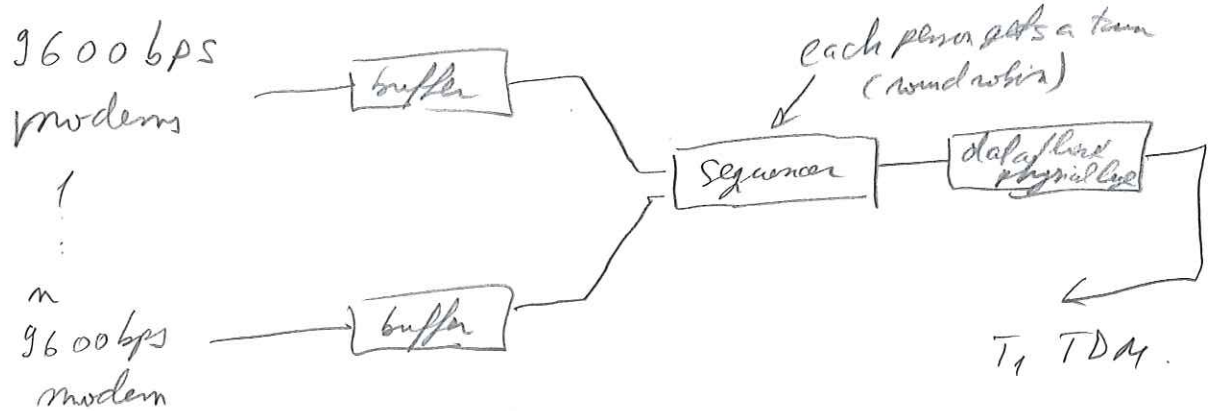
Example of synchronous TDM



(T_1 data rate is 1.544 MB

→ each modem gets a dedicated or preassigned timeslot

→ buffers are typically small (1 byte) and are emptied each time by the sequencer (FIFO).

Suppose T_1 has an overhead of 1% (15.4 Kbps)

how many modems can this accommodate?

$\sum$ modem data rates $\leq T_1$ data rate − overhead.

$\Rightarrow n \cdot 9600 \leq 1.544$ Mbps $- 15.44$ Kbps

$\Rightarrow n \leq 159.23$ (159 modems)

FDM and synchronous TDM are fixed multiplexing methods

advantages / disadvantages

→ FDM → no interference, TDM - no collisions

→ low delay / latency

→ simple implementation

but inefficient (BW) for FDM, timeslots that are reserved and show figure 8.12, mention switch slides

<u>New method</u> → data from each input stream is transmitted <u>on demand</u>

→ sources with no data to send do not waste time slots

→ sources with lots of data get more capacity

→ need to also send instructions with each frame (overhead)

<u>Statistical Time division multiplexing</u>

look at the average time each node transmits and account for that when allocating bandwidth

Revisit example knowing that each modem transmits 20% of the time and overhead of STDM is 10%.

How many modems?

$\sum$ <u>average</u> modem data rates $\leq$ T_1 data rate − overhead.

$(0.2)\, n\, (9600) \leq 1.544$ MBPS $-$ 150.4 KBPS.

$n \leq 723.75$ → improvement of 4X (more people

<u>Remarks</u>. what happens if all modems transmit at same time? − sequence gets overwhelmed

→ switch must "buffer" data and send it later

⇒ if buffers fill up, data is lost (congestion)