CS 558: Computer Systems Lab

Client Server Trading System using Socket Programming

Group 7

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INTRODUCTION

Trading system is a client-server based model. There will be a set of traders who will trade with each other in the automated system. Server will manage buy and sell requests from different traders. Each trader has a Trader ID and password which is stored in a file. The number of items is 10 with item codes ranging from 1-10. The number of traders is 5 whose code ranges from 1-5. From the Client Side only one trader can work.

Functionalities of any client can be:

- Login to the System.
- Send a Buy Request.
- Send Sell request.
- View Order Status.
- View Trade Status.

There will be only one server which will be running and perform the functions of order processing and trade matching in addition to acknowledging logins by clients and servicing their requests. On receiving buy/sell order request from a trader, the server will put it in the appropriate order queue. If there is a possibility of a trade match, then that trade match will take place, the traded items will be appropriately updated and the result of the trade along with the details of the counterparties, item, quantity and price.

Flow of the Process

Server side

1. Socket creation: *socket(domain, type, protocol)*. Creates a socket and returns a file descriptor in integer format.

2. Bind: *bind(int sockfd, const struct sockaddr *addr, socklen_t addrlen)*. Bind function binds the socket to the address and port number specified in address.

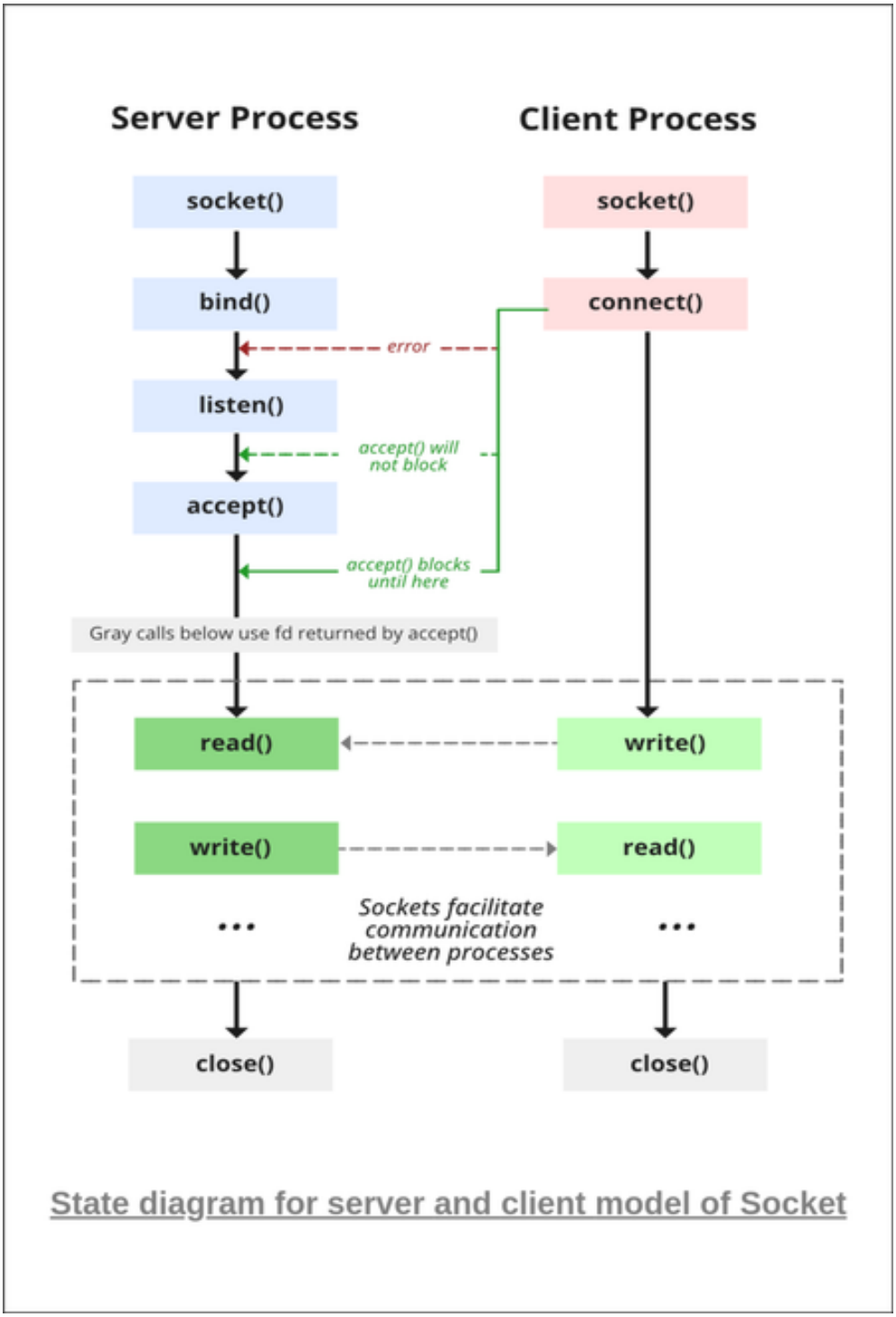
3. Listen: *listen(int sockfd, int backlog)*. It puts the server socket in a passive mode, where it waits for the client to approach the server to make a connection. The backlog defines the maximum length to which the queue of pending connections for sockfd may

grow. If a connection request arrives when the queue is full, the client may receive an error with an indication of ECONNREFUSED.

