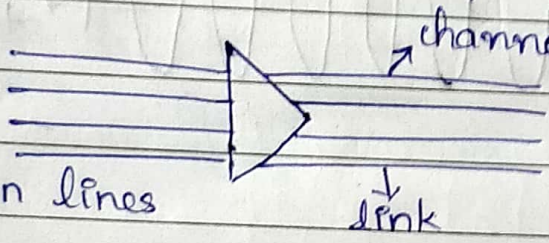
URBAN EDGE 1/11/19

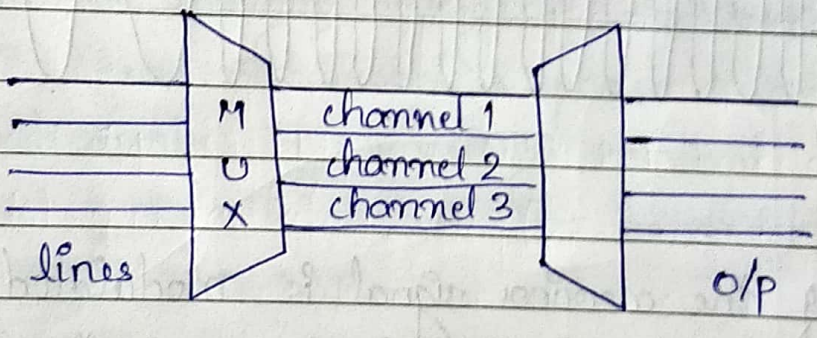
MODULE-1

Multiplexing

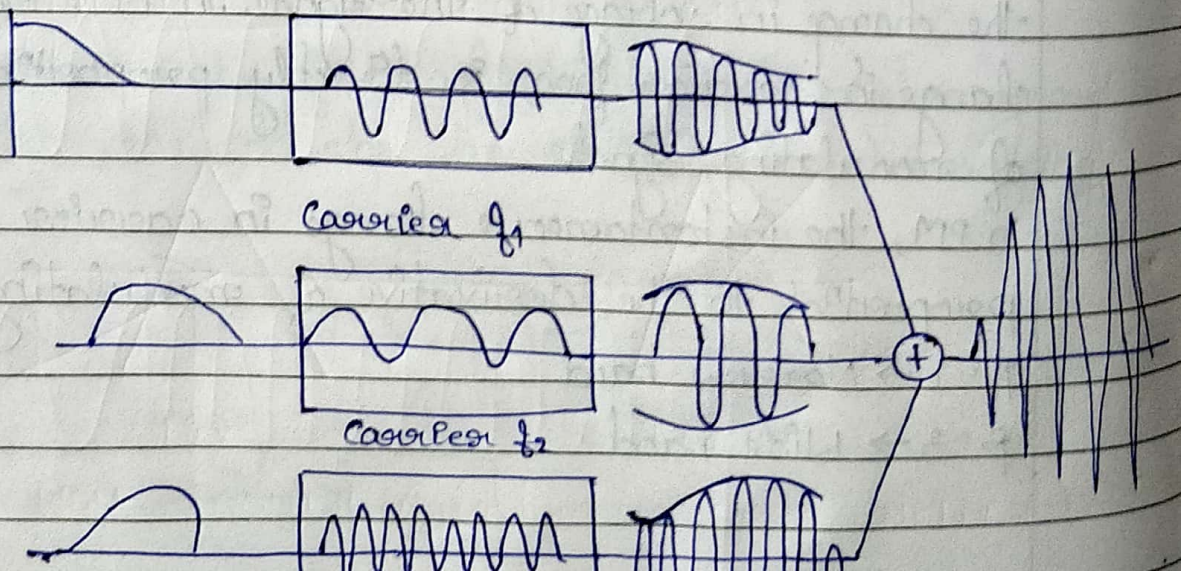
- FDM (Freq.)
- TDM (Time-period)
- WDM (Wavelength)



(i) Freq. Division Multiplexing (FDM)



Note:- Bandwidth of the channel must be greater than that of i/p signals.



