ASSIGNMENT 1

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Assignment Statement

Berners-Lee and his team are credited for inventing the original Hyper Text Transfer Protocol (HTTP) along with Hyper Text Markup Language (HTML) and the associated technology for a web server and a text-based web browser. The first version of the protocol had only one method, namely GET, which would request a page from a server. The response from the server was always an HTML page. What you're about to do is to reinvent the wheel on the motivation of getting a deep understanding of how HTTP works! In that assignment, you will use sockets to implement a simple web client that communicates with a web server using a restricted subset of HTTP. The main objective of this assignment is to give you hands-on experience with UNIX sockets.

Data Structures Used

- Array of characters (string) to save our request information.
- Vector of Strings to store our requests independent of each other.
- Struct socket_address to utilize our WebSocket.
- struct arg_struct { int client_socket; long long* timer; }.

User Guide

- Run the server from terminal after changing the directory to its directory and type the following in terminal:
 - o g++ -o HTTP-Server main.cpp -lpthread
 - o ./HTTP-Server <port number>
- Run the client from terminal after changing the directory to its directory and type the following in terminal:
 - o g++ -o HTTP-Client main.cpp -lpthread
 - o ./HTTP-Client <IP address> <port number>

Main functions

- Main functions of HTTP-Server/main.cpp are the following:
 - Edits() => It is used to parse String of command and divide it if it is separated by space.
 - RequestSplit() => It is used to split request as if command is give client_get index.html it parse the command line by space.
 - o CheckExistenceFile() => It checks if File is already Exist or not.
 - ChunkSend() => It is used to send information of file to socket.
 - TimeOutOFClient () => It is used to close connection when its time is out.
 - RequestedFileContent() => It is used to read all content of file and save it in string content.

- GetFileContent() => It is used to get all content of file.
- GetFileINformation() => It takes the requests and parse it and take filename and its type and print its content.
- Client_Post() => It receives file from client and the response will be 200.
- Client_Get() => It tries to get file if it exists response will be 200 else
 it will be 404.
- ConnectionOfClient() => It parses command line and check whether it is Post or get.

• Main functions of HTTP-Client/main.cpp are the following:

- findReq() => It returns vector of all the requests in the file with the name give.
- Splitor() => It takes the request and split it by its spaces and return vector of splitting request.
- getPostFileContent() => It returns the file with given name content in string.

Design Decisions

- The Server takes the requests and parses it and take from it file name and its type.
- In case of GET, if the file exist the response will be 200 OK and if it doesn't exist the response will be 404 not found.
- In case of POST, the response will be 200 OK after receiving the server from the client.
- The client has the ability make multiple requests on the same connection socket without needing to open a new socket for each connection.
- The thread that is working in the background watching the activity of each client when the time from the last activity of a client exceeded the given threshold this client will be timed out and its socket will be closed.

Sample Run

• Running get request from browser.

Quote of the Day

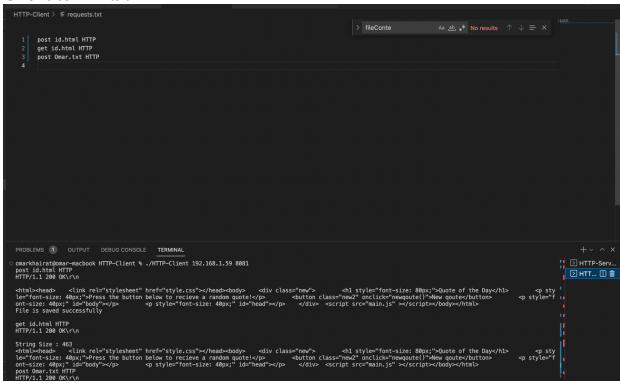
Press the button below to recieve a random quote!

New qoute

```
id.html
Connecting!!!
GET /style.css HTTP/1.1
Host: localhost:8081
Connection: keep-alive
sec-ch-ua: "Not7A_Brand";v="8", "Chromium";v="108", "Google Chrome";v="108"
sec-ch-ua: "Not7A_Brand";v="8", "Chromium";v="108", "Google Chrome";v="108"
sec-ch-ua-mobile: 70
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/108.0.0.0 Safari/537.36
sec-ch-ua-platform: "macOS"
Accept: text/css,**/*;q=0.1
Sec-Fetch-Site: same-origin
Sec-Fetch-Mode: no-cors
Sec-Fetch-Dest: style
Referer: http://localhost:8081/id.html
Accept-Encoding: gzip, deflate, br
Accept-Language: en-GB,en-US;q=0.9,en;q=0.8
```

• Running following request from the request.txt file.

Client terminal:



Server terminal:

```
Omarkhairat@omar-macbook HTTP-Server % ./HTTP-Server 8081

Connecting!!!
Connecting!!!
Connecting!!!
Connecting!!!
Post id.html HTTP
Connecting!!!
connecting!!!
connecting!!!
connecting!!!
connecting!!!
connecting!!!
connecting!!!
connecting!!
connecting!
connecting!!
connecting!
connecting
conne
```