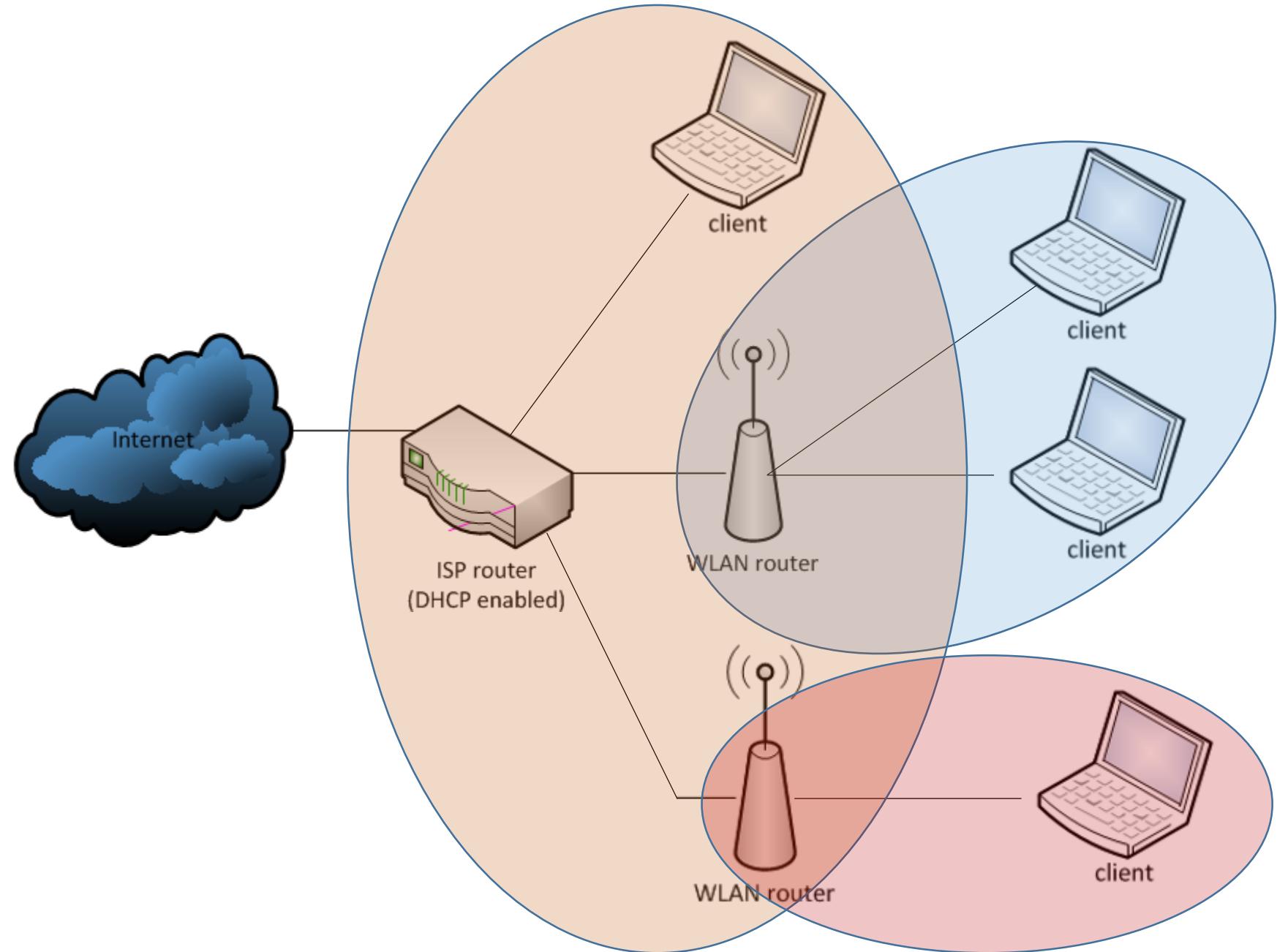


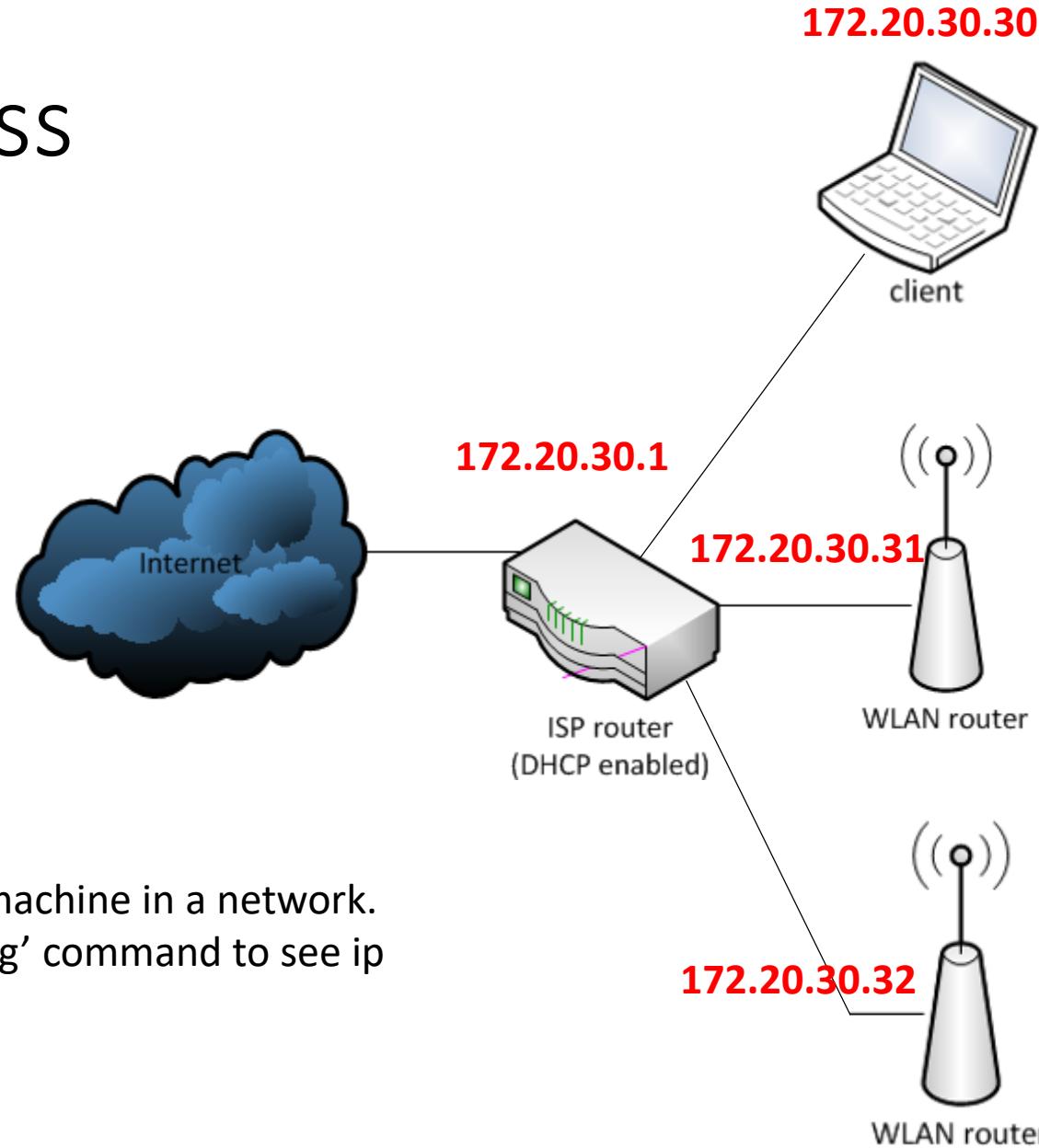
Introduction to Socket Programming

Md. Tareq Mahmood

Network

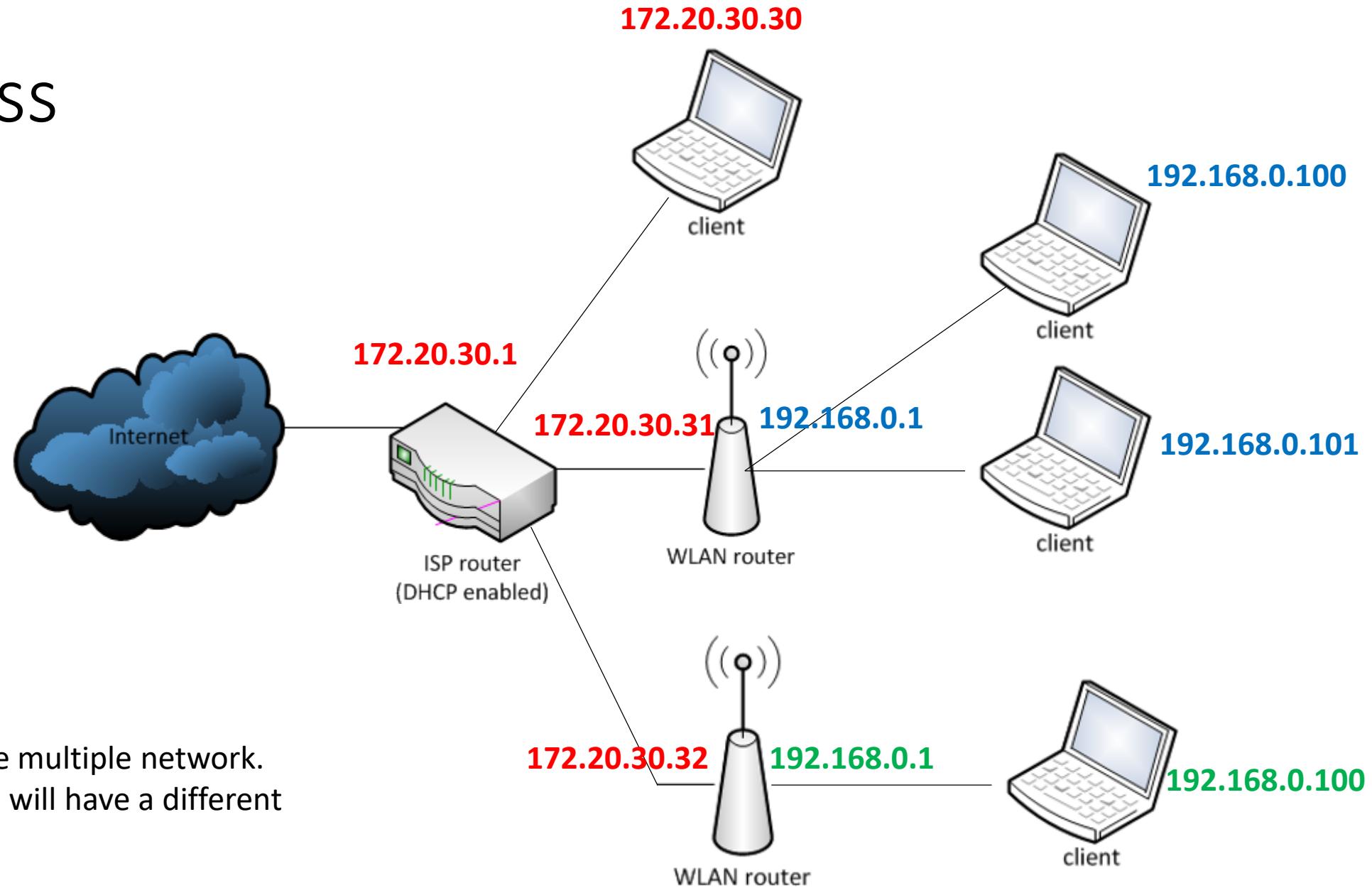


IP Address



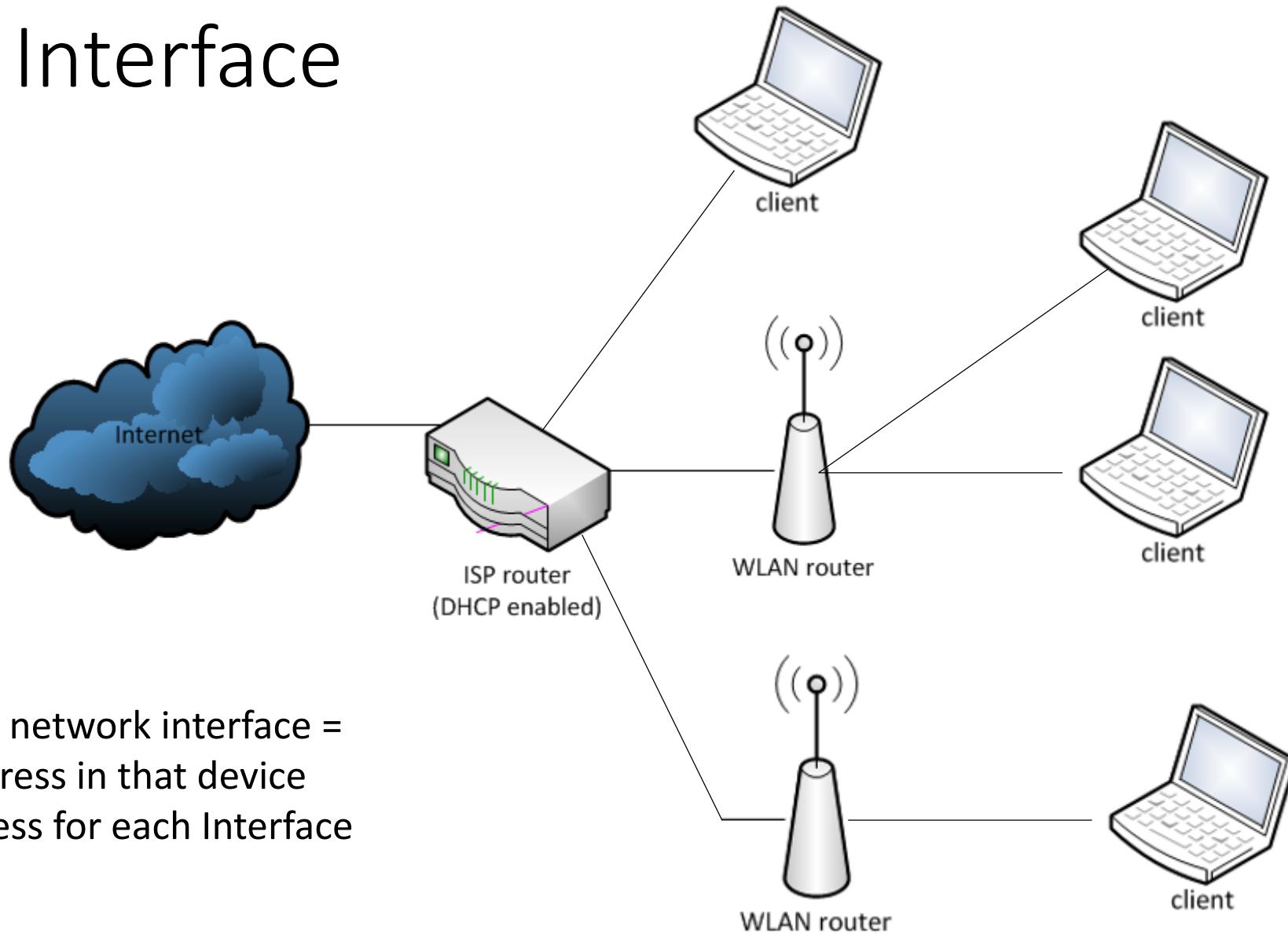
- Identification of a machine in a network.
- ‘ipconfig’ or ‘ifconfig’ command to see ip address.

IP Address



