ECE 420 Lab 2 Report

## Description of Implementation

This implementation of a multi-threaded server and client uses sockets to communicate via TCP. The server maintains an array of strings in its memory. The client sends requests to the server to either retrieve or modify a particular string in the array.

After connecting to the server, the client launches 1000 threads that send a request string containing either a read or write identifier and the index to the intended string. The server launches 1000 threads once the client connects to handle the incoming requests.

Each server thread reads the request from the client and parses the read or write request. If the client requests a read, the server will forward the message to the same client file descriptor that it received the request from. If the requests a write, server will modify the given string and echo the new string back to the client. This interaction with the array of strings is the critical section. In the initial implementation, a single mutex is used to control access to the array. Whenever a client requests access to the array, the processing thread on the server will attempt to lock the array from other processes that try to access. Otherwise, it will wait until the process in the critical section unlocks the mutex before it attempts to lock it.

The server will forward the specified string (either read the original or the modified string) back to the client.

## Testing and Verification

The correctness of your implementation must be tested. Introduce your method of testing and justify it. Testing is always a trade off between time investment and quality, but the requirement here is minimum. You will get your credit as long as you show some effort to verify the correctness of your solution by providing a set of selected testing inputs and explain.

## Performance Discussion

Discuss some particular performance issues as required in each lab, and support them with your experimental results. Typical topics include but are not limited to speedup, efficiency, running time as a function of the number of processes and problem size. You can also discuss additional points related to performance that are not required in the lab manual, e.g., overhead, cost, etc. Use figures or tables to show your results.

## Conclusion and Experience

Summarize the entire report and present the take-away message from doing each lab. You could also discuss the hands-on skills you have gained in each lab.