CS 484/504 Programming Assignment II: Building a Webserver

Fall 2022
Graduate Level Course Code CS 504
Computer Science Department, New Mexico State University

Graduate Level class participants must meet the graduate extension requirements

1 Requirements

Networking code often needs to manage concurrency. Write a program in any language you like which implements a simple HTTP server (no fair using HTTP server libraries). You must manage your own network sockets. You must have a main thread which accepts incoming connections, and then a pool of worker threads to handle them. Your server must be able to handle hundreds of simultaneous requests. Include a makefile to allow us to run your server as follows:

make server

Host your server on TCP port 8080, so no root permissions are required to run it.

Your program must follow a consistent style, include explanatory comments, and include a Makefile that allows it to be built from your source code. We will test on Ubuntu 20.04, we strongly suggest you test your code on a virtual machine running that OS!
Graduate students, your email sender must handle incoming connections that are dropped before the entire request is received

2 What to serve

Your program must serve the following endpoints with the following HTTP methods:

1. GET / $\rightarrow$ Returns a simple HTML page.

2. POST /multiply $\rightarrow$ Returns the product of a and b sent as form-encoded data

3. GET /index.html $\rightarrow$ Returns the same html page

4. DELETE /database.php?data=all $\rightarrow$ Always returns a 403 Forbidden error response

5. GET /google $\rightarrow$ Permanent redirect 301 to google.com

A proper request must perform as described above, and return the response with a 200 response code. Errors should be handled as follows:

1. Any request to a nonexistent endpoint must receive a 404 response code

2. Any request to a valid endpoint with the wrong HTTP method, must receive a 405 response code

3. Any request to /multiply where either a or b are not integers must receive a 400 response code.

4. Any request to multiply where the HTTP request body is not of the form a=¡integer¿&b=¡integer¿ must receive a 400 response code.

5. Any request to DELETE the database must always return a 403 error code

We will be providing an autograder for you to test against. You can also test with a web browser.

3 What to Submit

A zipped directory containing:

1. The source file(s) for your email sender

2. A makefile where "make server" compiles your code from source and runs the server

4 Acceptable Collaboration

Please help each other be successful on this assignment. The rule you must follow to ensure you are not plagiarizing is never to show your code to anyone else nor read anyone else's code. You may look at resources like stack overflow to learn how functions work, etc. If you use any small code snippets from an online resource, cite them with a URL in a comment. You many not copy a pre-built SMTP sender from github because you will learn nothing.

If we are concerned you have plagiarized, we may ask you to come walk us how everything in your code works and explain the design decisions you made. If you don't know what is going on, this could obviously become very awkward...