

CSE 344 System Programming Final

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1 Problem Solving

1.1 Adding New Clients

I used a queue for store clients. I protected the access to the queue with a mutex. When a new client is connected, the new client's socket id is added to queue. Then `pthread_condition_signal` is called and the one of the threads which wait the condition variable is invoked and get the client's socket.

1.2 Reading Writing Problem

I implemented the solution in the slides. I used one mutex, two conditional variable and 4 variable for this solution.

1.3 Preventing of Double Instantiation

Bind function prevents the double instantiation with same port number.

1.4 Notify Clients for Finish

When the current thread finished the save result of current command, it sends '\n' character. When the client detects this char at the beginning of the result string, if there are no more commands job of client finishes. If there are more commands the client sends the next command to the server.

2 Design Decisions

2.1 Data Structure

I used three dimensional char array. I implemented it as an array list. The reasons that I choose this data structure; it is easy to handle and it is efficient on the create phase.

2.2 Condition Variables

- new_socket: It is used for wait while the client's sockets queue is empty.
- okToRead: It is used for waiting the time that reading from data is allowed.
- okToWrite: It is used for waiting the time that writing to data is allowed.
- end_cond: It is used for waiting all the active client sockets to be close. It is used for handle ctrl+c signal properly.

2.3 Mutexes

- socket_mutex: It is used for protect queue from multiple access.
- condMutex: It is used for controlling AW, AR, WR, WW.

3 Achieved Requirements

- All kinds of commands in the PDF and variants can be parsed.
- CSV files can be loaded to data structure.
- SELECT and UPDATE commands work properly.
- Synchronization problems has been handled.
- Reader and writer problem has been implemented.
- Double instantiation has been prevented.

4 Failed Requirements

- Server process can not be daemon.
- SELECT DISTINCT command has not been implemented.
- Outputs of the server is not written to the file.
- There are not any timestamps.