Title: Socket Programming

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Objective:

The aim of this experiment is to establish a connection between the client and server using socket programming.

Problem Statement:

The client sends a request for data using an IP address to the server and the server acknowledges the request and sends data back to the client. The problem is to implement this connection. Socket programming should be used to write both of these programs, one for the client and the other for the server.

Algorithm:

The steps to be followed on the client side for establishing TCP Socket:

- Use the socket() function to create a socket.
- Use the connect() function for connecting the socket to the server IP address.
- Use send() function to send the request to the server from the client.
- After data is transmitted close the connection using close() function.

The steps to be followed on server side for establishing TCP Socket:

- Use socket() function for establishing a socket.
- Use the bind() function for binding the socket to an IP address.
- For listening client connections use listen() function.
- The accept() function is used for accepting the connection of the client.
- Send data back to the client using send() function.
- Close the connection using close() after data is sent back.

The connection is established successfully .

Code:

Same machine

Server Program:

```
import socket
s= socket.socket()   #Create the socket
print('Socket Created')

s.bind(("localhost",9999))   #Assign IP address and port number to socket
s.listen(3)

print('waiting for connections')

while True:
    c,addr=s.accept()        #accept the request from client
    name=c.recv(1024).decode()
    print("Connected with ",addr,name)

    c.send(bytes('Welcome','utf-8'))  #send data to client
    c.close()
```

Client Program:

```
import socket
c=socket.socket()
c.connect(("localhost",9999)) # Connect with the server using IP address
and port number
name=input("Enter your name")
c.send(bytes(name,'utf-8'))   # sends request to server
print(c.recv(1024).decode())   #Print the received data
```

Output:

```
In [1]: import socket
        c=socket.socket()
        c.connect(("localhost",9999))
        name=input("Enter your name")
        c.send(bytes(name,'utf-8'))#sends request to server
        print(c.recv(1024).decode())

        Enter your nameSravani
        Welcome
```

```
In [*]: import socket
        s= socket.socket()
        print('Socket Created')

        s.bind(("localhost",9999))
        s.listen(3)

        print('waiting for connections')

        while True:
            c,addr=s.accept()
            name=c.recv(1024).decode()
            print("Connected with ",addr,name)

            c.send(bytes('Welcome','utf-8'))
            c.close()

        Socket Created
        waiting for connections
        Connected with  ('127.0.0.1', 64234) Sravani
```

Explanation:

The client sent the request to the server using the local host and the port number by entering the name and the server accepted the request and connected with the client. The message “Welcome” in the server is displayed at the client end.

<u>Two different machines</u>

When I am server:

```
import socket
s= socket.socket()   #Create the socket
print('Socket Created')


s.bind(("10.1.78.154",9999))   #Assign IP address and port number to socket
s.listen(3)


print('waiting for connections')
```

while True:

c,addr=s.accept() #accept the request from client

name=c.recv(1024).decode()

print("Connected with ",addr,name)

c.send(bytes('Welcome','utf-8')) #send data to client

c.close()

```
In [*]: import socket
        s= socket.socket()
        print('Socket Created')

        s.bind(("10.1.78.154",9999))
        s.listen(3)

        print('waiting for connections')

        while True:
            c,addr=s.accept()
            name=c.recv(1024).decode()
            print("Connected with ",addr,name)

            c.send(bytes('Welcome!!','utf-8'))
            c.close()

        Socket Created
        waiting for connections
        Connected with  ('10.1.74.166', 51136) Kavya Sree
```

```
In [1]: import socket
        c = socket.socket()
        c.connect(('10.1.78.154',9999))
        name = input("Enter your name")
        c.send(bytes(name,'utf-8'))
        print(c.recv(1024).decode())

        Enter your nameKavya Sree
        Welcome!!
```

Explanation:

Here the client is Kavya Sree and the server is Sravani. The client sent the request to the server with the help of the IP address(10.1.78.154) of the server. The server accepted the request and connected with the client(Kavya Sree) . The server data “Welcome!!” is displayed at the client end. The port number of the server and client must be the same.

When I am Client:

```
import socket

c=socket.socket()

c.connect(("10.1.74.166",9999)) # Connect with the server using IP address and port number

name=input("Enter your name")

c.send(bytes(name,'utf-8'))   # sends request to server

print(c.recv(1024).decode())   #Print the received data
```

Output:

```
In [1]: import socket
        c=socket.socket()
        c.connect(("10.1.74.166",9999))
        name=input("Enter your name")
        c.send(bytes(name,'utf-8'))#sends request to server
        print(c.recv(1024).decode())

        Enter your nameSravani
        Welcome
```

```
In [*]: import socket
        s = socket.socket()
        print('Socket Created')
        s.bind(("10.1.74.166",9999))
        s.listen(3)
        print('waiting for connections')
        while True:
            c,addr = s.accept()
            name = c.recv(1024).decode()
            print("Connected with ",addr,name)

            c.send(bytes('Welcome','utf-8'))
            c.close()

        Socket Created
        waiting for connections
        Connected with  ('10.1.78.154', 50671) Sravani
```

Explanation:

Here the client is Sravani and the server is Kavya Sree. The client sent the request to the server with the help of the IP address(10.1.74.166) of the server. The server accepted the request and connected with the client(Sravani). The server data “Welcome” is displayed at the client end. The port number of the server and client must be the same.

Problems Faced:

Initially, I found it difficult to connect with another machine server as antivirus blocked the connection.

Conclusion:

With the help of this experiment, I learned how to implement the problem of establishing a connection between client servers in the same machine and also with two different machines.