Exercises - HTTP

You can do most of the exercises in this document by yourself, but they are meant as exercises with a supplementary discussion in the class, so you will gain a lot more from participating in the class.

1) Monitoring HTTP Headers 1

Create a new NetBeans Maven Web-project.
For this exercise we will just use the default index.html generated by NetBeans.

Press the run button. When the file is shown in the browser (Chrome), open the developer window (Ctrl-shift-j) and press F5

Observe and explain each of the values monitored (use view source to see the plain messages).

Hints: In order to better observe the values related to Caching you might need to:

Go back to NetBeans and rename your file to index1.html

Go back to your browser and (while the developer window is open) change the url to point to the new file.

Observe the values

- At first the browser doesnt notice that the site has been updated(cached),

Press F5 and observe the values again.

- It notice the page is wrong and gives us a 404.

Explain what you see.

2) Monitoring HTTP Headers 2

Add an image to the page

Add an external style sheet to the page (<link rel="stylesheet" type="text/css" href="myStyle.css">)

Reload the page again, observe the request being made, and explain the purpose of the Connection: header.

- We can see that we request the picture and the stylesheet. I dont have the stykesheet so that one will give a 404. the picture is loaded fine and gives a 200 code.

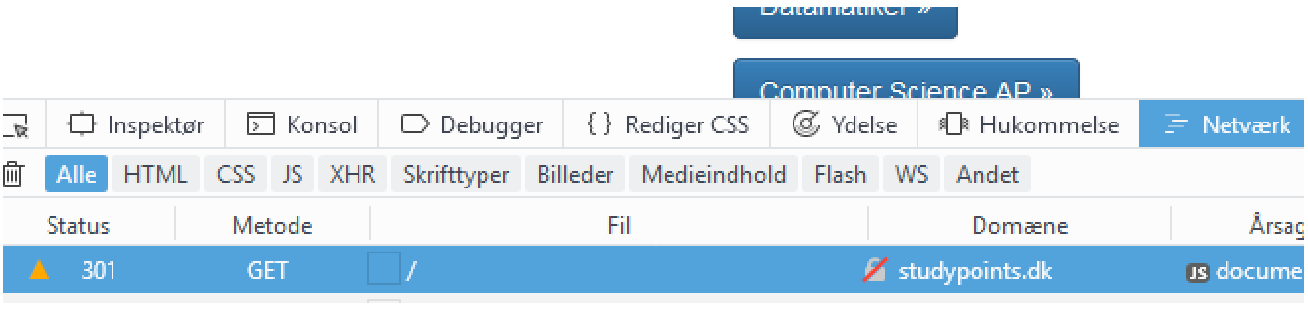
3) Monitoring HTTP Headers 3

In Google Chrome enter this address (with the developer window open, and **exactly** as it is spelled):

http://studypoints.dk:

Explain, as well as you can (at a conceptual level), the first two request monitored (notice where you requested to go, and where you actually ended).