A machine may have multiple network.
For each network, it will have a different
IP address.

Network Interface



Port

- Endpoint/channel for communication for different programs
 - 2^{16} ports, some are reserved
 - A computer process must acquire a port for network communication
 - A logical construct
-
- ‘netstat’ command to see ports in use

Connection Establishment

- You need (IP address, Port) to establish a connection to remote PC
 - A program must be running to that PC to accept your connection
 - Some program must be running on that port
-
- Example: buet.ac.bd:443
 - Error for, buet.ac.bd:120

Socket

- Represents a single connection between two network applications
- Number of connection = number of sockets
- A socket must have these informations to communicate
 - Remote IP
 - Remote Port
 - Local Port
- A socket need these bufferes to operate
 - Input buffer
 - Output buffer

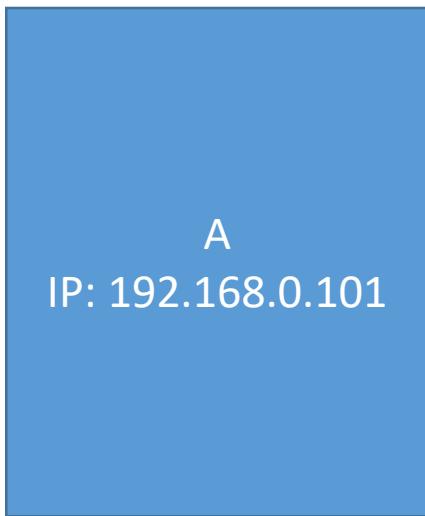
Socket vs Port

- Multiple sockets can be using same ports
- But a port must be acquired by only one program

