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Data Communication CS601 Lecture No 29

Lecture Prepared By

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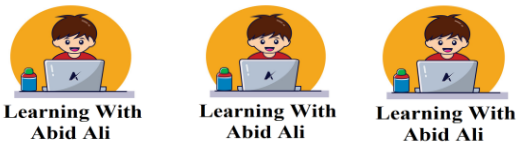
CS601 Lecture No 29 Topic 166 to 170

Media Access Control (MAC) Sub-Layer

- **When nodes use a multipoint or broadcast link, we need a multiple-access protocol to coordinate access to the link**

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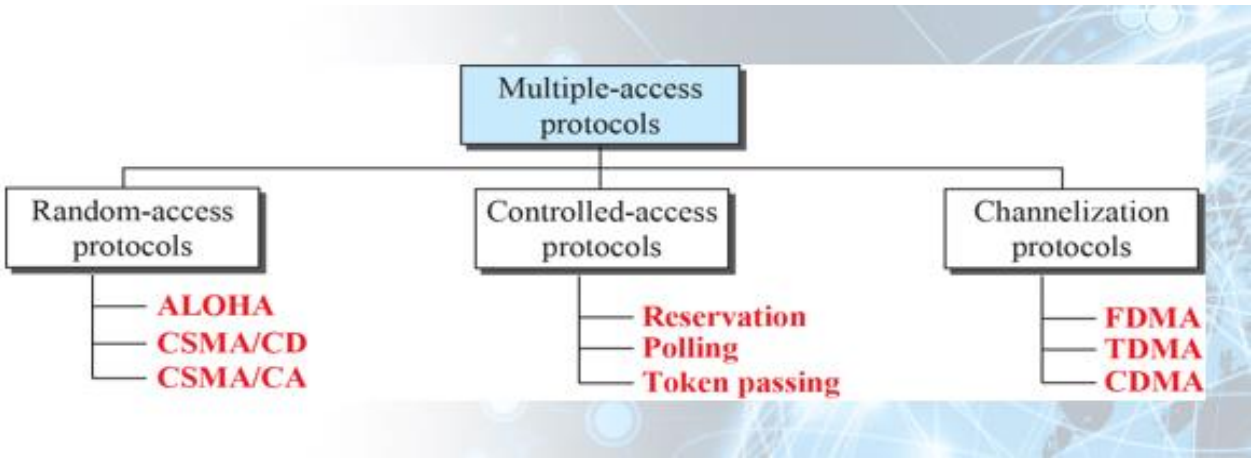
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- **Many protocols have been devised to handle access to a shared link**
- **All of these protocols belong to Media Access Control (MAC) sub-layer**

What is the function of medium access control MAC sub layer?

The medium access control (MAC) is a sublayer of the data link layer of the open system interconnections (OSI) reference model for data transmission. It is responsible for flow control and multiplexing for transmission medium. It controls the transmission of data packets via remotely shared channels.

Taxonomy of Multiple-Access Protocols

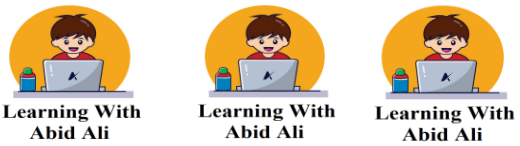


Random Access

- **In random-access or contention no station is superior to the other and none is assigned control over the other**
- **Station that has data to send uses a procedure defined by the protocol to make a decision on whether or not to send**
- **This decision depends on the state of the medium (idle or busy)**

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ALOHA

- **ALOHA, the earliest random-access method, was developed in early 1970s**
- **Designed for a radio (wireless) LAN, but it can be used on any shared medium**
- **Potential collisions in this arrangement as the medium is shared between the stations**
- **When a station sends data, another station may attempt to do so at the same time**
- **The data from the two stations collide and become garbled**

