Client Server Communication using TCP as Transport Layer Protocol

Rwithik Manoj, Roll No. 53

Aim

To implement Client-Server communication using Socket Programming and TCP as transport layer protocol.

Theory

TCP (Transmission Control Protocol) is one of the main protocols in TCP/IP networks. Transmission control protocol (TCP) is a network communication proto- col designed to send data packets over the Internet. TCP is a transport layer protocol in the OSI layer and is used to create a connection between remote computers by transporting and ensuring the delivery of messages over supporting networks and the Internet.

It is a connection-oriented protocol, which means that a connection is established and maintained until the application programs at each end have finished exchanging messages.

TCP programs are implemented in two parts:

- Server : A server program listens for a connection. On getting a request, the server accepts a connection. After the connection is established, server and client can exchange messages.
- Client : A client program requests some service. A client program request for some resources to the server and server responds to that request. Client initiates the connection establishment. The server accepts connection and client can request services by exchanging messages.

Sockets

Implementation of the above two programs (Client and Server) is to be done with the help of sockets. A socket is one endpoint of a two-way communication link between two programs running on the network. Client program and server program create and use sockets to communicate with each other.

Code

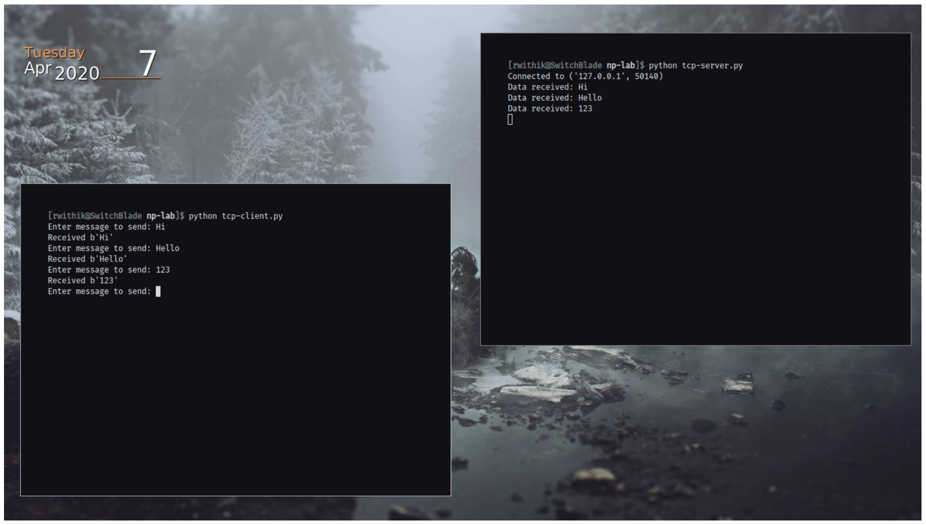
Server Code:

```
import socket

HOST = "127.0.0.1"
PORT = 8888

with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
    s.bind((HOST, PORT))
    s.listen()
    conn, addr = s.accept()
    with conn:
        print("Connected to", addr)
        while True:
            data = conn.recv(1024)
            print("Data received:", data.decode())
            conn.sendall(data)
```

Client Code:

