ZotChat
Beta

Developer Manual v1.2

By: ZotMeUp© (Team 7)

Development Team:
Anson Do
Arian Reyes
Xianzhang Li
Adrian Gomez
Kevin Huang

Affiliation:
University of California, Irvine
Department of Electrical Engineering and Computer Science

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Glossary

C

Chat - talking

Chess - a 2 player board game that is won by capturing the other player's king

Client - the person who is obtaining information from the server

clientAddress - the port number of the client

E

Encrypt - changing the password to be stored differently so it won't be easily obtained

F

Friend - theoretically, someone who you can message with

G

GUI - the graphic user interface that users interact with

I

Instant Messaging - sending and receiving messages to and from other users

M

Message - a string of text that is being sent to another user

P

Password - a code that is used to access your account

Port Number - a 16-bit unsigned number from 0 to 65535

R

Rbuffer - the message being received

S

Sbuffer	the message being sent
Server	provides the service to clients
serverAddress	port number of the server
Socket	a network that connects two or more clients

U

Username	a name that is used to access your account

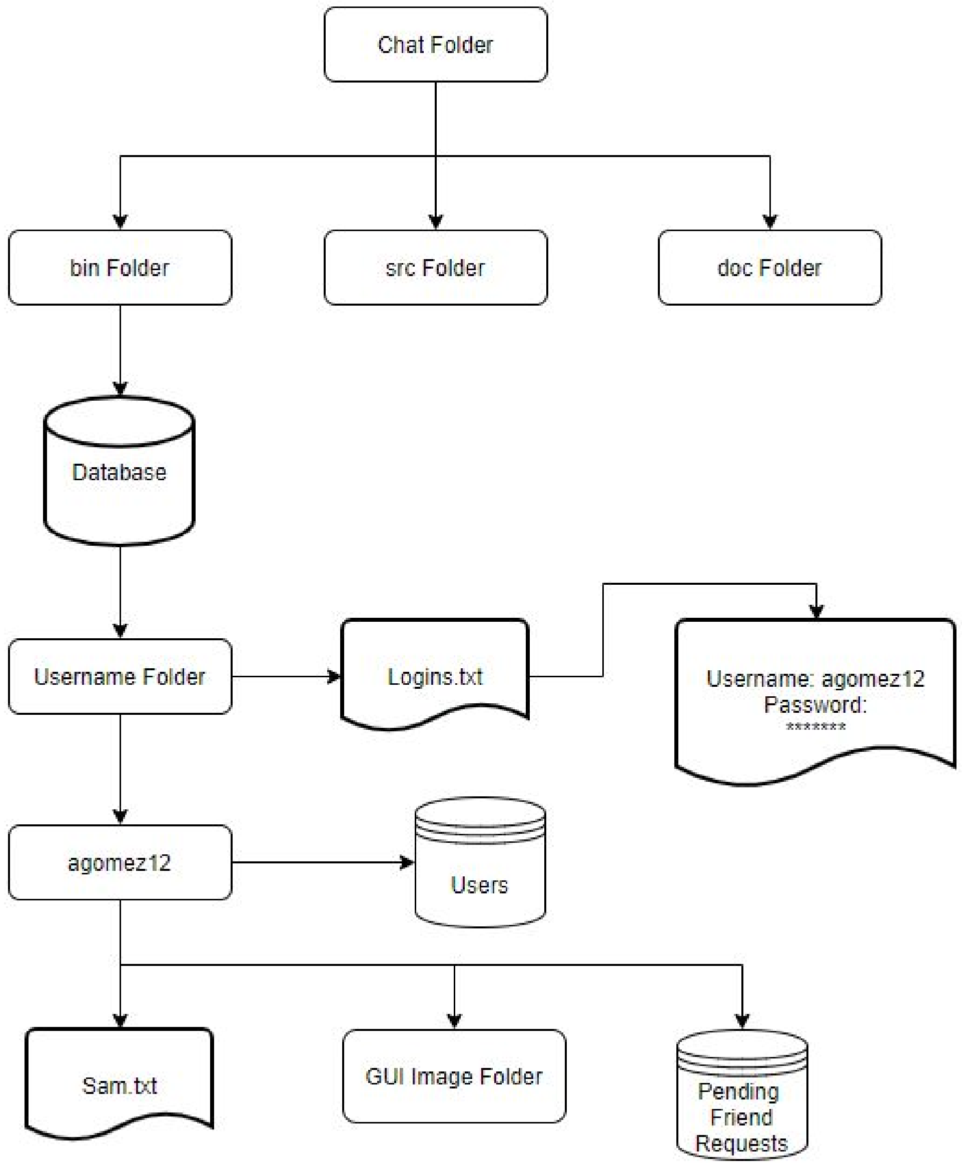
1. Client Software Architecture Overview

1.1 Main Data Types and Structures

Structure Name	Data Type
username	String of chars (char[x])
password	String of chars (char[x])
message	String of chars (char[x])

Socket Name	Data Type	Explanation
serverSocketFD	int	I/O for Service
dataSocketFD	int	I/O for Data
portNum	int	Port to connect to
serverAddress	int	Server Address
clientAddress	int	Client we connect to
Rbuffer[256]	String of chars (char[x])	Buffer for receiving a message
Sbuffer[256]	String of chars (char[x])	Buffer for sending a message

1.2 Major Software Components



1.3 Module Interfaces

- *Graphical User Interface (GUI)* : Contains the images that are being used for the GUI. This includes the “Login” Screen, “Sign-Up” Screen, “Messaging” Screen and etc.
- *Client* : Contains the functions responsible for logging in, sending/ receiving messages, and sending/receiving data from the GUI and server. These processes will be encrypted for the safety of the user.
- *Server* : Contains the functions responsible for data management from the client function. This includes sending and receiving messages, storing messages, and processing messages.

