

COMP3203 Final Exam Notes

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1 Test 1 Stuff (Brief and Important Only)

- test 1 stuff here

2 ARQs

- (A)utomatic (R)epeat Re(Q)uests
- strategy to handle errors detected by the CRC
 - or whatever other detection method
- main types
 - **stop and wait**
 - sliding window
 - **go back N**
 - **selective reject**

2.1 Sliding Window

2.1.1 Go Back N

- most commonly used sliding window
- sequential frames numbered $n \bmod N$
- send up to $N - 1$ frames **before an ACK is received**
- **unbounded sequence numbers** is a hurdle for sliding window in **non-FIFO** channels

ACKs and NAKs

- if no error
 - send RR (ACK) for frame[n]
- if error
 - send REJ (NAK) for frame[n]
- if frame lost, send a NAK
- if no ACK or NAK received before *timeout*, **assume lost**

When Sender Receives a NAK[n]

- resend frame[n] and all frames sent since

When a Sender Receives No ACK or NAK

- go back to the previous ACK and resend all frames sent since

2.1.2 Selective Reject

- similar to go back N
- **BUT** we only resend the **lost frame**
 - out of order!
 - receiver needs *sorting logic* to store frames after a NAK
- in general, smaller window size

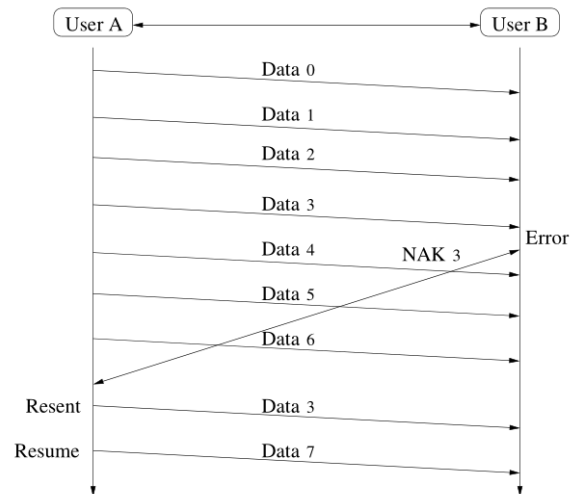


Figure 1: An example of the Selective Reject protocol.

2.2 Stop and Wait

- also called an **ABP**
 - *alternating bit protocol*
 - because the label bits alternate between 0 and 1
- you can think of it as sliding “window” with a **window size of 1**
- works only in **FIFO queues**
 - suitable for **data link layer**

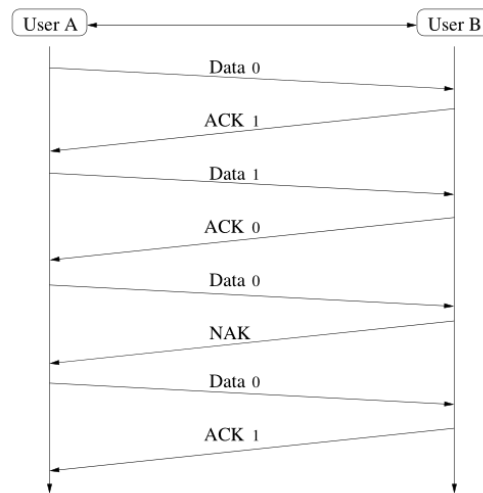


Figure 2: A diagram of the Stop and Wait ARQ protocol.

2.2.1 Errors in Stop and Wait

- two main types
- **frame** errors
 - damaged frame
- **ACK** errors
 - damaged acknowledgement

