 INFO 12636 --- [main] c.e.r.main.RestServiceApplication : Started RestServiceApplication in 2.561 seconds (
2025-07-13T18:17:42.126+05:30 INFO 12636 --- [main] c.e.r.main.RestServiceApplication : RestServiceApplication has started successfully.
```