If we assume that each character consists of eight bits. then each frame is 33 bits long: 32 bits for the four characters plus I framing bit. Looking at the bin relationships. we see that each device is creating 2000 bps (250 characters with 8 bits per character},
but the line is carrying 8250 bps (250 frames with 33 bits per frame): 8000 hits of data and 250 bits of overhead.

8250 bps =250 frames/second * 33 bits/frame
Or
8250 bps =4 X 2000 bps + 250 synchronization bps

b) Asynchronous *TDM*

Asynchronous time-division multiplexing, or ***statistical time-division multiplexing***, is designed to **avoid waste** in **synchronous *TDM*** .

The term ***asynchronous means*** something different in multiplexing than it means in other areas of data communications. Here it means **flexible or not fixed.**

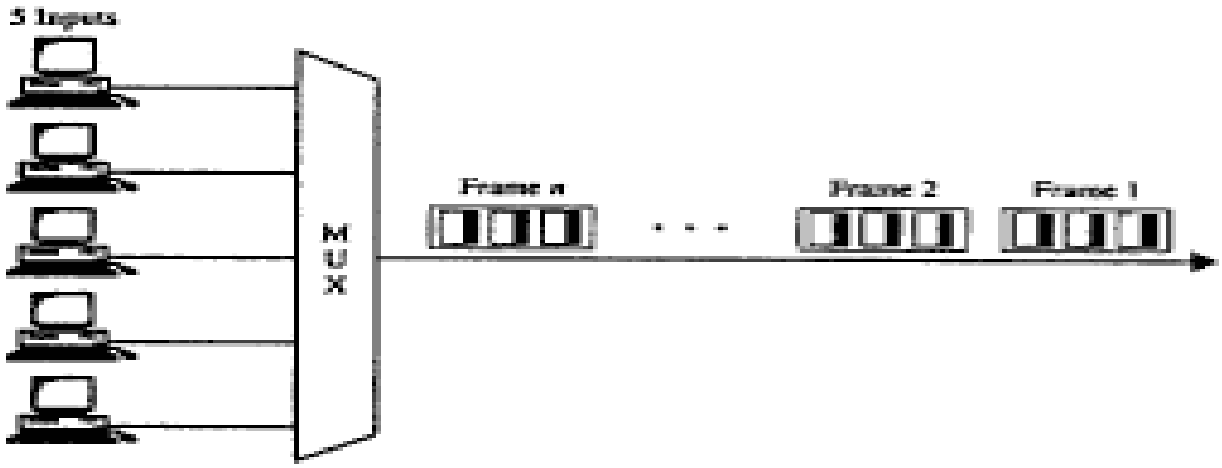
Like synchronous TDM. asynchronous TDM allows a number of lower speed input lines to be multiplexed to a single higher speed line**.**

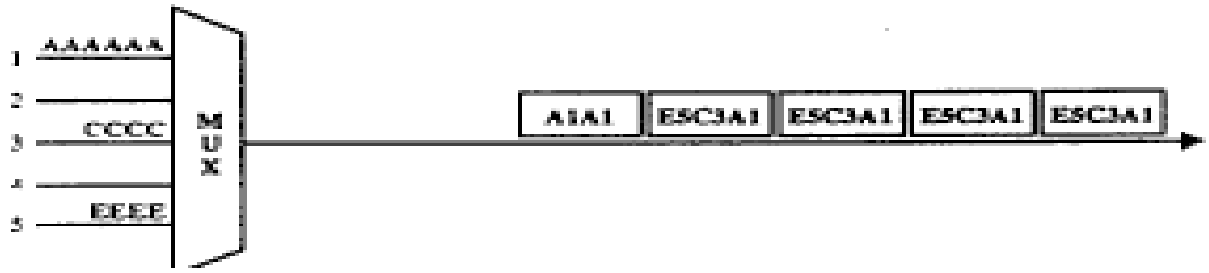
Unlike synchronous TDM, however, in asynchronous TDM the total speed of the input lines can be greater than the capacity of the path.

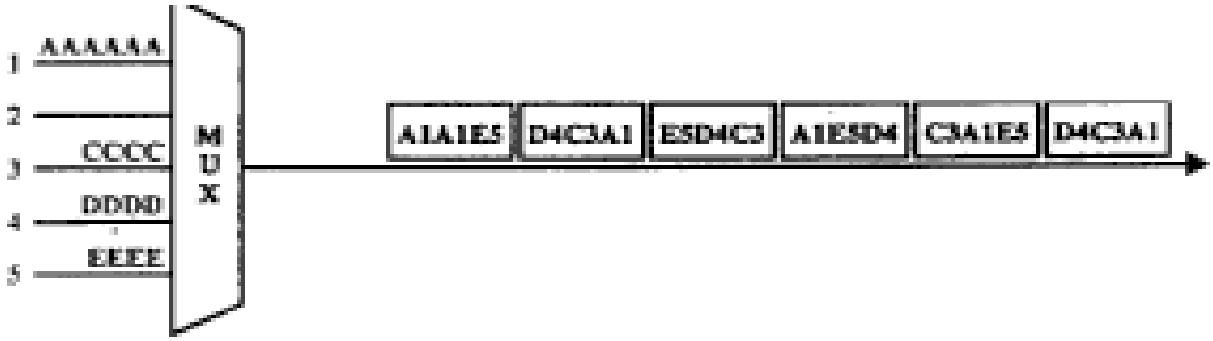
In a ***synchronous system***, if we have n input lines, the frame contains a fixed number of at least n time slots.

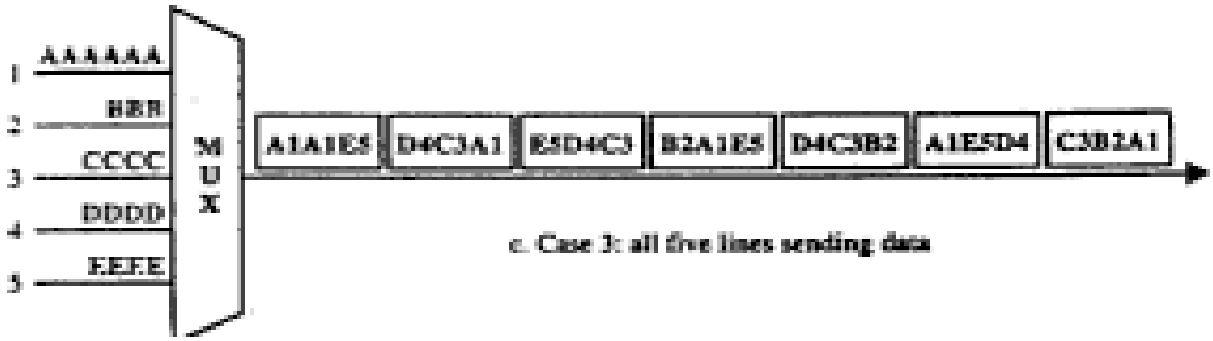
In an **asynchronous system**, if we have *n* input lines, the frame contains no more than in slots, with ni less than n (**based on** a statistical analysis of the number of input lines that are likely to be transmitting at any given time).

asynchronous TDM can support more devices than synchronous TDM.









c. Case 3: all five lines sending data

Addressing and Overhead is a major ***weakness* of asynchronous TDM.**

H ow does the demultiplexer know which slot belongs to which output line?

In synchronous TDM, the device to which the data in a time slot belong is indicated by the position of the time slot in the frame**.**

But in asynchronous TDM, data from a given device might be in the first slot of one frame and in the third of the next.