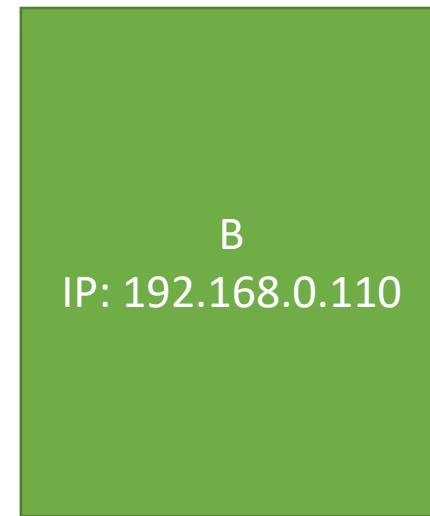
Connect Two PC

1. A listens for connection in a port (6666) using a Server Socket

6666
= 0001 1010 0000 1010



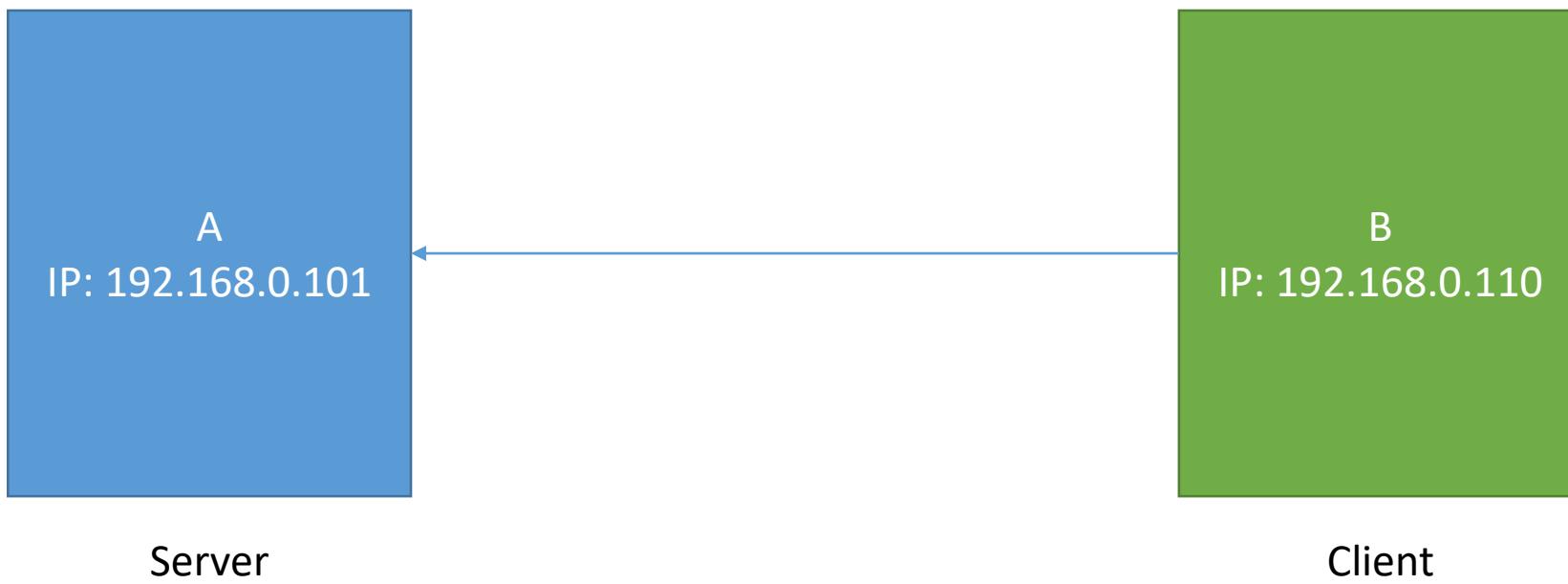
Server



Client

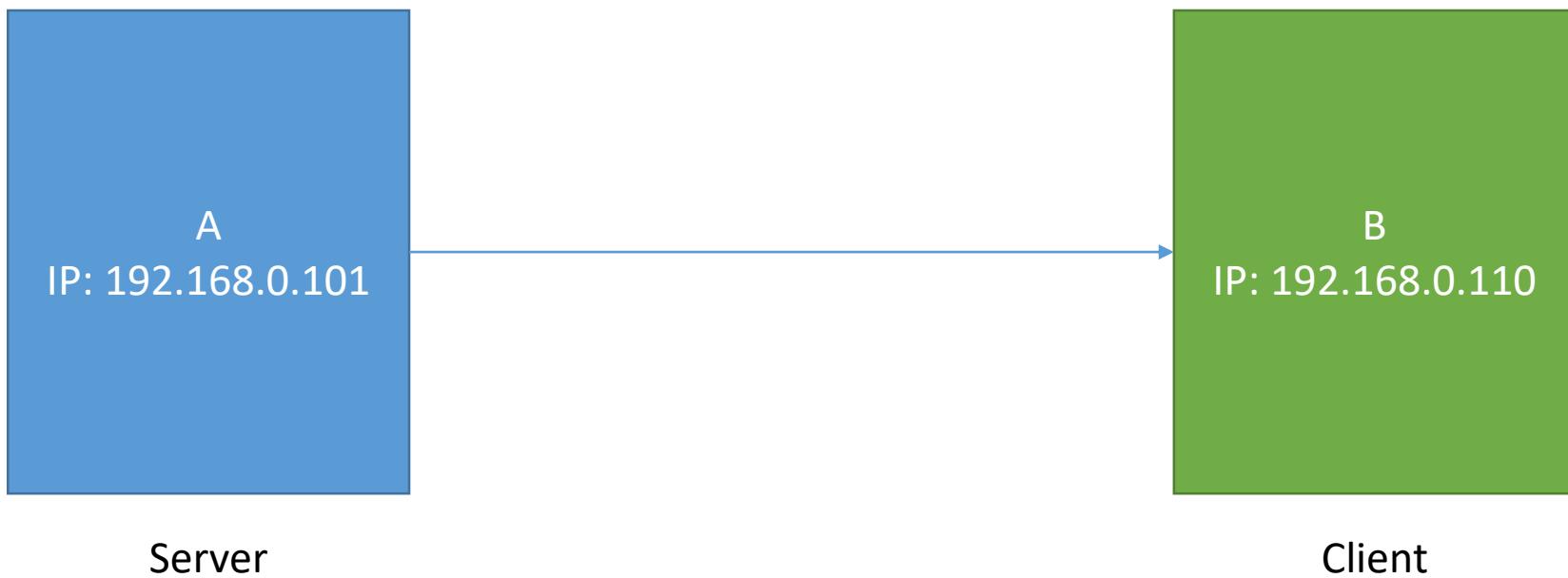
Connect Two PC

