Computer Network

Assignment 2:

Q1. What is CN? What are its uses?

Computer networks are collection of autonomous computers that are interconnected by a single technology. And two computers are interconnected when they are able to exchange information.

Uses of Computer networks are discussed below:

- **Business application** where the key issue is resource sharing. So, computer networks are widely used here in order to access the information remotely. One of the models generally used here is client-server model in which the network connects the clients with a server. For example, web application is based on client server model as it takes request from user and responds based on database present.
- **Home application** where the computer networks are used for variety for purposes, from sharing music in a peer-to-peer system, whether it is instant messaging, e-mail, or it can be a person-to-person communication such as a Facebook, Wikipedia, Home shopping etc.
- **Mobile users** which use wireless networks are one of the fast-growing segments of the industry. Since wired networks are not possible to vehicles and in general more complex compared to wireless to manage. Most devices have moved towards wireless networks which provides us with a plethora of options.
- Other uses such as sensor networks, wearable computers, NFC (Near field communication) etc.

The OSI model has seven layers. They are application, presentation, session, transport, network, datalink, physical layer. It is represented in figure below:
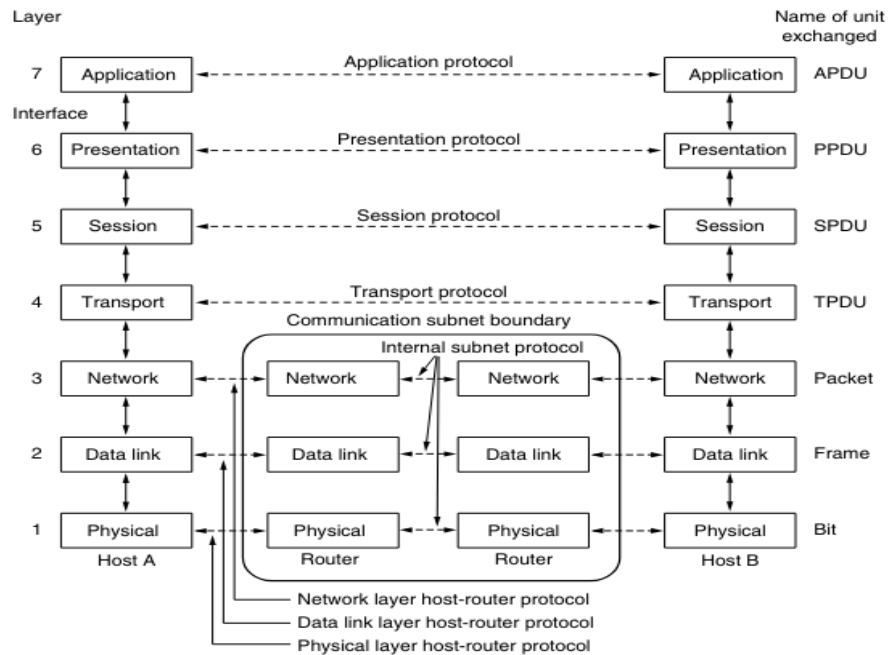

(source: Computer Networks, Tanenbaum Wetherhall)

The uses of each layer is discussed below:

1. **Physical layer**
   The physical layer is concerned with transmitting raw bits over a communication channel.

2. **Data link layer**

   The main task of the data link layer is to transform a raw transmission facility into a line that appears free of undetected transmission errors. It does so by masking the real errors so the network layer does not see them. It accomplishes this task by having the sender break up the input data into data frames (typically a few hundred or a few thousand bytes) and transmit the frames sequentially.

3. **Network layer**

   The network layer controls the operation of the subnet. When a packet has to travel from one network to another to get to its destination, many problems can arise. The addressing used by the second network may be different from that used by the first one. The second one may not accept the packet at all because it is too large. The protocols

may differ, and so on. It is up to the network layer to overcome all these problems to allow heterogeneous networks to be interconnected.

4. Transport layer

The basic function of the transport layer is to accept data from above it, split it up into smaller units if need be, pass these to the network layer, and ensure that the pieces all arrive correctly at the other end.

5. Session layer

The session layer allows users on different machines to establish sessions between them. Sessions offer various services, including dialog control (keeping track of whose turn it is to transmit), token management (preventing two parties from attempting the same critical operation simultaneously), and synchronization.

6. Presentation layer

Unlike the lower layers, which are mostly concerned with moving bits around, the presentation layer is concerned with the syntax and semantics of the information transmitted. In order to make it possible for computers with different internal data representations to communicate, presentation layer manages these abstract data structures and allows higher-level data structures (e.g., banking records) to be defined and exchanged.

7. Application layer

The application layer contains a variety of protocols that are commonly needed by users. One widely used application protocol is HTTP (Hypertext Transfer Protocol), which is the basis for the World Wide Web

Q3. Difference between the OSI model and TCP/IP model.

Parameters	OSI Model	TCP/IP Model
Full Form	OSI stands for Open Systems Interconnection.	TCP/IP stands for Transmission Control Protocol/Internet Protocol.
Layers	It has 7 layers.	It has 4 layers.
Usage	It is low in usage.	It is mostly used.
Approach	It is vertically approached.	It is horizontally approached.
Delivery	Delivery of the package is guaranteed in OSI Model.	Delivery of the package is not guaranteed in TCP/IP Model.
Replacement	Replacement of tools and changes can easily be done in this model.	Replacing the tools is not easy as it is in OSI Model.
Reliability	It is less reliable than TCP/IP Model.	It is more reliable than OSI Model.

Q4. Simulate using packet tracer a ping from one network to another network.

(Uploaded separately)