Computer Networks (UE22CS252B)

Mini Project (Socket Programming)

Cryptographic Reverse String Communication Protocol

Group Number: 22

Teammates

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(Semester-4 Section-J)

Programming Language used: ***Python***

Server Code:

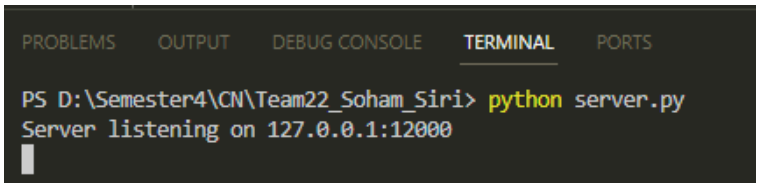
```python
import socket
import ssl

def perform_operation(operation, data):
    if operation == 1:
        return data[::-1]
    elif operation == 2:
        return data.upper()
    elif operation == 3:
        return data.lower()
    elif operation == 4:
        names = data.split()
        initials = ''.join([name[0].upper() for name in names])
        return initials
    else:
        return "Invalid operation"

def main():
    host = '127.0.0.1'
    port = 12000

    context = ssl.create_default_context(ssl.Purpose.CLIENT_AUTH)
    context.load_cert_chain(certfile='cert.pem', keyfile='private_key.pem')  # Adjust file paths as necessary

    with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as server_socket:
        server_socket.bind((host, port))
        server_socket.listen(5)
        print(f"Server listening on {host}:{port}")

        while True:
            client_socket, addr = server_socket.accept()
            with context.wrap_socket(client_socket, server_side=True) as secure_socket:
                print('Got connection from', addr)

                data = secure_socket.recv(1024).decode()
                print("Received from the client:", data)

                operation_choice = int(secure_socket.recv(1024).decode())
                print("Operation choice from the client:", operation_choice)

                result = perform_operation(operation_choice, data)

                secure_socket.sendall(result.encode())

if __name__ == '__main__':
    main()
```

Client Code

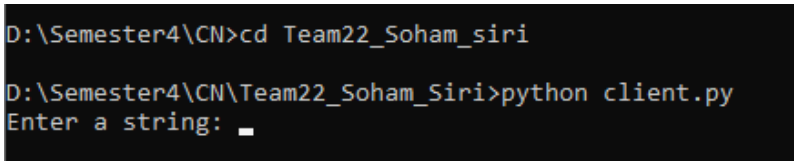
```python
import socket
import ssl

def get_user_input():
    print("Select operation:")
    print("1) Reverse the string")
    print("2) Capitalize the entire string")
    print("3) Decapitalize the entire string")
    print("4) Display initials of the person (assuming the string is a name)")
    choice = input("Enter your choice (1-4): ")
    return int(choice)

def main():
    host = '127.0.0.1'
    port = 12000

    context = ssl.create_default_context()
    context.check_hostname = False
    context.verify_mode = ssl.CERT_NONE  # Only for self-signed certs

    with socket.create_connection((host, port)) as sock:
        with context.wrap_socket(sock, server_hostname=host) as secure_socket:
            message_to_send = input("Enter a string: ")
            secure_socket.sendall(message_to_send.encode())
            print(f"Sent to server: {message_to_send}")

            operation_choice = get_user_input()
            secure_socket.sendall(str(operation_choice).encode())

            result = secure_socket.recv(1024).decode()
            print(f"Result from server: {result}")

if __name__ == '__main__':
    main()
```

The screenshots of the server and client:-

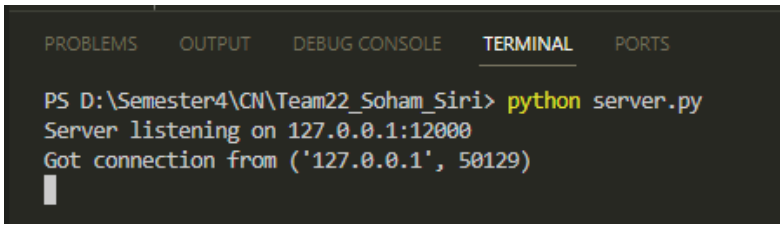
1. Server when it is running and waiting for client to connect:-



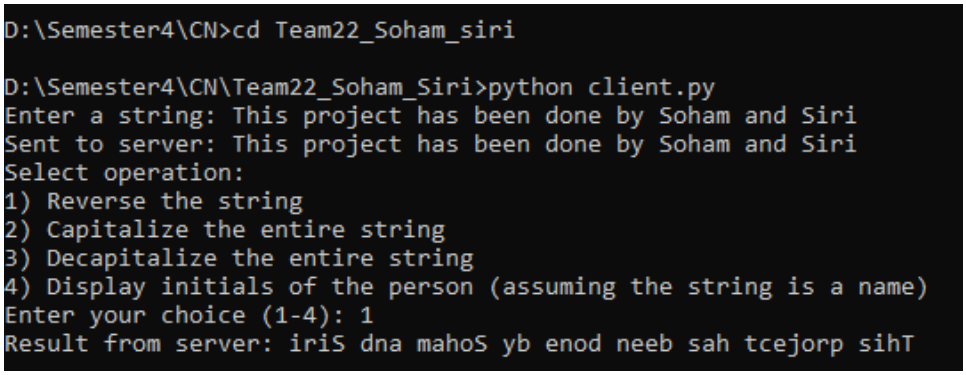
2. Client is running to connect to a server:-



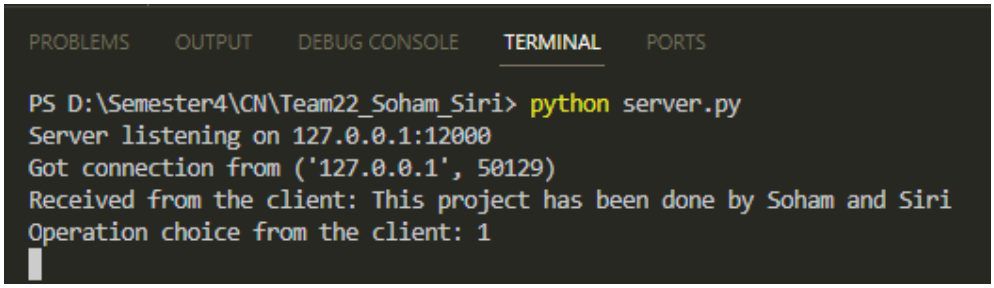
3. Server received a connection from client:-



4. Input strings are given in the client:-



5. Server shows the string received by server:-



Other Features:

```
D:\Semester4\CN\Team22_Soham_Siri>python client.py
Enter a string: hello world
Sent to server: hello world
Select operation:
1) Reverse the string
2) Capitalize the entire string
3) Decapitalize the entire string
4) Display initials of the person (assuming the string is a name)
Enter your choice (1-4): 2
Result from server: HELLO WORLD
```

```
D:\Semester4\CN\Team22_Soham_Siri>python client.py
Enter a string: HeLLO WorlD
Sent to server: HeLLO WorlD
Select operation:
1) Reverse the string
2) Capitalize the entire string
3) Decapitalize the entire string
4) Display initials of the person (assuming the string is a name)
Enter your choice (1-4): 3
Result from server: hello world
```

```
D:\Semester4\CN\Team22_Soham_Siri>python client.py
Enter a string: John Doe
Sent to server: John Doe
Select operation:
1) Reverse the string
2) Capitalize the entire string
3) Decapitalize the entire string
4) Display initials of the person (assuming the string is a name)
Enter your choice (1-4): 4
Result from server: JD
```