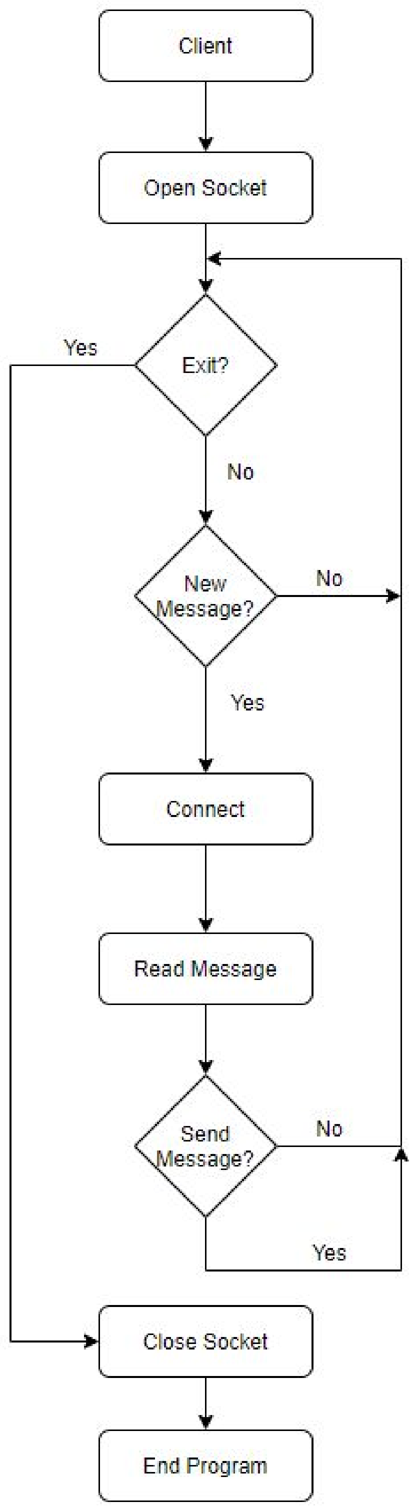
1.4 Overall Program Control Flow

Depending on whether the user is a new or a returning user, the program will adjust accordingly. If the user is new, then the user will be sent to another screen to create the credentials that would be sent and stored in the server.

If the user is already an existing user, then the information provided will be compared to the one stored on the server. This process will either return a "True" or "False" depending on the comparison of the information.

Once the user is able to log in, this will allow the user to be connected to the server. When the user has received a message, then they will be connected in order to view the message from the GUI. If the user wants to send a message, then it will read the conversation and push the message from the GUI to the server. The main user will be in a constant state of waiting for a message until it times out after a certain period of time.