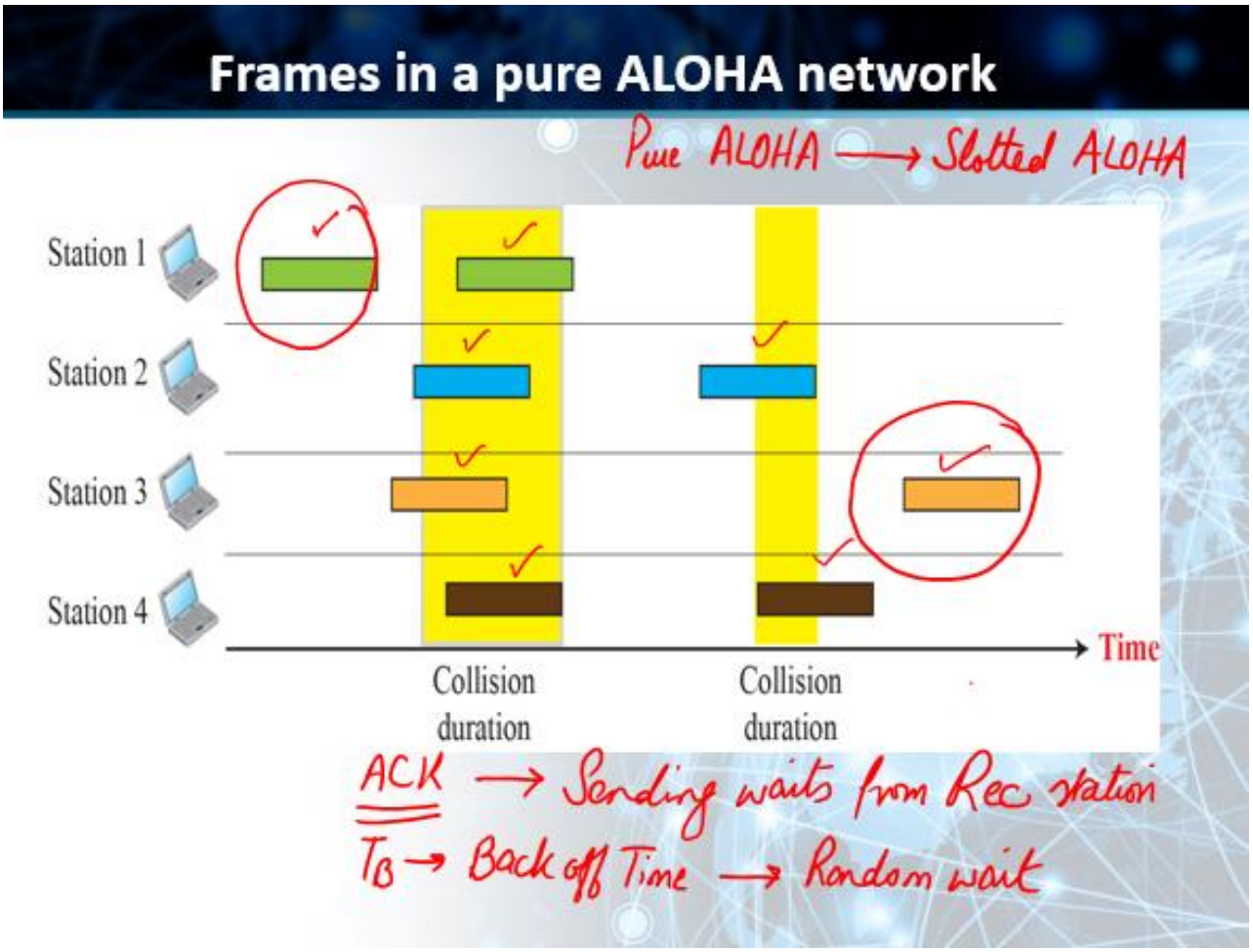
Difference between Pure Aloha and Slotted Aloha

In Slotted Aloha, any station can transmit data only at the beginning of a time slot. In Pure Aloha, time is continuous and is not globally synchronized. In Slotted Aloha, time is discrete and is globally synchronized.

