

Assignment 1

Recommended readings

- <https://docs.microsoft.com/en-us/windows-server/administration/windows-commands/nslookup> or [https://man.cx/nslookup\(1\)](https://man.cx/nslookup(1))
- <https://developers.google.com/web/tools/chrome-devtools/#discover>
- <http://httpd.apache.org/docs/2.4/getting-started.html>
- <https://developer.mozilla.org/en-US/docs/Web/HTML/Attributes>
- <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/footer>
- <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/a>

Exercise 1 – Domain Name Service, URIs, Protocols

Explain the idea of DNS record types and the difference between A, MX, NS, and TXT records. Use `nslookup` command line tool to find out the following information:

- a) The IP address of the server with the domain name www.ages.at. Additionally, find out how long your currently cached version of the corresponding record with this information is still valid and which DNS server is responsible for this zone.
- b) Explain all components of following URI:
`https://john:JPW@www.example.com:443/forum/posts/?topic=webtec&order=latest#top`

Exercise 2 – HTTP Requests

- a) Use the *Developer Tools* of your web browser (e.g., Chrome) to inspect the HTTP requests when opening the website of www.orf.at and answer the following questions:
 - How many requests are sent, how much data is transferred, and how long does it take to load the site from the server?
 - What is the *response status code* of the first request?
 - What type of web server is serving this website?
 - What types of resources are requested?
 - Which request is the slowest?
- b) Repeat the procedure and answer the same questions for www.kaernten.at
- c) Open up www.google.at, clear the content of the network inspection window and enter the word “Klagenfurt” into the search field. While entering the word look at the network requests and explain what happens.

Exercise 3 – Setting up Apache

Install Apache HTTP Server version 2.4 and open <http://localhost> in your browser. You should see the text “It works”.

Additionally, answer the following questions:

Describe the purpose of `conf/httpd.conf` and explain the meaning of the following terms:

- ServerRoot
- DocumentRoot
- Virtual Host

What is the loopback IP address `127.0.0.1` and the hostname `localhost` used for?

What is the purpose of the `index.html` document? Find the document and edit its content and open <http://localhost> again. Create a folder “mytest” in the documents root folder and add some random files and folders to the new folder. Open <http://localhost/mytest> in your browser and explain the result.

Additional Info:

- **For MS Windows** you can obtain binaries for apache from <https://www.apachelounge.com/download/>. Extract the contents of the download to `c:\programme\apache`. For starting the server execute the file `c:\programme\apache\Apache2.4\bin\httpd.exe`
- **For Linux:** Use your favorite package manager and install apache httpd 2.4.
- **For Mac:** Have a look at: https://medium.com/@aaron_lu1/apache-use-macos-built-in-apache-1f17beeb3f0a

Exercise 4 – HTML Page 1

Explain the notion behind HTML elements, tags and attributes. Give examples for each term. What is the difference between block elements and in-line elements?

Write a simple web page that looks as follows using HTML only (no CSS): Test this page with your Apache setup by placing it in the DocumentRoot folder (see previous exercise).

This is a top-level heading

This first paragraph loads the AAU logo directly from <https://www.aau.at/>, with a square dimension of 100x100 pixels:



The second paragraph contains an ordered list with nested unordered lists:

1. First item
 - Property 1
 - Property 2
2. Second item
 - Property 1
 - Property 2
3. Third item
 - Property 1
 - Property 2

This inline-span contains a link to the website of *Alpen-Adria-Universität Klagenfurt*, opening in a new window: [Click here](#)
Finally, this document contains a horizontal line of size 1.

Exercise 5 – HTML Page 2

a) Create the following HTML files:

- `index.html`
- `img1.html`
- `img2.html`
- `img3.html`

The folder `ex1-5`, contains three image files `img1.jpg`, `img2.jpg`, `img3.jpg`, and the corresponding thumbnails `img1-thumb.jpg`, `img2-thumb.jpg`, `img3-thumb.jpg`, and text files containing an image title and a short description of each image.

The `index.html` page should contain the heading “Image Gallery” and then show the thumbnails of each image. When hovering an image with the mouse, the image title should be shown. When clicking on an image the corresponding page (i.e. `img1.html` for `img1.jpg`) should be opened.

The details pages for each image should contain the image title as title and as heading. Then the image should be shown. After the image the textual descriptions should be displayed. When hovering over the image the text “Open image [imagetitle] in full” should be shown. When clicking on the image the image jpeg file should be opened in a new tab.

At the bottom of each image page there should be a link to the next and to the previous image page. In addition, there should always be a link to “home” navigating to the index page.

Put all pages under the document root of your apache installation and test the web page.

b) Change `img1.html` to `img3.html` in such a way that after 5 seconds the next picture page is loaded. After the last image, the first one should be loaded.