Lecture Scribe

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1 Introduction

We are going to improve upon the protocols we studied till last lecture. Stop wait is an inefficient propagation.

Ques: Can we send more frames in the channel? Can we use the channel as much as possible?
Product of Bandwidth and Propagation delay gives max no. of frames in the channel/medium at any given time.

Bandwidth * Propagation delay = Max no. of frames that can be present in the channel at any given time

Sender Window Size or SWS = Upper bound on the max no. of unacknowledged frames that one can send into the channel/medium.

If your SWS is N, you use windows size from 0 to N.

* Max Time Window by which the sender has to decide whether to send F_4 or just send F_1 again since it has not received acknowledgement for F_3. If Receiver receives anything other than F_3 at this moment, it will keep rejecting it even if the frame is not corrupt.

LAR $\rightarrow$ Last acknowledgement received=$\uparrow$
LFS $\rightarrow$ Last Frame Sent= T
T$-$Upper Arrow$\leq$ N

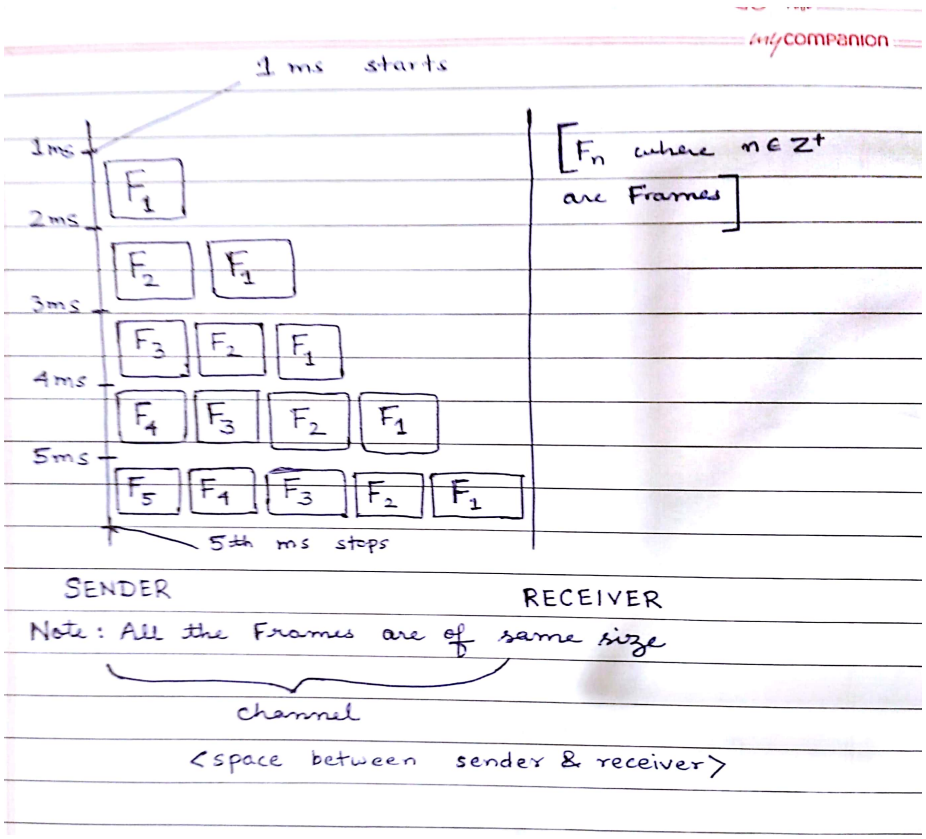

Figure 1: Max number of frames in a channel.

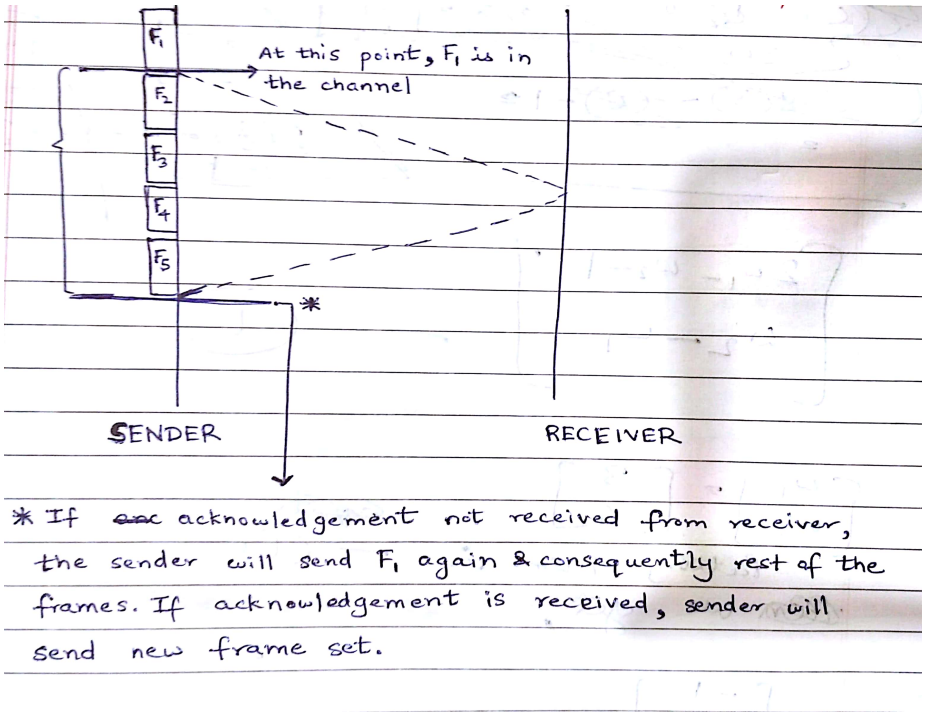

Figure 2: The time duration from the beginning of frame F_2 to the end of frame F_2 is 2D.