Diagram of Previous paragraphs



2. Server Software Architecture Overview

2.1 Main Data Types and Structures

Text file: Friends.txt

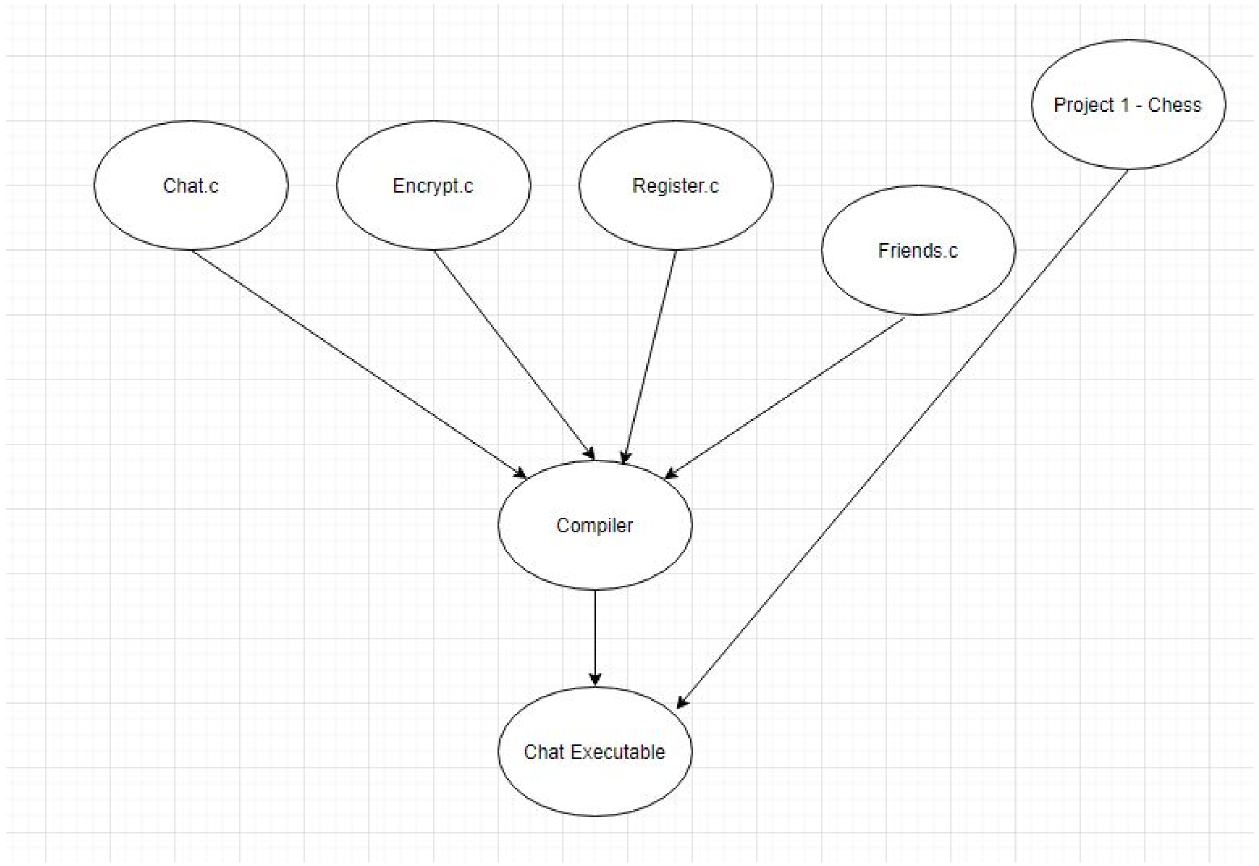
Text file: Login.txt

String Array: Save all the message

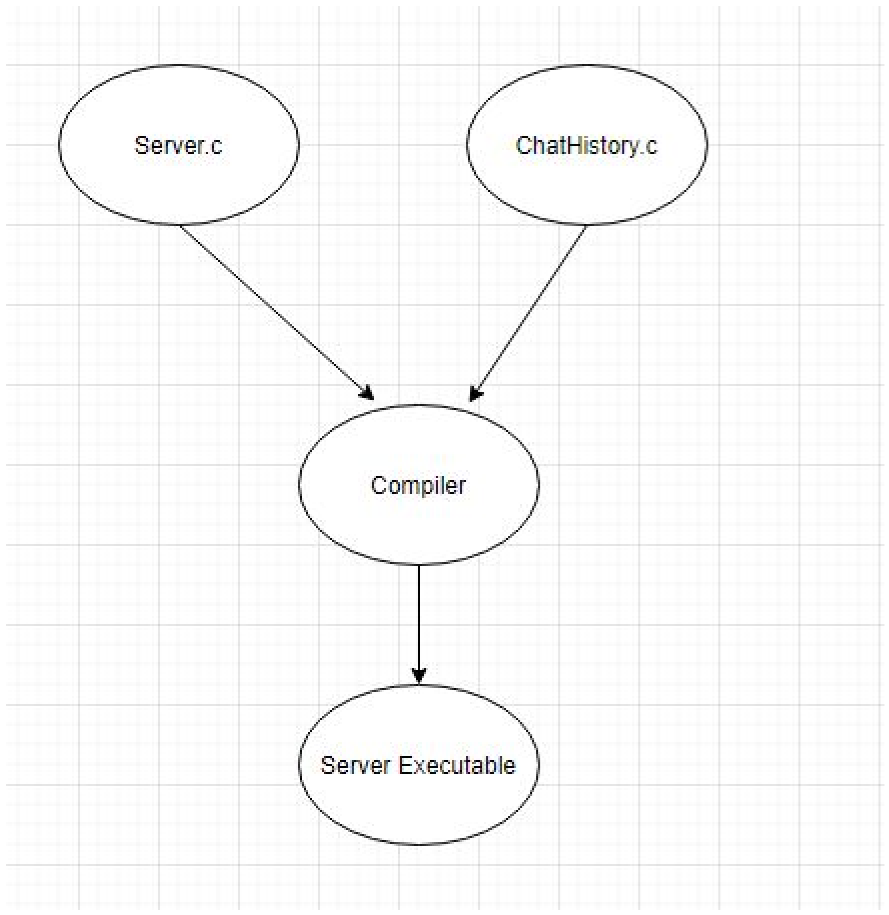
2.2 Major Software Components

/* Diagram of module hierarchy*/

Chat Client



Server Client

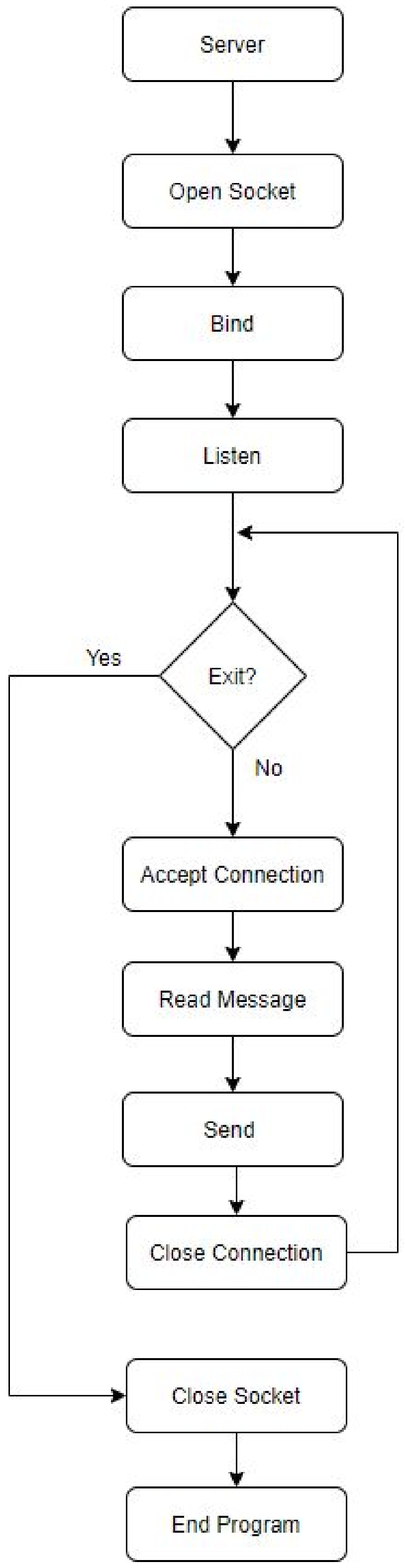


2.3 Module Interfaces

API of major module functions

- Server: This will attempt to connect the program to the server it needs to be connected to be able communicate through the internet
- Chess: This will be the chess implementation in the chat window
- Chat: This contains the program to make the chat function work within our program
- Register: Contains the registration function and login checker
- Encrypt: Encryption algorithm for saving password
- Friends: Functions for adding or blocking friends
- ChatHistory: Function for chat log in a text file within the server