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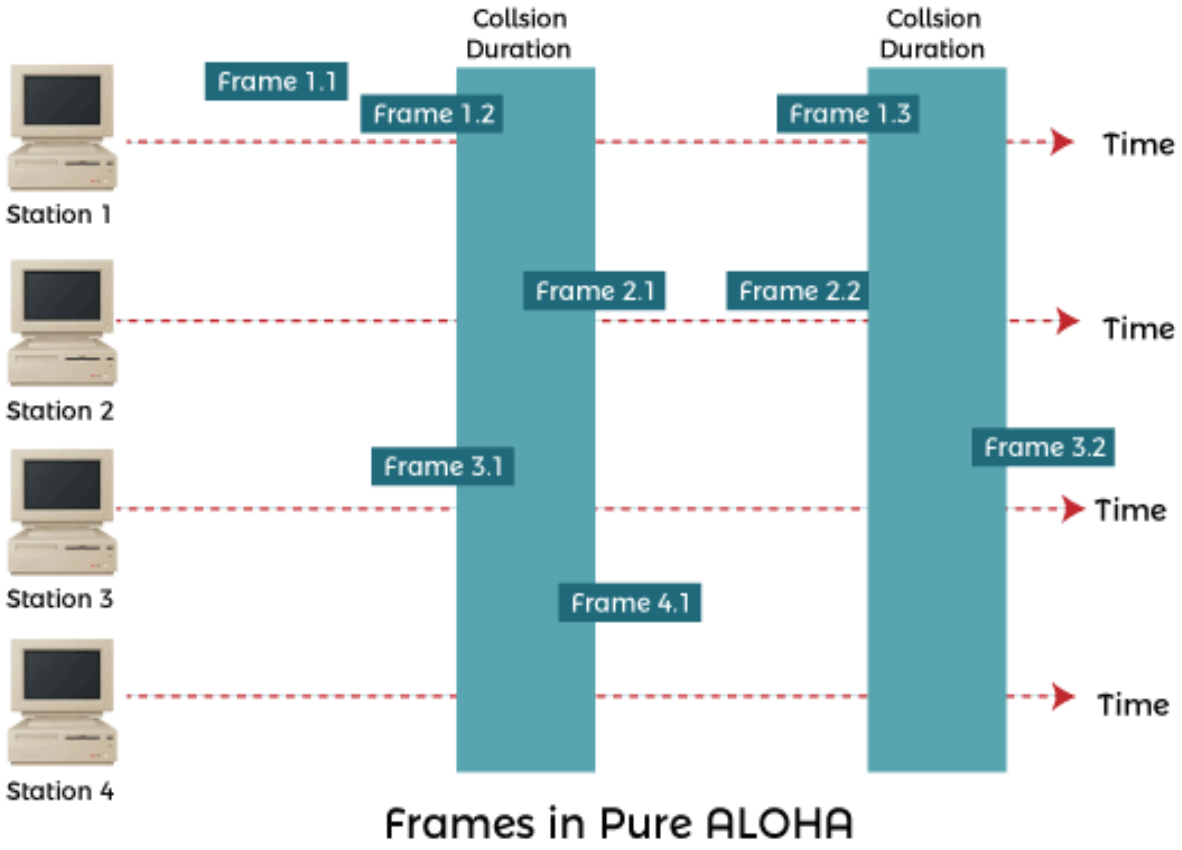
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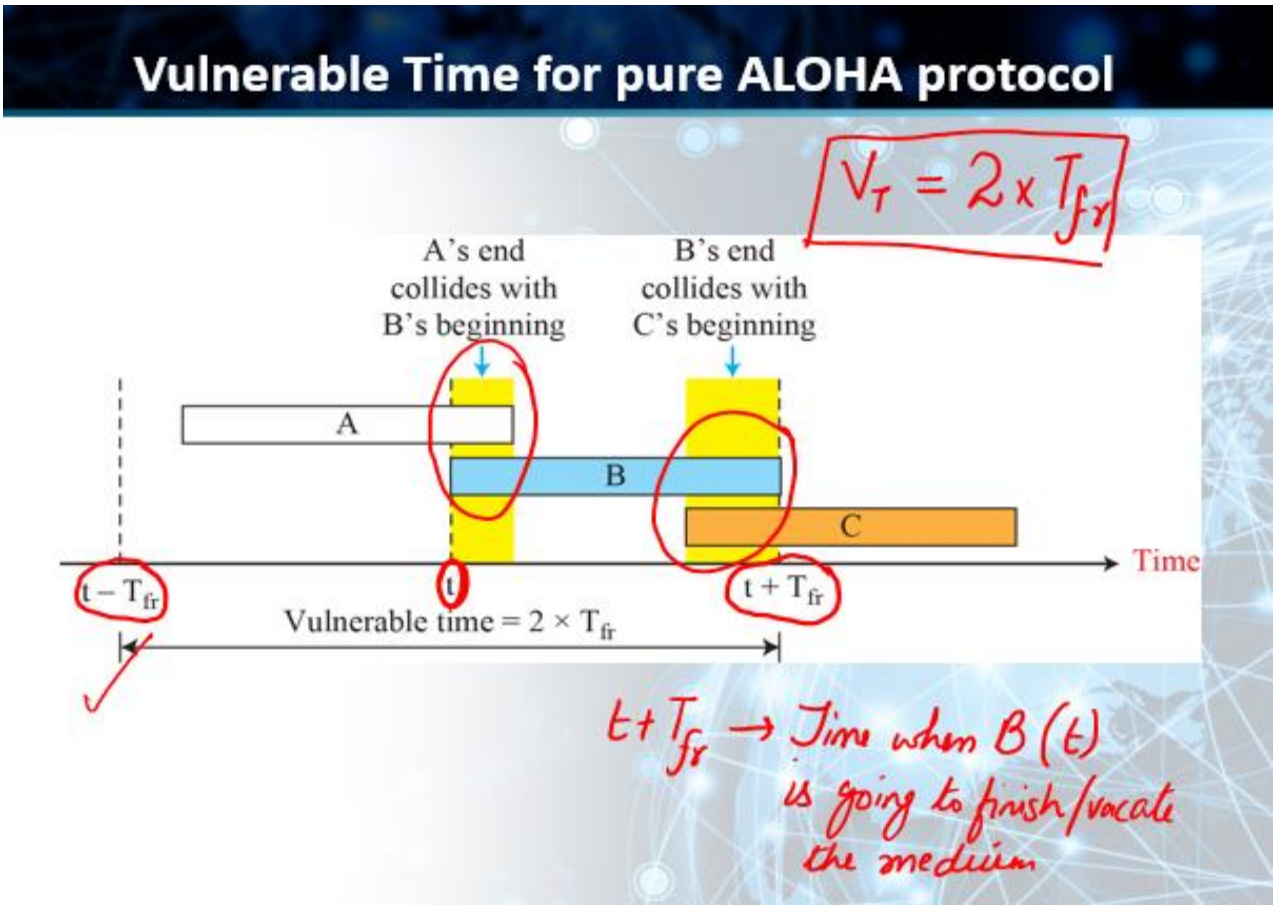