Write down your observations for the hand-in



Status	Metode	Fil	Domæne	Årsag
▲ 301	GET	/	studypoints.dk	JS docume

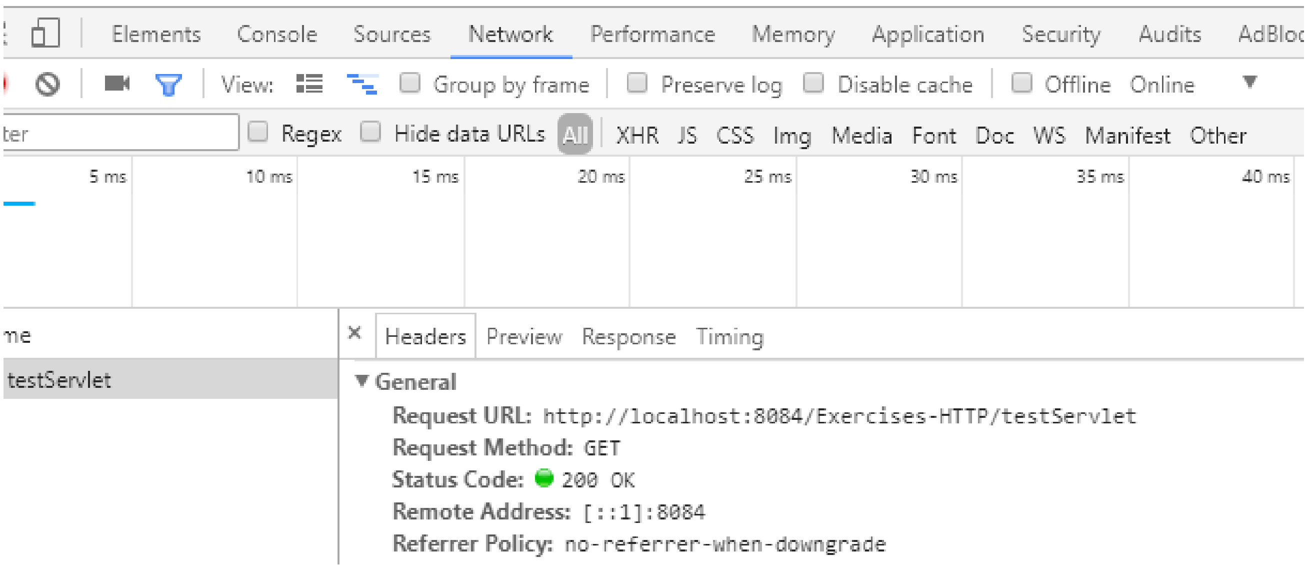
As you can see on the picture we get a 301, permanently redirected. It direct us to the https://studypoints.dk!

4) Get HTTP Request Headers on the Server

We have seen that a HTTP request from a Browser typically includes a lot of headers with information related to the client.

This information is available to a servlet via the request object. Create a Servlet, which should output this information in a table as sketched below (or in any way you like, don't think about presentation).

Hints: Use the request objects getHeaderXXX methods.



```
▼ General
    Request URL: http://localhost:8084/Exercises-HTTP/testServlet
    Request Method: GET
    Status Code: ● 200 OK
    Remote Address: [::1]:8084
    Referrer Policy: no-referrer-when-downgrade
```

As you can see the serlvet is up and running.

5) Get/Post-parameters

Create a new html-file in the web-project made in exercise 1.
Add a form to the file, including two text input boxes and a submit button as sketched below:

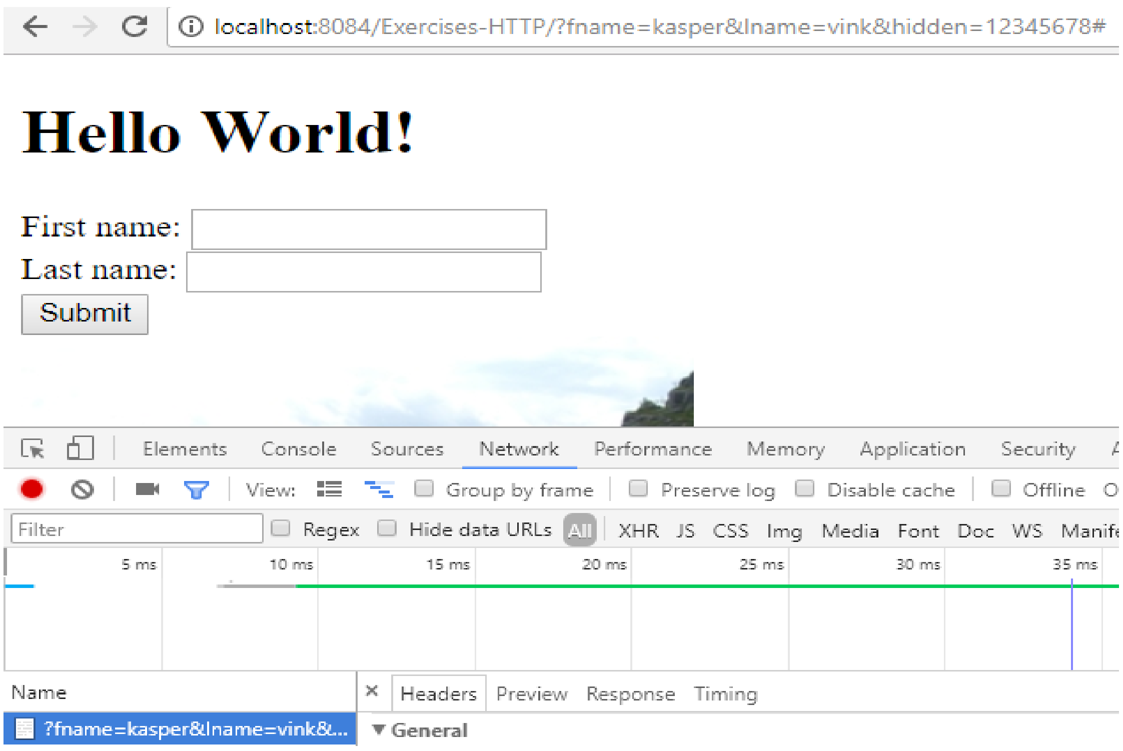
Add an extra input field to the form with type="hidden", name="hidden" and value=12345678.

