

# 404 NOT FOUND



# HTTP Web services

## POST

# Objectives

- Implement Java code that can send `POST`, `PUT`, and `DELETE` requests that send data to the server in JSON request body
- Handle an error in network communication properly
- Handle a response containing a 4xx status code
- Use Postman to make a `PUT`, `POST`, or `DELETE` request

# Spring Framework

- Powerful, lightweight framework used for application development
- Supports various other frameworks
  - Struts, Hibernate, Tapestry, EJB, JSF, etc.
- Helps solve many technical problems
- Comprehensive tool for supporting applications using Java

# Spring Framework

- POJO based
- Modular
- IoC (Inversion of Control)
- Integration with existing frameworks
- Testable
- Web MVC
- Central Exception handling
- Lightweight

# More Request Types

- GET: reads the data
- POST: Ideally suited for inserting new data into the data source.
- PUT: Ideally suited for updating an existing record within a data source.
- DELETE: Ideally suited for removing an existing record from the data source.

For the POST & PUT requests we are converting an object to data

# GET vs. POST

## GET

- Can be cached
- Remain in browser history
- Can be bookmarked
- Should never be used for sensitive data
- Maximum length of 2048 characters
- Used to request data

## POST

- Are never cached
- Do not remain in browser history
- Cannot be bookmarked
- Have no restrictions on length

# Implementing a POST

Suppose the documentation for the API specifies POST as well :

(POST) *http://localhost:3000/hotels/{id}/reservations*

```
String API_BASE_URL = http://localhost:3000/ ;
RestTemplate restTemplate = new RestTemplate();
HttpHeaders headers = new HttpHeaders();
headers.setContentType(MediaType.APPLICATION_JSON);

// Where reservation is an object of type Reservation.
HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);

reservation = restTemplate.postForObject(BASE_URL + "hotels/" + reservation.getHotelID() +
"/reservations", entity, Reservation.class);
```

Note that POST requests have a body and header as well!



Let's Code!

# Implementing a PUT

Suppose the API's documentation states that there is a PUT endpoint:  
(PUT) *<http://localhost:3000/reservations/{id}>*

Using a REST template we can implement the following:

```
String API_BASE_URL = http://localhost:3000/;  
RestTemplate restTemplate = new RestTemplate();  
HttpHeaders headers = new HttpHeaders();  
headers.setContentType(MediaType.APPLICATION_JSON);  
  
// Where reservation is an object of type Reservation.  
HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);  
  
restTemplate.put(API_BASE_URL + "reservations/" + reservation.getId(), entity);
```

# Implementing a DELETE

Suppose the API's documentation states that there is a DELETE endpoint: (DELETE) *<http://localhost:3000/reservations/{id}>*

Using a REST template we can implement the following:

```
String API_BASE_URL = http://localhost:3000/;  
RestTemplate restTemplate = new RestTemplate();  
// Where id is an int:  
restTemplate.delete(BASE_URL + "reservations/" + id);
```

Let's Create the PUTs & DELETEs requests

# Successful status codes

Successful POST, PUT and Delete return successful status codes:

POST – returns 201

PUT – 200 or 204

DELETE – 202 or 204



# Exceptions and Error Handling

There are 2 exceptions to be aware of when dealing with APIs:

- `RestClientResponseException` – for when a status code other than a 2XX is returned.
- `ResourceAccessException` – for when there was a network issue that prevented a successful call

```
try {  
    restTemplate.put(API_URL + "users/remove/23");  
}  
catch (ResourceAccessException ex) {  
    // Handle network I/O errors  
    System.out.println(ex.getMessage());  
}  
catch (RestClientResponseException ex) {  
    // Handle response status codes: 1xx, 3xx, 4xx, 5xx  
    System.out.println(ex.getRawStatusCode());  
}
```

We should use try catch blocks to handling these exceptions

```

private Reservation makeReservation(String CSV) {
    String[] parsed = CSV.split(",");

    // invalid input (
    if (parsed.length < 5 || parsed.length > 6 ) { false
        return null;
    }

    // Add method does not include an id and only has 5 strings - need to add an id
    if (parsed.length == 5) {
        // Create a string version of the id and place into an array to be concatenated
        String[] withId = new String[6];
        String[] idArray = new String[]{new Random().nextInt(1000) + ""};
        // place the id into the first position of the data array
        System.arraycopy(idArray, 0, withId, 0, 1);
        System.arraycopy(parsed, 0, withId, 1, 5);
        parsed = withId;
    } (set parsed to hold the reference of withId)
    return new Reservation(
        Integer.parseInt(parsed[0].trim()),
        Integer.parseInt(parsed[1].trim()),
        parsed[2].trim(),
        parsed[3].trim(),
        parsed[4].trim(),
        Integer.parseInt(parsed[5].trim())
    );
}

```

parsed

|         |              |             |              |        |
|---------|--------------|-------------|--------------|--------|
| 1       | Minnie Mouse | 04/23/21    | 04/30/21     | 4      |
| hotelID | fullName     | checkInDate | checkoutDate | guests |

withId

|       |   |              |          |          |   |
|-------|---|--------------|----------|----------|---|
| "899" | 1 | Minnie Mouse | 04/23/21 | 04/30/21 | 4 |
|-------|---|--------------|----------|----------|---|

idArray

|       |
|-------|
| "899" |
|-------|

copy from the parsed array starting in position 0  
to the withId array starting in position 1 - copy 5 elements

copy from the idArray starting in position 0  
to the withId array starting in position 0 - copy 1 element

```
private HttpEntity<Reservation> makeEntity (Reservation reservation) {  
    HttpHeaders headers = new HttpHeaders();  
    headers.setContentType(MediaType.APPLICATION_JSON);  
    HttpEntity<Reservation> entity = new HttpEntity<>(reservation, headers);  
    return entity;  
}
```



Let's Code!

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reservation.getHotelID() + "/reservations", entity, Reservation.class);
```

```
String API_BASE_URL = http://localhost:3000/;
RestTemplate restTemplate = new RestTemplate();

// Where id is an int:
restTemplate.delete(BASE_URL + "reservations/" +
id);
```

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