Aim: Socket programming using TCP or UDP.

Theory:

Sockets:

A socket is one endpoint of a two way communication link between two programs running on the network. The socket mechanism provides a means of inter-process communication (IPC) by establishing named contact points between which the communication takes place.

Socket are generally employed in client server applications. The server creates a socket, attaches it to a network port addresses then waits for the client to contact it. The client creates a socket and then attempts to connect to the server socket.

When the connection is established, transfer of data takes place.

Types of Sockets :
There are two primary and common types of Sockets: the datagram socket and the stream socket.

1.Datagram Socket :

This is a type of network which has connection less point for sending and receiving packets. It is similar to mailbox. The letters (data) posted into the box are collected and delivered (transmitted) to a letterbox (receiving socket).

2.Stream Socket:

In Computer operating system, a stream socket is type of interprocess communications socket or network socket which provides a connection-oriented, sequenced, and unique flow of data without record boundaries with well defined mechanisms for creating and destroying connections and for detecting errors. It is similar to phone.
A connection is established between the phones (two ends) and a conversation (transfer of data) takes place.

Program:

Client Side Program:

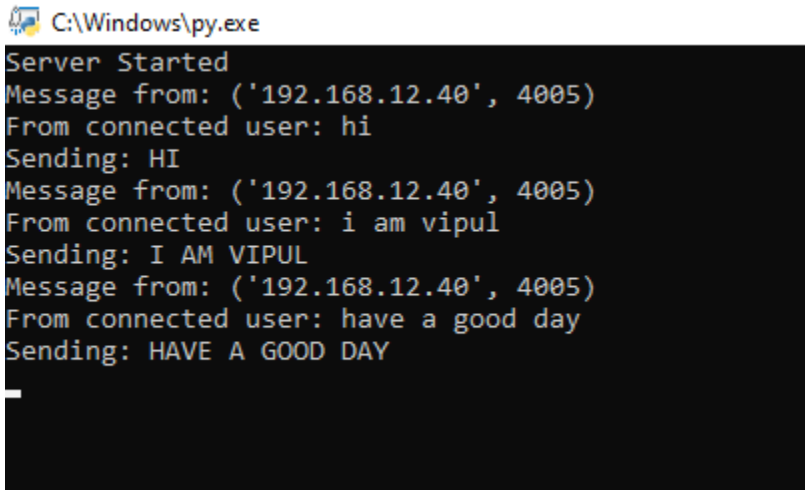
```
import socket

def Main():

    host='192.168.12.40' #client ip
    port = 4005

    server = ('192.168.12.39', 4000)

    s = socket.socket(socket.AF_INET,
socket.SOCK_DGRAM)
    s.bind((host,port))

    message = input("-> ")
    while message !='q':
        s.sendto(message.encode('utf-8'),
server)
        data, addr = s.recvfrom(1024)
        data = data.decode('utf-8')
        print("Received from server: " + data)
        message = input("-> ")
    s.close()

Main()
```

Server Side Program:

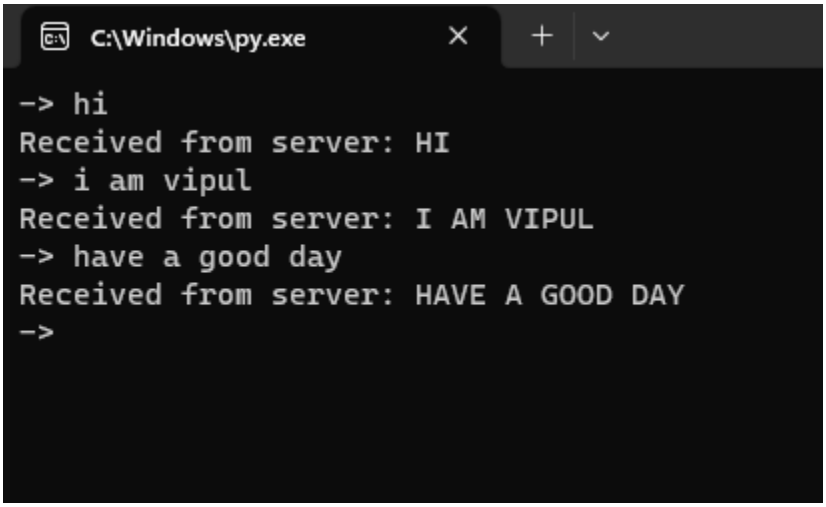
```
import socket

def Main():

    host = '192.168.12.39' #Server ip
    port = 4000

    s = socket.socket(socket.AF_INET,
socket.SOCK_DGRAM)
    s.bind((host, port))

    print("Server Started")
    while True:
        data, addr = s.recvfrom(1024)
        data = data.decode('utf-8')
        print("Message from: " + str(addr))
        print("From connected user: " + data)
        data = data.upper()
        print("Sending: " + data)
        s.sendto(data.encode('utf-8'), addr)
    c.close()

Main()
```

Output:

Server Side:



Client Side:



Conclusion:

In this experiment we have seen how to create sockets, establish connection between Server and Client and enable two-way communication between them.