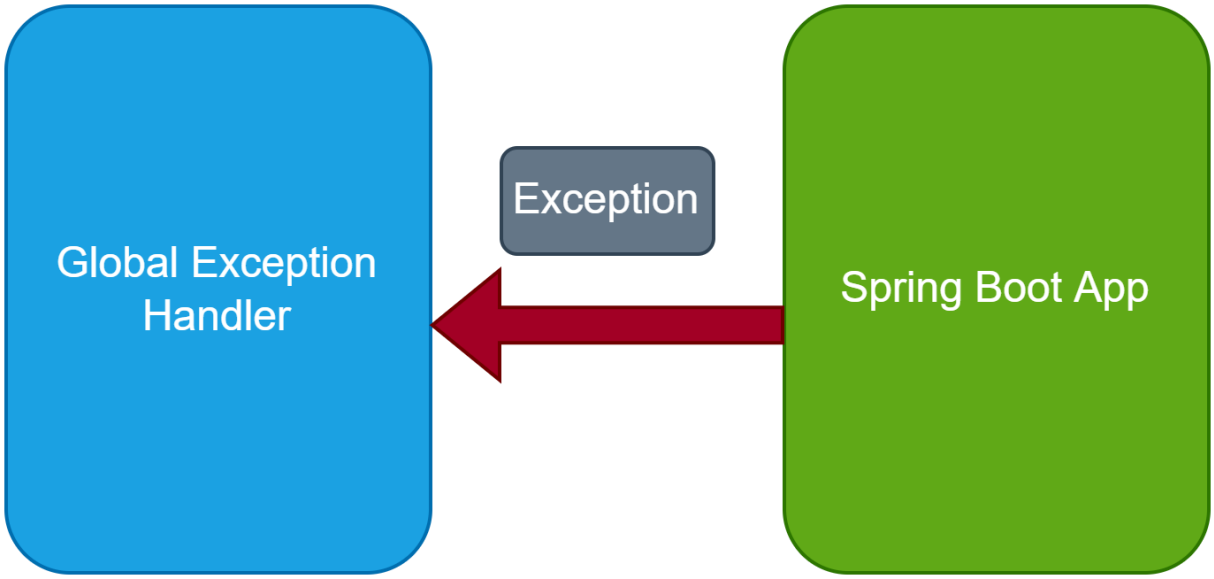
Global Exception Handling in the Spring Boot Rest API

In this example application, we can customize the exception and return a JSON response that can be understandable for the consumers of REST API. For this, we make a Global Exception Handler that handles all the exceptions in our application.



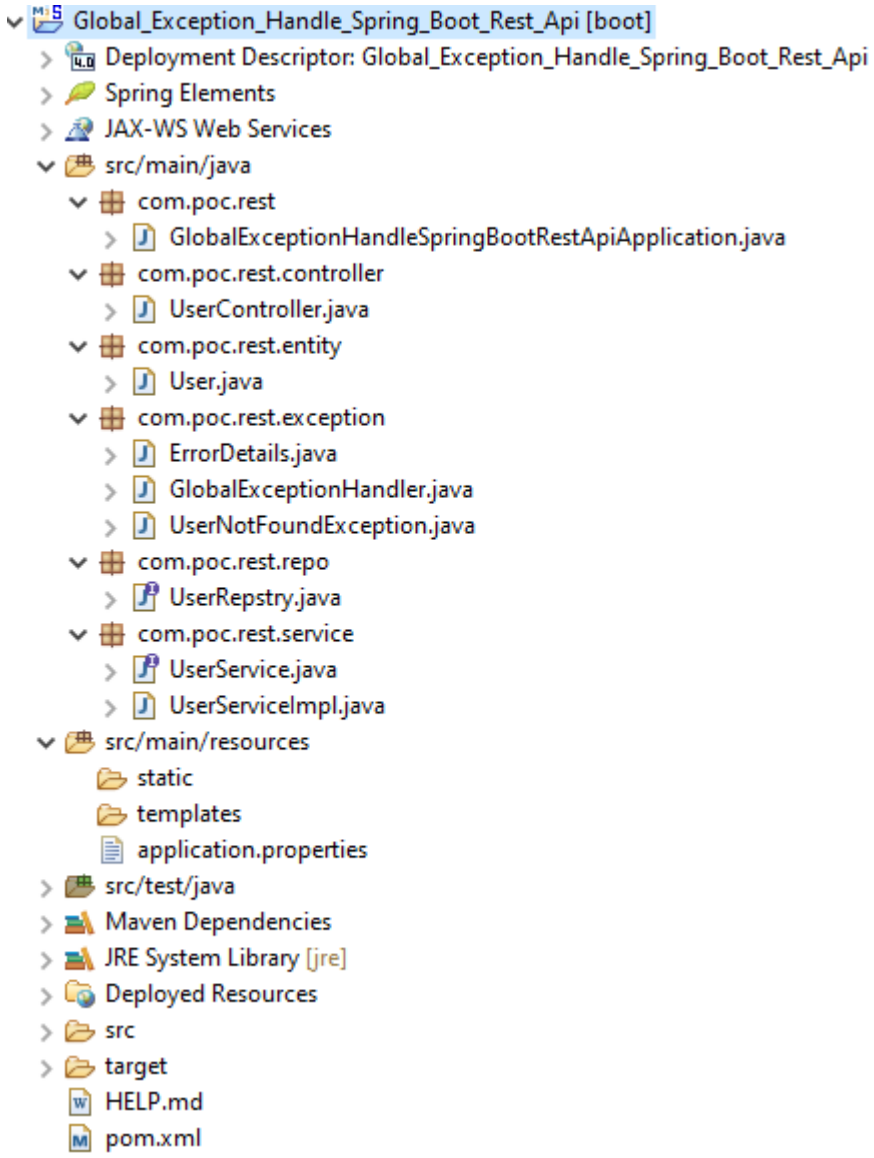
Development Process:
1. Keep eclipse IDE ready(STS Integrated)
2. Create a Spring Boot Starter Project
3. Define Database Connection in the application.properties file
4. Create Entity class
5. Create a Repository
6. Create an Error Model class
7. Create a Custom Exception class
8. Create a Global Exception Handler class
9. Create a Service
10. Create a Rest Controller class
11. Run the Project

