CS 5450
Project 2

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Through this project, we successfully implemented a Go-back-n (GBN) protocol. We designed this protocol to detect potential packet loss and damage and make sure the exact same information can be delivered with no bit changed or lost.

Our Go-back-n protocol works as the following. It starts with the slow mode, where the sender sends one packet at a time and the next packet will not be sent until the sender receives the acknowledgement for the previous packet. Once the sender receives the acknowledgement, it switches the fast mode, where a second packet can be sent without receiving the acknowledgement for the first packet. When the sender fails to receive an acknowledgement and retransmits a packet, it will switch back to the slow mode.

Inside the gbn.h, we add several features in state_t and enum. In state_t struct, we defined mode, state, isEnd and seqnum variables to record the mode (fast or slow), state (e.g. ACK_RCVD, etc.) and isEnd (if it reaches the end). We added two states (BYTE_SENT & ACK_RCVD) to track the data and acknowledge of the packets. We also defined SLOW and FAST mode with 1 and 2.

In gbn.c, we implemented the required functions (gbn_socket(), gbn_connet(), …. etc.) with our own code and comment. Throughout these functions, we were able to go through the whole process from gbn_socket() to gbn_close(). We also defined our own functions (timeoutHandler, makeHeader, packet, packetCheck). Through these functions, we were able to handle the timeouts, make packets, headers and check the validity of the packets.

In gbn_send() and gbn_connect(), we close the connection if the same DATA packet or SYN packet is sent five times without receiving ACK. Other details can be found in the comments inside our source files.

Tricky parts:

1. h_addr

   When running the program, there is an h_addr error. I will have to define an h_addr inside gbn.h to eliminate this error only.
2. The timeout handling is somewhat complicated, especially the signal() function. It took us a while to figure this all out.
3. Timeout would be detected when sending and receiving large files.
4. When implementing gbn_send(), one should be cautious about the order of attempts counting, switching between modes, and sending splitted packets. It is also tricky to keep track of sequence number, data length, cumulative length and remaining buffer in between two modes.