

Assignment 3

Implementation of TCP Socket Programming

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Problem Statements 1

Write a TCP socket program (in C/C++/Java/Python) to establish connection between client and server. The client program will send a message to the server and the server program will display the message.

Code

SERVER END

```
import socket
port=50000
host="127.0.0.1"

server= socket.socket(socket.AF_INET, socket.SOCK_STREAM)
server.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
server.bind((host, port))
print("socket binded to %s" %(port))

server.listen(2)
print("Socket is listening...")

# Accepting/Establishing connection from client.
conn, addr = server.accept()
print('Got connection from', addr)

while True:
    recieved_data = conn.recv(2048)
    print("Message from client: ",recieved_data.decode())
    if recieved_data.decode()=='quit':
        break

print("Connection closed from client")

#Close the connection with the client
conn.close()
```

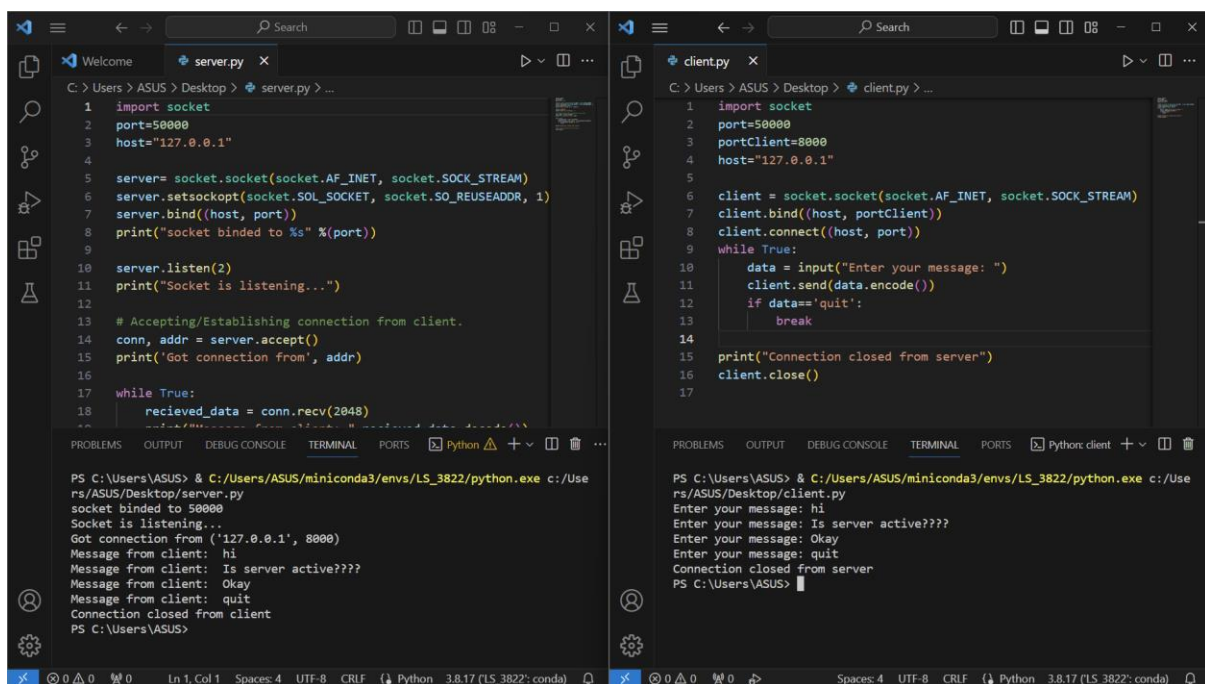
CLIENT END

```
import socket
port=50000
portClient=8000
host="127.0.0.1"

client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
client.bind((host, portClient))
client.connect((host, port))
while True:
    data = input("Enter your message: ")
    client.send(data.encode())
    if data=='quit':
        break

print("Connection closed from server")
client.close()
```

Result



The image shows two side-by-side Visual Studio Code windows. The left window displays the code for a server (server.py) and its terminal output. The right window displays the code for a client (client.py) and its terminal output.

