

# CSC3002F Networks Assignment 2018

## Socket Programming Project: Report

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### Implementation:

The multi-threaded client-server based chat application with media file transmission using TCP sockets, uses two java files (ChatServer.java and ChatClient.java). The application allows group and 1:1 private chat in real-time. The chat server accepts connection requests from the clients and delivers all messages from each client to other clients. The chat client's and server's interface uses the Ubuntu Linux terminal.

#### ChatClient.java:

This is the multi-threaded chat client which uses two threads.

##### **One thread (thread 1):**

- captures data from the standard input (user)
- checks if there is a media file to be transferred (for blocked, private and public messages)
- processes media file to be sent (uses byte array)
- sends text message / media file to chat server

##### **The other thread (thread 2):**

- checks for / creates a received folder for each client for media file transfer
- receives media file from chat server
- transfers media file to the particular client's received folder
- the client has the option of receiving or declining the media file (incorporates bandwidth constraint - media file transmission)
- receives text messages from the server and prints it to the screen (standard output)
- terminates the client on quit

#### ChatServer.java:

This is the multi-threaded chat server containing two classes.

##### **The ChatServer class:**

- is responsible for the overall control and coordination of communication between clients
- displays a log of each client's actions in the chatroom
- accepts connection requests from clients
- creates a new client thread every time a connection is established (i.e. a new connection request from a client is accepted)

- uses a separate thread for each client
- shows number of clients connected to the chat server

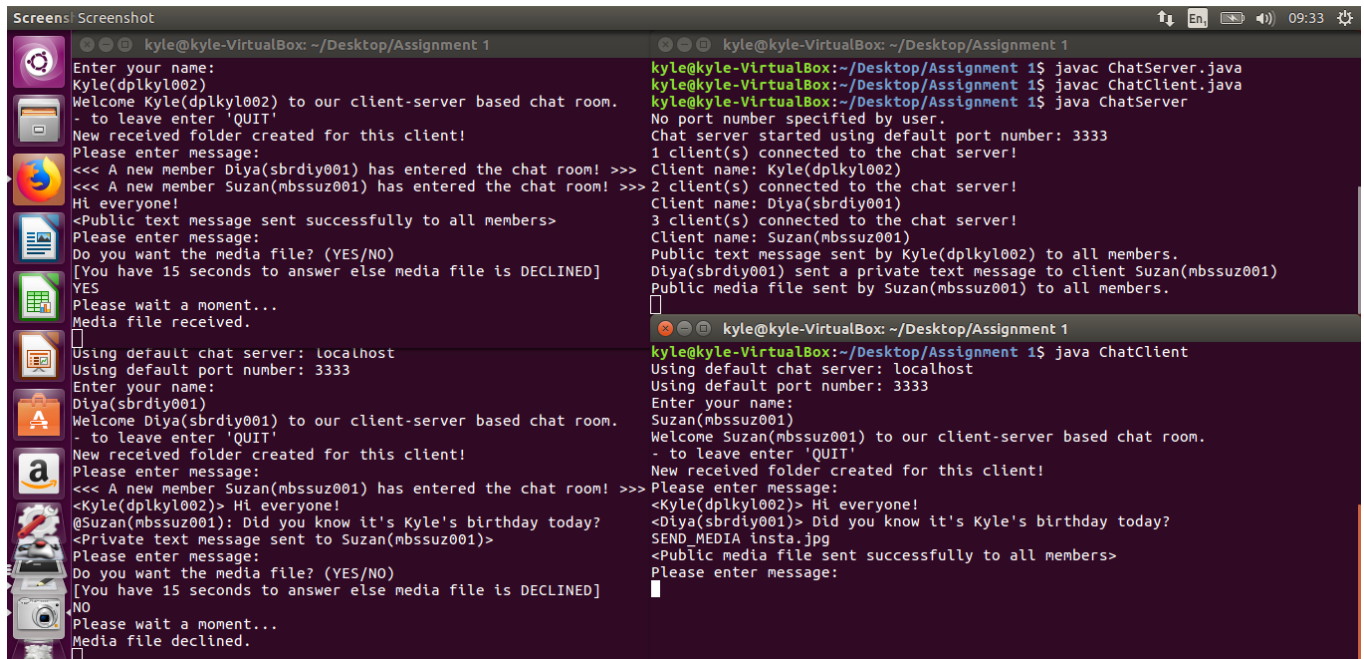
### The clientThread class:

- thread for a particular client (handles individual clients in their respective threads)

### This thread:

- opens the input and the output streams for a specific client
- asks the client to enter their name
- sends a welcome message to the particular client
- notifies all the other clients that a new client has joined the chat room
- receives data from client and checks message type (blocked, private or public)
- transfers (blocked) text messages or media files to all clients present in the chat room, except a particular client
- transfers (private) text messages or media files to a particular client present in the chat room
- transfers (public) text messages or media files to all clients present in the chat room
- notifies the client that the blocked, private or public text message or media file has been sent successfully
- notifies all the clients present in the chat room that a client has left

### Screenshots of the application:



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Screenshots: Screenshot
kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
Enter your name:
Kyle(dplkyl002)
Welcome Kyle(dplkyl002) to our client-server based chat room.
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<<< A new member Diya(sbrdiy001) has entered the chat room! >>>
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
Hi everyone!
<Public text message sent successfully to all members>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
YES
Please wait a moment...
Media file received.
Using default chat server: localhost
Using default port number: 3333
Enter your name:
Diya(sbrdiy001)
Welcome Diya(sbrdiy001) to our client-server based chat room.
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
<Kyle(dplkyl002)> Hi everyone!
@Suzan(mbssuz001): Did you know it's Kyle's birthday today?
<Private text message sent to Suzan(mbssuz001)>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
NO
Please wait a moment...
Media file declined.