4. Accept: *accept(int sockfd, struct sockaddr *addr, socklen_t *addrlen)*. It extracts the first connection request on the queue of pending connections for the listening socket, sockfd, creates a new connected socket, and returns a new file descriptor referring to that socket.

Client Side

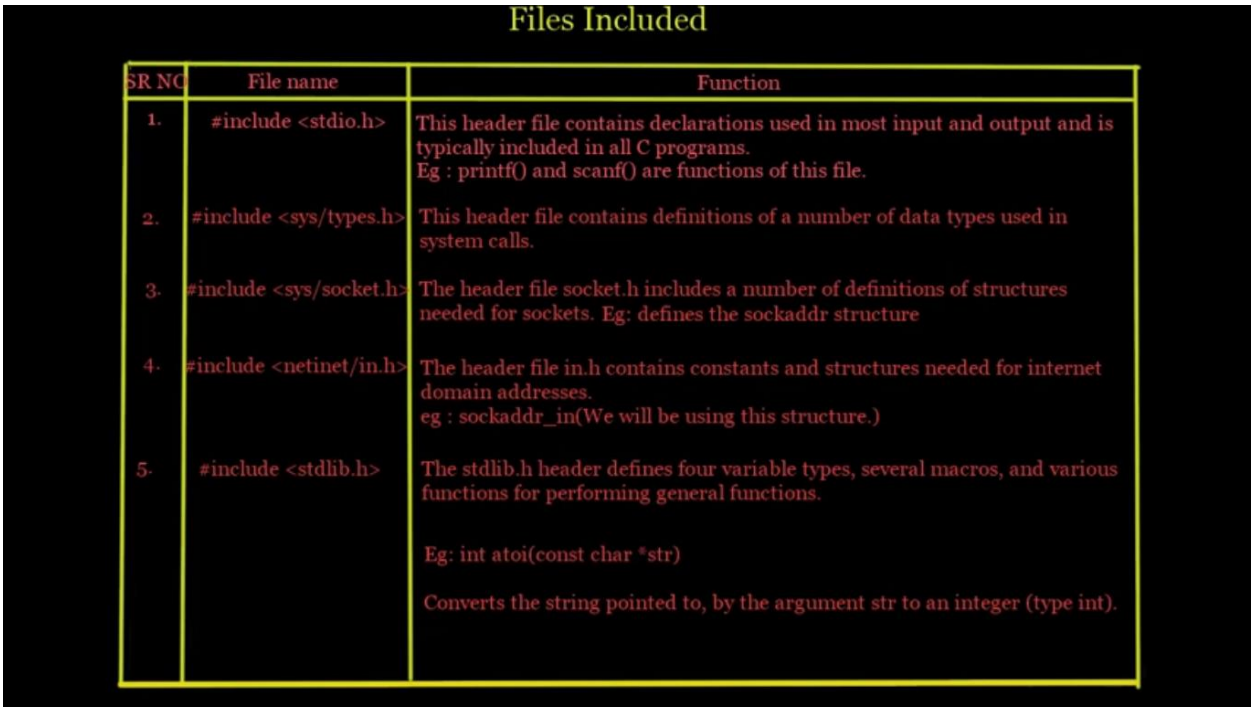
5. Connect The connect() system call connects the socket referred to by the file descriptor sockfd to the address specified by address. Server's address and port is specified in address.



State diagram for server and client model of Socket

Implementation

Libraries Included:

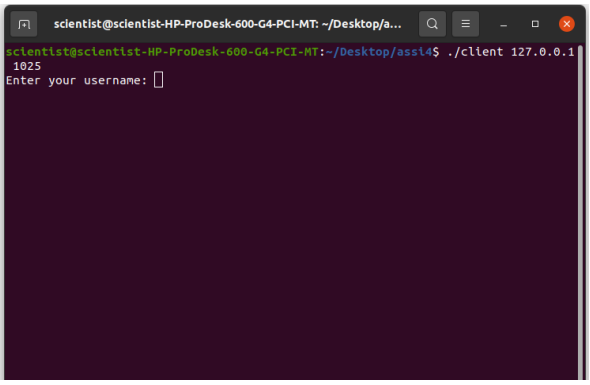


Files Included

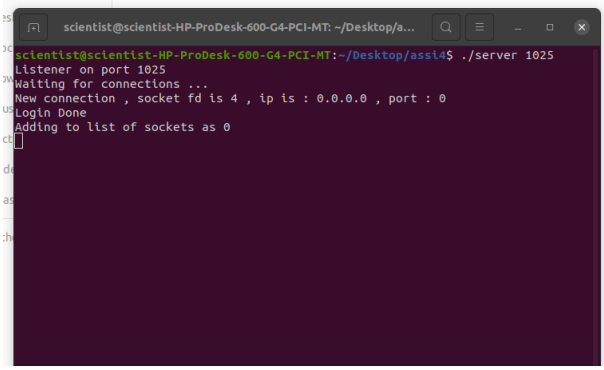
SR NO	File name	Function
1.	#include <stdio.h>	This header file contains declarations used in most input and output and is typically included in all C programs. Eg : printf() and scanf() are functions of this file.
2.	#include <sys/types.h>	This header file contains definitions of a number of data types used in system calls.
3.	#include <sys/socket.h>	The header file socket.h includes a number of definitions of structures needed for sockets. Eg: defines the sockaddr structure
4.	#include <netinet/in.h>	The header file in.h contains constants and structures needed for internet domain addresses. eg : sockaddr_in(We will be using this structure.)
5.	#include <stdlib.h>	The stdlib.h header defines four variable types, several macros, and various functions for performing general functions. Eg: int atoi(const char *str) Converts the string pointed to, by the argument str to an integer (type int).

