2.5 TIME DIVISION END FREQUENCY DIVISION MULTIPLEXING

Multiplexing is used in cases where the signals of lower bandwidth and the transmitting media is having higher bandwidth. In this case, the possibility of sending a number of signals is more. In this, the signals are combined into one and are sent over a link that has greater bandwidth of media than the communicating nodes.

1. Frequency Division Multiplexing (FDM) –

In this, a number of signals are transmitted at the same time, and each source transfers its signals in the allotted frequency range. There is a suitable frequency gap between the 2 adjacent signals to avoid over-lapping. Since the signals are transmitted in the allotted frequencies so this decreases the probability of collision. The frequency spectrum is divided into several logical channels, in which every user feels that they possess a particular bandwidth. A number of signals are sent simultaneously at the same time allocating separate frequency bands or channels to each signal. It is used in radio and TV transmission. Therefore to avoid interference between two successive channels **Guard bands** areused.

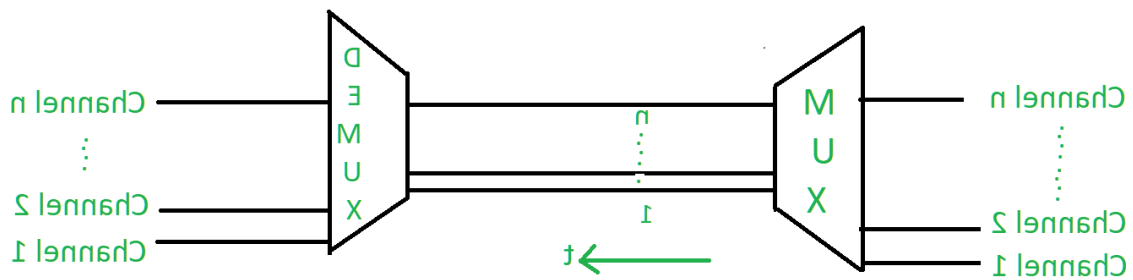

Figure 2.5.1 FDM

2. Time Division Multiplexing (TDM) –

This happens when data transmission rate of media is greater than that of the source, and each signal is allotted a definite amount of time. These slots are so small that all transmissions appear to be parallel. In frequency division

multiplexing all the signals operate at the same time with different frequencies, but in time division multiplexing all the signals operate with same frequency at different times.

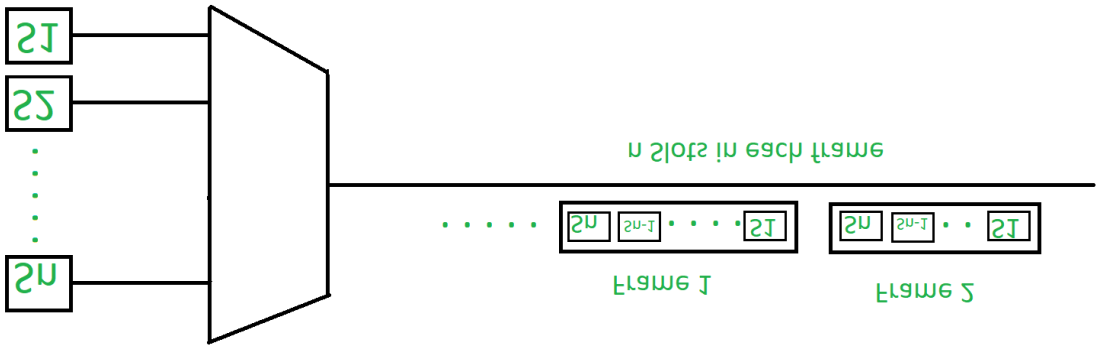

Figure 2.5.2 TDM

It is of the following types:

1. **Synchronous TDM –**

   The time slots are pre-assigned and fixed. This slot is even given if the source is not ready with data at this time. In this case, the slot is transmitted empty. It is used for multiplexing digitized voice streams.

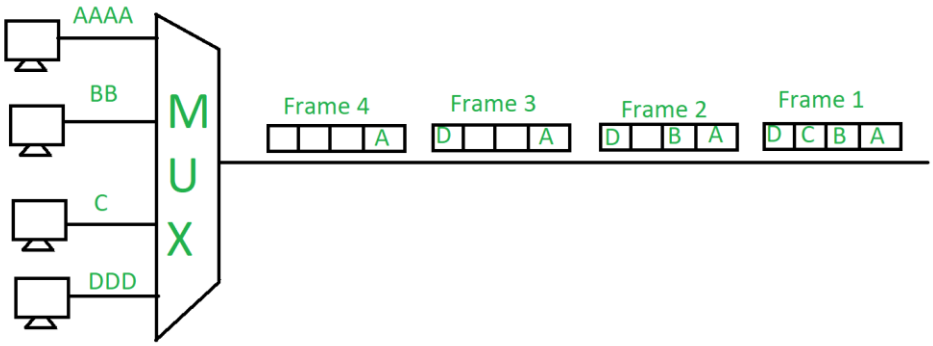

Figure 2.5.3 Synchronous TDM

2. **Asynchronous (or statistical) TDM –**

The slots are allocated dynamically depending on the speed of the source or their ready state. It dynamically allocates the time

slots according to different input channel's needs, thus saving the channel capacity.

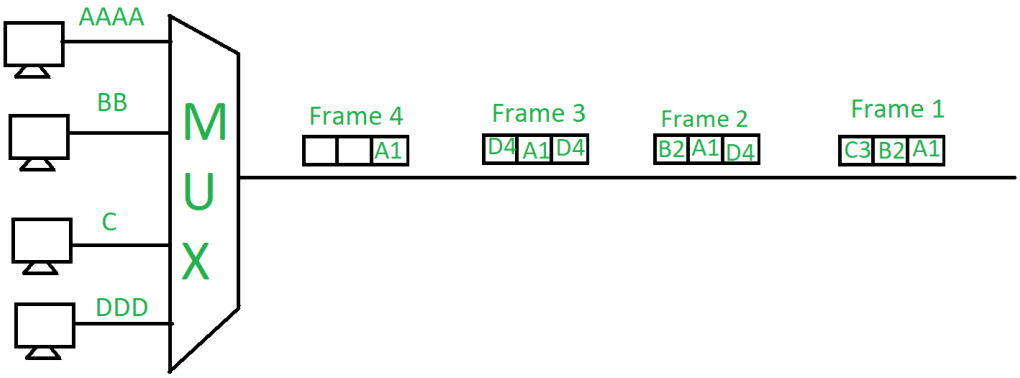

Figure 2.5.4 Asynchronous (or statistical) TDM