Misc

❑ Last HW on web. Will post solutions next Mon. Not due but responsible for material.

❑ Extra Office hours (beyond today's):
- David: Thurs. 2-3, Room 258 Cory
- Abhay: next Tues, 11-12, Room 258 Cory
- Nikhil, Marghoob: regular office hours

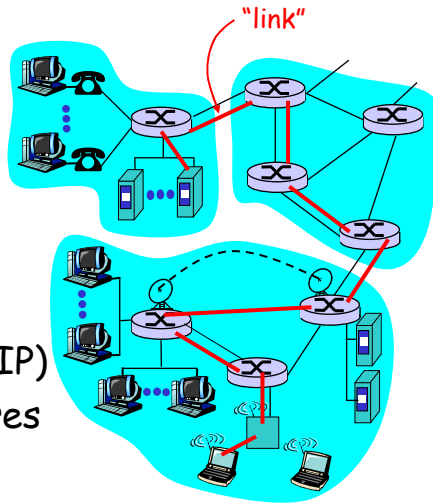❑ Final Exam: May 17, 5-8pm, 50 Birge Hall

1

The Layers

❑ Application
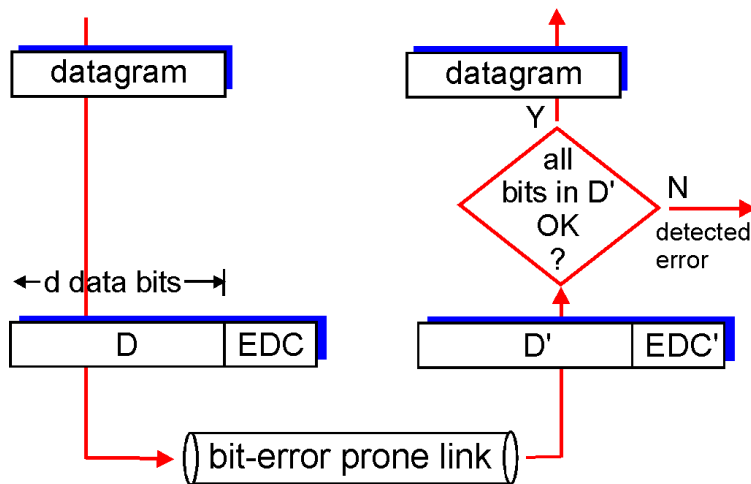❑ Transport
❑ Network
❑ Link
❑ Physical (Wireless)

2

Link Layer

Main concepts:

❑ Error correction and Detection
❑ Multiple access Protocols
❑ Addressing (MAC vs IP)
❑ Ethernet architectures (hub vs switch)

"link"

3

Error Detection and Correction

datagram

datagram

Y

all bits in D' OK ?

N

detected error

←d data bits→
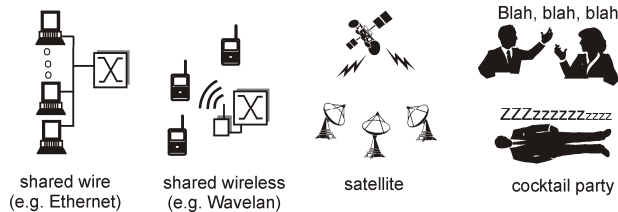
| D | EDC |

| D' | EDC' |

bit-error prone link

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2

Key conepts of parity-check codes

☐ How to calculate data rate of a code?

☐ What is the difference between error detection and error correction?

☐ What is the minimum Hamming distance of a code?

☐ How to relate this to the error detection and correction capabilities of a code?

☐ What does " correcting burst errors" mean?

☐ How does CRC work and how long a burst can it correct?

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Multiple Access Protocols

☐ What are the different types of MAC protocols?

☐ What types of traffic is each suitable for?

Blah, blah, blah

ZZZzzzzzzzzzzz

shared wire
(e.g. Ethernet)

shared wireless
(e.g. Wavelan)

satellite

cocktail party

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Random Access Protocols: Key Concepts

❑ random backoff
❑ channel sensing
❑ collision detection
❑ collision avoidance:
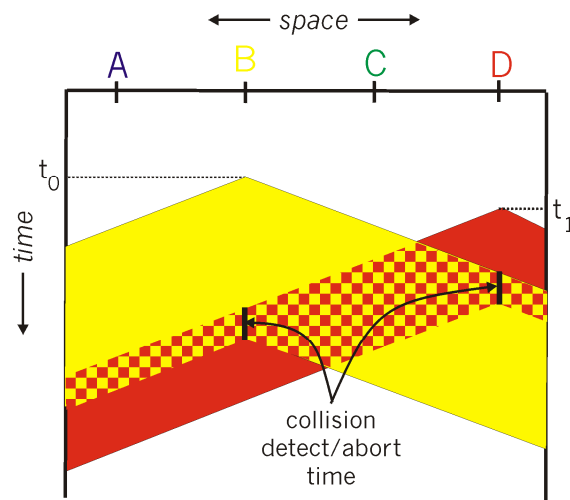 ○ random backoff on sensing busy channel
  ○ reservation (RTS/CTS)

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Aloha and CSMA

❑ What does efficiency of a MAC protocol mean?
❑ How to compute the efficiency of Aloha and CSMA protocols?
❑ How should the retransmission probability be adjusted as a function of system load?
❑ How is this actually done in Ethernet?
❑ What is the impact of propagation delay on efficiency?

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Timing Diagrams

9
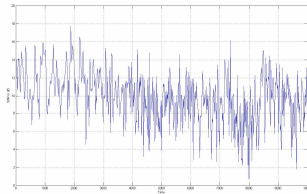
Wireless Networks

☐ Physical layer: multipath fading and impact on reliable transmission.

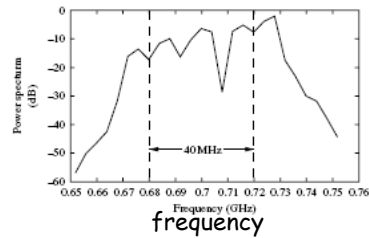☐ MAC layer: multiple access and interference management

☐ Mobility management

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Multipath Fading

❒ Why does the wireless channel behave like this?

time · frequency

❒ What is the main idea for reliable communication over this unreliable medium?

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Multiple Access and Interference Management

Key concepts:

❑ Universal vs fractional frequency reuse

❑ GSM vs CDMA

❑ Hidden terminal problem and impact on CSMA protocol in 802.11 networks.

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Mobility Management

❒ Home network vs visited network
❒ Home address vs care-of-address
❒ Indirect vs direct routing
❒ Soft vs hard handoff

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