



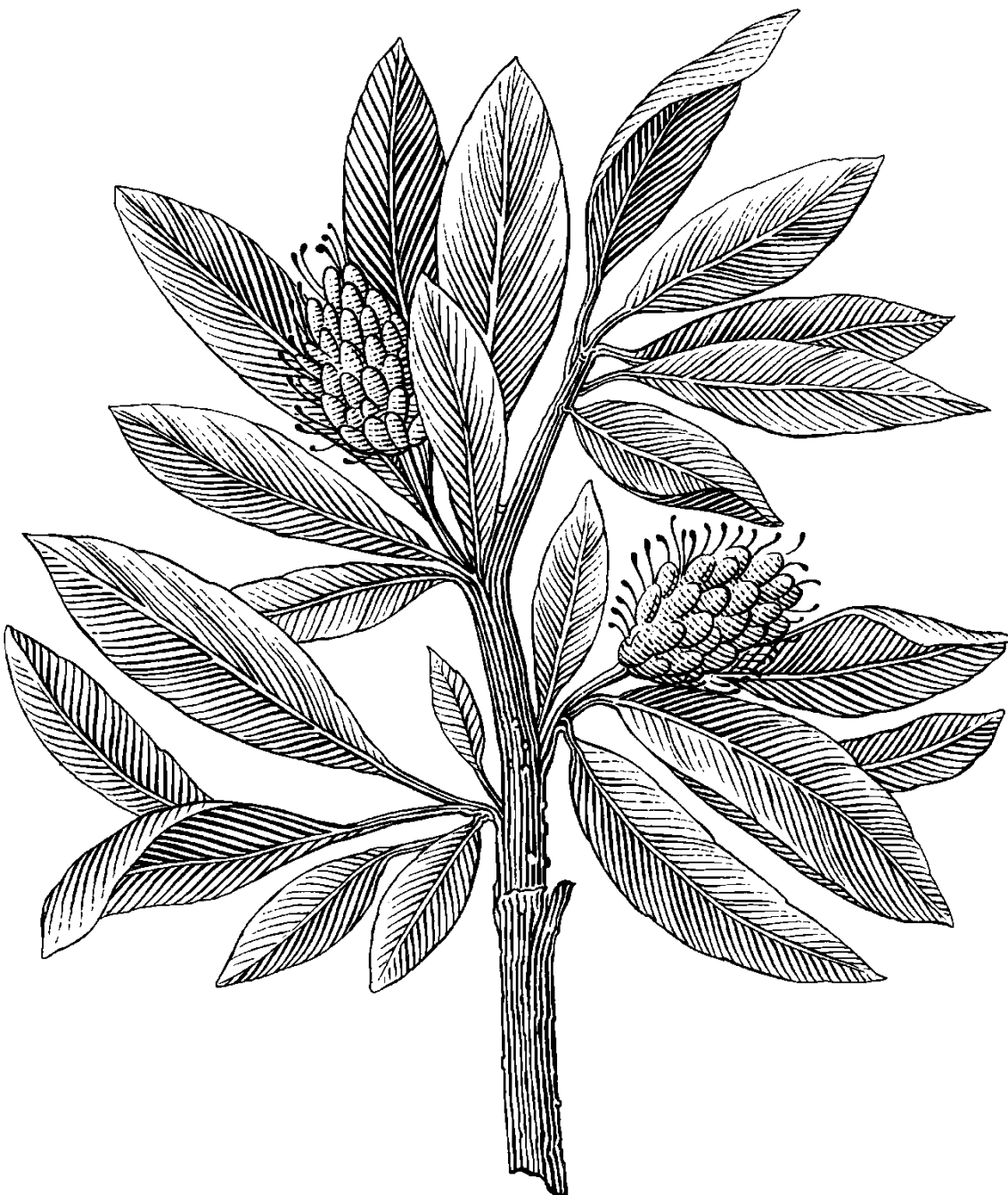
**Linneuniversitetet**  
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## Report

# Assignment 2

*1DV701*

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## Problem 1

Before describing problems from assignment 2 I would like to present the results of the testing of my code in accordance with tasks from this assignment. Please look below.