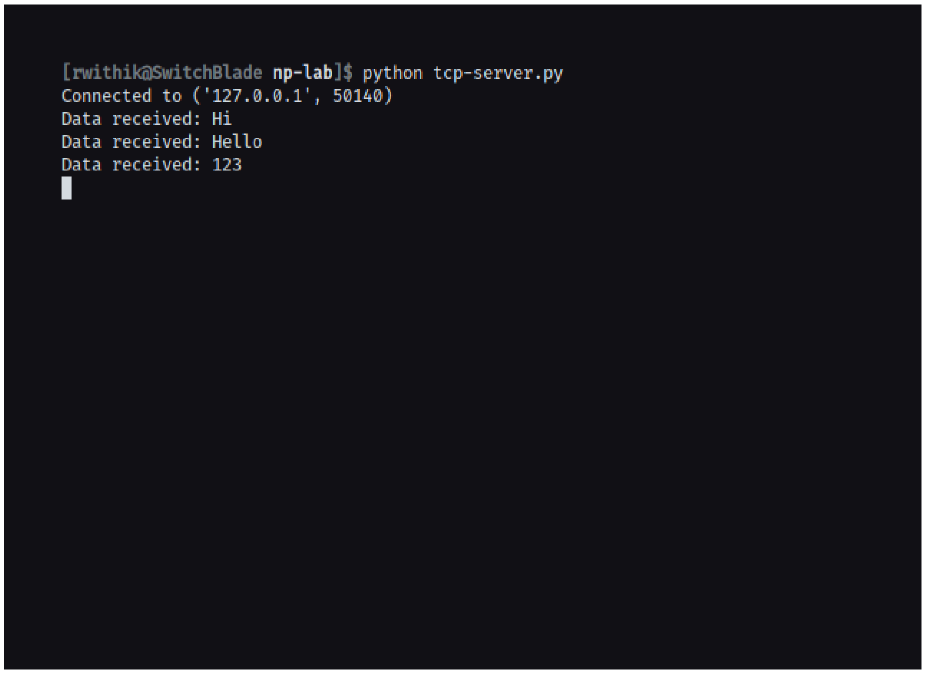
```
import socket

HOST = "127.0.0.1"
PORT = 8888

with socket.socket(socket.AF_INET, socket.SOCK_STREAM) as s:
    s.connect((HOST, PORT))
    while True:
        msg = input("Enter message to send: ")
        s.sendall(msg.encode())
        data = s.recv(1024)

        print("Received", repr(data))
```

Output

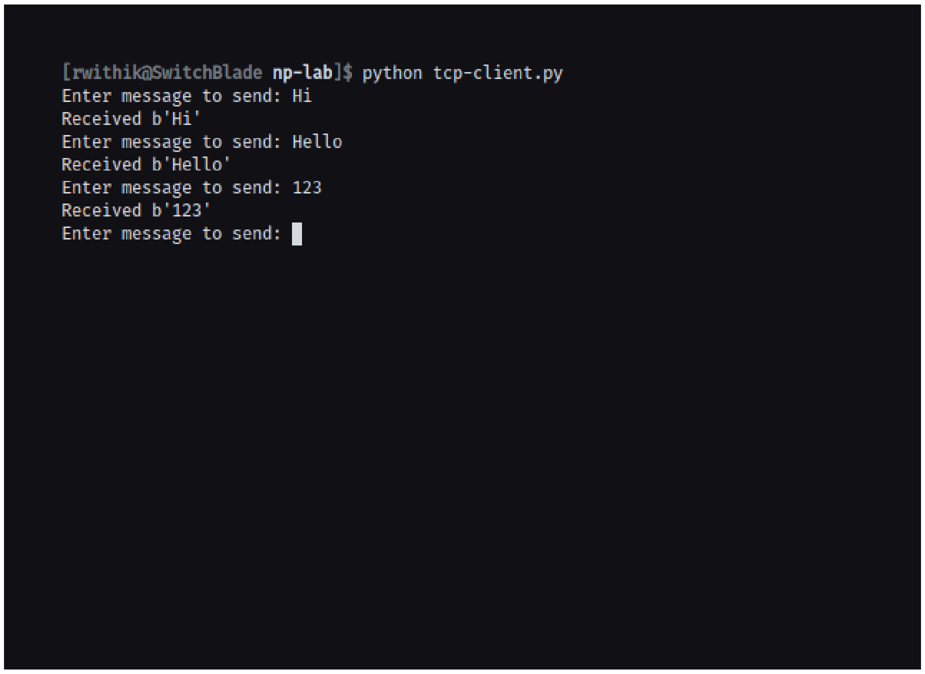


```
[rwithik@SwitchBlade np-lab]$ python tcp-client.py
Enter message to send: Hi
Received b'Hi'
Enter message to send: Hello
Received b'Hello'
Enter message to send: 123
Received b'123'
Enter message to send: 
```

```
[rwithik@SwitchBlade np-lab]$ python tcp-server.py
Connected to ('127.0.0.1', 50140)
Data received: Hi
Data received: Hello
Data received: 123
```



```
[rwithik@SwitchBlade np-lab]$ python tcp-server.py
Connected to ('127.0.0.1', 50140)
Data received: Hi
Data received: Hello
Data received: 123
```



```
[rwithik@SwitchBlade np-lab]$ python tcp-client.py
Enter message to send: Hi
Received b'Hi'
Enter message to send: Hello
Received b'Hello'
Enter message to send: 123
Received b'123'
Enter message to send: 
```