Vidyalankar Institute of Technology Accredited A+ by NAAC	**DEPARTMENT OF COMPUTER ENGINEERING**

Mini Project Report

Semester	S.E. Semester IV – Computer Engineering
Subject	Skill Base Lab Course: Python Programming (CSL405)
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Name of the Project: Chat Application

Project Description:We have built a chat application project that allows multiple clients to connect to a server using sockets and exchange messages in real-time. The project is divided into two parts, the front-end and the back-end.

The front-end is developed using the tkinter module in Python, which provides a graphical user interface for the chat application. It allows the user to enter their name and message and send it to the server using a send button. The chat box displays all the messages received from the server in real-time.

The back-end is developed using Flask and the threading module in Python. It creates a server that listens for incoming client connections using sockets. Once a client connects, the server creates a new thread to handle the client connection. The server then broadcasts any message received from a client to all the other connected clients.

Project Code:

Client:

```
import tkinter as tk
from tkinter import ttk
import threading
import socket

# Create a socket object
client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Define host and port for server
HOST = 'localhost'
PORT = 5000

# Connect to the server
client_socket.connect((HOST, PORT))

# Define function to send message to server
def send_message():
    message = message_entry.get()
    sender = sender_entry.get()
    data = {'message': message, 'sender': sender}
    client_socket.sendall(str(data).encode())
    message_entry.delete(0, tk.END)
    if not sender_entry['state'] == 'disabled':
        sender_entry.config(state='disabled')

# Create the GUI
root = tk.Tk()
root.title('Chat App')
root.geometry('500x500')
root.configure(bg='black')

# Create widgets
sender_label = ttk.Label(root, text='Name:', foreground='white',
background='black')
sender_entry = ttk.Entry(root)
message_label = ttk.Label(root, text='Message:', foreground='white',
background='black')
message_entry = ttk.Entry(root)
send_button = ttk.Button(root, text='Send', command=send_message)
chat_box = tk.Text(root, height=20, width=60, foreground='white',
background='black')
scrollbar = ttk.Scrollbar(root, command=chat_box.yview)
chat_box.config(yscrollcommand=scrollbar.set, state='disabled')

# Add widgets to grid
sender_label.grid(row=0, column=0, pady=10, padx=10)
```

```
sender_entry.grid(row=0, column=1, pady=10, padx=10)
message_label.grid(row=1, column=0, pady=10, padx=10)
message_entry.grid(row=1, column=1, pady=10, padx=10)
send_button.grid(row=2, column=1, pady=10, padx=10, sticky='e')
chat_box.grid(row=3, column=0, columnspan=2, pady=10, padx=10)
scrollbar.grid(row=3, column=2, sticky='ns', pady=10)

# Define function to update chat box with received messages
def update_chat_box(message):
    chat_box.config(state='normal')
    chat_box.insert(tk.END, message + '\n')
    chat_box.config(state='disabled')

# Define function to receive messages from server
def receive_messages():
    while True:
        data = client_socket.recv(1024)
        message = data.decode()
        update_chat_box(message)

# Create a new thread to receive messages from server
receive_thread = threading.Thread(target=receive_messages)
receive_thread.start()

# Run the GUI
root.mainloop()
```