Add the value "#" for the forms action attribute.

Set the forms method-attribute to the value "GET" (actually the default value) and test the form. Observe what happens in your browsers address field.

Change the forms method-attribute to the value "POST" and test the form. Observe the change in your browsers address field. See whether you can figure out, how parameters are passed in, for a POST request.

<u>Write down your observations for the hand-in</u>


localhost:8084/Exercises-HTTP/?fname=kasper&lname=vink&hidden=12345678#

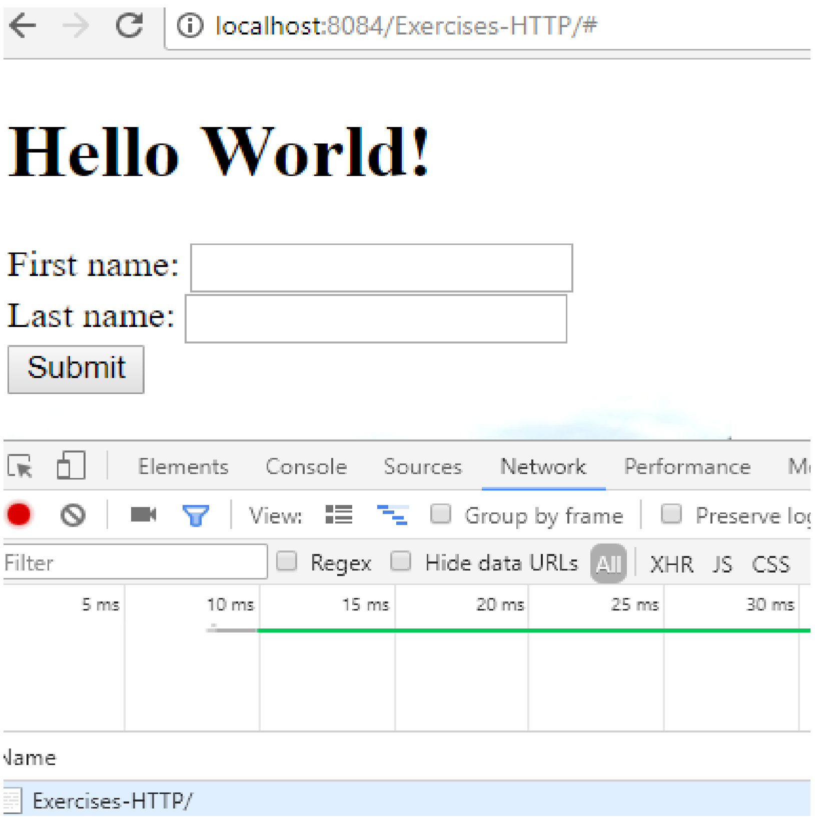
Hello World!

First name:
Last name:
Submit

Elements Console Sources Network Performance Memory Application Security
View: Group by frame Preserve log Disable cache Offline
Filter Regex Hide data URLs All XHR JS CSS Img Media Font Doc WS
Name
Headers Preview Response Timing
General

?fname=kasper&lname=vink&...

As we can see the get method adds the input to the url and sends us to the corosponding adress.
The post method is hiding the input and will just add a # to the url.


localhost:8084/Exercises-HTTP/#

Hello World!