2. B tries connect to A using (192.168.0.101, 6666)



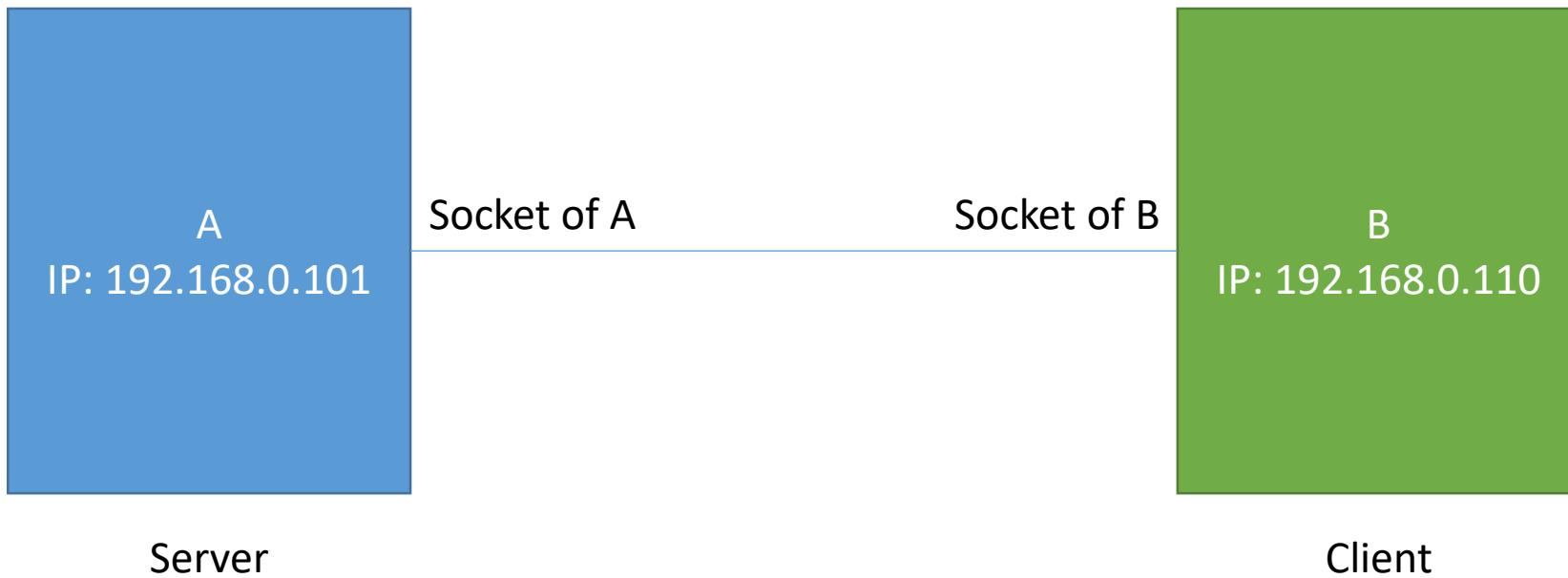
Connect Two PC

3. A accepts B's connection



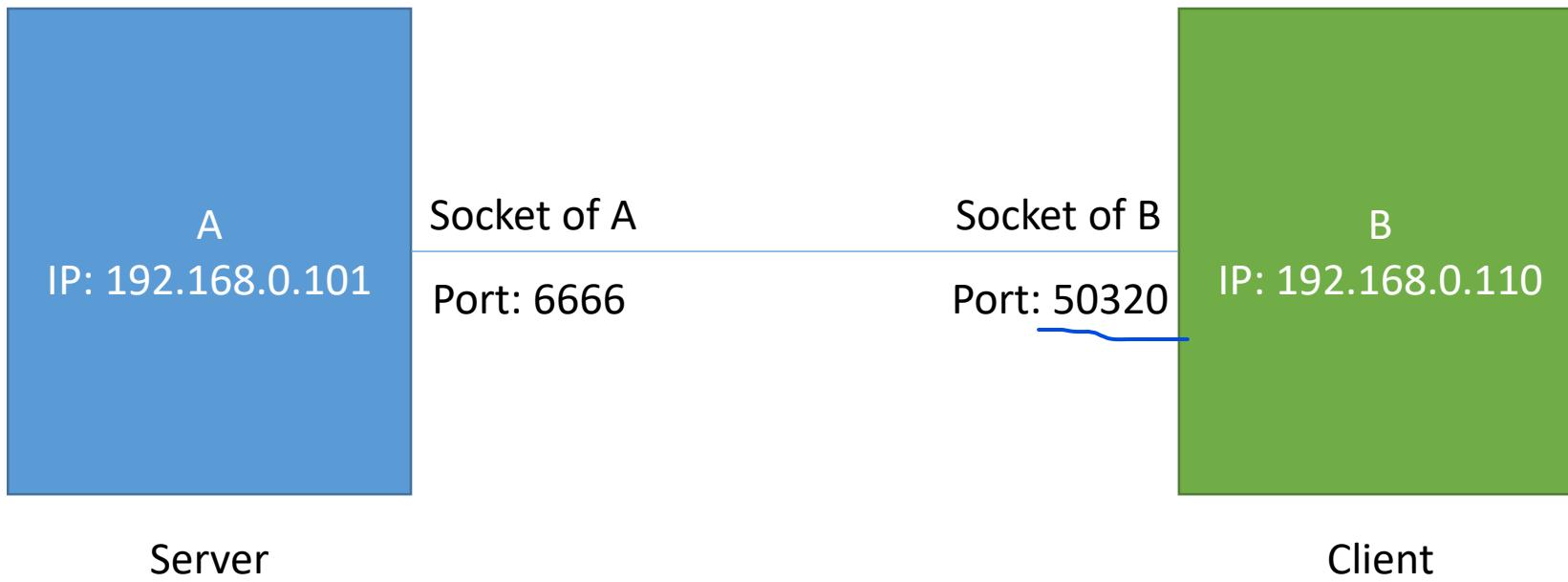
Connect Two PC

4. Both of them has a socket of their own



