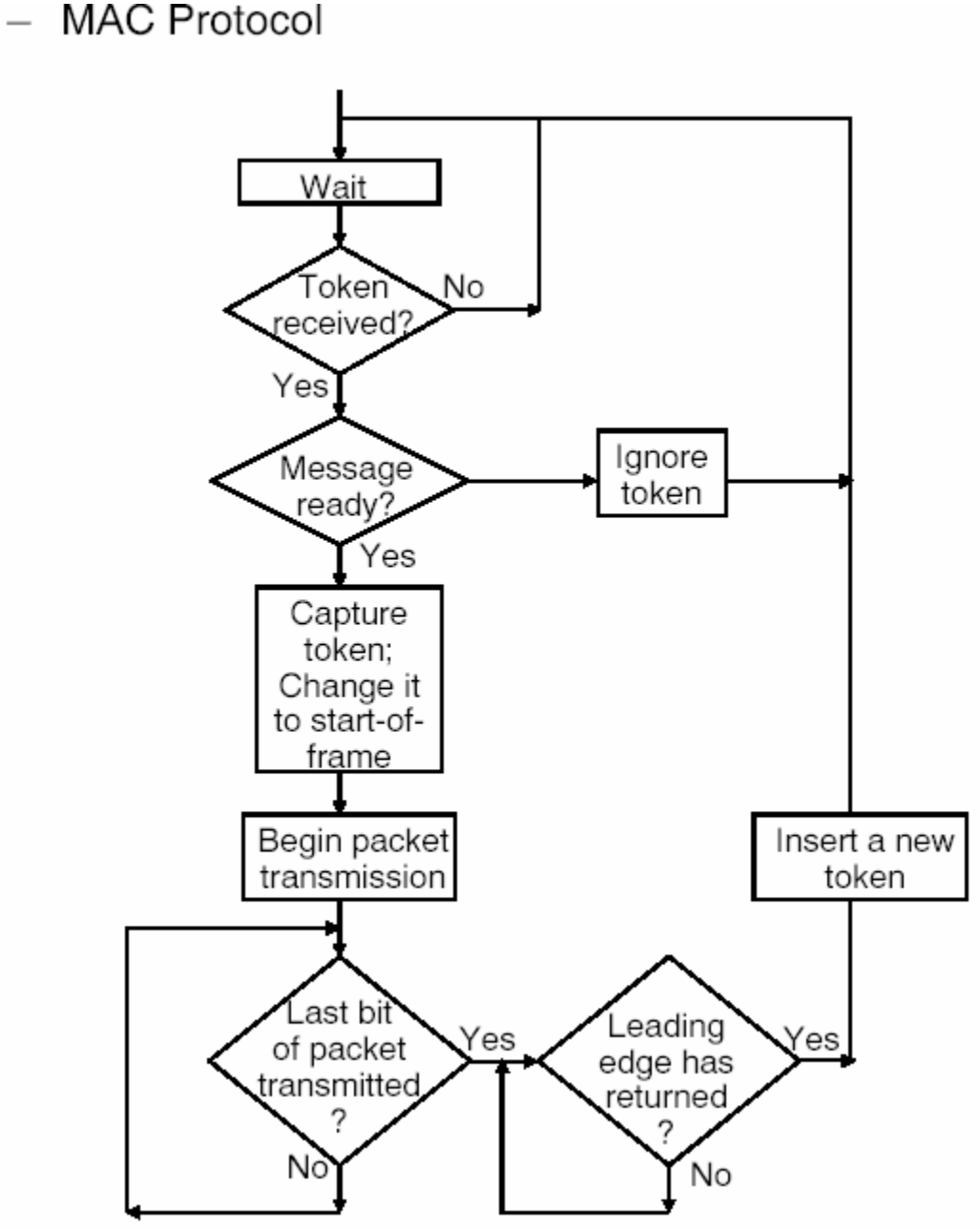
Lecture 8

Each station can check passing frame for errors and set the E-bit to 1 in ED field, if an error is detected. If a station detects it own MAC address, it sets the A bit in frame status field to 1; if station is also able to copy the frame, then corresponding C bit is also set to 1. This allows the originating station to decide about the status of the frame and destination station.

Destination station non existent (A=0 and C=0).
Destination station exist but unable to copy the frame (A=1 and C=0).
Destination station exist and also able to copy the frame (A=1 and C=1).

– MAC Protocol



We can now discuss about the token ring algorithm for the case when a **single priority** is used. In this case priority and reservation bits are set to zero. A station wishing to transmit waits until a token goes by, as indicated by a token bit of 0 in the AC field. The station seizes the token by setting the token bit to 1. The SD and AC fields of the received token now function as the first two fields of the outgoing frame. The station transmits one or more frames, continuing until either its supply of frames is exhausted or a THT (Token Holding Timer) expires. When the AC field of the last transmitted frame returns, the station sets the token bit to 0 and appends an ED field, resulting in the insertion of a new token on the ring.

Token Ring Priority and Reservation

There are three bits for priority and three bits for reservation in Access Control field.

P_f : priority of frame to be transmitted by station
P_s : service priority; priority of current token
P_r : value of P_s as contained in the last token received by this station.
R_s : Reservation value in current token.
R_r : Highest reservation value in the frames received by this station during the last token rotation

1. A station wishing to transmit must wait for a token with $P_s \leq P_f$.
2. While waiting, a station may reserve a future token at its priority level (P_f).
   If a data frame goes by and if $R_s < P_f$, then the station can set $R_s \leftarrow P_f$.
   If a token goes by and if $R_s < P_f$ and $P_f < P_s$, then the station can set $R_s \leftarrow P_f$.
3. When a station seizes a token, it sets the token bit to 1 to start a data frame, and the reservation field of the data frame to 0 and leaves the priority field unchanged.
4. Following transmission of one or more data frames, a station issues a new token with the priority and reservation fields set appropriately.

Early Token Release

When a station issues a frame, if

1. Bit-length of the frame < length of frame,

Then the leading edge of the frame will return to the transmitting station before it is finished with transmission of frame.

2. Bit length of the frame > length of frame,

Then after a station has completed transmission of a frame, it must wait until the leading edge of the frame returns before issuing a token.

In the second case, some of the capacity of ring is unutilized. To make efficient use of the capacity of the ring, an ETR option has been added to 802.5 standards. ETR allows a transmitting station to release a token as soon as it completes frame transmission, whether or not the frame header has returned to the station.

Dedicated Token Ring

A ring can be configured in a star topology by use of a hub or concentrator. This hub functions as a switch providing full-duplex and point to point link. Thus token passing is not used.

IEEE 802.5 physical layer specification