1. Keep eclipse IDE ready(STS Integrated)
Refer to this article **How to Create Spring Project in IDE** to create Spring Boot Project in Eclipse IDE.

2. Create a Spring Boot Starter Project

Add the following dependencies:

- Spring Web
- Spring Data JPA
- Mysql Driver



Maven Dependency
pom.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>2.3.0.RELEASE</version>
		<relativePath/>
		<!-- lookup parent from repository -->
	</parent>
	<groupId>com.poc</groupId>
	<artifactId>Global_Exception_Handle_Spring_Boot_Rest_Api</art
ifactId>
	<packaging>war</packaging>
	<version>0.0.1-SNAPSHOT</version>
	<name>Global_Exception_Handle_Spring_Boot_Rest_Api</name>
	<description>Demo project for Spring Boot</description>
	<properties>
		<java.version>1.8</java.version>
	</properties>
	<dependencies>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-data-
jpa</artifactId>
		</dependency>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-
web</artifactId>
		</dependency>
		<dependency>
			<groupId>mysql</groupId>
			<artifactId>mysql-connector-java</artifactId>
			<scope>runtime</scope>
		</dependency>
```

```
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-
test</artifactId>
			<scope>test</scope>
			<exclusions>
				<exclusion>

	<groupId>org.junit.vintage</groupId>
					<artifactId>junit-vintage-
engine</artifactId>
				</exclusion>
			</exclusions>
		</dependency>
	</dependencies>
	<build>
		<plugins>
			<plugin>

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

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3. Define Database Connection in the application.properties file

```
spring.datasource.url=jdbc:mysql://localhost:3306/user_db?useSSL=fal
se
spring.datasource.username=root
spring.datasource.password=root
spring.jpa.hibernate.ddl-auto=update
spring.jpa.generate-ddl=true
spring.jpa.show-sql=true
```

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4. Create Entity class
User.java:

```
package com.poc.rest.entity;
import javax.persistence.Entity;
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.Id;

@Entity

public class User {

  @Id

  @GeneratedValue(strategy = GenerationType.IDENTITY)

  private Integer id;

  private String userName;

  private String mobileNo;

  private String emailId;

  private String city;

  private String password;

  public User() {

  }

  public Integer getId() {
```

```
    return id;

  }

  public void setId(Integer id) {

    this.id = id;

  }

  public String getUserName() {

    return userName;

  }

  public void setUserName(String userName) {

    this.userName = userName;

  }

  public String getMobileNo() {

    return mobileNo;

  }

  public void setMobileNo(String mobileNo) {

    this.mobileNo = mobileNo;

  }

  public String getEmailId() {
```

```
    return emailId;

  }

  public void setEmailId(String emailId) {

    this.emailId = emailId;

  }

  public String getCity() {

    return city;

  }

  public void setCity(String city) {

    this.city = city;

  }

  public String getPassword() {

    return password;

  }

  public void setPassword(String password) {

    this.password = password;

  }
}
```

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5. Create a Repository
UserRespository.java:

```
package com.poc.rest.repo;

import org.springframework.data.jpa.repository.JpaRepository;

import com.poc.rest.entity.User;

public interface UserRepstry extends JpaRepository < User, Integer >
{

}
```