Left Window (server.py):

```
1 import socket
2 port=50000
3 host="127.0.0.1"
4
5 server= socket.socket(socket.AF_INET, socket.SOCK_STREAM)
6 server.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
7 server.bind((host, port))
8 print("socket binded to %s" %(port))
9
10 server.listen(2)
11 print("Socket is listening...")
12
13 # Accepting/Establishing connection from client.
14 conn, addr = server.accept()
15 print('Got connection from', addr)
16
17 while True:
18     recieved_data = conn.recv(2048)
```

Terminal Output (Left):

```
PS C:\Users\ASUS> & C:/Users/ASUS/miniconda3/envs/LS_3822/python.exe c:/Users/ASUS/Desktop/server.py
socket binded to 50000
Socket is listening...
Got connection from ('127.0.0.1', 8000)
Message from client: hi
Message from client: Is server active????
Message from client: Okay
Message from client: quit
Connection closed from client
PS C:\Users\ASUS>
```

Right Window (client.py):

```
1 import socket
2 port=50000
3 portClient=8000
4 host="127.0.0.1"
5
6 client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
7 client.bind((host, portClient))
8 client.connect((host, port))
9
10 while True:
11     data = input("Enter your message: ")
12     client.send(data.encode())
13     if data=='quit':
14         break
15
16 print("Connection closed from server")
17 client.close()
```

Terminal Output (Right):

```
PS C:\Users\ASUS> & C:/Users/ASUS/miniconda3/envs/LS_3822/python.exe c:/Users/ASUS/Desktop/client.py
Enter your message: hi
Enter your message: Is server active????
Enter your message: Okay
Enter your message: quit
Connection closed from server
PS C:\Users\ASUS>
```

Everything is working as desired. Server is receiving message from client and displaying. Connection is closed when client inputs quit.

Problem Statements 2

Write a TCP socket program where client sends a message (string) to server; server echo back the characters at even position if length of the string is even otherwise, echo back the characters at odd position. This process continues until the client sends 'bye'.

Code

SERVER END

```
import socket

port=30000
host="127.0.0.1"

server= socket.socket(socket.AF_INET, socket.SOCK_STREAM)
server.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
server.bind((host, port))
print("socket binded to %s" %(port))

server.listen(2)
print("Socket is listening...")

# Accepting/Establishing connection from client.
conn, addr = server.accept()
print('Got connection from', addr)

while True:
    recieved_data = conn.recv(2048)
    print("Message from client: ", recieved_data.decode())
    decoded_data = recieved_data.decode()

    if recieved_data.decode()=='bye':
        break

    characters = "" # For storing Even or Odd characters
```

```

        for i in range(len(decoded_data)):
            if len(decoded_data) % 2 == 0:
                if i % 2 == 0:
                    characters += decoded_data[i]
            elif i % 2 != 0 :
                characters += decoded_data[i]

        conn.send(characters.encode())

print("Connection closed from client")

#Close the connection with the client
conn.close()

```

CLIENT END

```

import socket

port=30000
portClient=4000
host="127.0.0.1"

client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
client.bind((host, portClient))
client.connect((host, port))

while True:
    data = input("Enter your message: ")
    client.send(data.encode())

    if data=='bye':

