

BCA – Part III  
Computer Network

**Bandwidth :-**

Capacity of channel to carry a fix amount of data per second from source to destination . it is measured in Hrzs  
Channels are divided in

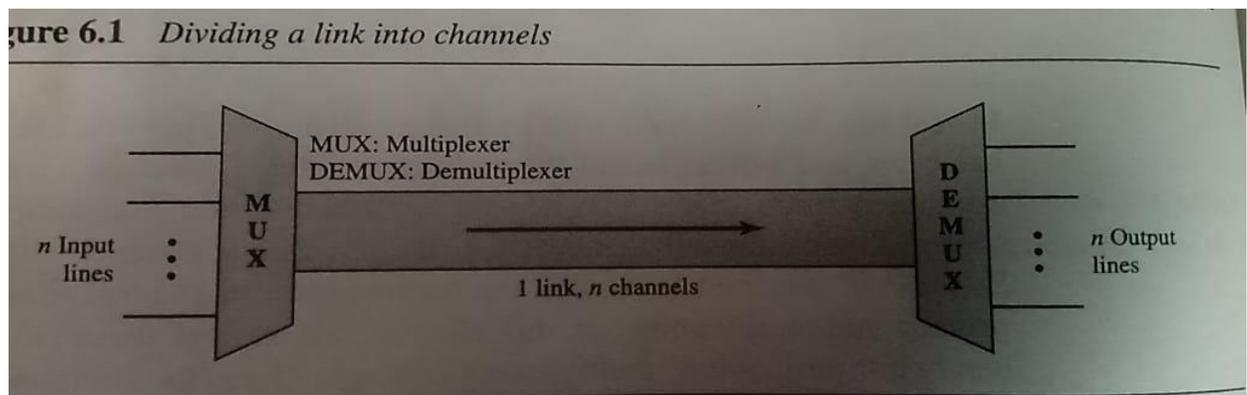
1. Narrowband
2. Wide band
3. Broad band

**Multiplexing :-**

It is set of techniques that allows the simultaneous transmission of multiple signals across the single data link. In case of multiple data signal , either we can increase the individual link or install the higher bandwidth data channel.

In case of higher bandwidth data channel, multiple signals combine together and transfer to the channel for transmission so that maximum utilization of channel can be achieved.

In multiplexed system n line share the bandwidth of one link. It may be shown as →



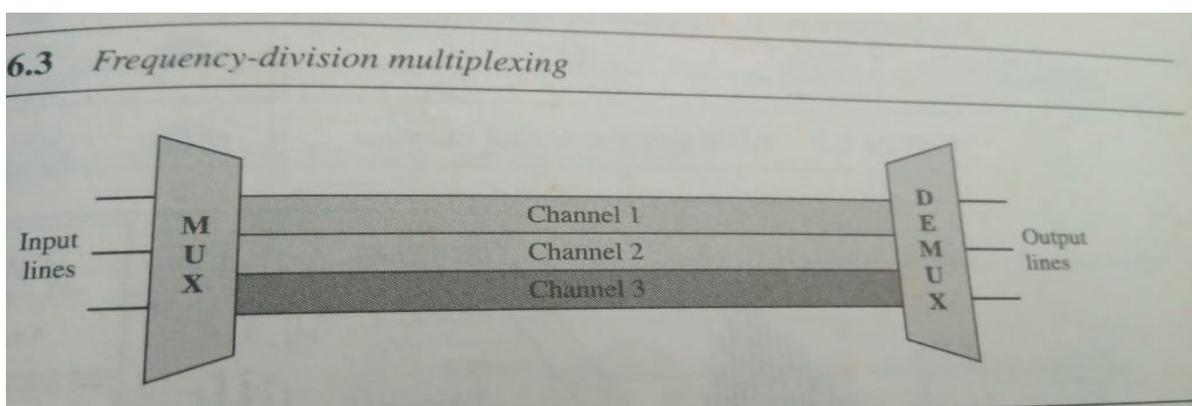
In the above figure - the lines on the left direct their transmission streams to a multiplexer(MUX), which combines them into single stream. At the receiving end that stream is fed into demultiplexer(DEMUX) ,which separate the stream back into its component transmission and direct to their corresponding lines .

