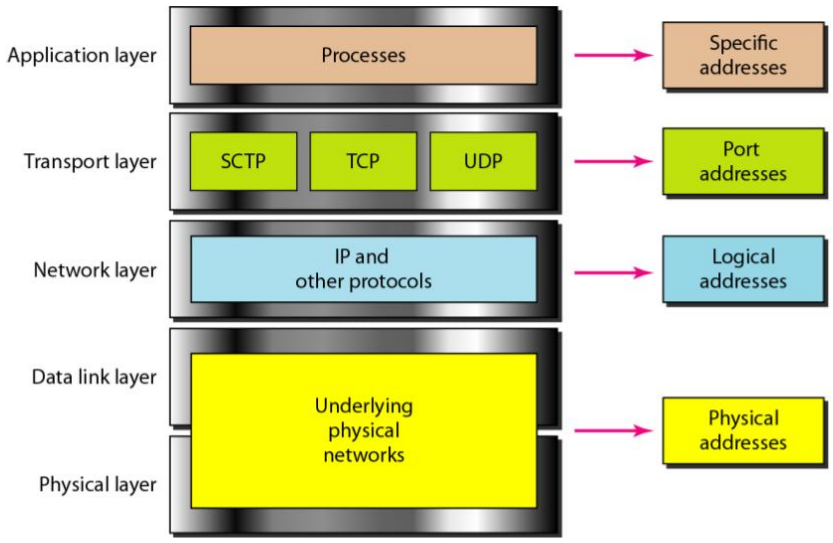
(A) Identify the relationship of layers and addresses in TCP/IP model and also write need of addresses at specific layer also write length of each address. (03)

Addressing



Relationship of layers and addresses in TCP/IP

Physical Address: 48bit

Logical Address: IP V4: 32bit, IP V6: 128bit

Port Address: 16bit

Data link Layer: It uses Physical Address because it is responsible for hop-to-hop reliable communication.

Network Layer: It uses Logical Address because it is responsible for source to destination communication.

Transport Layer: It uses Port Address because it is responsible for Process to Process message delivery.

Each and every process having port address using port address we can easy understand data deliver to witch process that running on destination computer.

(B) A bit-stuffing based framing protocol use 8-bits delimiter pattern of **01111110**. If the input bit-string is **0111111111010111111111111111101**, then what will be the output bit-string? Also mark why we have to used variable size framing techniques. (02)

Flag: 01111110

Data: 0**1111**1111010**1111**1111**1111**1111**1111**11101

Bit stuff Data: 0**11111**0**1**1110**1**0**11111**0**111110**1**1111**0**11101

(C) List out functionalities of Datalink layer, Network layer, Transport Layer and Session layer. Why few functionalities are same at data link and transport layer? (03)

Functionality of Data link layer

- **Framing:** its divides the stream of bits received from the network layer into manageable data units called frame
- **Physical Addressing :** if the frame is intended for a system outside the sender's network, the receiver address is the address of the device that connects the network to the next one.
- **Flow Control:** if the rate at which the data are absorbed by the receiver is less than the rate at which data are produced in the sender, this layer imposes a flow control mechanism to avoid overwhelming the receiver.
- **Error control :** detect and retransmit damaged or lost frames. It also uses a mechanism to recognize duplicate frame
- **Access control :** when two or more devices are connected to the same link, data link layer protocols are necessary to determine which device has control over the link at any given time.

Functionality of network layer

- **Logical Addressing:** if a packet passes the network boundary, we need another addressing system to help distinguish the source and destination systems.
- **Routing :** find path from source-to-destination message delivery

Functionality of transport layer

- **Service point addressing :** port address
- **Segmentation and reassembly :** each segment containing sequence number for reassemble the message correctly upon arriving at the destination and to identify and replace
- **Connection control :**
- **Flow control and Error control:**

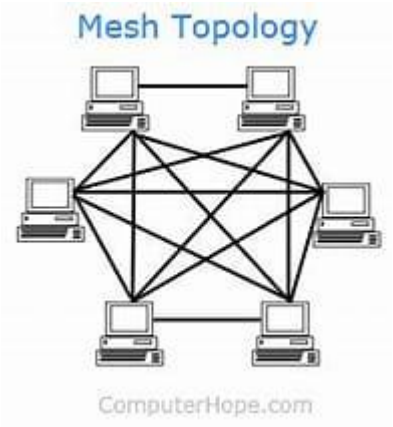
Functionality of session layer

- **Dialog control :** it allow the communication between two processes to take place in either half duplex and full duplex mode
- **Synchronization :** it's allow a process to add checkpoints, or synchronization points, to stream of data

Why few functionality are same in Data Link Layer and Transport Layer.

When you route packet over internet, there are many router and other networking device exist between source and destination. Data link layer handles flow control, error control between two consecutive device i.e. your PC to next layer 2 network device (router, switch etc) and that network device to next network device. But transport layer handles end to end delivery that means it take care of flow control and error control between source and destination (intermediate network devices do not involve in that).

(D) Elaborate the concept of mesh topology. How many channels are required, if number of nodes are 41. (02)



A mesh topology is a network setup where each computer and network device is interconnected with one another.

How many channels are required, If number of node are 41

if channels are **bidirectional** then (n*(n-1)\2) channels require

(41*40)/2= **820**

if channels are **unidirectional** then (n*(n-1)) channels require

(41*40)= **1640**