2.4 Overall Program Control Flow



3. Installation

3.1 System Requirements, Compatibility

System:	Linux
Disk Space:	128MB free
Ram:	512 MB or more
CPU:	1.2GHz or higher
Internet:	essential for the chat application

3.2 Setup and configuration

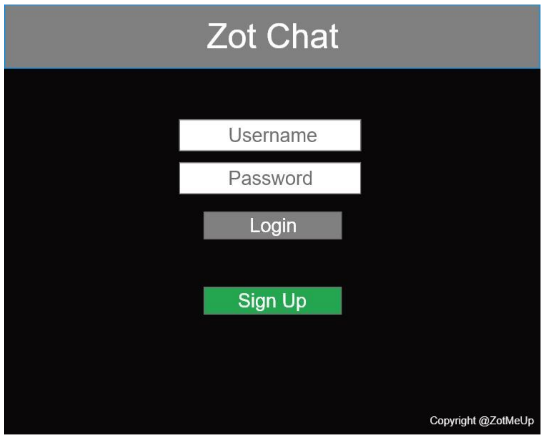
To install the chat app, copy (using ~cp) the chat_beta_src.tar.gz and chat_beta_src.tar.gz file from the host to your own Linx.
Type make servertest to compile and run the server client first.
Type make test command which can run the chat client after running the server.

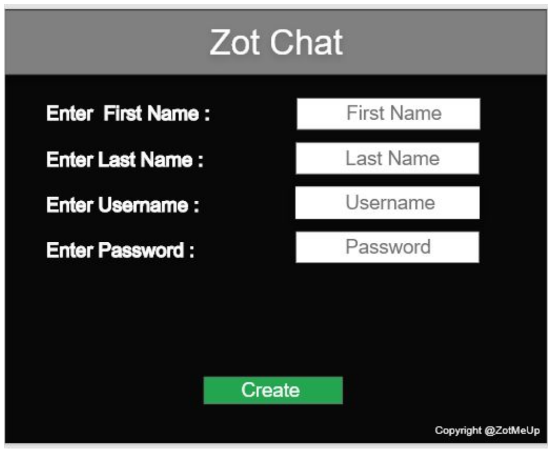
3.3 Building, Compilation, Installation

Type make servertest to compile and run the server first.
Type make test to compile and run the chat program.

4. Documentation of Packages, Modules, Interfaces

4.1 Detailed description of data structures





<u>Chat Login - Client</u>

***** Special note *****
Please use the pre-made accounts in the README.md from the tar to login at this time.

Client Logging In or Create Log in:

1) username
    a) Data Type: string
    b) Functionality: Stores username inserted by the user
2) password
    a) Data Type: string
    b) Functionality: Stores password inserted by the user

