MINOR PROJECT

Aim: Make a Chat Application using any programming language, including the following points:

1. TCP protocol
2. Encrypted message sharing

Language: Python

Code:

Server.py

```
import socket
import threading
from cryptography.fernet import Fernet

key = Fernet.generate_key()
cipher = Fernet(key)

clients = {}

def handle_client(client_socket, addr):
    clients[addr] = client_socket  # Add client to the dictionary
    print(f"Client {addr} connected.")

    while True:
        try:
            encrypted_message = client_socket.recv(1024)
            if not encrypted_message:
                print(f"Connection with {addr} closed.")
                break

            decrypted_message = cipher.decrypt(encrypted_message).decode('utf-8')
            print(f"Received from {addr}: {decrypted_message}")

            try:
                target_address_str, actual_message = decrypted_message.split(":", 1)
                target_address = eval(target_address_str.strip())

                print(f"Routing message to {target_address}: {actual_message}")

                if target_address in clients:
                    target_client = clients[target_address]
                    encrypted_response = cipher.encrypt(actual_message.encode('utf-8'))
                    target_client.send(encrypted_response)
                    print(f"Message sent to {target_address}")
```

```
            else:
                print(f"Client {target_address} not connected.")
                failure_message = f"Client {target_address} not connected."
                encrypted_response = cipher.encrypt(failure_message.encode('utf-8'))
                client_socket.send(encrypted_response)

        except ValueError as e:
            print(f"Error in message format: {e}")

    except Exception as e:
        print(f"An error occurred: {e}")
        break

  del clients[addr]
  client_socket.close()


def start_server(host='127.0.0.1', port=65432):
  server = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
  server.bind((host, port))
  server.listen()
  print(f"Generated Key: {key.decode()}")
  print(f"Server listening on {host}:{port}")

  while True:
    client_socket, addr = server.accept()
    print(f"Accepted connection from {addr}")
    client_handler = threading.Thread(target=handle_client, args=(client_socket, addr))
    client_handler.start()

if __name__ == "__main__":
  start_server()
```

Client.py

```
import socket
import threading
from cryptography.fernet import Fernet

key = b'G5HPznadtAY0A6nWwE4JTe6Me95J8jC9qFic7YeqtMw='
cipher = Fernet(key)

def receive_messages(client_socket):
  while True:
    try:
      encrypted_response = client_socket.recv(1024)

      if not encrypted_response:
```

```
            print("Server connection closed.")
            break

        decrypted_response = cipher.decrypt(encrypted_response).decode('utf-8')
        print(f"\nReceived message: {decrypted_response}")

      except Exception as e:
        print(f"An error occurred while receiving: {e}")
        break

def start_client(host='127.0.0.1', port=65432):
  client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
  client.connect((host, port))

  receive_thread = threading.Thread(target=receive_messages, args=(client,))
  receive_thread.start()

  while True:
    message = input("Enter a message (or 'exit' to quit): ")
    if message.lower() == 'exit':
      break

    encrypted_message = cipher.encrypt(message.encode('utf-8'))
    client.send(encrypted_message)
    print("Message sent to server.")

  client.close()

if __name__ == "__main__":
  start_client()
```

Output:

Server

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  AZURE

PS D:\college\5th sem\Exploring the Networks\Chat Application> python -u "d:\college\5th sem\Exploring the Networks\Chat Application\Server.py"
Generated Key: G5HPznadtAY0A6nWwE4JTe6Me95J8jC9qFic7YeqtMw=
Server listening on 127.0.0.1:65432
Accepted connection from ('127.0.0.1', 54451)
Client ('127.0.0.1', 54451) connected.
Accepted connection from ('127.0.0.1', 54452)
Client ('127.0.0.1', 54452) connected.
Received from ('127.0.0.1', 54451): ('127.0.0.1',54451):hello1
Received from ('127.0.0.1', 54451): ('127.0.0.1',54452):hello2
Routing message to ('127.0.0.1', 54452): hello2
Message sent to ('127.0.0.1', 54452)
Received from ('127.0.0.1', 54452): ('127.0.0.1',54451):how are you?
Routing message to ('127.0.0.1', 54451): how are you?
Message sent to ('127.0.0.1', 54451)
Received from ('127.0.0.1', 54451): ('127.0.0.1',54452):i am good
Routing message to ('127.0.0.1', 54452): i am good
Message sent to ('127.0.0.1', 54452)
Received from ('127.0.0.1', 54451): ('127.0.0.1',54452):how about you
Routing message to ('127.0.0.1', 54452): how about you
Message sent to ('127.0.0.1', 54452)
Received from ('127.0.0.1', 54452): ('127.0.0.1',54451):i am good
Routing message to ('127.0.0.1', 54451): i am good
Message sent to ('127.0.0.1', 54451)
An error occurred: [WinError 10054] An existing connection was forcibly closed by the remote host
An error occurred: [WinError 10054] An existing connection was forcibly closed by the remote host
```

Client 1

```
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\IPG 3>d:

D:\>cd college\5th sem\Exploring the Networks\Chat Application

D:\college\5th sem\Exploring the Networks\Chat Application>python Client.py
Enter a message (or 'exit' to quit): ('127.0.0.1',54451):hello1
Message sent to server.
Enter a message (or 'exit' to quit):
Received message: hello1
('127.0.0.1',54452):hello2
Message sent to server.
Enter a message (or 'exit' to quit):
Received message: how are you?
('127.0.0.1',54452):i am good
Message sent to server.
Enter a message (or 'exit' to quit): ('127.0.0.1',54452):how about you
Message sent to server.
Enter a message (or 'exit' to quit):
Received message: i am good
exit
An error occurred while receiving: [WinError 10053] An established connection was aborted by the software in your host machine

D:\college\5th sem\Exploring the Networks\Chat Application>
```

Client 2

```
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\IPG 3>d:

D:\>cd college\5th sem\Exploring the Networks\Chat Application

D:\college\5th sem\Exploring the Networks\Chat Application>python Client.py
Enter a message (or 'exit' to quit):
Received message: hello2
('127.0.0.1',54451):how are you?
Message sent to server.
Enter a message (or 'exit' to quit):
Received message: i am good

Received message: how about you
('127.0.0.1',54451):i am good
Message sent to server.
Enter a message (or 'exit' to quit): exit
An error occurred while receiving: [WinError 10053] An established connection was aborted by the software in your host machine

D:\college\5th sem\Exploring the Networks\Chat Application>
```