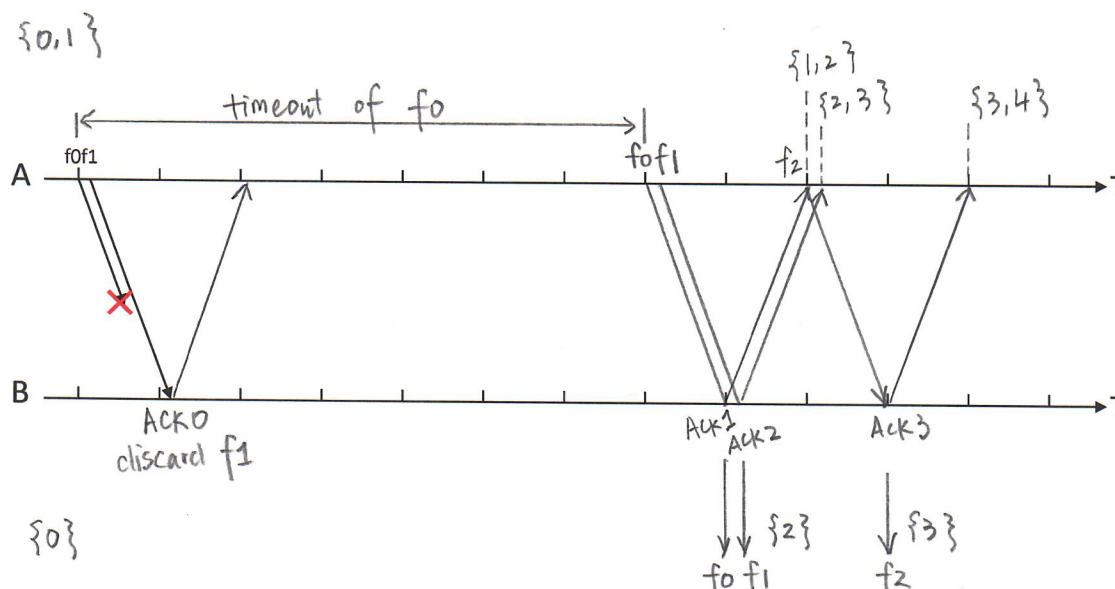


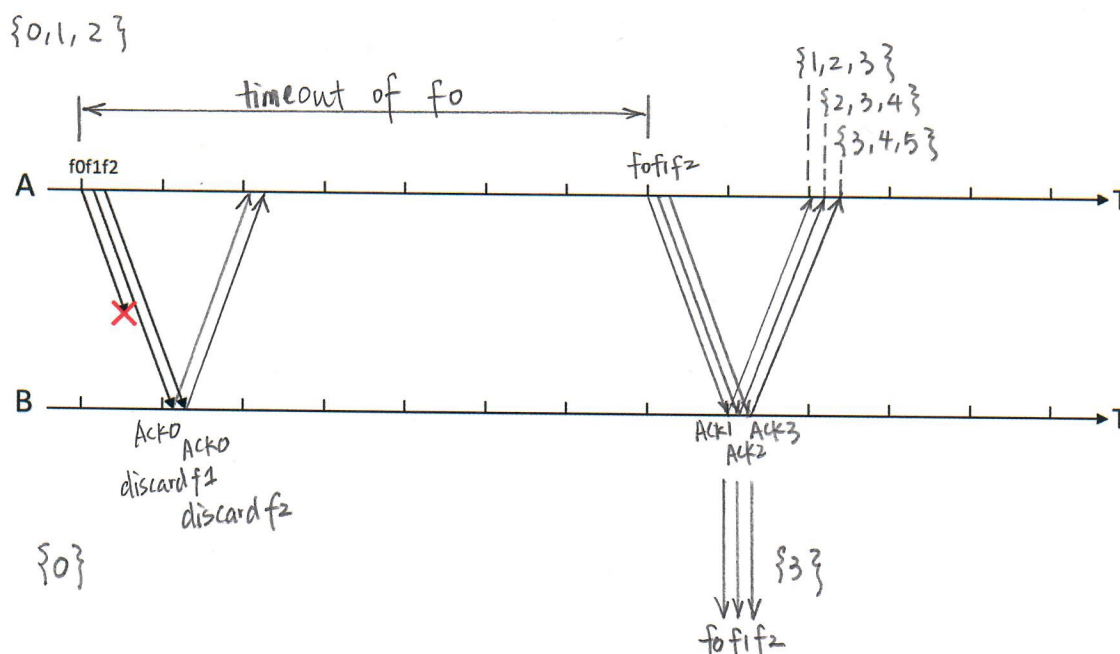
Cpr E 489 Spring 2020  
Homework #3 Solution

Suppose station A tries to send three frames ( $f_0$ ,  $f_1$ ,  $f_2$ ) to station B (there are no more frames to send after  $f_2$ ). Suppose  $f_0$  is lost on the first attempt, while all other frame transmissions (including retransmitted data frames and ACK/NAK frames) succeed. Suppose that one-way propagation delay is one time unit, and timeout for each frame is seven time units. For each of the following ARQ protocols, complete a diagram to show the frame exchange sequence and send/receive window information, until all three frames are delivered successfully. An example diagram (to be completed) for Question (1) is shown below.

