# Exercises: HTTP Protocol

Problems for exercises and homework for the "Java Web Development Basics" course @ SoftUni. Submit your solutions on the **course page** of the **current instance**.

## 1. Parsing HTTP Requests

Implement a simple java application which parses HTTP Requests and returns an appropriate response based on the Request.

You will receive an input of several lines. The **first input line** will contain several **URL paths**, separated by **spaces**.

**Example**: **`/path /register /login /products/create /admin/users/all`**

You should store these paths, they are the **valid URL**s.

The next **several input lines** will contain **information** about a simple **HTTP Request**.

**Example**:

```
POST /url HTTP/1.1
Date: 17/01/2019
Host: localhost:8000
Content-Type: application/xml
Authorization: Basic UGVzaG8=

name=Yum&quantity=50&price=10
```

You must implement a simple **parser**, which parses **specific** information, from the given **request data**, and returns a well-formatted **HTTP Response** in **text format**.

You must process the **Request Line**.

- Check if the **URL** is present in the **valid URLs**

You may be given any header, but you must only process the **Date**, **Host**, **Content-Type** headers.

- **Attach** the **headers** to the **HTTP Response**'s **headers**
- If any of the headers is missing you **don't need** to do anything.
- Skip the **Authorization** header for this

You must also process the **Request Body**.

- Split the **body parameters**

In the end you should return a Response which contains the processed data from the request in an aggregated format.

```
HTTP/1.1 200 OK
Date: 17/01/2019
Host: localhost:8000
Content-Type: application/xml

Greetings Pesho! You have successfully created Yum with quantity - 50, price - 10.
```

As you can see the **Response**'s **Headers** are the same as the **Request**'s **Headers**. The Response Body is the only new thing. It is created in the following format.

**`Greetings {username}! You have successfully created {firstRequestBodyParameterValue} with {secondRequestBodyParameterName} - {secondRequestBodyParameterValue}, {thirdRequestBodyParameterName} - {thirdRequestBodyParameterValue}.`**

The **`username`** is extracted by **decoding** with **Binary64Decoder** the **Authorization Header's value** (after the **`Basic`** credential key).

**Example**: **`Authorization: Basic UGVzaG8=`** -> **`Pesho`**

Then you must format the **`Request`**'s **body parameters** and place them in the **`Response content`**.

**NOTE**: If the **URL** is **invalid** (**not present** in **valid URL**s **given** on the **first line**), you should return an HTTP Response in the same format but this time with:

- **`Status`** - **404 Not Found**
- **`Response Body`** – "**The requested functionality was not found.**"

**NOTE**: If the **Authorization** header is **missing**, you should return an HTTP Response in the same format, but with:

- **`Status`** - **401 Unauthorized**
- **`Response Body`** – "**You are not authorized to access the requested functionality.**"

**NOTE**: If the **`Request`**'s **`Method`** is **POST** and there is **NO** body parameters, you should return an HTTP Response in the same format but with:

- **`Status`** – **400 Unauthorized**
- **`Response Body`** – "**There was an error with the requested functionality due to malformed request.**"

If the **Request**'s **Method** is **GET** just print "**`Greetings {username}!`**" as Response **body**.

## Example

| Input | Output |
|---|---|
| /url /login /register<br>POST /url HTTP/1.1<br>Date: 17/01/2019<br>Host: localhost:8000<br>Content-Type: application/xml<br>Authorization: Basic UGVzaG8=<br><br>name=Yum&quantity=50&price=10 | HTTP/1.1 200 OK<br>Date: 17/01/2019<br>Host: localhost:8000<br>Content-Type: application/xml<br><br>Greetings Pesho! You have successfully created Yum with quantity - 50, price - 10. |
| /url /login /register<br>POST /url HTTP/1.1<br>Date: 17/01/2019<br>Host: localhost:8000<br><br>name=Yum&quantity=50&price=10 | HTTP/1.1 401 Unauthorized<br>Date: 17/01/2019<br>Host: localhost:8000<br><br>You are not authorized to access the requested functionality. |
| /create /update<br>POST /url HTTP/1.1<br>Host: localhost:8000<br>Authorization: Basic UGVzaG8= | HTTP/1.1 404 Not Found<br>Date: 17/01/2019<br>Host: localhost:8000 |

| | |
|---|---|
| name=Yum&quantity=50&price=10 | The requested functionality was not found. |
| /url /update<br>POST /url HTTP/1.1<br>Host: localhost:8000<br>Authorization: Basic UGVzaG8= | HTTP/1.1 400 Bad Request<br>Date: 17/01/2019<br>Host: localhost:8000<br><br>There was an error with the requested functionality due to malformed request. |