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.2604]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Katja\Desktop\network security\es225hi_assign2\task2>python testa2u1.py
OK: Main index page
OK: Named page
OK: Named page
OK: Clown PNG
OK: Bee PNG
OK: World PNG
OK: Index a
OK: Page a
OK: Fake page b
OK: Index b
OK: Page b
OK: Fake Page c
OK: Index c
OK: Page c
OK: Page fail
OK: Page in dir fail
OK: Dir no index fail
OK: Image fail

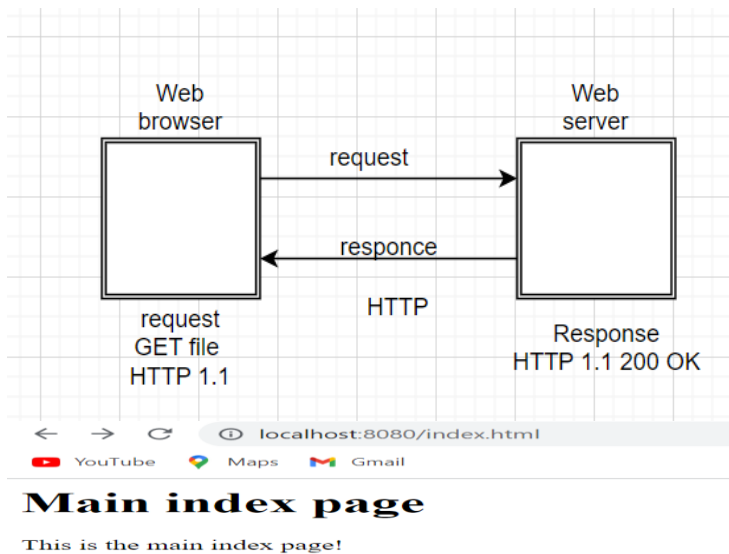
C:\Users\Katja\Desktop\network security\es225hi_assign2\task2>
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.2604]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Katja\Desktop\network security\es225hi_assign2\task2\src>javac Server.java