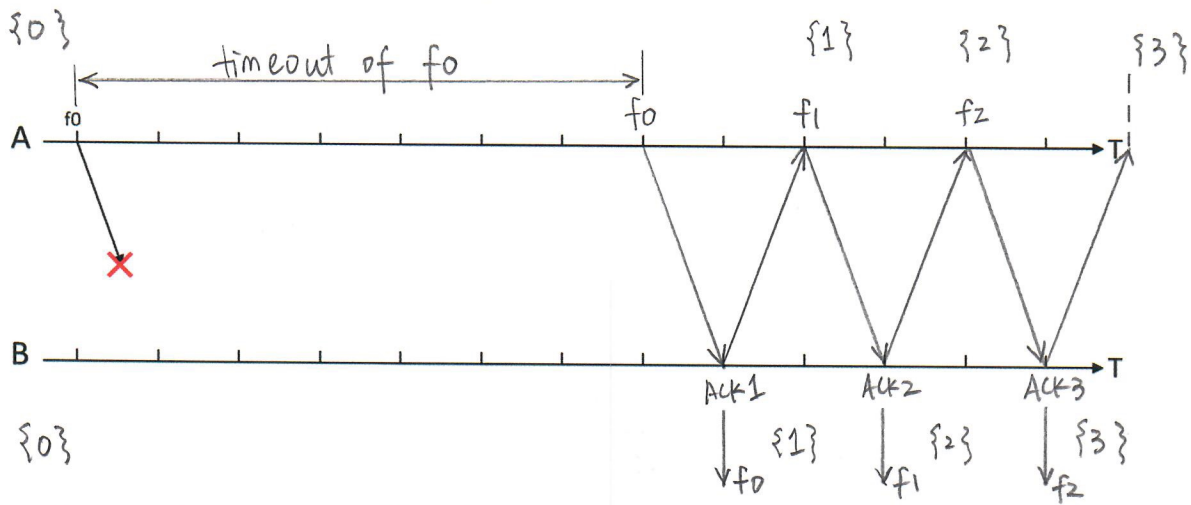
- 1) (20 points) Go-Back-N (GBN) ARQ protocol with  $N = 2$ ;



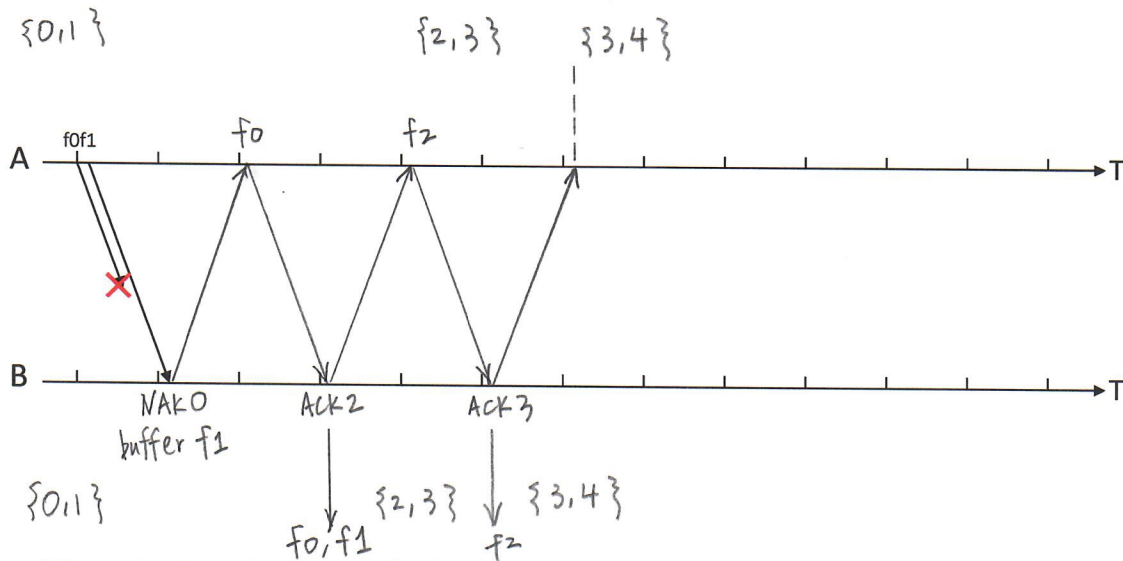
- 2) (20 points) Go-Back-N (GBN) ARQ protocol with  $N = 3$ ;



3) (20 points) Stop and Wait (S&W) ARQ protocol;



4) (20 points) Selective Repeat (SR) ARQ protocol with  $W_s = W_r = 2$ ;



5) (20 points) A special version of Selective Repeat (SR) ARQ protocol with send window of size  $W_s = 2$  and receive window of size  $W_r = 1$ .

