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Computer Networks
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Homework 5

Final Project Design Report

Project Overview

The general idea for this project is to develop an application that takes in real-time input from one (or more) users and writes them to a shared screen. You can think of the application essentially as a real time instant messaging application. The main difference is that users will see each character of input from every other user, not just the entire message when a user hits the enter key.

On the development side, we will bypass the conventional client/server setup for these types of applications, instead allowing clients to connect directly to each other to form a type of communication network. The idea is that clients do not have to be directly connected to one another to communicate. Each client will send *and* receive data to all other adjacent clients. If a new client connects to the network, he/she should be able to (nearly) instantaneously start communicating with all the other nodes.

This idea is not yet meant to be built to scale.

Learning Concept

Some of the learning ideas behind this project include using socket architecture to send bytes reliably (using TCP) as they are processed on each client's computer.

Additionally, concepts we learned in the intra-domain routing lecture including link-state and distance-vector routing algorithms will be implemented in this example. Since there is no guarantee that multiple clients could be connected to the same client, we must also remember to implement cycle detection in our routing algorithm.

Required Libraries

The socket module is of course required.
Some additional modules that I have been experimenting with for keyPress detections within a client include Cocoa (an Object-C and Python bridge wrapper) and some AppKit libraries such as NSApplication, NSApp, NSObject, NSLog, NSEvent, NSKeyDownMask, etc. These libraries allow python to detect native OS keypresses along with their keyCodes. We can turn these unique key codes into bytes and transmit them to the other users in our network.

Questions and Concerns

I am not sure if it is necessary I implement the keyPress detection using Cocoa. Perhaps there would be a simpler method using native Python. Some local experiments I have run seemed to have worked though. I am able to log an event each time a key is pressed which has a corresponding keyCode.

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Further Ideas

An idea to take this application beyond a simple group instant messaging platform is to turn it into a game. Specifically, a typing game. There is a website (http://www.typeracer.com) that generates a passage of text for users to type as they “race” each other on the screen. It displays their words per minute (WPM) and increments the cars in ticks as each word is completed. This would be a fun stretch goal for this assignment, which would add more interactivity and some competitiveness to the application.