- the high level design of your server and client;

This project contains two executables, server and client, that both depend on low-level helpers, including util.*, helper.*, handshake.* and ftransfer.*.

The util files defined several related constants, as well as some basic utilities that all other components depend on.

The helper files implemented header-related helper functions and data structures that can be used by higher level components.

The handshake files supported both connection initiation and termination functionalities that can be used directly by the server.c and client.c files.

The ftransfer files are the most important files of this project that defined data abstractions of the items to be stored in sender and receiver windows. This component used pthread to send and recv data packets at the same time to achieve a full-duplex connection design.

The server.c and client.c files are controlling when and where other components should be used to achieve reliable data transfer.

- the problems your ran into and how you solved the problems;

Since multithreading is used in this project, the most difficult part of this project is to debug thread synchronization problems. Synchronization techniques are used in this project, and it takes time and patience to detect and fix all found bug.

- additional instructions to build your project (if your project uses some other libraries);

This program is tested to work on Mac OS X 10.10 with LLVM 7.3.0 as compiler and Ubuntu 14.04 with GCC 4.8.4 as compiler. To compile, untar the archive and execute ‘make’.

- how you tested your code and why.

Since this project mainly focuses the correctness of data transfer and the robustness against packet loss, I tested the program in virtual machine with 10% loss rate. In addition, thread synchronization problems will likely to occur once in multiple testing, so extensive testing are done to eliminate the possibility of having a bug.

- the contribution of each team member (up to 3 members in one team) and their UID

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