3) firstName

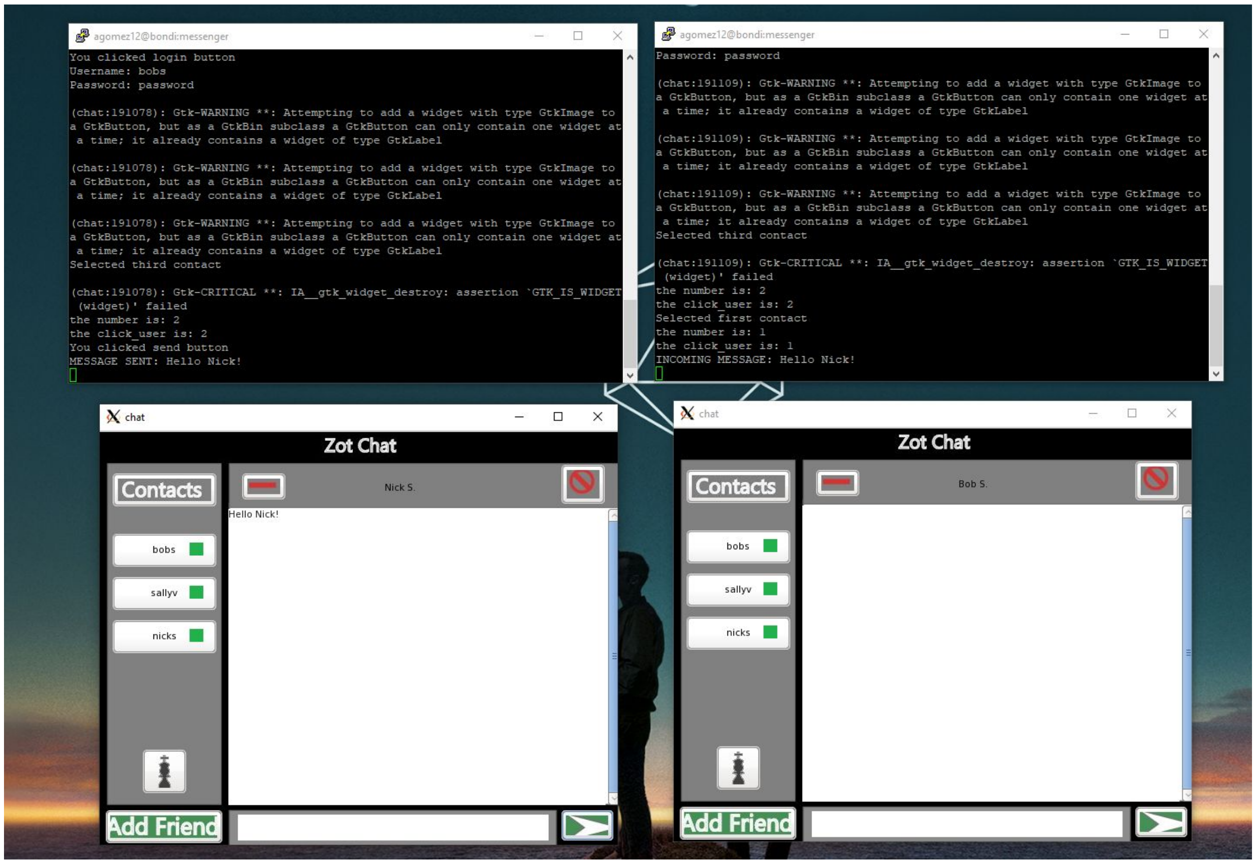
    a) Data Type: string

    b) Functionality: Stores first name inserted by the user

4) lastName

    a) Data type: string

    b) Functionality: Stores last name inserted by the user



```
You clicked login button
Username: bobs
Password: password

(chat:191078): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
 a time; it already contains a widget of type GtkLabel

(chat:191078): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
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 a time; it already contains a widget of type GtkLabel

(chat:191078): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
 a time; it already contains a widget of type GtkLabel
Selected third contact

(chat:191078): Gtk-CRITICAL **: IA__gtk_widget_destroy: assertion `GTK_IS_WIDGET
 (widget)' failed
the number is: 2
the click_user is: 2
You clicked send button
MESSAGE SENT: Hello Nick!
```

```
Password: password

(chat:191109): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
 a time; it already contains a widget of type GtkLabel

(chat:191109): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
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 a time; it already contains a widget of type GtkLabel

(chat:191109): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
 a time; it already contains a widget of type GtkLabel
Selected third contact

(chat:191109): Gtk-CRITICAL **: IA__gtk_widget_destroy: assertion `GTK_IS_WIDGET
 (widget)' failed
the number is: 2
the click_user is: 2
Selected first contact
the number is: 1
the click_user is: 1
INCOMING MESSAGE: Hello Nick!
```

Hello Nick!

Client/Server Chatroom:

Client:

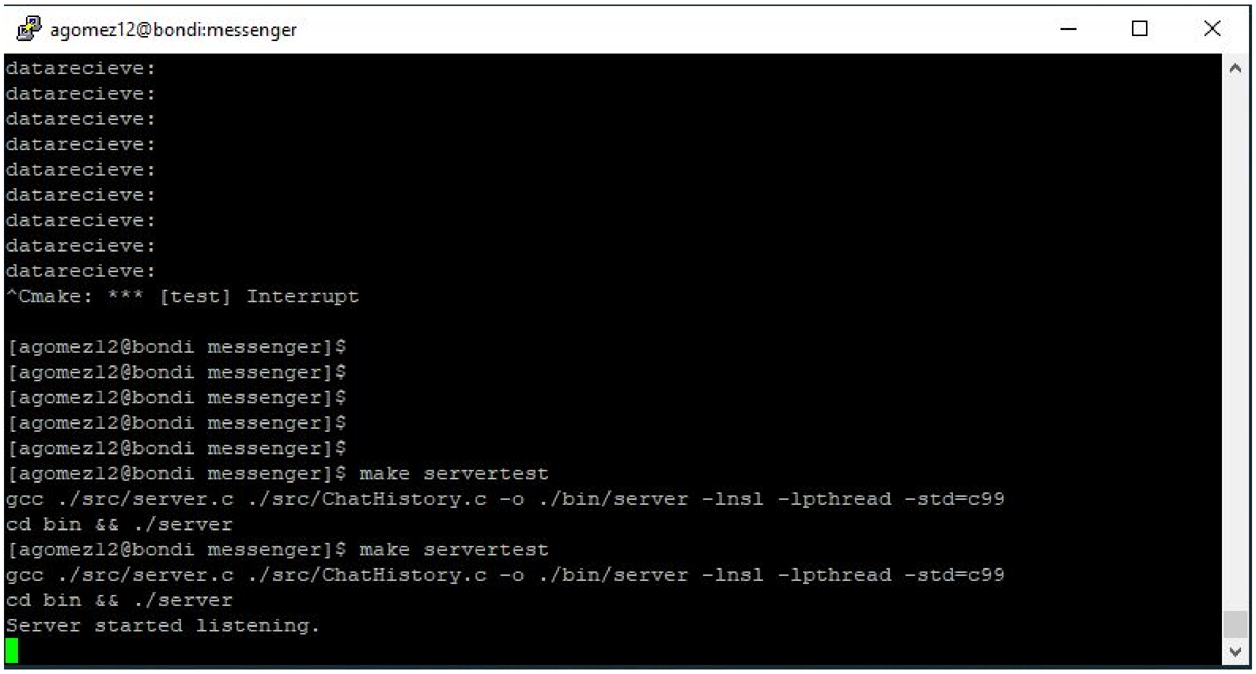
1) message

    a) Data Type: string

   b) Functionality: Stores the message the client wants to send.

2) serviceSocketFD
   a) Data Type: int
   b) Functionality: Socket file description for service. Handles the input and output from client and server.
3) dataSocketFD
   a) Data Type: int
   b) Functionality: Socket file description for data. Handles the input and output from client and server.
4) portNum
   a) Data Type: int
   b) Functionality: Holds the port number the client and server will use in order to connect.
5) serverAddress
   a) Data Type: int
   b) Functionality: Location of the server. Since, the server is the host will send the location to the client.
6) clientAddress
   a) Data Type: int
   b) Functionality: Has a copy of the address of the server the client will connect to.