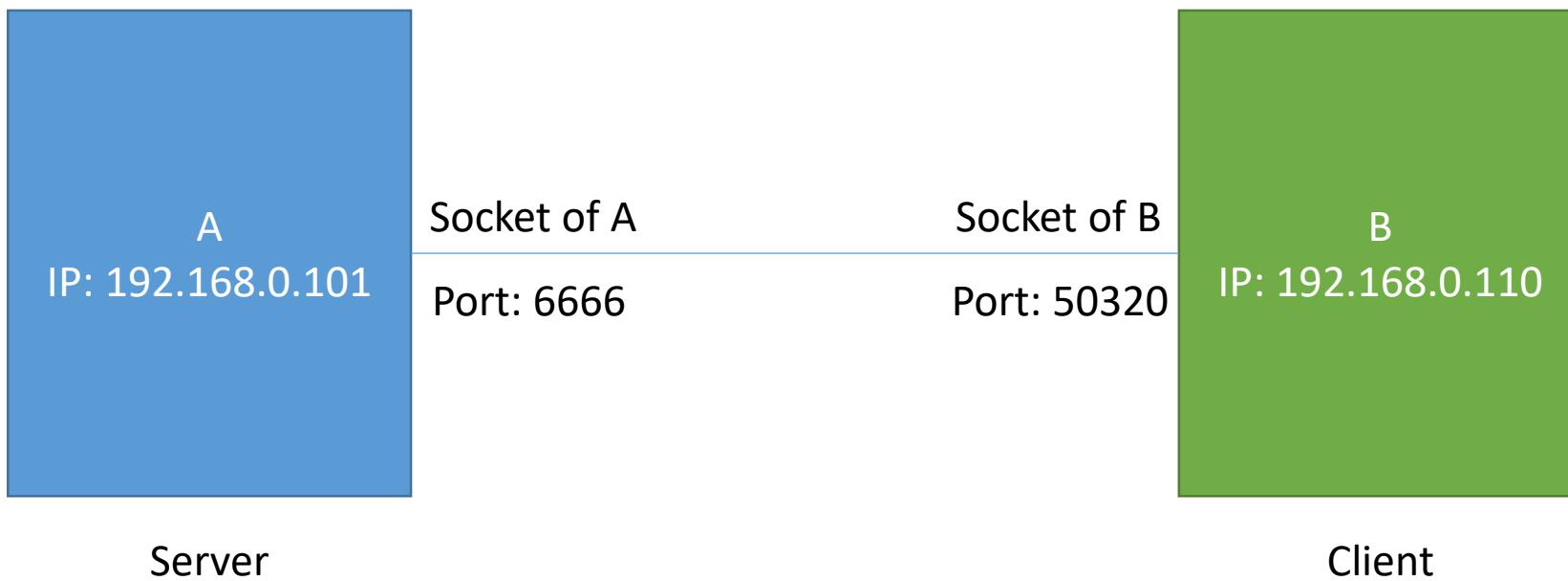
Connect Two PC

5. Both of them knows each other's IP address and Port



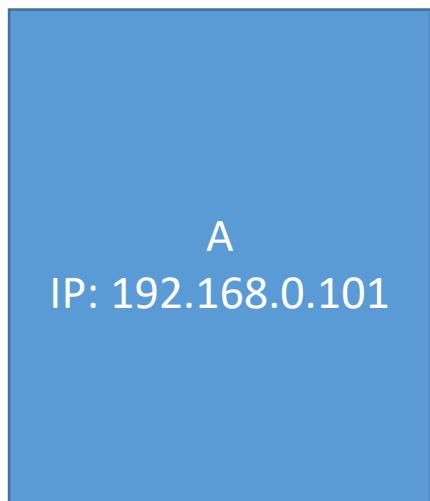
Connect Two PC

6. Server keeps listening on same port for new connection



Connect Two PC

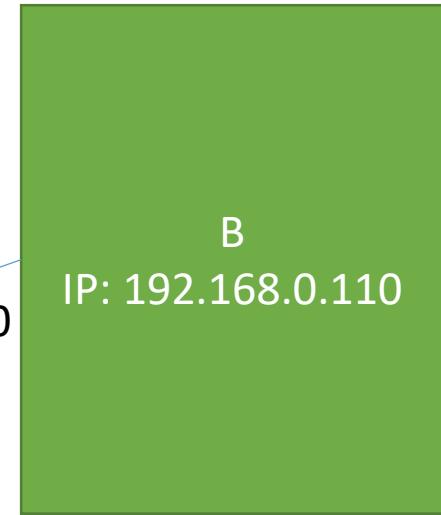