There are three important multiplexing and demultiplexing technique

1. Frequency division multiplexing (Analog Signal )
2. Wave length division multiplexing (Analog Signal)
3. Time Division multiplexing (Digital signal )

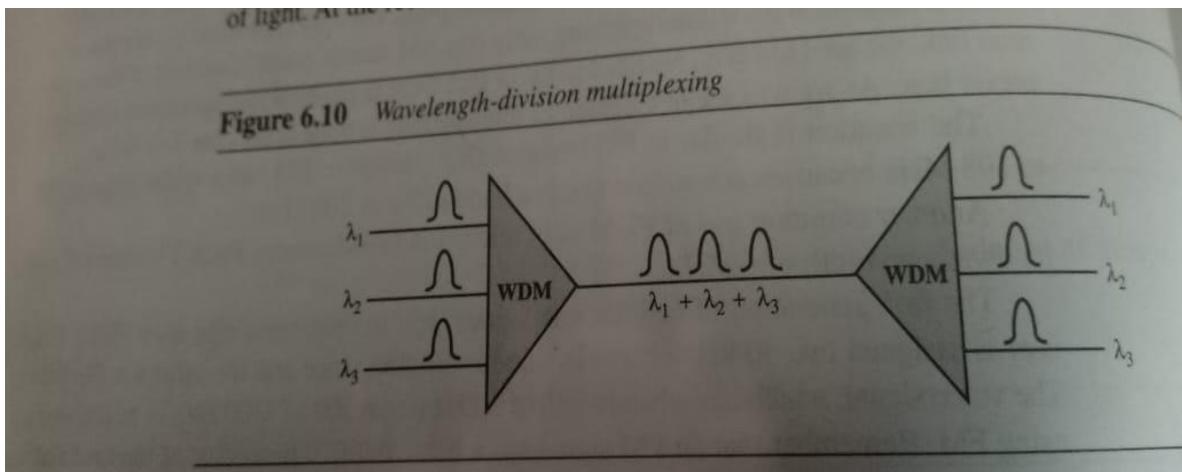
### 1. Frequency division multiplexing

FDM - it can be applied when the bandwidth of the link is greater than the combined bandwidth of the signal to be transmitted. here, signal generated by each sending device modulate different carrier frequencies . these modulated signals are then combined into the single composite signal that can be transported by the link. Carrier frequencies are separated by sufficient bandwidth to accommodate the modulated signal. Channels can be separated by strips of unused bandwidth(Guard band) to prevent signals from overlapping. It may be shown as –

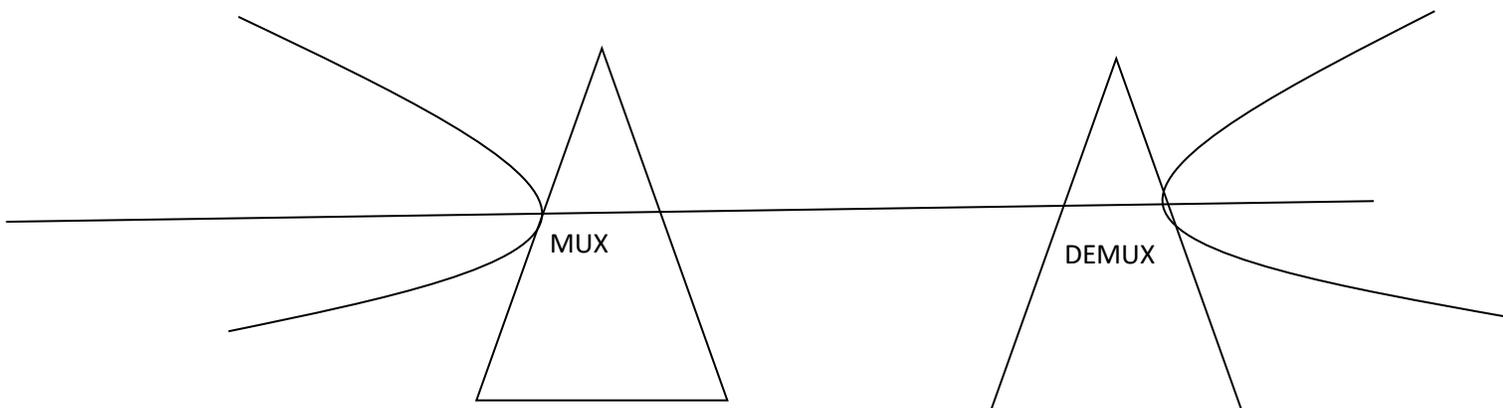


## 2. Wave length division multiplexing

It is designed to use the high data rate capability of fibre optics cable . the optical fiber data rate is higher than the metallic transmission. Using a fiber optic cable for one single line waste the bandwidth. Multiplexing here allow us to combine several lines into one. WDM is conceptually same as FDM. The process of multiplexing may be shown as :-



This technology is very complex. we combine multiple sight source into one single light at the multiplexer and to the reverse at the demultiplexer. as



-----X-----