BIRZEIT UNIVERSITY

Department of Electrical and Computer Engineering

ENCS3320-Computer Networks

Project#1 due: 08/12/2023

1- **This is a group project, so you are allowed to work in groups of max 3 students**
2- **Do not use libraries to implement the project. Use socket programming.**
3- **Important: Each screenshot should include the date and time of your computer.**

You have to submit

1- **A report in pdf format (only pdf format) on moodle (itc.birzeit.edu) that contains Screenshots** with **detailed explanation**, **codes, runs, etc.**
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 must send a complete report as pdf file separately.

Part1:

1- In your own words, what are ping, tracert, nslookup, and telnet (write one sentence for each one)
2- 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 www.cornell.edu
   3- tracert www.cornell.edu
   4- nslookup www.cornell.edu
3- use wireshark to capture some DNS messages.

Provide a screenshot of the runs and brief explanation of the output.
From the ping results, do you think the response you have got is from USA? Explain your answer briefly.

Part2:

Using socket programming, implement TCP client and server applications in go, python, java or C. The server should listen on port 9955. The server waits for a message from a client.
If the message is with one of the students ID, the sever should do the following:

1. display a message on the server side that the OS will lock screen after 10 seconds
2. send a message to the client that the sever will lock screen after 10 seconds
3. then wait 10 seconds
4. then call a function lock the screen of the operating system (windows or Linux or MAC).

Any student ID of the group member should work. Any other student number or any text should display an error message on the server side and no lock screen should be done.

Part3:

Using socket programming, implement a simple but a complete web server in go, python, java or C that is listening on port 9966.

Have a look also on rfc2616 (https://datatracker.ietf.org/doc/html/rfc2616)

0- from rfce2616, what is Content-Type in the HTTP request and why do we need it?

The user types in the browser something like http://localhost:9966/ar or http://localhost:9966/en

The program should check

1- if the request is **/ or /index.html or /main_en.html or /en (for example localhost:9966/ or localhost:9966/en)** then the server should send main_en.html file with Content-Type: text/html.

The main_en.html file should contain

HTML webpage that contains

a. "ENCS3320-My Tiny Webserver 23/24" in the title
b. "Welcome to our course **Computer Networks, This is a tiny webserver" (**part of the phrase is in **Blue)**
c. Use CSS to make the page looks nice
d. Divide the page in different boxes and put student's information in the different boxes
e. Include CSS as a separate file
f. Summarize point 0 above in a box
g. Group members names and IDs (each one in a box)
h. Some information about the group members. For instance, projects you have done during different course (programming, electrical, math, etc), skills, hobbies, etc.
i. The page should contain at least an image with extention.jpg and an image with extension .png
j. A link to a local html file (an html file)
k. a link to https://www.w3schools.com/python/python_strings.asp

2- If the request is /ar then the server response with main_ar.html which is an Arabic version of main_en.html
3- if the request is an .**html** file then the server should send the requested html file with Content-Type: text/html. You can use any html file.
4- if the request is a **.css** file then the server should send the requested css file with Content-Type: text/css. You can use any CSS file
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- Use the status code 307 Temporary Redirect to redirect the following
    a. If the request is /cr then redirect to cornell.edu website
    b. If the request is /so then redirect to stackoverflow.com website
    c. If the request is /rt then redirect to ritaj website

8- 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 404" 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
9- The program should print the HTTP requests on the terminal window (command line window).

Provide screenshots of the browser with brief descriptions to show that your project works as expected. **(/main_en.html /imagename.png, /yt, 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.

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