Assignment -6

→ Titlle: TCP socket pugramming.

→ Problem Statement:

Write a program using TCP socket for wired network for following.

a) Say hello to each other (for all students)

b.) File treansfere (for all students)

c) Calculator (Arithmetic) (50% students)

d.) calculator (Tuignometry) (50% students)

Demonstreat the packets captureed treaces using wiresharrk packet analyzer tool for peer to peer mode.

• Objective:
  • To learn about TCP socket pugramming
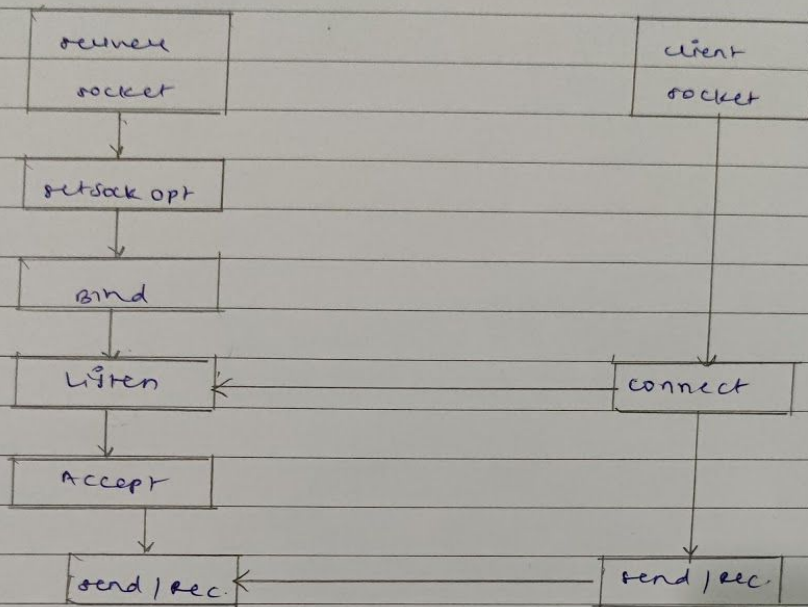 • File treansfere using TCP.

→ Outcome:

Students will be able to:
  • Implement TCP socket pugramming

→ Theory:
  • The TCP is one of the main puotocols of the Internet Puotocol suite.
  • TCP is connection-ourented and a connection between client and server is establlished before data can be sent.

- The server must be listening for connection requests to them from clients before connection is established.

- TCP is dominantly used for the web ie the HTTP protocol, and later HTTP2 while not used by latest standard HTTP/3.

- TCP Ports:

  - TCP uses port numbers to identify sending and receiving application and end-points on a host often called internet sockets.

  - Each side of a TCP connection has an associated 16-bit unsigned port number $(0 - 65535)$ reserved by the sending or receiving application.

  - Arriving TCP packets are identified as belonging to a specific TCP connection by its sockets, that is the combination of source host address, source port, destination host address, and destination port.

  - Port numbers are categorized into three basic categories : well-known, registered and dynamic/private

  state diagram of server & client model.

  P.T.O

```
┌──────────────┐                      ┌──────────────┐
│   server     │                      │   client     │
│   socket     │                      │   socket     │
└──────┬───────┘                      └──────┬───────┘
       ↓                                     │
┌──────────────┐                             │
│  setsock opt │                             │
└──────┬───────┘                             │
       ↓                                     │
┌──────────────┐                             │
│     Bind     │                             │
└──────┬───────┘                             │
       ↓                                     ↓
┌──────────────┐              ┌──────────────┐
│    Listen    │ ←────────────│   connect    │
└──────┬───────┘              └──────┬───────┘
       ↓                             │
┌──────────────┐                     │
│    Accept    │                     │
└──────┬───────┘                     │
       ↓                             ↓
┌──────────────┐              ┌──────────────┐
│  send / Rec. │ ←────────────│  send / Rec. │
└──────────────┘              └──────────────┘
```

* Conclusion :

   Thus we studied & implemented java program
to demonstrate TCP socket programming over wired
network