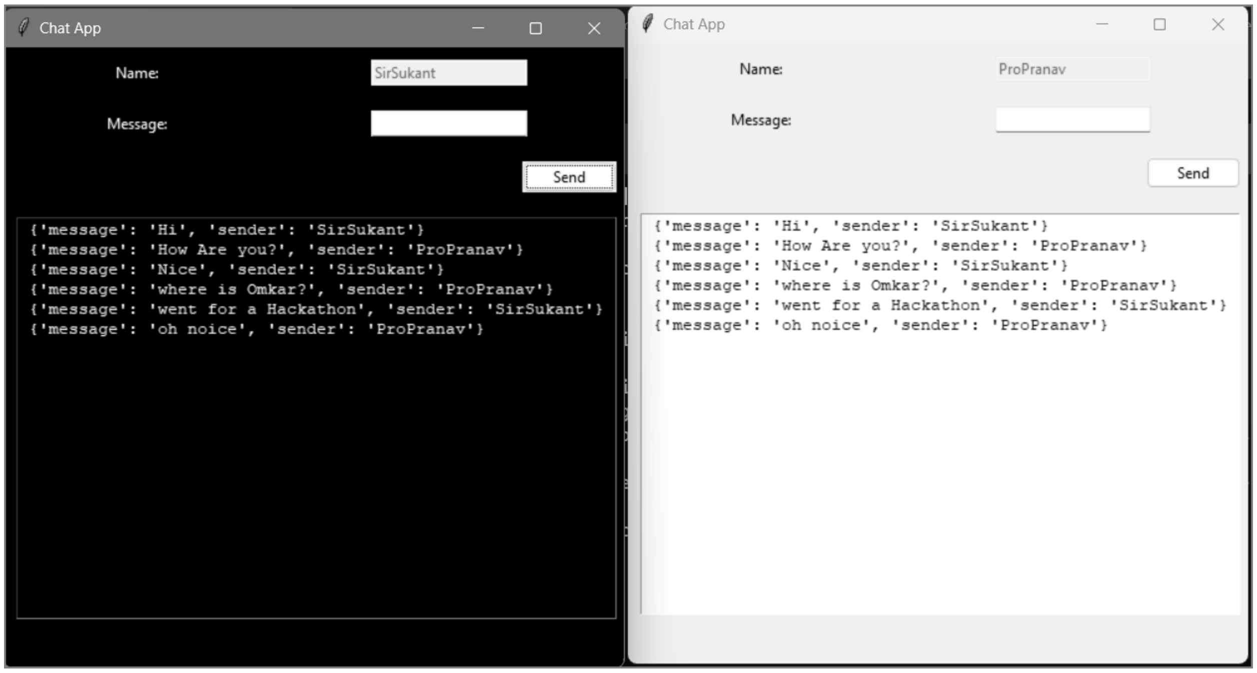
Server:

```
import socket
from threading import Thread
from flask import Flask, render_template

# Create a Flask app instance
app = Flask(__name__)
app.config['SECRET_KEY'] = 'secret!'

# Define host and port for server
HOST = 'localhost'
PORT = 5000

# Create a socket object
server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Set socket option to allow re-use of the address and port
server_socket.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)

# Bind the socket to the host and port
```

```
server_socket.bind((HOST, PORT))

# Listen for incoming client connections
server_socket.listen()

# Define list of connected clients
clients = []

# Define function to broadcast message to all connected clients
def broadcast_message(sender, message):
    for client in clients:
        if client != sender:
            try:
                # Send the message to the client
                client.sendall(f'{sender}: {message}'.encode())
            except socket.error:
                # If there's an error sending the message, remove the client from
the list of connected clients
                clients.remove(client)
                print(f'Client {client} disconnected')

# Define function to handle client connection
def handle_client(client_socket, addr):
    print(f'Client connected from {addr}')

    # Add the client socket to the list of connected clients
    clients.append(client_socket)

    while True:
        # Receive data from the client
        data = client_socket.recv(1024)

        # If there's no data, the client has disconnected
        if not data:
            # Remove the client from the list of connected clients and close the
connection
            clients.remove(client_socket)
            client_socket.close()
            break

        # Decode the received data into a string
        message = data.decode()

        # Broadcast the message to all connected clients
        broadcast_message(addr, message)

# Define a route for the index page
```

```python
@app.route('/')
def index():
    return render_template('index.html')

if __name__ == '__main__':
    print(f'Server running on {HOST}:{PORT}')

    # Listen for incoming client connections
    while True:
        # Accept an incoming client connection and create a new thread to handle 
the connection
        client_socket, addr = server_socket.accept()
        client_thread = Thread(target=handle_client, args=(client_socket, addr))
        client_thread.start()
```

Result/ Output:



```
{'message': 'Hi', 'sender': 'SirSukant'}
{'message': 'How Are you?', 'sender': 'ProPranav'}
{'message': 'Nice', 'sender': 'SirSukant'}
{'message': 'where is Omkar?', 'sender': 'ProPranav'}
{'message': 'went for a Hackathon', 'sender': 'SirSukant'}
{'message': 'oh noice', 'sender': 'ProPranav'}
```

```
{'message': 'Hi', 'sender': 'SirSukant'}
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{'message': 'where is Omkar?', 'sender': 'ProPranav'}
{'message': 'went for a Hackathon', 'sender': 'SirSukant'}
{'message': 'oh noice', 'sender': 'ProPranav'}
```

References:

https://python.plainenglish.io/create-a-basic-lan-chat-room-with-python-f334776bf70c
https://www.geeksforgeeks.org/simple-chat-room-using-python/