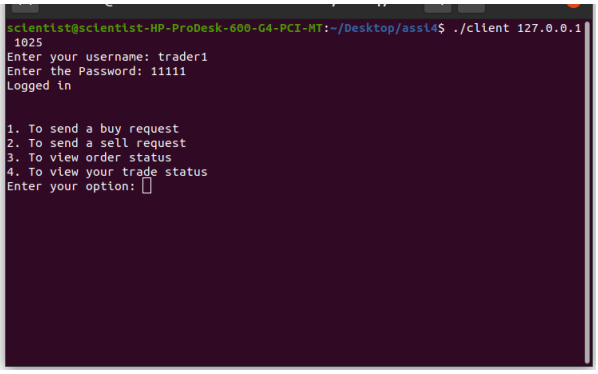
Starting the server

Connecting client to server

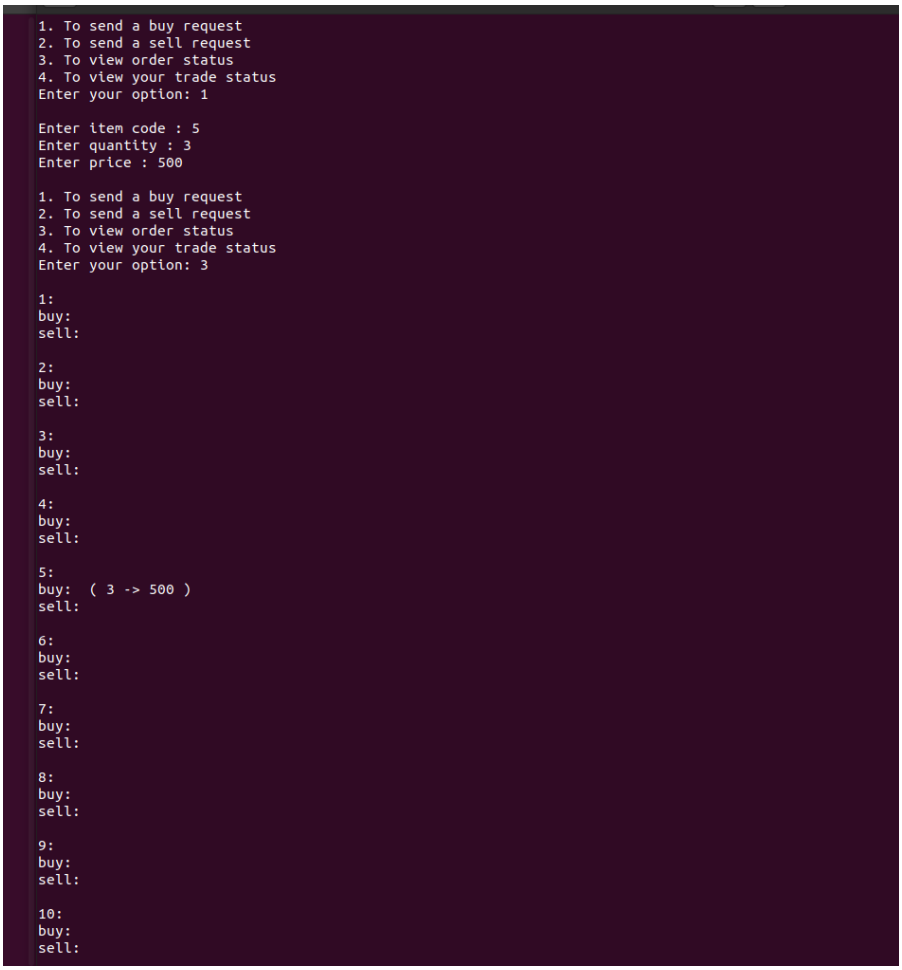


Checking Authentication of client



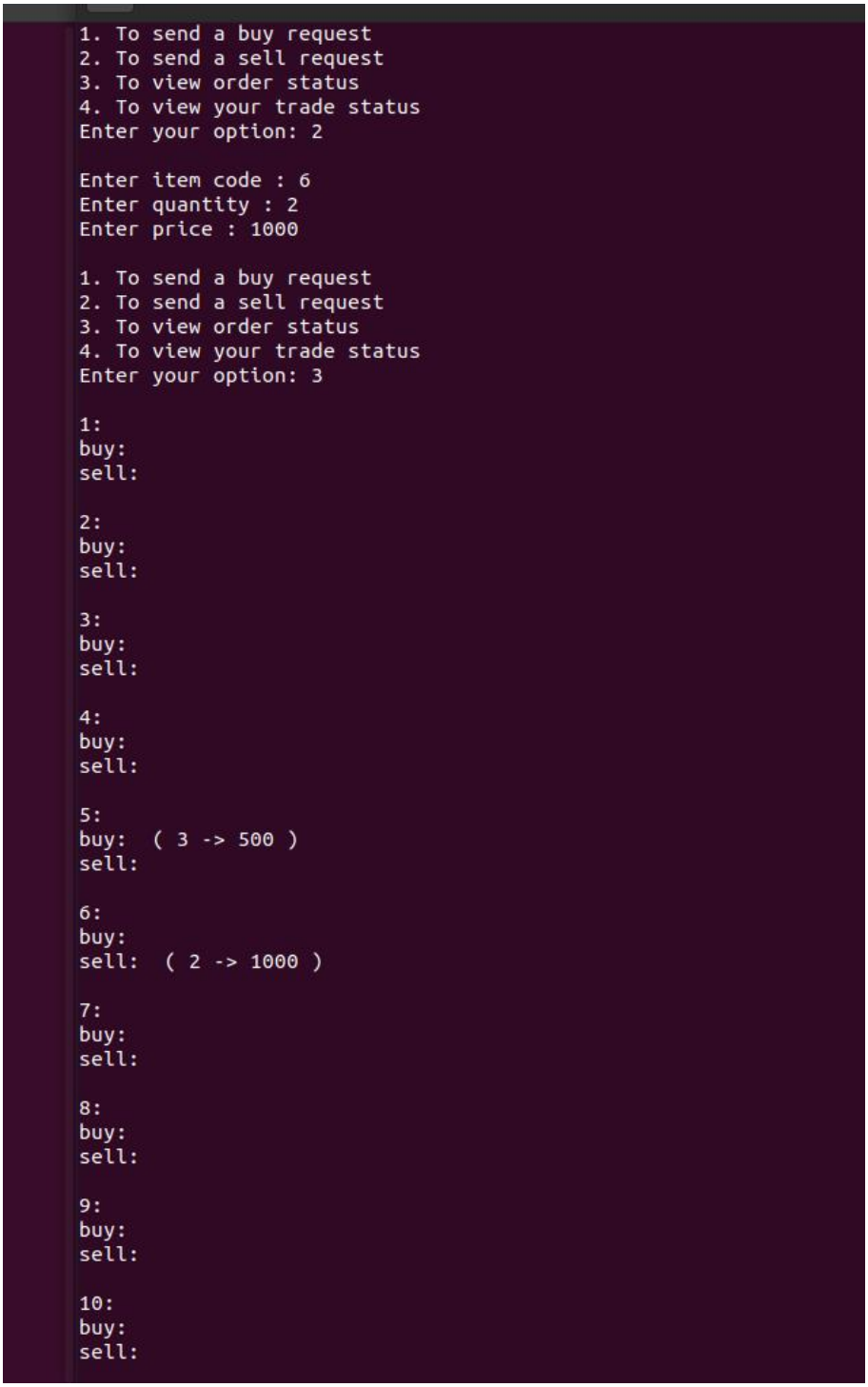


Sending Buy Request



Trader is sending a buy request for item number 5 for quantity 3 at price of ₹500. Server will handle this buy request.

Sending Sell Request



Trader is sending a sell request for item number 6 for quantity 2 at price of ₹1000. Server will handle this sell request.

View Trade Status

Trader1 is shown at left side and trader2 at the right side.

Trade is done between trader1 and trader2 for 5 items at price Rs. 20 as shown above.