**Computer Networks:**

A network is an interconnection of two or group of systems. The data between the two system in two different networks can be transferred using the OSI or TCP/IP reference model. In our case we use TCP/IP reference model. This model consists of following layers

1. Physical layer

2. Data Link layer

3. Network layer

4. Transport layer

5. Application layer

**Physical Layer:**

Physical layer is the lowest layer in the reference model. It deals with the sending and receiving data from one computer from another computer. It doesn't care about the type of the data it is carrying. Functionalities of the Physical layer include Representation of Bits, Data Rate, Synchronization, Line Configuration, Transmission Modes.All these functionalities are taken care at chip level at every computer.

**Data-Link Layer:**

Data link layer act between the network layer and the physical layer ,and control the data flow between above mentioned two layers. This can be done by use of frames, an example to this is an Ethernet Frame. An Ethernet or Wifi is used to connect a computer with network layer of the reference model. An Ethernet frame consists of Preamble , Source Address, Destination Address etc. A standard RJ45 ethernet cable is used for connection. Common protocol used in this layer is Ethernet cable or WiFi.

**Network Layer:**

In network layer, routers and gateways are operated. This layer translate the logical address into the physical address, so that the routers can easily route the given ip datagram to the destination network. The data in the network layer is called a ip datagram. An ip datagram consists of ip datagram header and data payload, which is data from previous data. If the given data is very large then the data is again broke into smaller pieces and then sent individually. Common protocol used in this layer is IP(Internet Protocol).

**Transport Layer:**

The basic functions of the transport layer is it accepts the data from the above layer, breaks into smaller pieces and then sends these smaller data packets to the application/session layer. In transport layer, we have connection oriented protocol(TCP) or connectionless protocol(UDP). In TCP, secure transfer of the data is given priority such as bank transaction. While UDP is secure but faster than TCP. TCP protocol has more overhead of acknowledgement while UDP don't have such acknowledgment. In TCP , to establish or send data we use three-way handshake and to finish the connection four-way handshake is used.

**MAC Address:**

A mac address is 48 bit binary number represented in hexadecimal used to uniquely identify a given hardware. MAC address is used to identify the hardware in a given network.

**IP Address:**

An Internet Protocol address (IP address) is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. IP address is used to identify the host and network address. Different classes of IP address are

1. Class A
2. Class B
3. Class C
4. Class D

**TCP Port:**

A port number is a way to identify a specific process to which an Internet or other network message is to be forwarded when it arrives at a server. For the Transmission Control Protocol and the User Datagram Protocol, a port number is a 16-bit integer that is put in the header appended to a message unit. A port number can be represented with the help of colon(:).

**Checksum Check:**

A checksum is a simple type of redundancy check that is used to detect errors in data transmission at various layers in the network. It to check weather the errors has occured in a transmission or not. If error occurred then data packet is discarded.

**Routing Table:**

Routing table is a data table used to route the the data based on its IP address, In some cases a routing table even consists of number hops the destination network is from the given router. This routing table is designed inside a router.

**TTL:**

Time To Live(TTL) is a number specified in a IP datagram to terminate the misguided data packet. It is automatically incremented at every router it reached, if once the TTL field become zero, data packet gets terminated.