WRITEUP for `httpserver.c` (ASSIGNMENT 2)

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Testing Performed:

This assignment was reasonably more difficult to test and debug than the previous. I tested in two forms:

- A shell script with a combination of concurrently run curl commands and python scripts to simulate a variety of clients and requests.
- Valgrind to detect memory leaks and potentially fatal memory handling flaws.

Tests would often need to be run multiple times in order for me to fully understand the errors that occurred. Testing was performed with a variety of file sizes, from 0 bytes - 3.8MB, both binary and text.

Comparing my asgn1 server to my asgn2 server:

After conducting the experiment on my two assignments, multithreading asgn1 with 4 threads in asgn2 provides the maximal speedup of 2.08x (from an average of 7.358s to 3.527s).

What is likely to be the bottleneck in your system:

I believe the bottleneck in my system which affects my overall performance is my logging implementation. There is not a lot of concurrency available in the logger thread given that it handles log requests one at a time. I believe that this bottleneck could be reduced by relaxing the conditions of logging an entire file's contents. It seems like both a waste of time and clock cycles to have to perform two operations for every piece of data (moving and logging) as opposed to one (moving). As a result, my logger thread takes the penalty of being behind rather than the worker pool itself. Additionally, the concurrency between the workers in the worker pool could be increased by continuously optimizing the code responsible for handling a request.

Why don't we log the entire contents of files in real life?

As stated above, this is impractical because it wastes computer resources on keeping two copies of data in the server. While it may be important to know the exact contents of sensitive files, this should not be the job of the server but instead a database/alternative storage mechanism. Even then, storing so much data makes maintenance harder as the storage medium changes.