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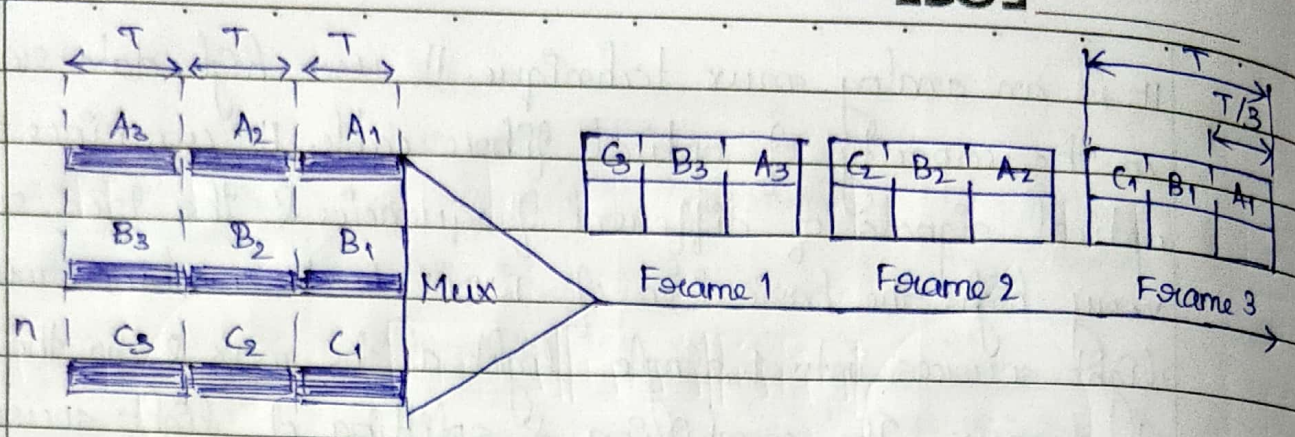

Synchronous TDM has an allotment in the o/p even if it is not sending data. The data flow of each i/p connectn is divided into 1 i/p time slot. It can be 1 bit, 1 character or 1 block of data. Each i/p unit occupies 1 o/p time slot. But the durat^n of an o/p time slot is n times shorter than the durat^n of i/p time slot i.e. if i/p time slot is T seconds then the o/p time slot is T/n seconds where n is the no. of connect^{n}s. In synchronous TDM a round of data units from each i/p connectn is collected into a frame. A frame is divided into n time slots with 1 unit for each i/p line. The durat^n of each frame is T & each slot is T/n in the frame. Hence the data rate of the link is n times faster.

① The data rate for each i/p connectn is 1kbps: if 1 bit at a time is multiplexed, what is the durat^n of

(a) Each i/p slot

(b) Each o/p slot

(c) Each frame

ans Data rate = 1kbps = 1000 bps

Bit durat^n = 1/Data rate

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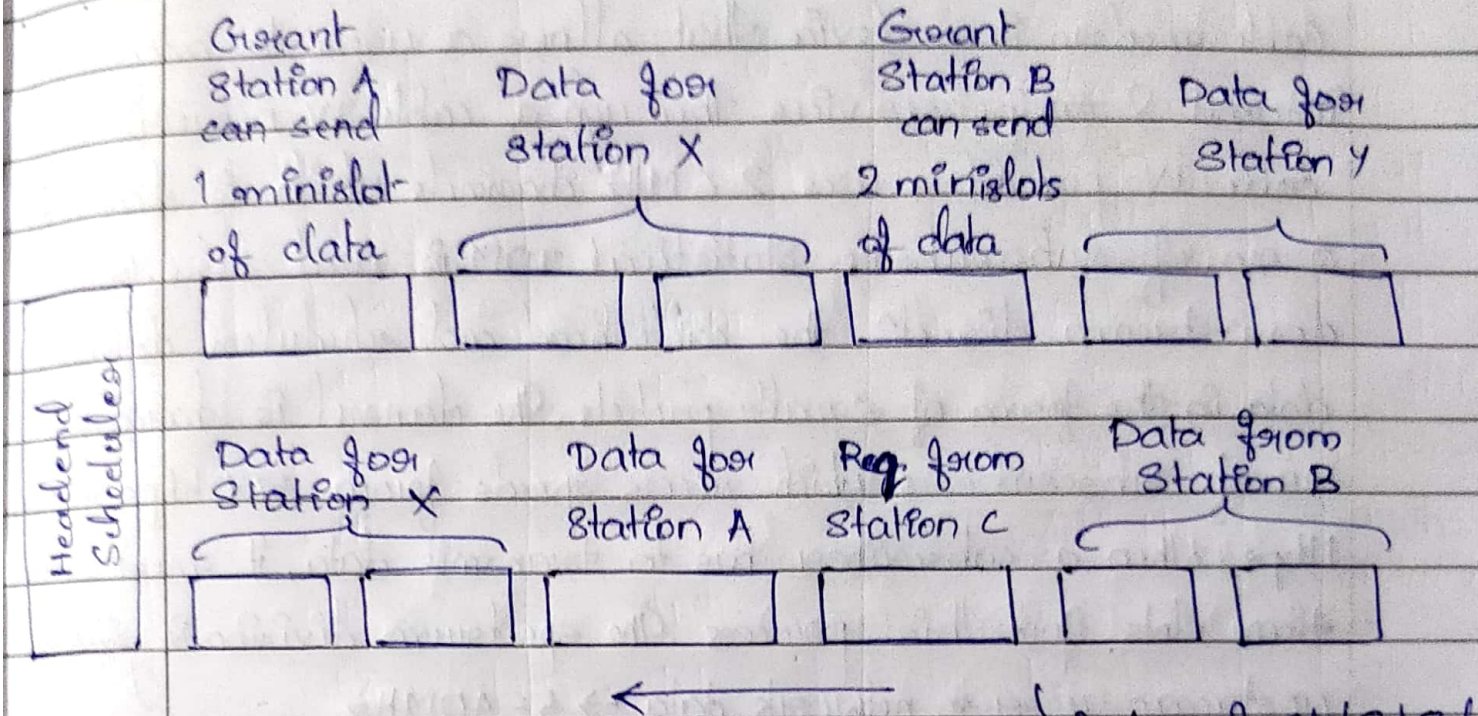
URBAN EDGE 14/11/19