First name:
Last name:
Submit

Elements Console Sources Network Performance
View: Group by frame Preserve log
Filter Regex Hide data URLs All XHR JS CSS
Name

Exercises-HTTP/

Session and Cookies

For the next two exercises/demos you should create a new web-project.

Both the demos uses a Servlet.

6) Sessions (Session Cookies)

In your web project use the wizard to generate a new Servlet

a) Enter *SessionDemo* as the name of the Servlet and *servlets* as package name
b) Right click the file and select Run to see "what is does"

c) Change the generated processRequest(..) method as sketched below.

```
protected void processRequest(HttpServletRequest request,
                              HttpServletResponse response)
        throws ServletException, IOException {
    String name = request.getParameter("name");
    if (name != null) {
      request.getSession().setAttribute("name", name);
    } else {
      name = (String) request.getSession().getAttribute("name");
    }
    response.setContentType("text/html;charset=UTF-8");
    try (PrintWriter out = response.getWriter()) {
      out.println("<!DOCTYPE html>");
      out.println("<html>");
      out.println("<head>");
      out.println("<title>Servlet SessionDemo</title>");
      out.println("</head>");
      out.println("<body>");
      if (name != null) {
        name = (String)request.getSession().getAttribute("name");
        out.println("<p> Welcome " + name  + " !</p>");
      } else {
        out.println("<h2>Please enter your name, and submit</h2>");
        out.println("<form action='SessionDemo'>");
        out.println("<input type='input' name='name'>");
        out.println("<input type='submit'></form>");
      }
      out.println("</body>");
      out.println("</html>");
    }
  }
```

d) Enter your name and press submit, copy the URL in the browser into your clipboard, close the tab (but not the browser) and load the page again in a new tab using the URL in the clipboard.
e) While doing the things in step e, you should monitor the content of your local cookies and the HTTP requests being sent, using the development tools in Chrome.
f) Most import part of this exercise:
Explain (on paper) using both words and images how the Server can maintain state between subsequent calls even when using a stateless protocol

Add a readme-file for your observations (f) for the hand-in

7) Persistent Cookies

a) In your web project use the wizard to generate a new servlet
b) Enter *CookieDemo* as the name of the Servlet and *servlets* as package name
c) Change the generated processRequest(..) method as sketched below.

```
protected void processRequest(HttpServletRequest request, HttpServletResponse response)
                    throws ServletException, IOException {
String name = request.getParameter("name");
if (name != null) {
        Cookie cookie = new Cookie("username", name);
        cookie.setMaxAge(60 * 60 * 24 * 365);
        response.addCookie(cookie);
}
Cookie[] cookies = request.getCookies();
if (cookies != null) {
        for (Cookie cookie : request.getCookies()) {
        if (cookie.getName().equals("username")) {
                name = cookie.getValue();
        }
        }
}
response.setContentType("text/html;charset=UTF-8");
try (PrintWriter out = response.getWriter()) {
        /* TODO output your page here. You may use following sample code. */
        out.println("<!DOCTYPE html>");
        out.println("<html>");
        out.println("<head>");
        out.println("<title>Servlet CookieDemo</title>");
        out.println("</head>");
        out.println("<body>");
        if (name != null) {
        out.println("<p> Welcome " + name + " !</p>");
        } else {
        out.println("<h2>Please enter your name, and submit</h2>");
        out.println("<form action='CookieDemo'>");
        out.println("<input type='input' name='name'>");
        out.println("<input type='submit'></form>");
        }
        out.println("</body>");
        out.println("</html>");
}
}
```

d) Enter your name and press submit, copy the URL in the browser into your clipboard, close the tab (but not the browser) and load the page again in a new tab using the URL in the clipboard.
e) Now close your browser (you could even close your laptop, but don't ;-) , open it again and load the page again using the URL in the clipboard
f) While doing the things in step e, you should monitor the content of your local cookies and the HTTP requests being sent, using the development tools in Chrome.
g) Most import part of this exercise:
h) Explain (on paper) how Cookies can be used to maintain "state" on the client between subsequent calls to a server, even when a browser has been closed down.

<u>Add a readme-file for your observations for the hand-in</u>