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6. Create an Error Model class
ErrorDetails.java:

```
package com.poc.rest.exception;

public class ErrorDetails {

  private Integer status;

  private String message;

  public ErrorDetails(Integer status, String message) {

    super();

    this.status = status;

    this.message = message;

  }
```

```
  public Integer getStatus() {

    return status;

  }

  public String getMessage() {

    return message;

  }
}
```

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7. Create a Custom Exception class UserNotFoundException.java:

```
package com.poc.rest.exception;

import org.springframework.http.HttpStatus;

import org.springframework.web.bind.annotation.ResponseStatus;

@ResponseStatus(value = HttpStatus.NOT_FOUND)

public class UserNotFoundException extends RuntimeException {

  public UserNotFoundException(String message) {

    super(message);

  }
}
```

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→ **@ResponseStatus:** Marks a method or exception class with the status code() and reason() that should be returned. A status code is applied to the HTTP response

when the handler method is invoked and overrides status information detail set by the other means, like ResponseEntity or "redirect:".

8. Create a Global Exception Handler class

```
package com.poc.rest.exception;


import org.springframework.http.HttpStatus;


import org.springframework.http.ResponseEntity;


import org.springframework.web.bind.annotation.ControllerAdvice;


import org.springframework.web.bind.annotation.ExceptionHandler;


import
org.springframework.web.servlet.mvc.method.annotation.ResponseEntity
ExceptionHandler;


@ControllerAdvice


public class GlobalExceptionHandler extends
ResponseEntityExceptionHandler {


  @ExceptionHandler(UserNotFoundException.class)


  public ResponseEntity < ErrorDetails >
userNotFoundException(UserNotFoundException ex) {


    ErrorDetails errorModel = new ErrorDetails(0, ex.getMessage());


    return new ResponseEntity < ErrorDetails > (errorModel,
HttpStatus.NOT_FOUND);


  }


  @ExceptionHandler(Exception.class)
```

```
  public ResponseEntity < ? > globleExcpetionHandler(Exception ex) {

    ErrorDetails errorModel = new ErrorDetails(0, ex.getMessage());

    return new ResponseEntity < > (errorModel,
HttpStatus.INTERNAL_SERVER_ERROR);

  }
}
```

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→ **@ControllerAdvice** is a specialization of the **@Component** annotation which authorizes to handle of exceptions across the whole application in one global exception-handling component. It can act as an interceptor of exceptions that are thrown by methods.
→ **ResponseEntityExceptionHandler** is a convenient base class for **@ControllerAdvice** classes that wish to provide centralized exception handling across all **@RequestMapping** methods through the **@ExceptionHandler** methods of our application. This base class provides an **@ExceptionHandler** method for handling internal Spring MVC exceptions that are raised on the application. This method returns a ResponseEntity for writing to the response with a message converter, in contrast to DefaultHandlerExceptionResolver which returns the output as the ModelAndView.
→ **@ExceptionHandler** is an annotation that is used for handling exceptions in the specific handler classes or the handler methods.

9. Create a Service
UserService.java:

```
package com.poc.rest.service;

import java.util.List;

import com.poc.rest.entity.User;

public interface UserService {

  public List < User > getTheUsersList();

  public void save(User user);
```

```
  public User findById(Integer id);

  public void delete(User user);

}
```

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UserServiceImpl.java:

```
package com.poc.rest.service;

import java.util.List;

import java.util.Optional;

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

import org.springframework.stereotype.Service;

import com.poc.rest.entity.User;

import com.poc.rest.exception.UserNotFoundException;

import com.poc.rest.repo.UserRepstry ;

@Service

public class UserServiceImpl implements UserService {

  @Autowired

  private UserRepstry  userRepo;

  @Override
```

```
  public List < User > getTheUsersList() {

    return userRepo.findAll();

  }

  @Override

  public void save(User user) {

    userRepo.save(user);

  }

  @Override

  public User findById(Integer id) {

    Optional < User > userInfo = userRepo.findById(id);

    User user = null;

    if (userInfo.isPresent()) {

      user = userInfo.get();

    } else {

      throw new UserNotFoundException("The user info is not
available:" + id);

    }

    return user;
```

```
  }

  @Override

  public void delete(User user) {

    userRepo.delete(user);

  }
}
```

