**CS 392: Homework Assignment 7**
**Due: May 1, 11:55pm**

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**Collaboration Policy.**  Homeworks will be done individually: each student must hand in their own answers. It is acceptable for students to collaborate in understanding the material but not in solving the problems. Use of the Internet is allowed, but should not include searching for previous solutions or answers to the specific questions of the assignment.

**Late Policy.**  No late submissions will be allowed without consent from the instructor. If urgent or unusual circumstances prevent you from submitting a homework assignment in time, please e-mail me explaining the situation.

# Objective

This homework aims to build a simple client-server application, where both the client and server are running on the same host.

# Client-Server Minimum (100 points)

Create a client-server system that implements the following protocol.

(1) The server waits for a client on a port passed an an argument to the server executable. This number should be an integer between 1024 and 65535, i.e., any valid unprivileged port.

(2) The client connects and sends the string "switch" to the server.

(3) The server selects a random integer between 1024 and 65535 and sends it to the client. This is the number of the new port to be used.

(4) The server closes the initial connection and waits for the client on the new port.

(5) The client connects to the new port and sends integers typed by the user to the server, one by one.

(6) The server receives the integers and maintains the minimum value, which it sends back to the client.

(7) The client displays the minimum and requests a new integer from the user, which it sends to the server triggering the previous step.

(8) The user can end the session by typing "quit" which causes the client to terminate. The server should go back to waiting on the initial port.

## Requirements

(1) Run the server in the background and the client in the foreground on the same host. This is referred to as the "`localhost`."

(2) Both the server and client require one argument: the port number to be used.

(3) Appropriate error messages should be printed if the socket cannot be created, if the client cannot connect, and if any step on the server side fails.

(4) The data typed in by the user should be checked since they can be strings or integers. Appropriate error messages should be generated when the user's input is invalid. The client should proceed by requesting the correct input from the user.

## Hints

(1) Use the examples in the `socket_examples.zip` file on Canvas as templates for your submission.

(2) There is no need to use `getaddrinfo()` in this assignment. Both client and server will be running on `localhost`, which can be hard-coded.

(3) Be careful when initializing the minimum on the server.

(4) You should include the following header files, potentially among others:

```
#include <sys/types.h>
#include <sys/socket.h>
#include <netdb.h>
#include <string.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
```

## Deliverables

A zip file containing:

(1) source files named client.c and server.c.

(2) a script that calls gcc to compile the above files, and then starts the server in the background and the client in the foreground.