7) Rbuffer[256]
    a) Data Type: string
    b) Functionality: Message buffer for receiving a message from the server.
8) Sbuffer[256]
    a) Data Type: string
    b) Functionality: Message buffer for sending a response to the server.



```
datarecieve:
datarecieve:
datarecieve:
datarecieve:
datarecieve:
datarecieve:
datarecieve:
datarecieve:
datarecieve:
^Cmake: *** [test] Interrupt

[agomez12@bondi messenger]$
[agomez12@bondi messenger]$
[agomez12@bondi messenger]$
[agomez12@bondi messenger]$
[agomez12@bondi messenger]$
[agomez12@bondi messenger]$ make servertest
gcc ./src/server.c ./src/ChatHistory.c -o ./bin/server -lnsl -lpthread -std=c99
cd bin && ./server
[agomez12@bondi messenger]$ make servertest
gcc ./src/server.c ./src/ChatHistory.c -o ./bin/server -lnsl -lpthread -std=c99
cd bin && ./server
Server started listening.
```

Server:

1) messageReceive
    a) Data Type: string

   b) Functionality: Holds a message that was last sent from the client.

2) messageStore
   a) Data Type: string
   b) Functionality: Holds a message from the server before it sends it to the other client.
3) usersConnected
   a) Data Type: string
   b) Functionality: Has the list of all the users who have an existing socket. If users exit the socket or open a socket then the list will be updated.
4) login
   a) Implemented in Text File
   b) Functionality: Has a list of all the existing logins.
   c) Additional Information: If a user creates an account then the list will be updated.
5) friendList
   a) Implemented in Text File
   b) Functionality: Has a list of all the friends the user has.
   c) Additional Information: List will be updated when the user adds or removes a friend from the contact list.

4.2 Detailed description of functions and parameters .

1) Client Functions
    a) char* encrypt(char* password);
        i) Takes in the clients password and encrypts it.
2) Server Functions for Login:
    a) char* user_pass_verification(char* username, char* password);
        i) Takes in username and password of the user and compares it to their existing list to see if it finds a match.
            (1) If incorrect information is given, a wrong username and/or password is given.
    b) int register_user(char* first, char* last, char* username, char* password);
        i) Stores information and is updated onto the login list.
        ii) Returns 0 if username is invalid or already taken
3) Server Functions for Chat:
    a) Void * doNetworking(void * ClientDetail);
        i) Used to send the message to the corresponding client.

ii) Used to send the list of the others client to the target client

b) void errorMessage(char* message, char *user);

i) Error in sending the messages to the client.

ii) A message error will be printed out.

c) void errorConnecting(char* connection, char* errorMessage);

i) Prints an error message when there has been an error connecting to the client.

d) void write_chat_history(char* sender, char* receiver, char* message)

i) Takes in the message and prints it out in the sender and receiver's chat history file

4) GUI Functions:

a) char* addFriend(char *username);

i) When adding a friend they will be implemented in the list of friends for that user.

b) char* removeFriend(char *username);

i) When removing a friend they will be eliminated from the list of friends for that user.

c) char* getLogin();

i) It takes the username and password of the user.

    ii) If valid, then switches the screen to the chat room.
    iii) If invalid, executes loginError()

d) char* getUsername();
    i) Gets username to pull up a specific users platform.
    ii) Each user has their own friends, conversations, and games.
    iii) Username is obtained through ASCII characters.

e) char* getPassword();
    i) Password is obtained through ASCII characters.

f) void loginError();
    i) Prints login error on GUI.

g) char* loadConversation(char* sender, char* friend);
    i) Retrieve conversation from the server and display it onto the GUI.
    ii) Will retrieve using username of the user.

h) char* loadBoard(char* sender, char* friend);
    i) Retrieve board moves from the server and display the board movements onto the GUI.
    ii) Will retrieve using username of the user.

Beta Implementations:

Client Software

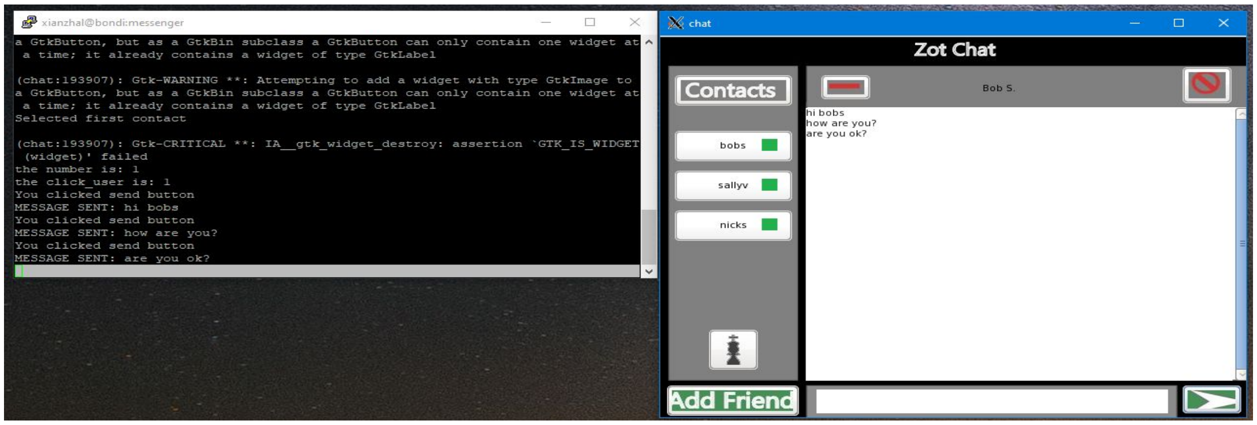
- void newid(char username[NAME_LEN]);
  - To store the socket number of the user
- void search_id(char* username);
  - To find the socket number of the user
- int chess_button(GtkButton *ChessButton, GObject *context_object);
  - To start play the chess which other client
- int first_contact(GtkButton *ContactOneButton, GObject *context_object)
  - Communication with the first contact
- int second_contact(GtkButton *ContactTwoButton, GObject *context_object)
  - Communication with the second contact
- int third_contact(GtkButton *ContactThirdButton, GObject *context_object)
  - Communication with the third contact
- const gchar *send_button(GtkButton *SendMessageButton, GObject *context_object)