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ javac ChatServer.java
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ javac ChatClient.java
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ java ChatServer
No port number specified by user.
Chat server started using default port number: 3333
1 client(s) connected to the chat server!
Client name: Kyle(dplkyl002)
2 client(s) connected to the chat server!
Client name: Diya(sbrdiy001)
3 client(s) connected to the chat server!
Client name: Suzan(mbssuz001)
Public text message sent by Kyle(dplkyl002) to all members.
Diya(sbrdiy001) sent a private text message to client Suzan(mbssuz001)
Public media file sent by Suzan(mbssuz001) to all members.

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ java ChatClient
Using default chat server: localhost
Using default port number: 3333
Enter your name:
Suzan(mbssuz001)
Welcome Suzan(mbssuz001) to our client-server based chat room.
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<Kyle(dplkyl002)> Hi everyone!
<Diya(sbrdiy001)> Did you know it's Kyle's birthday today?
SEND MEDIA insta.jpg
<Public media file sent successfully to all members>
Please enter message:

```

In the screenshot above, three clients (Kyle, Diya, Suzan – with student numbers included for each) joins the chatroom. Kyle sends a public text message and Diya sends a private text message to Suzan. Then Suzan sends a public media file to everyone in the chatroom. Kyle accepts the public media file, while Diya declined to accept the media file (limited bandwidth constraint).

```
Screenshot
kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
Please enter message:
<<< A new member Diya(sbrdiy001) has entered the chat room! >>>
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
Hi everyone!
<Public text message sent successfully to all members>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
YES
Please wait a moment...
Media file received.
@Suzan(mbssuz001): SEND_MEDIA fb.png
<Private media file sent to Suzan(mbssuz001)>
Please enter message:
QUIT
<<< Cheers Kyle(dplkyl002) >>>
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ 
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
<Kyle(dplkyl002)> Hi everyone!
@Suzan(mbssuz001): Did you know it's Kyle's birthday today?
<Suzan(mbssuz001): Did you know it's Kyle's birthday today?
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
NO
Please wait a moment...
Media file declined.
<Suzan(mbssuz001)> Let's through a surprise party for Kyle tonight!
ht!
<<< The member Kyle(dplkyl002) has exited the chat room! >>>
QUIT
<<< Cheers Diya(sbrdiy001) >>>
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ 

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
1 client(s) connected to the chat server!
Client name: Kyle(dplkyl002)
2 client(s) connected to the chat server!
Client name: Diya(sbrdiy001)
3 client(s) connected to the chat server!
Client name: Suzan(mbssuz001)
Public text message sent by Kyle(dplkyl002) to all members.
Diya(sbrdiy001) sent a private text message to client Suzan(mbssuz001)
Public media file sent by Suzan(mbssuz001) to all members.
Kyle(dplkyl002) sent a private media file to client Suzan(mbssuz001)
Blocked text message sent by Suzan(mbssuz001) to all members except Kyle(dplkyl002).
Kyle(dplkyl002) has left the chat room.
Diya(sbrdiy001) has left the chat room.

