Report on Project Titled

**Multi-Client Chat Server**

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In this Assignment we are building multi-client chat server where clients can communicate with each other using server with the commands given in the Assignment.

**Connection Establishment**:

It is done by using the select which is a non-blocking mode. The select() call monitors activity on a set of sockets looking for sockets looking for sockets ready for reading, writing, or with an exception condition pending.

The functionalities implemented in the program are implemented by detecting if it is right command or not and send/recv function with send\_buffer used for sending and receive\_buffer used for receiving the command, socket IDs and client IDs are stored in the client\_socket and clientid arrays.

1. /send command: It is implemented by detecting if it a /send command and storing the client ID by checking if it is number or not and sending it to the client ID which is specified.
2. /broadcast command: Message is stored and sent to all the active clients connected to the server by iterating to the active clients and sending to them by their socket Ids.
3. /active: This command is implemented by retreiving all the active client from the stored array and sending it to the client.
4. /makegroup: This command is given along with the client ids. makegroup() is implemeted by detecting if it is valid client or not and storing the group data is a structure ‘g’ which contains client ids and admins array for checking if the client is admin or not which is useful for further commands.
5. makegroupreq(): This function is used for implemented the make group request which stores all the client ids mentioned by checking if it is valid or not and sending the request to the active client by checking if it is active or not bythe following fucntion checkifcleintactive() and group ID is also along with the request.
6. joingroup(): This function is implemented by detecting whether if the client is received the makegrouprequest and sends to the clients whom sent the acceptance request by checking if the group id is valid or not and the client id is added into the group structure.
7. declinegroup(): This function is implemented by detecting whether if the client received the makegrouprequest and sends to the client whom sent the decline request by checking if the group id if it is valid or not.
8. addtogroup(): This function is implemeted by detecting if the group is valid or not and client is added to the group structure and message is sent to all the clients in the group that client is added into the group.
9. removefromgroup(): This function is implemented by checking if the group and client are valid and checking if the client is admin or not and if the client is present in the group, client is removed from the group sending the client the message that you are removed from the group and removed from the group structure.
10. activegroups(): This function will send all the groups in which the client is present in and all the admins of the groups by iterating through the group structure checking if the client is present in the group.
11. makeadmin(): This function is implemented by checking if the group id is valid or not and checks if the client is in the group and admin or not, if the client is not admin then client is added as an admin to that group else sending the appropriate message to the client.
12. makeadminreq(): This function is implemented by checking if the group is valid or not and checking if the client is in the group and sending the request to all the admins in the group and cleint waits for the reply.g-req stores the client request and no\_of\_accepts and no\_of\_rejects.
13. approveadminreq(): This function is implemented by checking if the client has received the request and checking if the

group and client are valid with respect to the group and storing the client request in structure g\_req incremeting the no\_of\_accepts.If the no\_of\_admins=no\_of\_accepts+no\_of\_rejects and checking accepts and greater than rejects if it is greater then the client is made as admin updating the group structure and sending the message to th client.

1. declineadminreq(): This function is implemented by checking if the client has received the request and checking if the group and client are valid with respect to the group and storing the client request in structure g\_req incremeting the no\_of\_rejects.
2. quit():This comand will disconnect the client from the server by clearing ther client request if any such as makegroupreq or makeamdinreq and sending the message to the client belongs to the group in which client belong belongs to and if the client is the only admin for any group then the group is dismissed sending the clients appropriate message if they belong to the group.