    - Read the String from the GtkEntry and send it to the server with the selected socket number.
- void * doRecieving(void * sockID)
    - Used to receive the message from the server.
- int login_button (GtkButton *LoginButton, GObject *context_object)
    - To checking the username and the password, if incorrect the user need to retype again
- void fileLogin(char* username, char* password)
    - To store the Login information into Login.txt
- int signUp_Button(GtkButton *SignupButton, GObject *context_object)
    - Transfer to the signUp page
- int createAccount_button(GtkButton *createButton, GObject *context_object)
    - Read first name, last name, user name and the password
    - Store those information in the indivital file
- void close_window(GtkWidget *button,gpointer window)
    - To close the Gtk window
- void destroy(GtkWidget *widget, gpointer data)
    - Close the Gtk programming and Gtk windows
- char createNewUser(int argc, char **argv)

    - To create the Gtk window and GtkWidget, let the user can enter the information
- char createLogin(int argc, char **argv)
    - This function makes the window where the user would login to the program and calls the appropriate window when the button is clicked.
- char chatInterface(int argc, char **argv,char *username)
    - This function essentially creates the main chat user interface and calls the appropriate functions when a certain button is clicked.
- int main(int argc, char **argv)

<u>Server</u>

- write _chat_history(char* sender,char* receiver, char* message)
    - To store the chat history to the file
    - In the picture, nicks send messager to bobs, and those messenger will store in the file 1 to 2log.txt in ./bin , 1 and 2 is the socket number.



```
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
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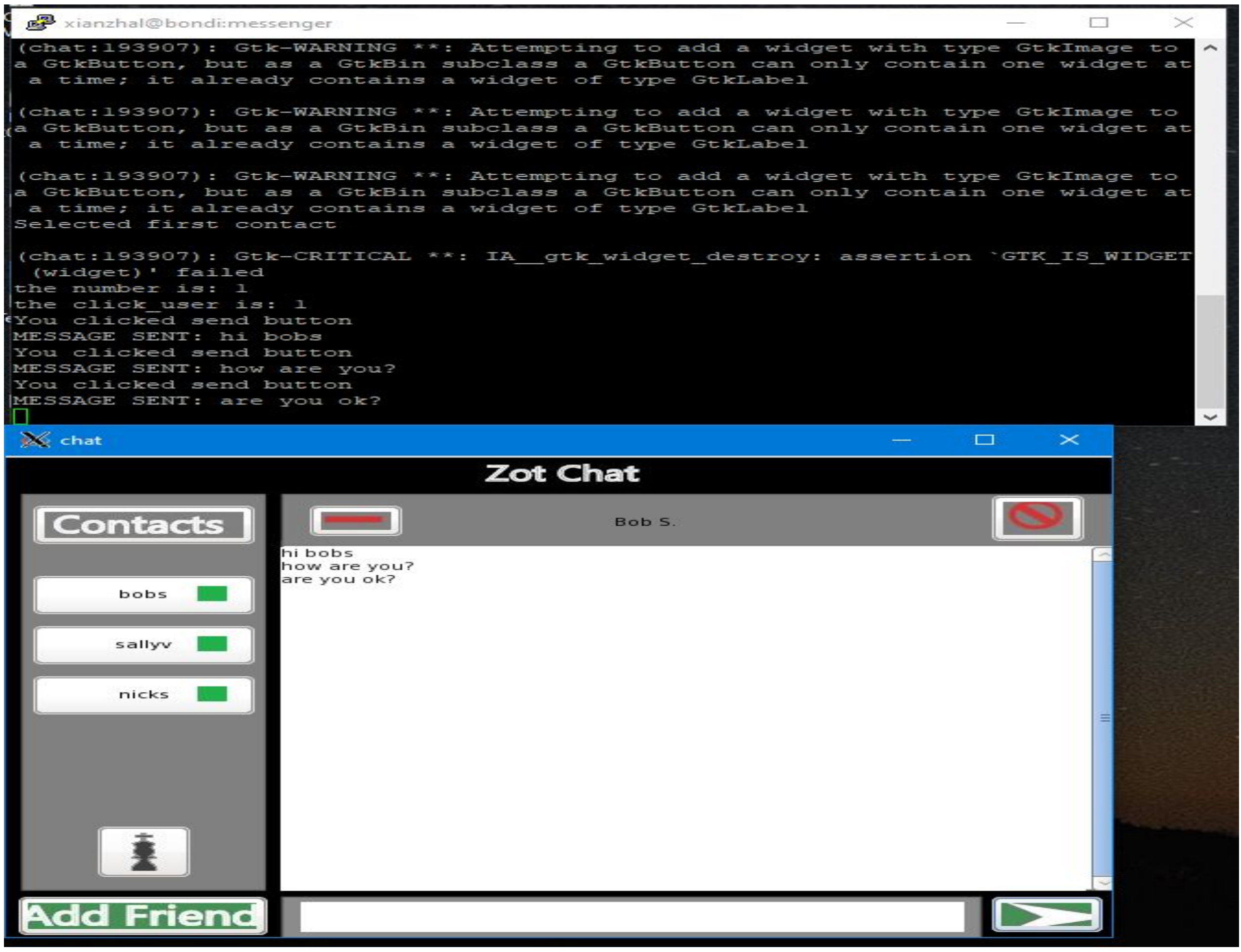
(chat:193907): Gtk-WARNING **: Attempting to add a widget with type GtkImage to
a GtkButton, but as a GtkBin subclass a GtkButton can only contain one widget at
 a time; it already contains a widget of type GtkLabel
Selected first contact

(chat:193907): Gtk-CRITICAL **: IA__gtk_widget_destroy: assertion `GTK_IS_WIDGET
 (widget)' failed
the number is: 1
the click_user is: 1
You clicked send button
MESSAGE SENT: hi bobs
You clicked send button
MESSAGE SENT: how are you?
You clicked send button
MESSAGE SENT: are you ok?
```

```
hi bobs
how are you?
are you ok?
```

