HTTP-CLIENT SERVER

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Problem Statement

- Berners-Lee and his team are credited for inventing the original HyperText 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 this 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.

System Calls

- **Socket()**
- **bind()**
- **listen()**
- **accept()**
- **connect()**

Data Structures

- Character arrays
- Vector
- Struct socket_address
- struct arg_struct { int client_socket; long long* timer; };

Project summary

- Run the Server from the terminal
  - g++ -o HTTP-Server main.cpp -lpthread
  - Give the server port ex: 8081 -> ./HTTP-Server 8081
  - Wait for a connection to the server
- Run the client with the same port of the Server
  - g++ -o HTTP-Client main.cpp -lpthread
  - Run on the same port -> ./HTTP-Client 127.0.0.1 8081
- 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 b 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

1.Multi-Threaded Web server

Major functions:

- clientConnection(void* socketClient): to handle get and post requests
- split(string str): takes the request and split it by its spaces and return vector of splitting request
- readFile(string fileName): Read the file line by line using string stream and return one string of the file contents
- sendChunks(int socket , string s): it sends this content to the client chunk by chunk until finishing transmitting the file and it only used in get request

2.The Client Side

Major functions:

- getCommands(string fileName) : Read commands line by line
- split(string str): takes the request and split it by its spaces and return vector of splitting request

3.HTTP 1.1

- client can make multiple requests on the same connection socket without needing to open a new socket for each connection
- There is a 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 threshold this client will be timed out and its socket will be closed

4.Bonus

The project can handle the requests from web browsers tested on firefox.