BIRZEIT UNIVERSITY

Department of Electrical and Computer Engineering

ENCS3320-Computer Networks

Project#1 due 19/11/2021

1- **This is a group project, so you are allowed to work in groups of max 3 students**
2- **Do not use ready libraries to implement the project. Use socket programming**

Part1:

Make sure that your computer is connected to the internet and then run the following commands:

1- Ping a device in the same network, e.g. from a laptop to a smartphone

2- ping b.root-servers.net

3- tracert b.root-servers.net

4- nslookup b.root-servers.net

Provide a screenshot of the runs and explain briefly the output.

Par2:

Using socket programming, write a program in python or java or C that uses HEAD method of HTTP to get HTTP response from a specific webserver. It should measure the time elapsed from sending the HTTP request until it received the HTTP response. It should ask the user to enter a URL which will be used in the HTTP request. It should print the elapsed time as well as the HTTP response.
Provide the code with comments and well as several runs of the program

Part3:

Using socket programming, implement a simple but a complete web server in python or java or C that is listening on port 6000. The user types in the browser something like http://localhost:6000/ or http://localhost:6000/index.html or http://localhost:6000/image.png, etc

The program should check

1- if the request is **/ or /index.html (for example localhost:6000/ or localhost:6000/index.html)** then the server should send main.html file with Content-Type: text/html.

The main.html file should contain

HTML webpage that contains

1- "ENCS3320-Simple Webserver" in the title
2- "Welcome to our course **Computer Networks" (**part of the phrase is in **Blue)**
3- Group members names and IDs
4- Some information about the group members. For instance, projects you have done during different course (programming, electrical, math, etc), skills, hobbies, etc.
5- Use CSS to make the page looks nice
6- Divide the page in different boxes and put student's information in the different boxes
7- Include CSS as a separate file
8- An image with extention.jpg and an image with extension .png
9- A link to a local html file (an html file) and a link to https://www.w3schools.com/tags/att_img_src.asp

2- if the request is an .**html** then the server should send html file with Content-Type: text/html. You can use any html file.
3- if the request is a **css** then the server should send html file with Content-Type: text/css. You can use any image.
4-
5- if the request is a .**png** then the server should send the png image with Content-Type: image/png. You can use any image.
6- if the request is a **.jpg** then the server should send the jpg image with Content-Type: image/jpeg. You can use any image.

7- Include a text file (or you can use csv file) that contains names and prices of at least 10 items (any items you want)
8- if the request is **/SortByName** then the output on the browser should be the names and prices of the items sorted by the name. The server should send text page with Content-Type: text/plain. I you wish, you can use text/html to display the output in a more convenient way.

9- if the request is **/SortByPrice** then the output on the browser should be name and price of the item sorted by its price. The server should send text page with Content-Type:

text/plain. If you wish, you can use text/html to display the output in a more convenient way.

10- If the request is wrong or the file doesn't exist the server should return a simple HTML webpage that contains (Content-Type: text/html)
    1- "HTTP/1.1 404 Not Found" in the response status
    2- "Error" in the title
    3- "The file is not found" in the body in **red**
    4- Your names and IDs in **Bold**
    5- The IP and port number of the client

The program should print the HTTP requests on the terminal window (command line window).

Provide screenshots of the browser to show that your project works as expected. **(/index.html /imagename.png, /SortByName, etc.)** . Test the project from a browser on the **same computer** and from **a different computer or phone**.

Provide also a screenshot of the HTTP request printed on the command line.

Hint: Have a look on HTTP response in Listing 1 and the HTML code In Listing 2. You may use the minimal header and HTML code. Have a look also on rfc2616 (https://tools.ietf.org/html/rfc2616)

HTTP/1.1 200 OK
Connection: close
Date: Fri, 03 Mar 2017 06:19:37 GMT
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16
Last-Modified: Fri, 03 Mar 2017 05:28:07 GMT
Content-Length: 6821
Content-Type: text/html
data data data data data ...

Listing 1: HTTP Response

```
<!DOCTYPE html>
<html>
<head><title >XYZ Company INC.</ title ></head>
<body><h1>Welcome <b>XYZ</b> Company</h1>
<img src="http:www. xyz.com/ images / logo.gif " ALT="XYZ Logo"><br>
We are so happy that you have chosen to visit our website.
</body>
</html>
```

Listing 2: Simple HTML Code

You have to submit

1- **a report in pdf format (only pdf format) on moodle (itc.birzeit.edu) that contains Screenshots** and with **detailed explanation** and the **codes** and the **runs.**
2- The code with comments (include the code in the pdf file and as text file .py or .java or .c as well)
3- You are allowed to send compressed file (e.g., .zip). But you have to send the report as pdf file separately.

Important: Each screenshot should include the date and time of your computer.