C:\Users\Katja\Desktop\network security\es225hi_assign2\task2\src>java Server 8080 public
publicWeb server is running...
Listening for connection on port 8080
directory public
Press ctrl+c to terminate the program
Host: 0:0:0:0:0:0:1:49721
Request: Method GET, Path: /, Version: HTTP/1.1
Server request file exist
Closed connection from 0:0:0:0:0:0:1:49721
Assigned new client to a separate thread
Host: 0:0:0:0:0:0:1:49722
Request: Method GET, Path: /favicon.ico, Version: HTTP/1.1
Server request file does not exist
Closed connection from 0:0:0:0:0:0:1:49722
Assigned new client to a separate thread
Host: 0:0:0:0:0:0:1:49723
Request: Method GET, Path: /index.html, Version: HTTP/1.1
Server request file exist
Closed connection from 0:0:0:0:0:0:1:49723
Assigned new client to a separate thread
Host: 0:0:0:0:0:0:1:49724
Request: Method GET, Path: /fun.xml, Version: HTTP/1.1
Server request file does not exist
Closed connection from 0:0:0:0:0:0:1:49724
Assigned new client to a separate thread
```

## 1.1 Working HTTP server with HTML+HTM support.



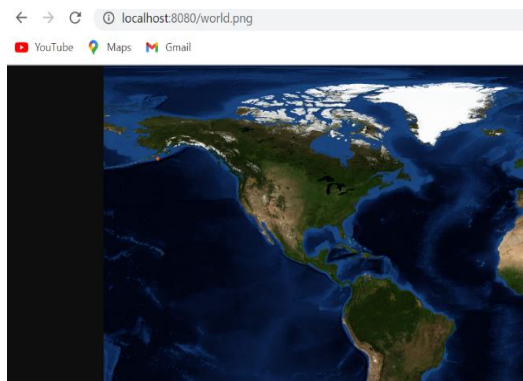
On a web server, the HTTP server is responsible for processing and responding to incoming requests. Upon receiving a request, the HTTP server checks if the requested URL matches an existing file. If yes, then the web server sends the contents of the file back to the browser. If not, the server will check if it should dynamically generate a file for the request (see Static and dynamic content). If none of these options is possible, the web server returns an error message to the browser, most commonly 404 Not Found.

That is, the web server serves HTML files and HTM files (HTM file is an HTML-formatted web page used by web browsers such as Google Chrome, Microsoft Edge, and Mozilla Firefox) using the Get method in the HTTP protocol.

For solving this task, I have done the following things:

In the class Server. It has been declared attributes: port and directory. The function void start(), var socket = server.accept() for connection to be made to this socket and accepts it, create new thread and start interacting with the client, assign new requests; class Client: reading input from the client and check request. The class ClientManager: reading file (reading bytes), obtains input bytes from a file, reading streams of raw bytes (for ex image data), checking type of files, creating response to the request.

## 1.2 Image support.



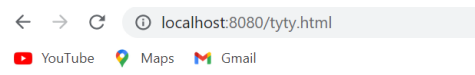
Webserver supports PNG.files (images). Class ClientManager, the method `public String getContentType(String requestedFile)` helps to realize the type of the file (png).

## 1.3 Safety against escaping the root.

To understand how to solve this problem, the following concept helps with it: directory traversal (file path traversal) is a web security vulnerability that allows an attacker to read arbitrary files on the server where the application is running. That is, we can say what happens reading arbitrary files through a directory traversal using this sequence `../` climbs from `/public/users1/picture/images` to the root of the file system. On Windows, both `../` and `..\` are valid directory traversal sequences, and an equivalent attack to extract a standard file is possible.

Briefly: Users are unable to access files bypassing the directory. To solve this problem, I check the request, if the request is empty or null, then a 500 error is sent (please look the class Client).

## 1.4 Exception handling.



### **Resource not found Error 404**

The requested resource could not be found.

It means that a user can request a file which doesn't exist and the web server has to serve such requests and handle exceptions.

I have the folder exceptions which contains the following classes: `ErrorFileNotFound` (if file cannot be found) etc. That is error can happen during running of the web server. I have used hierarchy. The class `ErrorFileNotFound` inherits from the `Webexception` class.

### Program arguments in correct order.

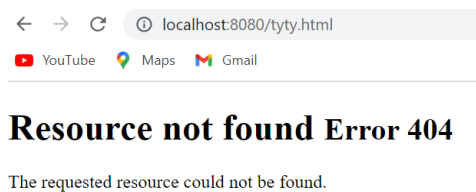
The following arguments such as port and path (in our case relative path in accordance with this assignment) have to be in a certain order to be accepted by the web server. I have implemented the code which gives this possibility. The class Server the method public static void main(String[] args). There I have defined the port and path in a specific order.

### Console output.

Web server gives response for the requests, that is it prints to console. It helps to see that connections have been done, the result of the requests.

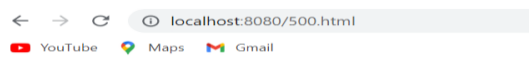
## **Problem 2**

### 2.1 404 Implementation



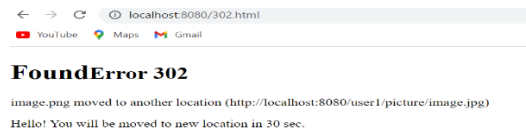
The 404 not found error: This HTTP status code means that the requested page cannot be found on the website's server. If the page doesn't exist then it will be on the screen for the user error 404, resource not found.

### 500 Implementation

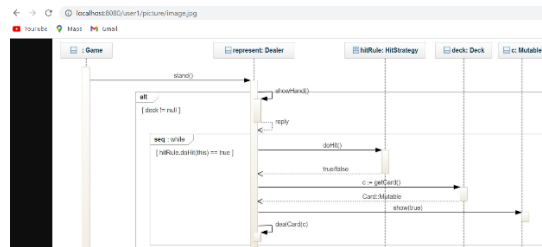


500 Internal Server Error: it means that the server encountered an unexpected condition that prevented it from fulfilling the request.

## 2.3 302 Implementation



### Redirect to other location:



The 302 error is a redirection message that appears when a user tries to load a page moved to a new location.

I have created the folder user1, in this folder is image.png. If a user requests the file 302.html then web server gives message that it is error 302 and it will be redirected. In few seconds the user can see the image. That is web server redirected to another location.