Reliable Data Transfer from *Kurose & Ross*

CS 3171

Protocol	*New Features*	*Problems*
rdt **1**.0 ideal scenario	sends packets	errors
rdt **2**.0 weak stop & wait	checksums for error detection ACK & NAK for receiver feedback	ACK/NAK may have errors
rdt **2**.1 alternating bit	1-bit sequence numbers	ACK/NAK may be lost wrong packet number corrupt packets
rdt **2**.2 NAK-free	send only ACK & sequence #	ACKs may be lost
rdt **3**.0 robust stop & wait	timers	utilization can be low
rdt **3+** pipeling/sliding windows	window of sequence numbers buffer space for N frames goback N selective repeat	windows may be too large

There are more notes on the back of the page

Bibliography

[1] James F. Kurose and Keith W. Ross. *Computer Networking: A Top-Down Approach Featuring the Internet*. Section 3.4: Principles of Reliable Data Transfer (pp. 182 – 207). Addison-Wesley Longman, Inc., 2001. ISBN 0-201-47711-4.

[2] William Stallings. *Data and Computer Communications*. Prentice Hall, sixth edition, 2000. ISBN 0-13-084370-9.

Features of Network Protocols

1 Reliability

1. error detection
2. feedback
3. retransmission

Type of Error	Solution
• single bits • bursts	ACKs & sequence #s
• lost transmissions	timers & sequence #s

2 Performance

- Simple control message structure
  - NAK-free
  - cumulative acknowledgment
  - fast-retransmit
- Measure of utilization (U)
- Pipelined protocols
  - Go Back N (GBN)
  - Selective Repeat (SR)
- Flow Control
- Congestion Control

3 Fairness