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<Kyle(dplkyl002)> Hi everyone!
<Diya(sbrdiy001)> Did you know it's Kyle's birthday today?
SEND_MEDIA insta.jpg
<Public media file sent successfully to all members>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
YES
Please wait a moment...
Media file received.
#Kyle(dplkyl002): Let's through a surprise party for Kyle tonight!
<Blocked text message sent to all members except: Kyle(dplkyl002)>
Please enter message:
<<< The member Kyle(dplkyl002) has exited the chat room! >>>
<<< The member Diya(sbrdiy001) has exited the chat room! >>>
```

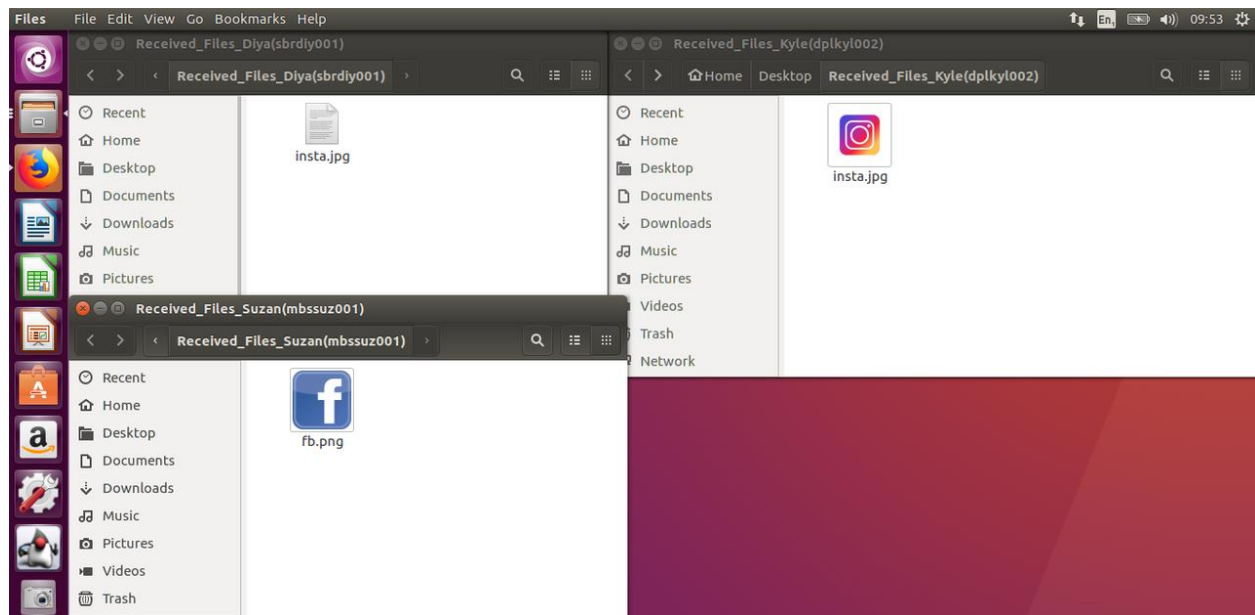
In the screenshot above, Kyle sends a private media file to Suzan. Suzan accepts the media file. Susan then sends a blocked text message that is sent to all members except Kyle. Then Kyle and Diya leave the chatroom and Suzan is notified of their departure.

```
Screenshot
kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
Please enter message:
<<< A new member Diya(sbrdiy001) has entered the chat room! >>>
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
Hi everyone!
<Public text message sent successfully to all members>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
YES
Please wait a moment...
Media file received.
@Suzan(mbssuz001): SEND_MEDIA fb.png
<Private media file sent to Suzan(mbssuz001)>
Please enter message:
QUIT
<<< Cheers Kyle(dplkyl002) >>>
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ 
- to leave enter 'QUIT'
New received folder created for this client!
Please enter message:
<<< A new member Suzan(mbssuz001) has entered the chat room! >>>
<Kyle(dplkyl002)> Hi everyone!
@Suzan(mbssuz001): Did you know it's Kyle's birthday today?
<Suzan(mbssuz001): Did you know it's Kyle's birthday today?
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
NO
Please wait a moment...
Media file declined.
<Suzan(mbssuz001)> Let's through a surprise party for Kyle tonight!
ht!
<<< The member Kyle(dplkyl002) has exited the chat room! >>>
QUIT
<<< Cheers Diya(sbrdiy001) >>>
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$ 

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
Client name: Kyle(dplkyl002)
2 client(s) connected to the chat server!
Client name: Diya(sbrdiy001)
3 client(s) connected to the chat server!
Client name: Suzan(mbssuz001)
Public text message sent by Kyle(dplkyl002) to all members.
Diya(sbrdiy001) sent a private text message to client Suzan(mbssuz001)
Public media file sent by Suzan(mbssuz001) to all members.
Kyle(dplkyl002) sent a private media file to client Suzan(mbssuz001)
Blocked text message sent by Suzan(mbssuz001) to all members except Kyle(dplkyl002).
Kyle(dplkyl002) has left the chat room.
Diya(sbrdiy001) has left the chat room.
Suzan(mbssuz001) has left the chat room.

kyle@kyle-VirtualBox: ~/Desktop/Assignment 1
Please enter message:
<Kyle(dplkyl002)> Hi everyone!
<Diya(sbrdiy001)> Did you know it's Kyle's birthday today?
SEND_MEDIA insta.jpg
<Public media file sent successfully to all members>
Please enter message:
Do you want the media file? (YES/NO)
[You have 15 seconds to answer else media file is DECLINED]
YES
Please wait a moment...
Media file received.
#Kyle(dplkyl002): Let's through a surprise party for Kyle tonight!
<Blocked text message sent to all members except: Kyle(dplkyl002)>
Please enter message:
<<< The member Kyle(dplkyl002) has exited the chat room! >>>
<<< The member Diya(sbrdiy001) has exited the chat room! >>>
QUIT
<<< Cheers Suzan(mbssuz001) >>>
kyle@kyle-VirtualBox:~/Desktop/Assignment 1$
```

In the screenshot above, Suzan then leaves the chatroom and receives a message confirming her departure.



The above screenshot shows the media files in each clients' respective received folder as expected. As Diya had declined to receive the "insta.jpg" file, it is still displayed in her folder - but the file is empty (0 bytes).