```

break

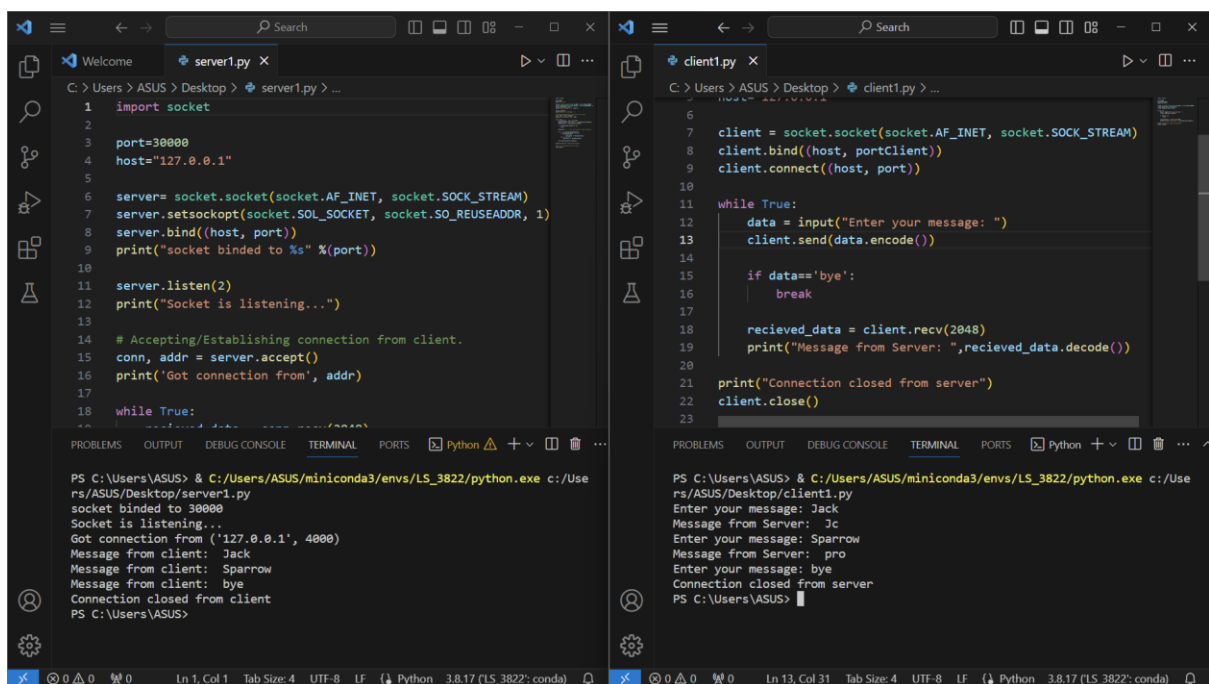
```
recieved_data = client.recv(2048)
```

```
print("Message from Server: ",recieved_data.decode())
```

```
print("Connection closed from server")
```

```
client.close()
```

Result



```
server1.py
1 import socket
2
3 port=30000
4 host="127.0.0.1"
5
6 server= socket.socket(socket.AF_INET, socket.SOCK_STREAM)
7 server.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
8 server.bind((host, port))
9 print("socket binded to %s" %(port))
10
11 server.listen(2)
12 print("Socket is listening...")
13
14 # Accepting/Establishing connection from client.
15 conn, addr = server.accept()
16 print('Got connection from', addr)
17
18 while True:
19     data = conn.recv(2048)
20     if data:
21         print("Message from client: ",data.decode())
22         conn.send(data)
23     if data == 'bye':
24         break
25     conn.close()

client1.py
6
7 client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
8 client.bind((host, portClient))
9 client.connect((host, port))
10
11 while True:
12     data = input("Enter your message: ")
13     client.send(data.encode())
14
15     if data=='bye':
16         break
17
18     recieved_data = client.recv(2048)
19     print("Message from Server: ",recieved_data.decode())
20
21 print("Connection closed from server")
22 client.close()
23
```

```
PS C:\Users\ASUS> & C:/Users/ASUS/miniconda3/envs/LS_3822/python.exe c:/Users/ASUS/Desktop/server1.py
socket binded to 30000
Socket is listening...
Got connection from ('127.0.0.1', 4000)
Message from client: Jack
Message from client: Sparrow
Message from client: bye
Connection closed from client
PS C:\Users\ASUS>
```

```
PS C:\Users\ASUS> & C:/Users/ASUS/miniconda3/envs/LS_3822/python.exe c:/Users/ASUS/Desktop/client1.py
Enter your message: Jack
Message from Server: Jc
Enter your message: Sparrow
Message from Server: pro
Enter your message: bye
Connection closed from server
PS C:\Users\ASUS>
```

The echo output printed on client end after getting echoed and even/odd filtering from server end is correct with respect to indexing as it, starts from 0. So, for “Jack” even index letters are J (0th index) and c (2nd index). Similarly for Sparrow odd index letters are p, r and o. When client inputs bye message connection is closed and no return message to client is sent.