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10. Create a Rest Controller class UserController.java:

```
package com.poc.rest.controller;

import java.util.LinkedHashMap;

import java.util.List;

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.DeleteMapping;

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

import org.springframework.web.bind.annotation.PathVariable;

import org.springframework.web.bind.annotation.PostMapping;
```

```
import org.springframework.web.bind.annotation.PutMapping;

import org.springframework.web.bind.annotation.RequestBody;

import org.springframework.web.bind.annotation.RequestMapping;

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

import com.poc.rest.entity.User;

import com.poc.rest.service.UserService;

@RestController

@RequestMapping("/api")

public class UserController {

  @Autowired

  private UserService userService;

  @GetMapping("/users")

  public ResponseEntity < ? > getUser() {

    Map < String, Object > respJsonOutput = new LinkedHashMap <
String, Object > ();

    List < User > userList = userService.getTheUsersList();

    if (!userList.isEmpty()) {

      respJsonOutput.put("status", 1);
```

```
      respJsonOutput.put("data", userList);

      return new ResponseEntity < > (respJsonOutput, HttpStatus.OK);

    } else {

      respJsonOutput.clear();

      respJsonOutput.put("status", 0);

      respJsonOutput.put("message", "Data is not found");

      return new ResponseEntity < > (respJsonOutput,
HttpStatus.NOT_FOUND);

    }

  }

  @PostMapping("/save")

  public ResponseEntity < ? > saveUser(@RequestBody User user) {

    Map < String, Object > respJsonOutput = new LinkedHashMap <
String, Object > ();

    userService.save(user);

    respJsonOutput.put("status", 1);

    respJsonOutput.put("message", "Record is Saved Successfully!");

    return new ResponseEntity < > (respJsonOutput,
HttpStatus.CREATED);
```

```
  }

  @GetMapping("/user/{id}")

  public ResponseEntity < ? > getUserById(@PathVariable Integer id)
{

    Map < String, Object > respJsonOutput = new LinkedHashMap <
String, Object > ();

    User user = userService.findById(id);

    respJsonOutput.put("status", 1);

    respJsonOutput.put("data", user);

    return new ResponseEntity < > (respJsonOutput, HttpStatus.OK);

  }

  @DeleteMapping("/delete/{id}")

  public ResponseEntity < ? > deleteUser(@PathVariable Integer id) {

    Map < String, Object > respJsonOutput = new LinkedHashMap <
String, Object > ();

    User user = userService.findById(id);

    userService.delete(user);

    respJsonOutput.put("status", 1);

    respJsonOutput.put("message", "Record is deleted
successfully!");
```

```
    return new ResponseEntity < > (respJsonOutput, HttpStatus.OK);

  }

  @PutMapping("/update/{id}")

  public ResponseEntity < ? > updateTheUser(@PathVariable Integer
id, @RequestBody User userDetail) {

    Map < String, Object > respJsonOutput = new LinkedHashMap <
String, Object > ();

    User user = userService.findById(id);

    user.setUserName(userDetail.getUserName());

    user.setMobileNo(userDetail.getMobileNo());

    user.setEmailId(userDetail.getEmailId());

    user.setCity(userDetail.getCity());

    user.setPassword(userDetail.getPassword());

    userService.save(user);

    respJsonOutput.put("status", 1);

    respJsonOutput.put("data", userService.findById(id));

    return new ResponseEntity < > (respJsonOutput, HttpStatus.OK);

  }

}
```

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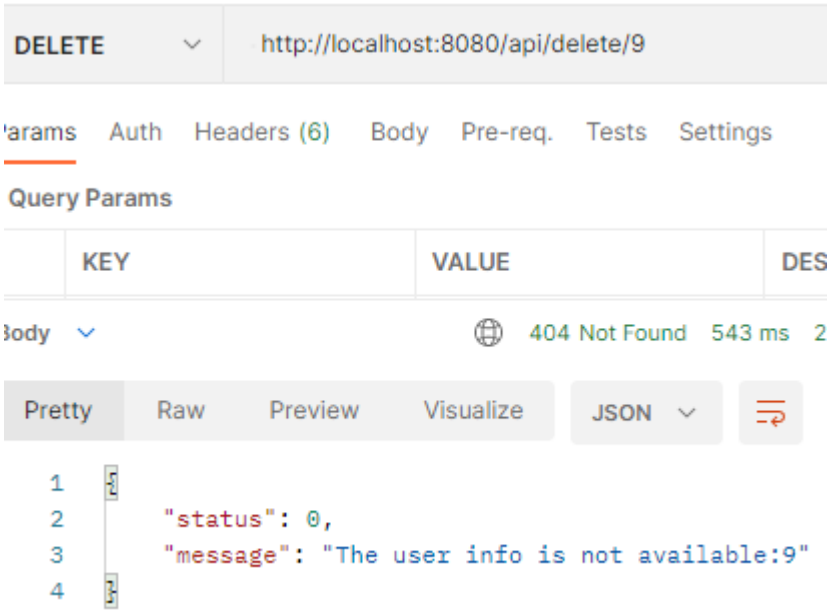
11. Run the Project
There is no user with id 9.
GET Type: http://localhost:8080/api/user/9



Conclusion:
This example is explained **How to customize the exception and return a JSON response? How to create a Global Exception Handler class? What is a @ControllerAdvice annotation? What is a @ExceptionHandler annotation? What is a @ResponseStatus?**