Frames in Pure ALOHA

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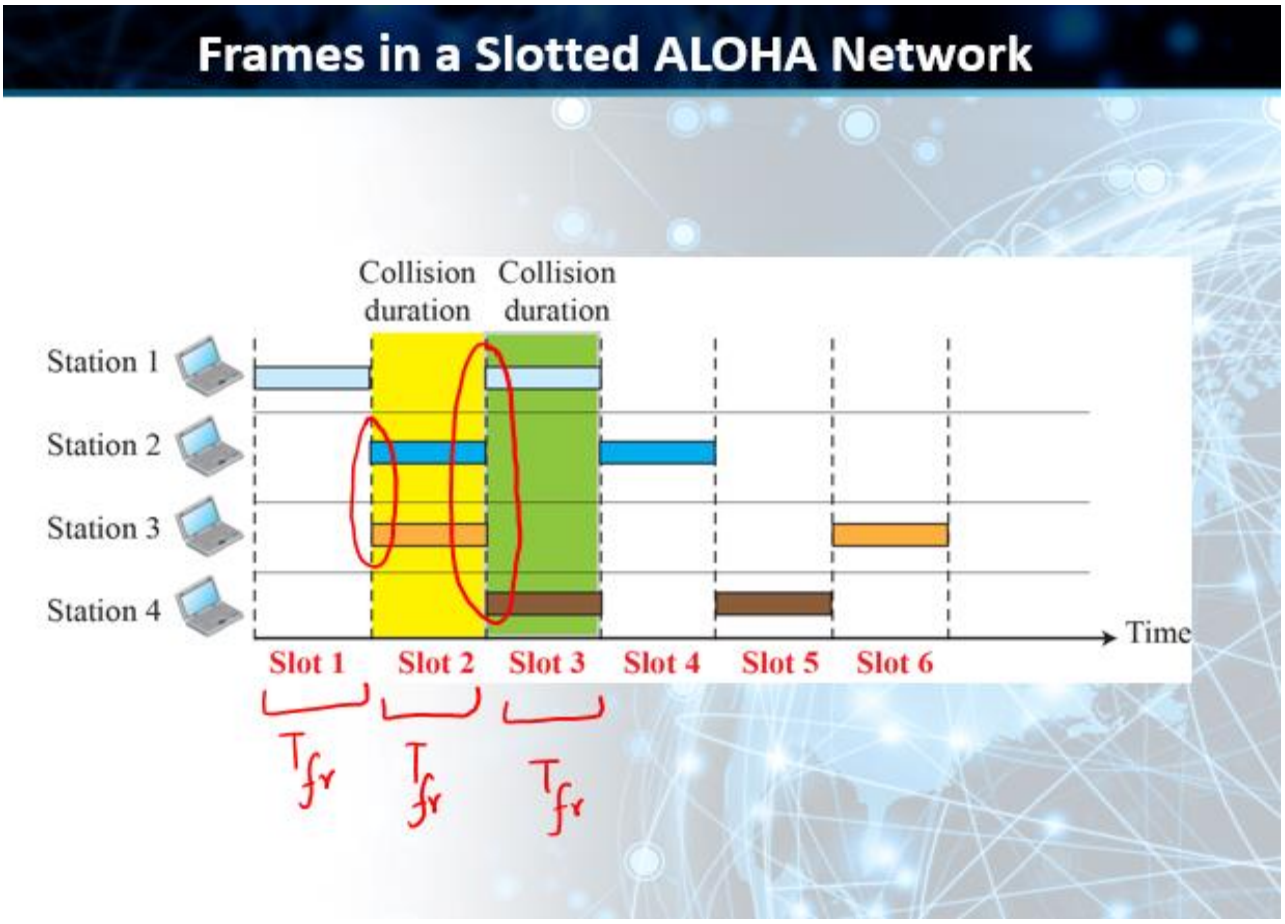
Slotted ALOHA

