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Utilization List:

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IDE - Pycharm version 2019.3.3

Programming Language - Python version 3.8

OS - Windows 10

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Requirements to Run & check the functionalities

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1. Download and Install Pycharm 2019.3.3 - from
<https://www.jetbrains.com/pycharm/download/#section=windows>

2. Download and Install Python 3.8 - from <https://www.python.org/downloads/>

3. Create a new Project in Pycharm

4. Setup Pycharm with Python Interpreter:

a) Go to settings > Projects > Project Interpreter - Select Python 3.8

5. Include header/packages

a) Go to settings > Projects > '+' - add desired packages

If not installed already install json, socket, threading, Tkinter packages for this project

REFERENCES:

Following videos/links/document links include Sockets, Client-Server Model, Multi-threading, Chat room, Broadcast messages, Multiclient chat system

<https://www.geeksforgeeks.org/simple-chat-room-using-python/>

<https://medium.com/swlh/lets-write-a-chat-app-in-python-f6783a9ac170>

<https://pythontips.com/2013/08/06/python-socket-network-programming/>

[https://github.com/attreyabhatter/Reverse-Shell/tree/master/Multi_Client%20\(%20ReverseShell%20v2\)](https://github.com/attreyabhatter/Reverse-Shell/tree/master/Multi_Client%20(%20ReverseShell%20v2))

<https://pythonprogramming.net/sockets-tutorial-python-3/>

<https://pythonprogramming.net/client-chatroom-sockets-tutorial-python-3/>

<https://pythonprogramming.net/client-chatroom-sockets-tutorial-python-3/>

https://www.bogotobogo.com/python/python_network_programming_tcp_client_client_chat_client_chat_client_select.php

<https://github.com/KetanSingh11/SimpleChatApp>

https://github.com/naveensn/Naveen_GitRepo/commit/084a277eb29f46f122e17a43ee03074c5478c428

<https://www.geeksforgeeks.org/python-get-key-from-value-in-dictionary/>

<https://www.geeksforgeeks.org/python-string-split/>

Following videos/links/document links include tutorials, code snippets, widgets, buttons, multiple frames, syntax for TKINTER (GUI MODULE) Using Python

<https://www.geeksforgeeks.org/radiobutton-in-tkinter-python/>

<https://mail.python.org/pipermail/tutor/2009-October/072145.html>

<https://stackoverflow.com/questions/6919596/tkinter-radio-buttons-does-not-work-inside-function>

<https://stackoverflow.com/questions/35660342/radio-button-values-in-python-tkinter>

https://www.python-course.eu/tkinter_radiobuttons.php

<https://stackoverflow.com/questions/47386185/how-to-create-multiple-checkbox-in-loop-using-tkinter>

<https://stackoverflow.com/questions/15306631/how-do-i-create-child-windows-with-python-tkinter>

<https://www.youtube.com/watch?v=IB6VkXJVf0Y>

<https://www.youtube.com/watch?v=qWnE-yp6wzU&t=163s>

https://www.youtube.com/watch?v=_ISNIrR1nZU

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How to Run the Code and check Functionalities

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1. Download the File.
2. Contents –
 - a. READ_ME.pdf
 - b. server.py
 - c. client1.py
 - d. client2.py
 - e. client3.py
 - f. updatewithzero.py
 - g. And 9 .txt files for the vector values storage
3. Open server.py, client1.py, client2.py, client3.py in the newly created project in Pycharm.
4. Check If all the headers are included in your IDE.
5. Go ahead and Run server.py first
 - a. GUI Window for the server will be started.
 - b. “Server started” – message will be displayed in the message listbox.
6. Run client1.py
 - a. GUI Window for the client1 will be started.
 - b. “Enter Username-” message will be displayed.
 - c. Enter a username for the client1 (if the username is already in use by any other client then “username already exists please try another username” will be displayed. Use a different username for the client).

- d. Client will receive a welcome notification and the connection notification will be broadcasted to all the currently connected users.
 - e. All buttons except “enter” button will be disabled until the client is registered.
7. Repeat Step 6 for both client2 and client3.
8. You can visualize the connections being made with the server in the Server GUI – “username connected” message and “Username Disconnected” message for any disconnections. And the active users list, Complete Usernames logs.
9. Go the Client1 –
 - a. Double click the get active client’s button to verify that all three clients A, B and C are presently connected.
 - b. Click the start sending vector clock values button to start the process.
10. Visualize the vector clock values exiting the client and transiting the server to the intended recipient giving a send notification on sender side, transit notification on the server side and a receive notification on the receiver side.
11. To stop the exchange of messages between the clients click the stop sending the vector clock values button.
12. Similarly, check for all the three messaging (sending vector clock values) from all the three clients.
13. If you want to you can disconnect from the server using the disconnect button on the client gui & disconnection notification can be visualized on the server GUI and will also be broadcasted to the actively connected users. The username which disconnected will be removed from the active clients list.
14. To reset the vector clock values of all the three clients to (0,0,0) run the python script updatewithzero.py.