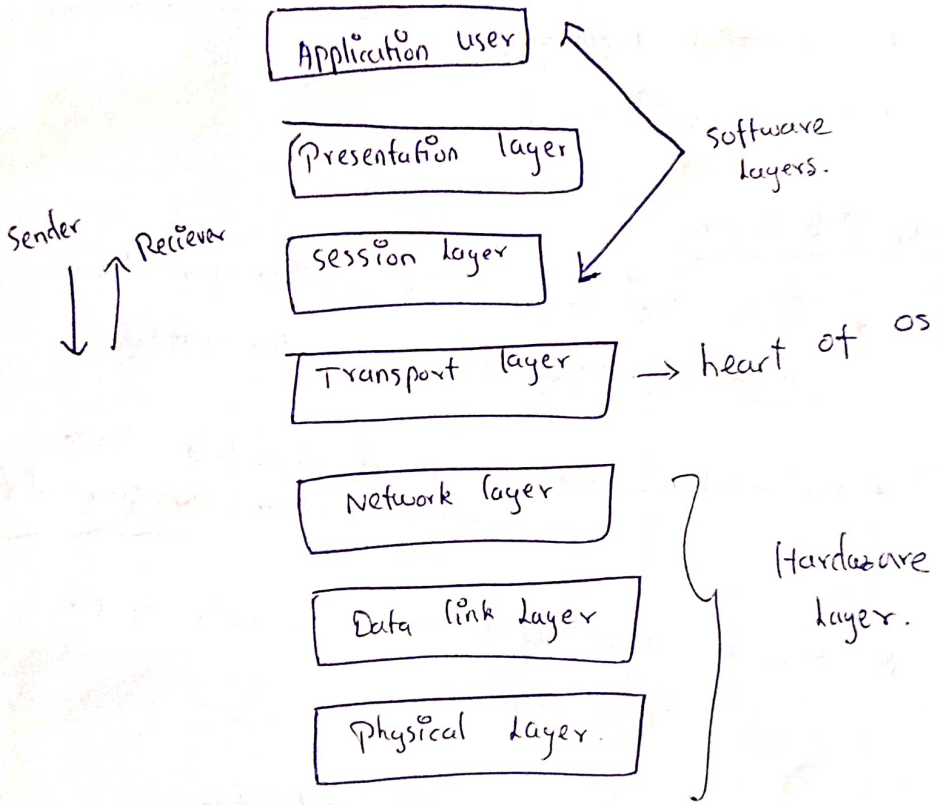
Computer Networks

OSI model

* OSI stands for open system interconnection.
* developed by international organization of standarization.
* It is a 7 layer architecture with each layer having specific functionality to perform.
* All the 7 layer collaboratively to transmit the data from one person to another across the globe.

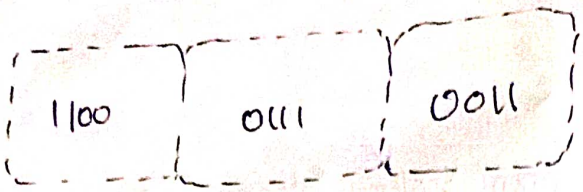
- bottomup Approach.



~~Application user~~

1) Physical Layer

- lowest layer of the OSI model is physical layer.
- responsible for the actual physical connection between the devices.
- Contain information in the form of bits.
- Responsible for transmitting individual bits from one node to the next.
- When Receiving data, layer will get the signal recieved and convert into 0s and 1s and send them to Data link layer.



function.

* Physical characteristic of interfaces and medium.
* Representation of bits
* Data rate.
* line configuration.
* Physical topology.
* Transmission mode.

2) Data link Layer

* Data link layer is responsible for the node-to-node delivery of the message.

* main function - data transfer is error free from one node to another over physical layer.

* It is the Responsible of DLL to transmit if to the host using its MAC address.

Data link layer are divided into 2 layers.

1) logical link control (LLC)
2) media access control (MAC).

function

* framing * Physical addressing
* Error control * flow control
* access control.

3). Network layer.

- Works for transmission of data from one host to the other located in different networks.
- It also take care of Routing.

Example

selection of shortest path to transmit the packet, from the number of routes available. The sender & receiver IP address are placed in the header by the network layer.

functions:-

1) Routing - The network layer protocol determine which route is suitable from source to destination.

2) Logical Addressing - TO identify each device on internetwork uniquely, the network layer defines an addressing scheme. Sender & Receiver's IP addresses are placed in header by network layer.

⇒ Segment in Network layer is referred to as Packet.

4) Transport layer

- It Provides services to the application layer and takes service from network layer.
- Data in Transport layer reffered as segments. it is responsible for end to end Delivery of the complete message.
- It also provide acknowledgement of the successfull data transmission and re-transmits the data if an error is found.

* At Sender's side:

- Transport layer receives the formatted data from the upper layers, Perform segmentation and implements flow & error control to ensure Proper.
- it also adds source and Destination Port number in its header and forwards the segmented data to the network layer.

* At receiver's side.

- Transport Layer reads the Port number from it header and forwards the Data. it received to the application.
- Perform sequencing and reassembling of the Segmented data.

functions:

1. Segmentation and Reassembly.
2. Service point Addressing.

connection control
flow control
error control.

5) Session layer

- This layer is responsible for the establishment of connection, maintence of session, authentication, and also ensures security.

functions:

1. session establishment, maintence and termination.
   - allow the two processes to establish, use and terminate a connection.

2. Synchronization.
   - allow a process to add checkpoint which are considered synchronization point into data.
   - help to identify error, so data is re-synchronized properly and end of the message are not cut and data loss is avoided.

3. Dialog controller:
   - allow two system to start communication with each other in half-duplex (or) full duplex.

6) Presentation Layer

- Presentation layer also called Translation layer.
- data from the application layer is extracted here and manipulated as per the required format to transmit over the network.

function:

1) Translation: for example, ASCII to EBCDIC.

2) Encryption / Decryption:
   - Data encryption translates the data into another form(or) code.
   - encrypted data known as ciphertext and decrypted data known as plain text.

- A key value is used for encrypting as well as decrypting data.

3. Compression.

- Reduce the number of bits that needs to be transmitted on the network.

7) Application layer (Desktop layer)

- top of the OSI Reference model stack of layers.
- Application layer is implemented by the network application.
- The application produce the data, which has to be transferred over the network.
- Serves as window for the application services to access the network and displaying the received information to user.

Eg: Application - browser, skype, messenger.

function:

1) Network virtual Terminal
2) FTAM - file transfer access and management.
3) mail services.
4) Directory services.