Assignment No. 5

Title: Calculator using TCP.

Problem Statement:
Write a program using TCP socket for wired network for the following:
- Say hello to each other
- File transfer
- Arithmetic calculator
- Trigonometric calculator

Demonstrate the packets captured traces using wireshark tool for peer to peer mode.

Objectives:
- Basics of socket programming
- Design and implement connection oriented client server services using TCP protocol.

Outcomes:
- Design and develop client server application using TCP sockets.

Requirements:
Eclipse IDE for java, wireshark packet analyzer tool

Theory:
Types of internal sockets:
- Stream sockets

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- Datagram sockets
- Socket

Socket Structure - TCP:

- Connection oriented protocol
- Reliance transmission of data in an IP environment.
- Reliable transmission. Reliability is provided by giving connection oriented end to end packet delivery through an internetwork. It is done by sequencing bytes with a forward acknowledgement number that indices to ~~data~~ dest" ~~no~~. the next byte the source expects to recieve.

Bytes not acknowledged within the specific time are retransmitted. This reliable mechanism of TCP allows devices to deal with lost, delayed, duplicated, misread packets. A time out mechanism allows to devices to detect lost & packets and request transmission.

TCP also offers efficiency which means that when sending acknowledgement back to the source, recieving TCP process indicates highest sequence number that it can recieve without overflowing internal buffers. TCP supports

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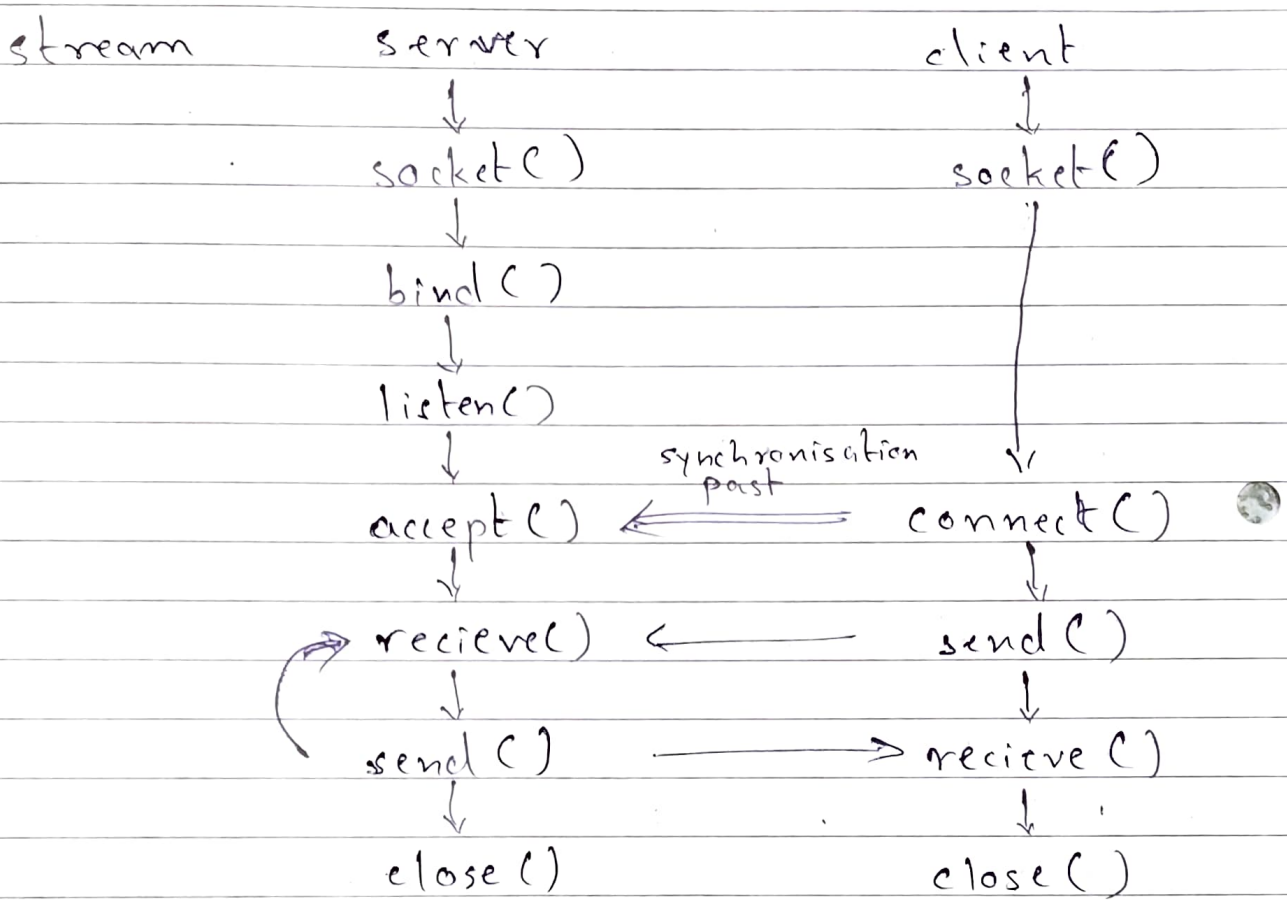
Full duplex operations.
TCP process can both send and receive at the same time. Finally TCP's multiplexing means that numerous simultaneous upper layer conversations can be multiplex over a single connection.

Relationship between TCP and IP
It acts similar to postal services. It transfers encapsulated IP datagram from one computer to another.

File transfer:
A TCP client indicates the communication with server which is waiting
It is connection-oriented and while UDP on the other hand is connectionless.



Algorithm:

Server side:

- create socket.
- Bind port no. to socket
- Listen for incoming connections
- Accept connection if recieved
- Recieve data.
- Send response data
- Close socket.

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Client Side:

- Open socket.
- Connect to server
- Send data to server
- Recieve data from server
- Close socket.

Conclusion:

Thus we have succesfully implemented TCP socket for wired network.

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