7. Multiple client can connect



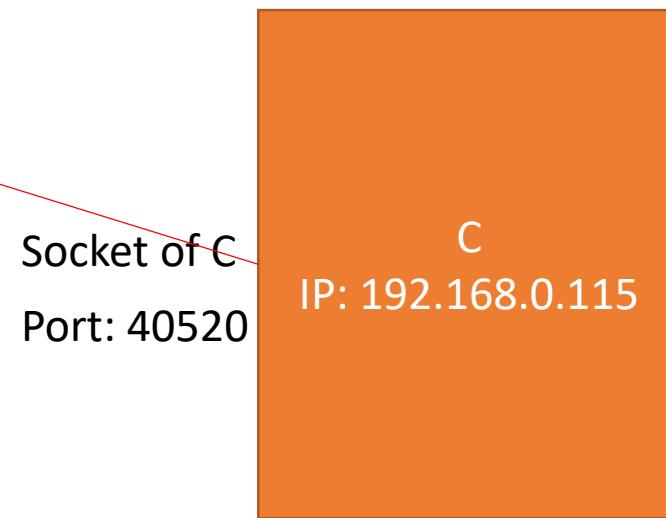
Server

Socket of A for B
Port: 6666

Socket of A for C
Port: 6666



Client



Client

Different socket, but on same port

TCP

- This whole thing is done using Transmission Control Protocol