Cable Modem

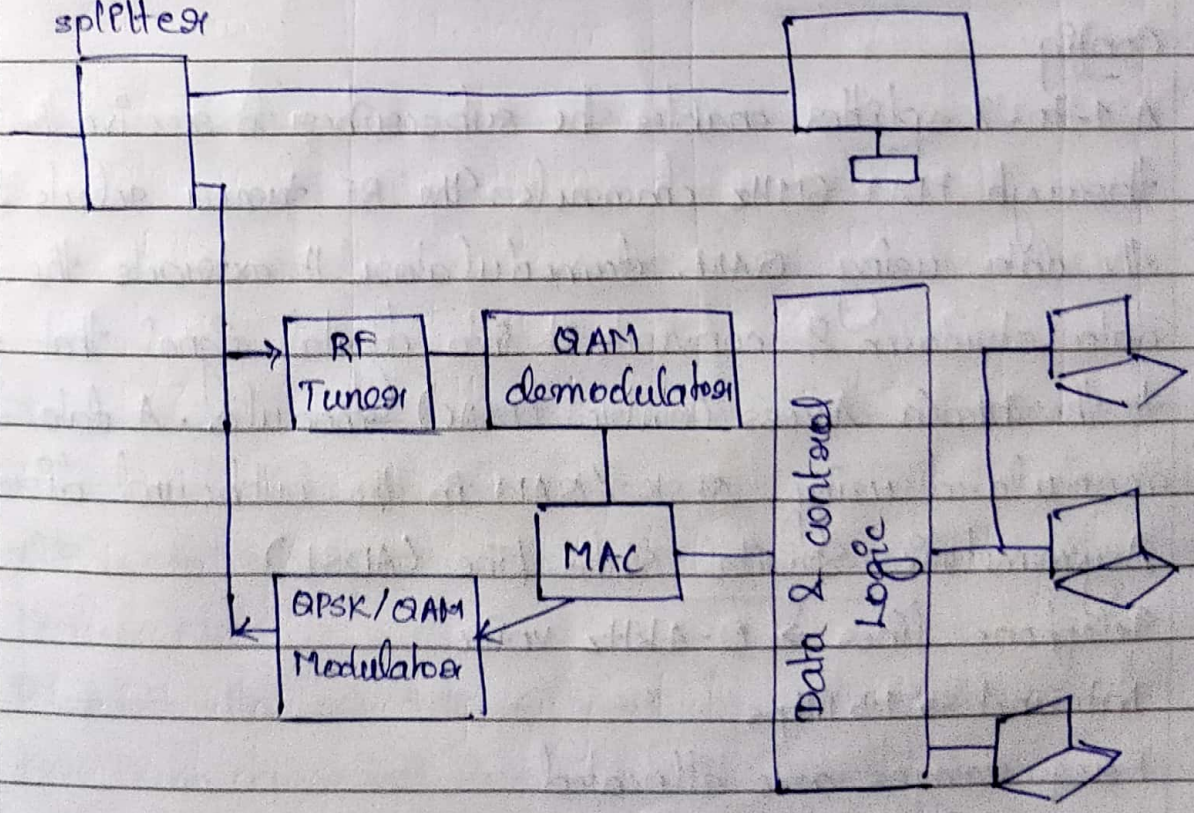


Speed upto 1.5 Mbps

↳ App of Statistical TDM

Configuration

One to two splitter



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Cable modem is a device that allows a user to access the internet & online services through a cable TV network. A cable TV provider uses 2 6 MHz channels which is shared by a no. of subscribers. Statistical TDM is used here. In downstream direct, the cable head end scheduler delivers data in the form of small packets. The channel is shared by no. of subscribers which access speeds from 500 Kbps to 1.5 Mbps. When a subscriber has to transmit data, it must request time slots for this process. The spectrum division is given as

upstream user to network data → 5-40 MHz
downstream TV " " " → 50-550 MHz
Network to user data (downstream) → 550-750 MHz

Config

A 1-to-2 splitter enables the subscriber to receive the TV service through FDM 6MHz channels. The RF tuner selects & demodulates the data using QAM demodulator. It extracts the encoded data stream & converts it into digital signal that passes it to the Media Access Control (MAC) module. A data stream is modulated using QPSK / QAM in the outbound direction.

Asymmetric Digital Subs. Line (ADSL)

Telephone lines → 0-4kHz voice
Internet → 1.5 Mbps
Freq. ranges are allocated
POTS → Plane Old Telephone Service
Range → 5.5 km

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