## 2. Create classes

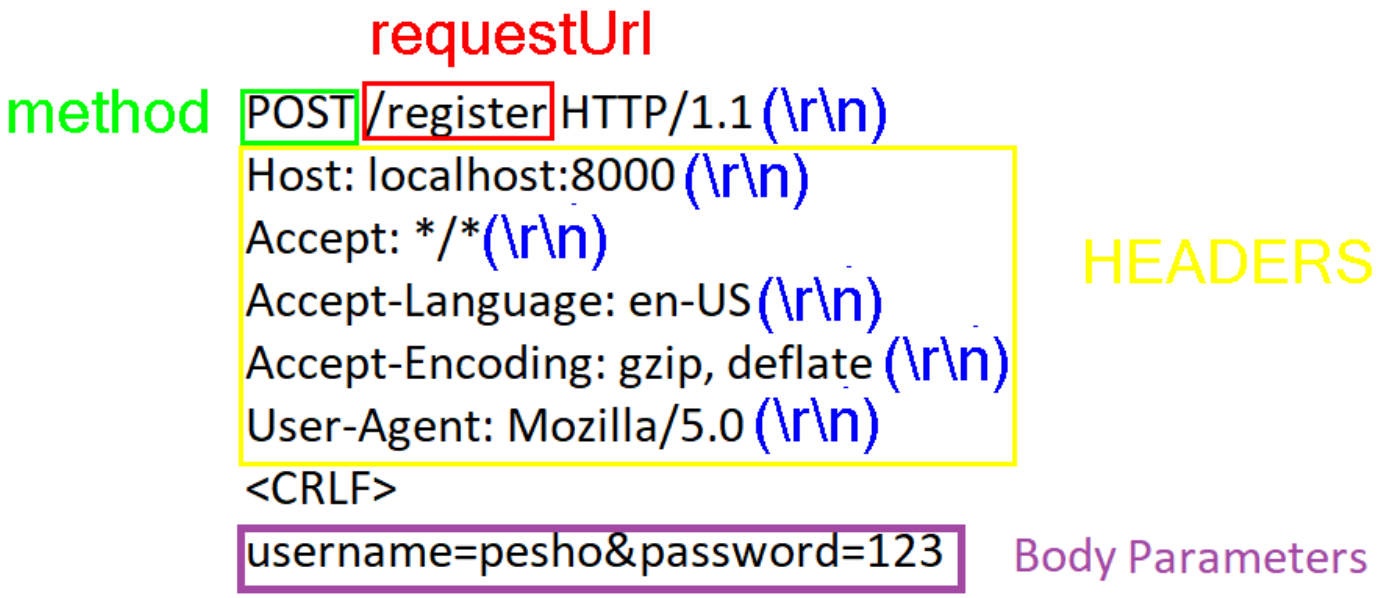
Now, all the parsing logic from the previous task should be aggregated into 2 classes.

The **HttpRequest**:

```
public interface HttpRequest {
    HashMap<String, String> getHeaders();

    HashMap<String, String> getBodyParameters();

    String getMethod();

    void setMethod(String method);

    String getRequestUrl();

    void setRequestUrl(String requestUrl);

    void addHeader(String header, String value);

    void addBodyParameter(String parameter, String value);

    boolean isResource();
}
```

Create a class which implements this interface, and write the logic behind the methods. The class should have a **method**, a **requestUrl**, a collection of **headers** and a collection of **bodyParameters**.

Remember, a request looks like this:




You should receive the **string** in the **constructor** of the **`Request`** class, exactly as shown above, with **every line**, **delimitered** by "**`\r\n`**". **Everything** should be **parsed** and **formatted INSIDE** the class.

The **`isResource()`** method should **check** if the **`requestedUrl`** is a **resource** and **not an actual route**, and should return a **boolean result**.

## HttpResponse

And the **`HttpResponse`**:

```
public interface HttpResponse {
    HashMap<String, String> getHeaders();

    int getStatusCode();

    byte[] getContent();

    byte[] getBytes();

    void setStatusCode(int statusCode);

    void setContent(byte[] content);

    void addHeader(String header, String value);
}
```

Same as the **`HttpRequest`** above, you should implement this class, so that it **corresponds** to the **behaviour** defined by the **interface**.

The **`getBytes()`** method should **return** the **whole response** (**ResponseLine** + **Headers** + **Content**) as **`byte array`**.