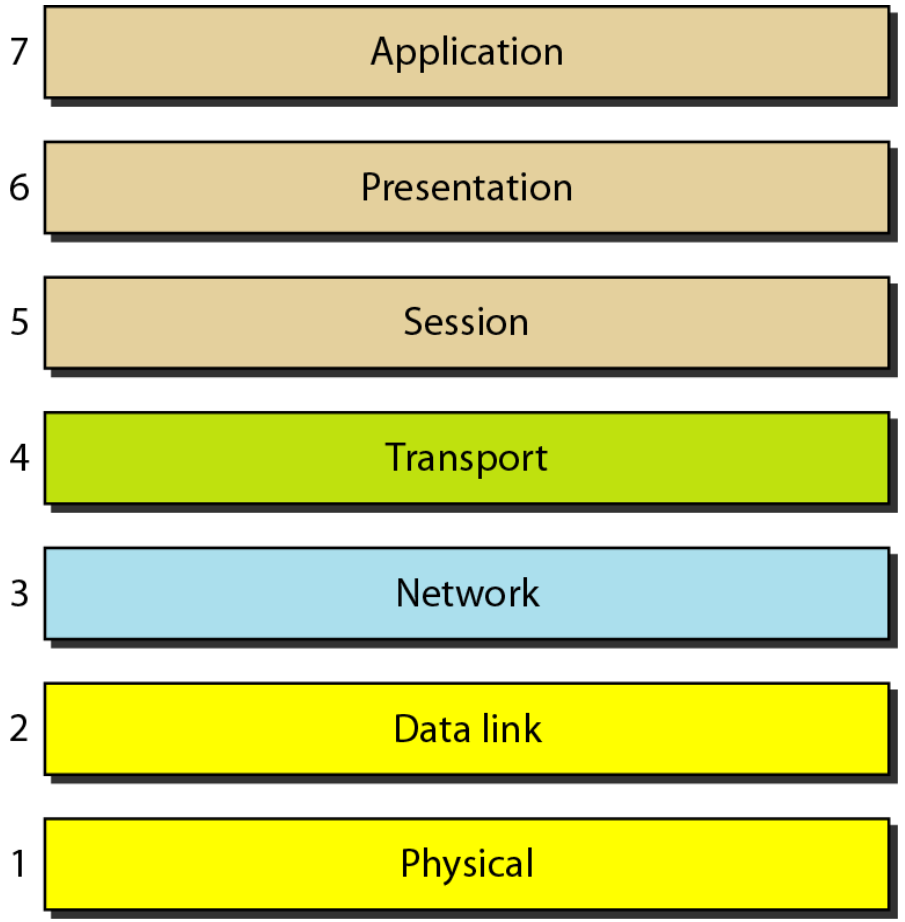
Data Link Layer

Data Link Layer



Data Link Layer

- Data link layer performs the most reliable **node to node** delivery of data.
- It forms frames from the packets that are received from network layer and gives it to physical layer.
- It also synchronizes the information which is to be transmitted over the data.
- Error controlling is easily done.
- The encoded data are then passed to physical.

Data Link Layer

- Error detection bits are used by the data link layer.
- It also corrects the errors.
- Outgoing messages are assembled into frames.
- Then the system waits for the acknowledgements to be received after the transmission.
- It is reliable to send message.
- The Data Link Layer protocols are Ethernet, token ring, FDDI and PPP.

Fiber Distributed Data Interface

Point-to-Point Protocol

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 to the **network layer**.
- It accomplishes this task by having the sender break up the input data into **data frames** (typically a few hundred or few thousand bytes) and transmit the frames sequentially.
- If the service is reliable, the receiver confirms correct receipt of each frame by send back an acknowledgement frame.

Data Link Layer

Data link layer has two sub-layers:

- **Logical Link Control:** It deals with protocols, flow-control, and error control
- **Media Access Control:** It deals with actual control of media

Functions of Data Link Layer

Framing:

Frames are the streams of bits received from the network layer into manageable data units. This division of stream of bits is done by Data Link Layer.

Physical Addressing:

The Data Link layer adds a header to the frame in order to define **physical address** of the sender or receiver of the frame, if the frames are to be distributed to different systems on the network.

Functions of Data Link Layer

Flow Control:

- A flow control mechanism to avoid a **fast transmitter from running a slow receiver** by buffering the extra bit is provided by flow control.
- This prevents traffic jam at the receiver side.
- Also called speed matching mechanism.

Functions of Data Link Layer

Error Control: (Error detection+ Error correction)

Error control is achieved by adding a trailer at the end of the frame.

Duplication of frames are also prevented by using this mechanism.

Functions of Data Link Layer

Access Control:

Protocols of this layer determine **which of the devices has control over the link at any given time**, when two or more devices are connected to the same link.

Design Issues with Data Link Layer

- The issue that arises in the data link layer(and most of the higher layers as well) is how to keep a fast transmitter from drowning a slow receiver in data. Some traffic regulation mechanism is often needed to let the transmitter know how much buffer space the receiver has at the moment. Frequently, the flow regulation and the error handling are integrated.
- Broadcast networks have an additional issue in the data link layer: How to control access to the shared channel. A special sublayer of the data link layer, the Medium Access Control(MAC) sublayer, deals with this problem.