**Client/Server Protocol:**

**Client-to-Server Grammar:**

LOG\_ON ::= LOG\_ON USER\_ID [A-Za-z0-9]+

* When a client wants to log on.

LOG\_OFF ::= LOG\_OFF

* When a client wants to log off.

START\_CHAT ::= START\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* When a client wants to create a new conversation.

EXIT\_CHAT ::= EXIT\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* When a client wants to exit a conversation in which he is involved.

ENTER\_CHAT ::= ENTER\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* When a client wants to enter a conversation in which he is not involved.

SEND\_MESSAGE ::= SEND\_MESSAGE CONVERSATION\_ID [A-Za-z0-9]+ .\*

* When a client wants to send a message in a conversation in which he is involved.

SEND\_INVITE ::= SEND\_INVITE CONVERSATION\_ID [A-Za-z0-9]+ USER\_ID [A-Za-z0-9]+

* When a client wants to invite a user to a conversation in which he is involved.

**Server-to-Client Grammar:**

USER\_LOG\_ON ::= USER\_LOG\_ON USER\_ID [A-Za-z0-9]+

* When a new user logs on, update the client about that user.
* When a client logs on, update the client about all existing users.

USER\_LOG\_OFF ::= USER\_LOG\_OFF USER\_ID [A-Za-z0-9]+

* When a user logs off, update the client about that user.

ADD\_CONVERSATION ::= ADD\_CONVERSATION CONVERSATION\_ID [A-Za-z0-9]+

* When a new conversation is created, update the client about the conversation.
* When a client logs on, update the client about all existing conversation names.

USER\_ENTER\_CHAT ::= USER\_ENTER\_CHAT CONVERSATION\_ID [A-Za-z0-9]+ USER\_ID [A-Za-z0-9]+

* When a user enters a chat, update the client about that user.
* When a client logs on, update the client about all members of a conversation.

USER\_EXIT\_CHAT ::= USER\_EXIT\_CHAT CONVERSATION\_ID [A-Za-z0-9]+ USER\_ID [A-Za-z0-9]+

* When a user exits a chat, update the client about that user.

SEND\_MESSAGE ::= SEND\_MESSAGE CONVERSATION\_ID [A-Za-z0-9]+ USER\_ID [A-Za-z0-9]+ \_TIME\_ [0-9]{2}:[0-9]{2}:[0-9]{2} \_TEXT\_ .\*

* When a user in a conversation sends a message, send the message to all clients in the conversation.

RECEIVED\_INVITE ::= RECEIVED\_INVITE CONVERSATION\_ID [A-Za-z0-9]+

* When a user in a conversation sends an invite to another client, send the invite to the client who was invited if that client is not already in the conversation.

LOG\_ON ::= LOG\_ON USER\_ID [A-Za-z0-9]+

* Open the main chat window.

LOG\_ON\_FAIL ::= (LOG\_ON\_FAIL0 | LOG\_ON\_FAIL1 )

LOG\_ON\_FAIL0 ::= LOG\_ON\_FAIL0

* User is already logged on.

LOG\_ON\_FAIL1 ::= LOG\_ON\_FAIL1 USER\_ID [A-Za-z0-9]+)

* Username is already in use.

LOG\_OFF ::= LOG\_OFF

* Close all windows.

LOG\_OFF\_FAIL ::= LOG\_OFF\_FAIL

* User is not logged on.

START\_CHAT ::= START\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* Update the client that a new conversation was made (similar to ADD\_CONVERSATION).
* Open up a new window for the conversation.

START\_CHAT\_FAIL ::= (START\_CHAT\_FAIL0 | START\_CHAT\_FAIL1)

START\_CHAT\_FAIL0 ::= START\_CHAT\_FAIL0

* User is not logged on.

START\_CHAT\_FAIL1 ::= START\_CHAT\_FAIL1 CONVERSATION\_ID [A-Za-z0-9]+

* Conversation name is already in use.

ENTER\_CHAT ::= ENTER\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* Open up a new window for the conversation.

ENTER\_CHAT\_FAIL ::= (ENTER\_CHAT\_FAIL0 | ENTER\_CHAT\_FAIL1 | ENTER\_CHAT\_FAIL2)

ENTER\_CHAT\_FAIL0 ::= ENTER\_CHAT\_FAIL0

* User is not logged on.

ENTER\_CHAT\_FAIL1 ::= ENTER\_CHAT\_FAIL1 CONVERSATION\_ID [A-Za-z0-9]+

* Conversation name does not exist.

ENTER\_CHAT\_FAIL2 ::= ENTER\_CHAT\_FAIL2

* User is already in the conversation.

EXIT\_CHAT ::= EXIT\_CHAT CONVERSATION\_ID [A-Za-z0-9]+

* Close the conversation window if it is still open.

EXIT\_CHAT\_FAIL ::= (EXIT\_CHAT\_FAIL0 | EXIT\_CHAT\_FAIL1 | EXIT\_CHAT\_FAIL2)

EXIT\_CHAT\_FAIL0 ::= EXIT\_CHAT\_FAIL0

* User is not logged on.

EXIT\_CHAT\_FAIL1 ::= EXIT\_CHAT\_FAIL1 CONVERSATION\_ID [A-Za-z0-9]+

* Conversation name does not exist.

EXIT\_CHAT\_FAIL2 ::= EXIT\_CHAT\_FAIL2

* User is not in the conversation.

SEND\_MESSAGE\_FAIL ::= (SEND\_MESSAGE\_FAIL0 | SEND\_MESSAGE\_FAIL1 |SEND\_MESSAGE\_FAIL2)

SEND\_MESSAGE\_FAIL0 ::= SEND\_MESSAGE\_FAIL0

* User is not logged on.

SEND\_MESSAGE\_FAIL1 ::= SEND\_MESSAGE\_FAIL1 CONVERSATION\_ID [A-Za-z0-9]+

* Conversation name does not exist.

SEND\_MESSAGE\_FAIL2 ::= SEND\_MESSAGE\_FAIL2 CONVERSATION\_ID [A-Za-z0-9]+

* User is not in the conversation.

SEND\_INVITE\_FAIL ::= (SEND\_INVITE\_FAIL0 | SEND\_INVITE\_FAIL1 | SEND\_INVITE\_FAIL2 | SEND\_INVITE\_FAIL3)

SEND\_INVITE\_FAIL0 ::= SEND\_INVITE\_FAIL0

* User is not logged on.

SEND\_INVITE\_FAIL1 ::= SEND\_INVITE\_FAIL1 CONVERSATION\_ID [A-Za-z0-9]+

* Conversation name does not exist.

SEND\_INVITE\_FAIL2 ::= SEND\_INVITE\_FAIL2 CONVERSATION\_ID [A-Za-z0-9]+

* User is not in the conversation.

SEND\_INVITE\_FAIL3 ::= SEND\_INVITE\_FAIL3 USER\_ID [A-Za-z0-9]+

* Username does not exist.

INVALID\_INPUT ::= INVALID\_INPUT

* To deal with an invalid regex.