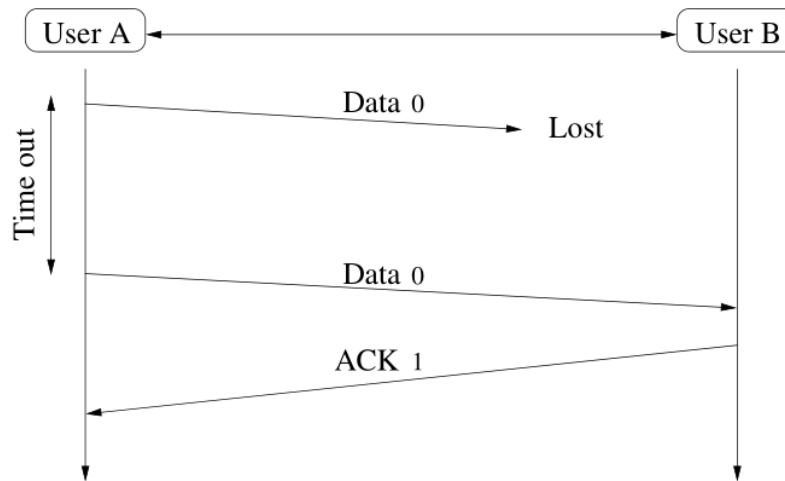
Frame Errors

Figure 3: A lost frame error in the Stop and Wait ARQ protocol.

- frame is damaged
 - one or more bits have been altered
- discard the frame
- source waits for ACK
 - if it doesn't receive one, it will resend

ACK Errors

- frame is received but ACK is damaged
- sender will resend message
- receiver will accept the same message twice
 - so we need to label frames
 - and label ACKs
 - use a bit for this
 - $\text{ACK}[b]$ acknowledges $\text{frame}[b + 1 \bmod 2]$
 - says receiver is ready for $\text{frame}[b]$

2.2.2 Correctness

- satisfies:
 - safety
 - algorithm never gives an incorrect result
 - always results in a “corrected” error
 - liveness
 - never enters a deadlock condition

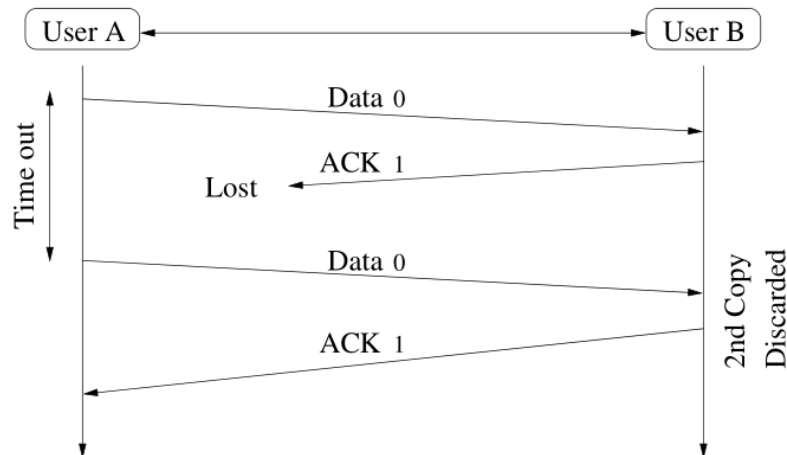


Figure 4: An ACK error in the Stop and Wait ARQ protocol.

3 Multiaccess

3.1 LANs

- two types
 - **switched**
 - lines, multiplexes, switches
 - hierarchical addressing scheme
 - routing tables
 - **broadcast**
 - no routing
 - flat addressing scheme
 - (M)edium (A)ccess (C)ontrol to coordinate transmissions
 - **preferred over switched** due to **simplicity**

3.2 The Problem with Shared Channels

- in *point-to-point* networks we have signal as a function of one transmitted signal
- in *shared* networks, we may have **more than one** transmission contributing to a signal

3.3 MAC Protocol

3.4 Uncoordinated Access Control

COME BACK HERE

3.5 Ethernet

4 Coordinated Access

4.1 Tree Algorithm

4.2 Binary Countdown

4.3 Bitmap

5 Wireless

5.1 Cellular

5.2 Ad Hoc

5.2.1 UDG

5.2.2 Compass Routing

5.2.3 Face Routing

5.3 Bluetooth

6 GPS

6.1 Three Techniques

6.2 Satellites

7 Routing

7.1 Distance Vector (RIP)

7.2 Link State Protocol (LSP)

7.3 MSTs

7.4 Dijkstra

8 IP

8.1 IPv4

8.1.1 Classes of Address

8.1.2 Subnets

8.1.3 Subnet Masks

8.2 IPv6

8.3 DHCP

8.4 ARP

8.4.1 RARP

9 TCP

9.1 How it Works (Sliding Window)

9.2 How it Builds Statistics

9.3 Equilibrium Model