- **We divide time into slots of Tfr sec and force the station to send only at the beginning of the slot**
- **Invented to improve the efficiency of pure ALOHA**
- **If a station misses the time slot, it must wait until beginning of next time slot reducing vulnerable time to Tfr (vs. 2 x Tfr for pure ALOHA)**

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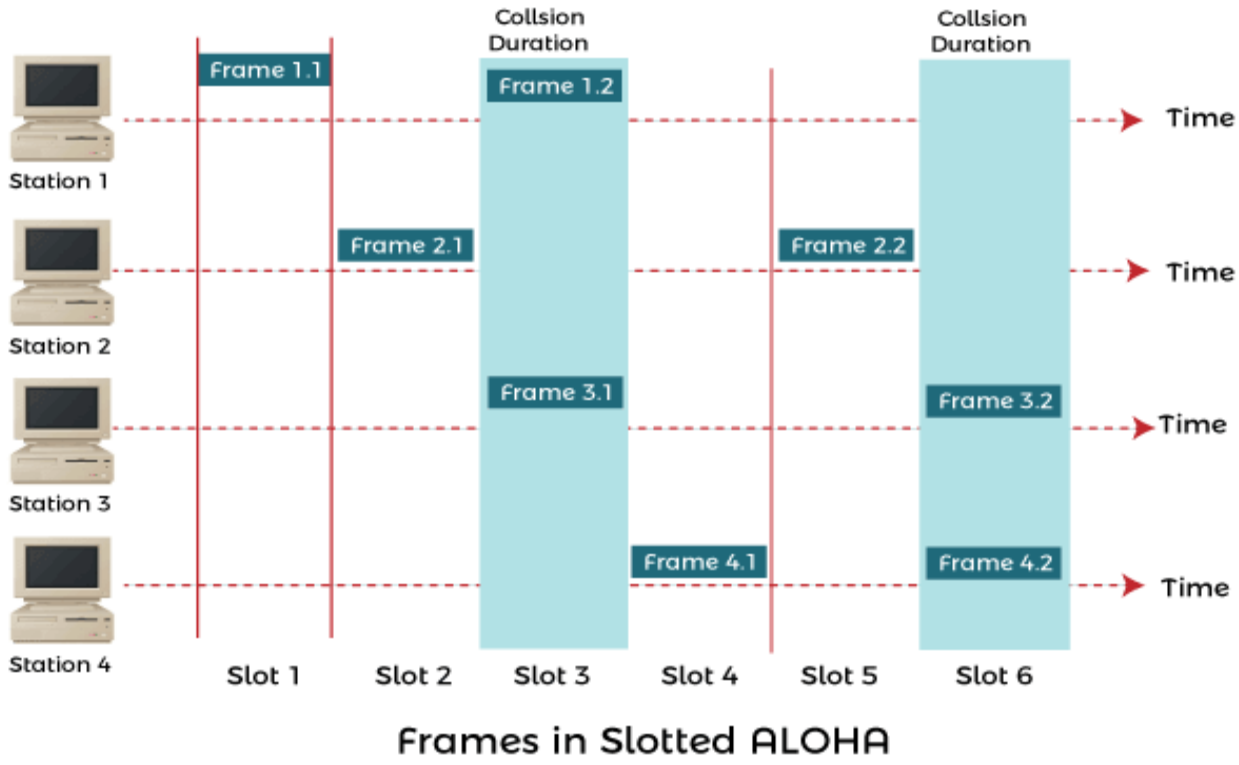
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Frames in Slotted ALOHA

What is aloha?

Aloha is designed for wireless LAN (Local Area Network) but can also be used in a shared medium to transmit data. In aloha, any station can transmit data to a channel at any time. It does not require any carrier sensing.

Pure Aloha

Pure aloha is used when data is available for sending over a channel at stations. In pure Aloha, when each station transmits data to a channel without checking whether the channel is idle or not, the chances of collision may occur, and the data frame can be lost.

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