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Assignment No. 1A

Distributed Application Using Java Socket & RMI

* Problem Statement:

Power calculation: Design a distributed application which consist of a client server. communication using TCP, UDP & RMI techniques in Java. Multiple clients can simultaneously connect to the server and send messages of the format -> (a, b) where a and b are integers and server returns the value a^b (a raised to b)

* Objectives:

To learn to implement any distributed multithreaded client-server programmes using Java sockets.

Software and Hardware Requirements

Software: Ubuntu or windows

Hardware: Dual core / Quard core

* Theory:

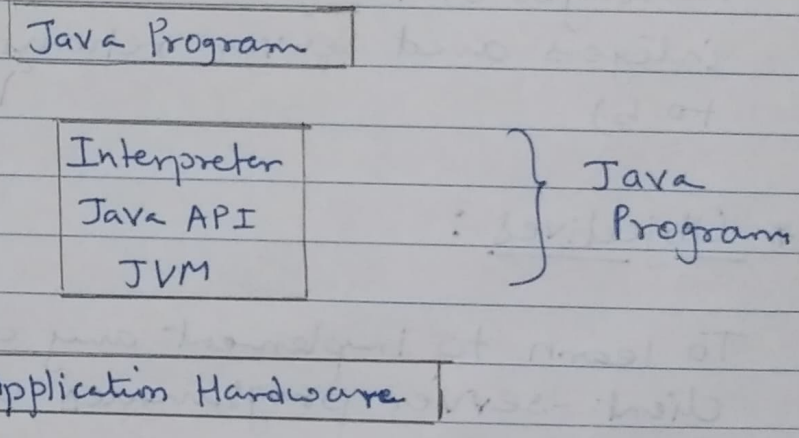
Java Socket-

socket provides a communication mechanism

between two computers using TCP. A client program creates a socket on its end of communication and attempts to connect that socket to a server.

Java API

Java API is the set of classes included with Java development enviroment. These classes are written using Java language and run on the JVM.



TCP (Transmission Control Protocol)

TCP is a connection oriented communication. It is an intermediate layer of application layer and internet protocol layer in the OSI model.

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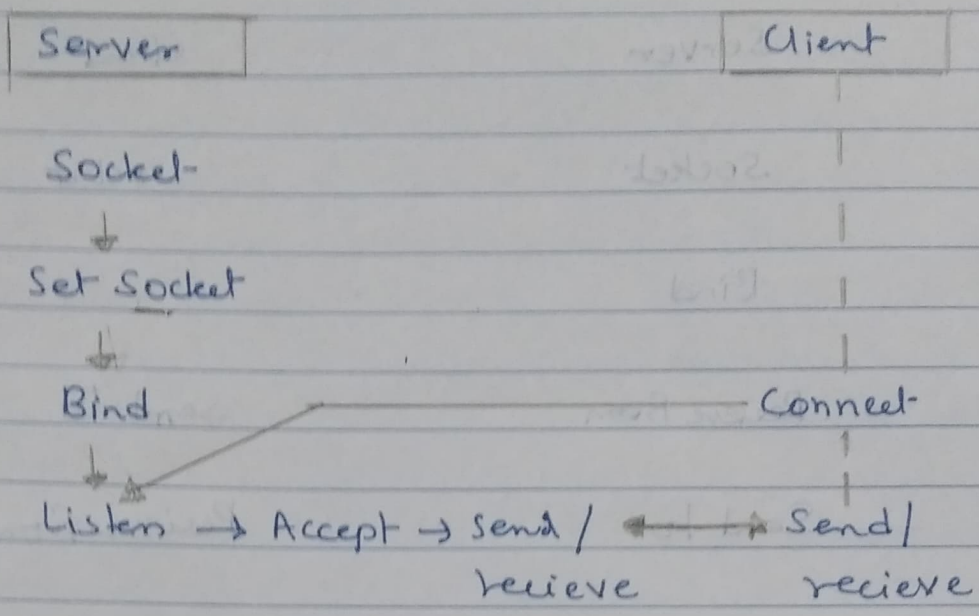

TCP Server

1) create() → Create TCP socket
2) bind() → Bind the socket to server
3) listen() → wait for client to make a connection.
4) accept() → Accepts client connection Ready to transfer data
5) Go back to (3)

TCP Client

1) Create TCP socket
2) Connect socket to server

UDP

In UDP client does not form a connection with server it instead just sends a datagram similarly server doesn't accept a connection but just wait for datagram to arrive. Datagram contains the address of sender which the server uses to send the data to current client.

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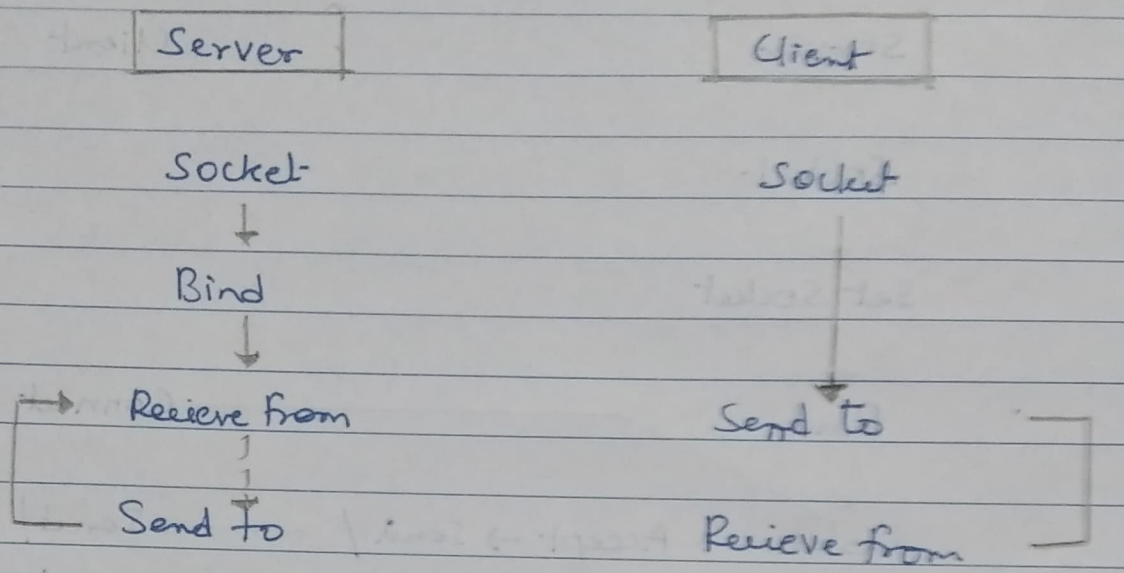

UDP Server

1) Create UDP client
2) Bind the socket to server address
3) Wait until datagram packets arrive from client.
4) Process the datagram packet & send reply to client.
5) Go to step 3.

UDP Client

1) Create UDP socket
2) Send message to the server
3) Wait until datagram packets arrive.
4) Process the datagrams packet and send a reply.
5) Go back to step 3
6) Close socket, exit

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* Conclusion :

We have sucessfully developed a distributed application through implementing client server communicate programs based on Java.