- void * doNetworking(void * ClientDetail);
  - This function is used by the server client to know who and what is send the data out to each client



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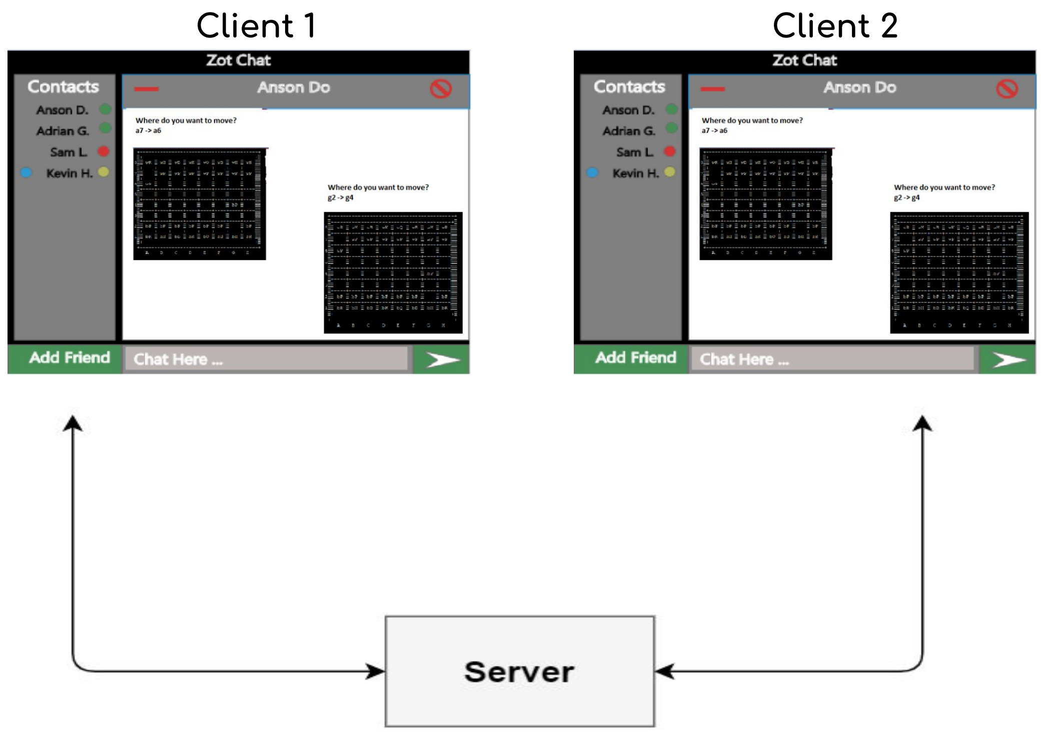
the number is: 1
the click_user is: 1
You clicked send button
MESSAGE SENT: hi bobs
You clicked send button
MESSAGE SENT: how are you?
You clicked send button
MESSAGE SENT: are you ok?
```

```
hi bobs
how are you?
are you ok?
```

4.3 Detailed description of the communication protocol

Schematics of communication between multiple clients and server:



Where do you want to move?
a7 -> a6

Where do you want to move?
g2 -> g4

Main Idea: The server will be used to communicate with one client at a time.

Functions used for client and server communication:

1) Char *receiveMessage();
    a) Server is receiving the messages from the clients.
    b) Server will only receive a message if it's done receiving the message from the other client or if it's unoccupied.
    c) If a message is pending from server to client, then will return message to corresponding client.
    d) One message can be handled at a time.

2) void sendMessage(char* message);
    a) Takes in the message from one of the clients, sends it to the server and the server will send it to the corresponding client.
    b) Can categorize the type of messages that would be sent from client to server.

Functions used for registering and logging in:

3) int register_user(char* first, char* last, char* username, char* password);
    a) Takes in strings of first name, last name, username, and password, then creates a .txt file for that user
    b) The .txt file is named (username).txt and holds the first and last name and the encrypted password
4) char* user_pass_verification(char* username, char* password);
    a) Takes in strings of username and password of the user, then looks into the .txt file and compares encrypted passwords to see if they match

Function used for storing the Chat Log:

5) void write_chat_history(char* sender, char* receiver, char* message)

a) Takes in strings of sender username, receiver username, and the message, then writes into their chat history file with the format of (sender): (message)

5. Development Plan and Timeline

5.1 Partitioning of tasks

Features	Week 7	Week 8	Week 9	Week 10
Chat	X	WIP	WIP	FINISH
Server	X	WIP	WIP	FINISH
Chess	X	WIP	WIP	FINISH
Main	X	WIP	WIP	FINISH

5.2 Team member responsibilities

Anson Do: Server Client, Client Server Connection, Chess Implementation, Manuals, Debugging
Adrian Gomez: GUI, GUI Integration, Debugging, Updating Manuals
Kevin Huang: Registering and Logging In Users, Password Encryption, Chat History
Xianzhang Li: Chess client and server Communication
Arian Reyes: Chat GUI, Server/Client Communication

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ERROR MESSAGES

Error	Meaning	How to Resolve
100	Wrong username	Try to type a valid username
101	Wrong password	Try to type the correct password
102	Could not connect to server	Try to make sure the server client is running
103	Username taken	Try another username

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