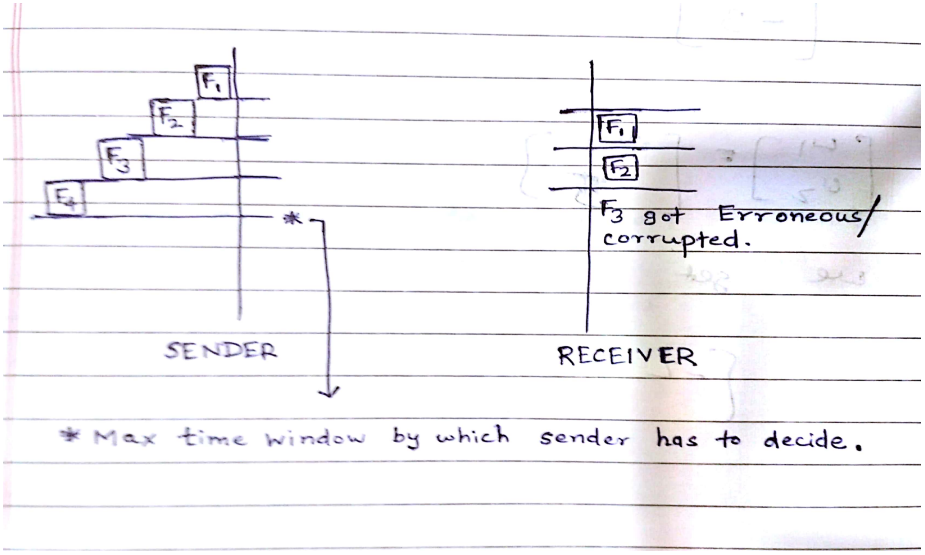

Figure 3: Here, the receiver has already received frame F_1 and F_2. However, frame F_2 got lost in the channel. Despite the frame F_4 in being intact and perfectly fine, the receiver will reject it, and will keep rejecting the next frames as well, till it receives the frame F_3

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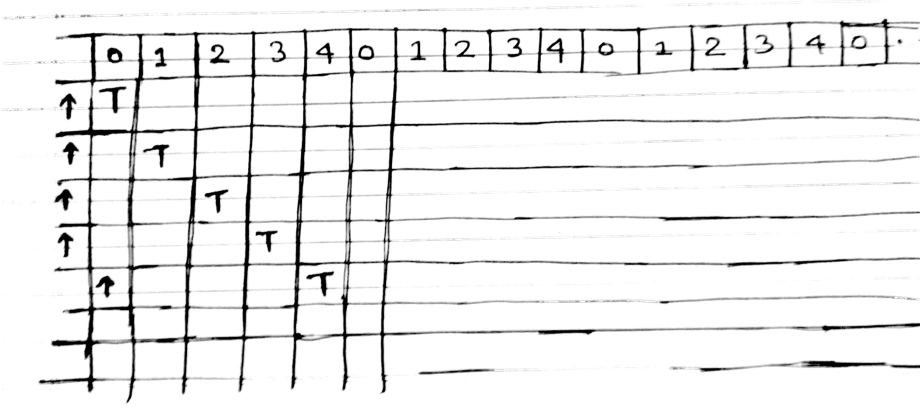

Last Acknowledgement Received or LAR is denoted by ↑. LFS or Last frame sent is denoted by T. At the beginning of transmission, the LAR is at NULL position. Then, the 0th frame is sent. But the LAR stays at NULL position since we have not received acknowledgment for LFS yet. So, LFS pointer moves

to 0, since it was our last frame sent. Though, we have not received the acknowledgment yet, the sender has the time before it makes a decision. So, the sender will send the 1st frame now. The LFS will move to 1st position. The sender still has not received the acknowledgement yet. But it will send the 2nd frame now. So, the T will move to 2nd frame. The sender will keep sending the files from 0 to N(windows size) before it waits, and makes a decision, whether to send new frames or send the older ones, depending upon the acknowledgement received.

2.1

Problem of Duplication
If acknowledgement gets delayed, for e.g., F_0, the sender will send 0 again as it will wait for a certain time to receive the acknowledgement from receiver. But receiver has already received F_0, it is just that the acknowledgement got delayed. Now, since the sender has already sent the new F_0, despite receiver receiving old F_0, the receiver will assume the old F_0 to be new F_0 and will accept it. Hence, the receiver will have 2 F_0's which is, the old F_0 and the new F_0.