

Name:

CS461, Midterm
Spring 2003
Mar 12, 2003

Pledge:

Directions:

- Please answer each question in the space provided. The amount of space should be sufficient for a correct answer. If you need more space, please use the backs of pages, and make a note to that effect. If you run out of space, exam books are provided at the front of the room.
- This exam is closed-book, closed-notes, and is covered by the Honor Code. Please write and sign the pledge after you finish your exam.
- There are a total of five sections, with the number of points for each shown by the question. While it is not the intent for the exam to be a race, spending too much time on a single question may preclude finishing the exam. Budget your time wisely.
- To be fair, I will try to avoid answering content-related questions during the exam, unless it's to correct a mistake on my part.
- If you feel that a question **requires** additional assumptions or information to answer, please state them. Your guiding principle should be *Occam's razor*, which loosely translated states that you should allow as few assumptions as necessary to explain the situation.
- Unless otherwise stated/implied, assume a C-like language running on a Unix-like operating system.
- Please first read over the entire exam and then begin to answer questions. I will wait outside the exam room for the first 10-15 minutes, and then will be available in my office (room 322).
- Please write legibly

2. Short Answer (15pts) Answer each item *well* in no more than 3 sentences.

- What's the traffic difference between distance vector protocols and link-state protocols?

- What happens in a token ring if the machine holding the token crashes?

- What's the difference between the congestion window and the advertised window?

- What's the difference between a bridge and a switch?

- What's the difference between a switch and a router?

3. Physical layer (15pts)

- Modern networks tend to use 4B/5B (or variants) instead of Manchester encoding. Explain what each is and why 4B/5B is preferred

- Increasing packet/frame size reduces overhead wasted by packet/frame headers. What are the drawbacks of increasing size?

- The very simple (and successful) approach in shared Ethernet of trying to transmit as soon as possible is not used in wireless networks. What is the motivation behind having clients ask the access point for permission to send (i.e., what's different in this new environment)?

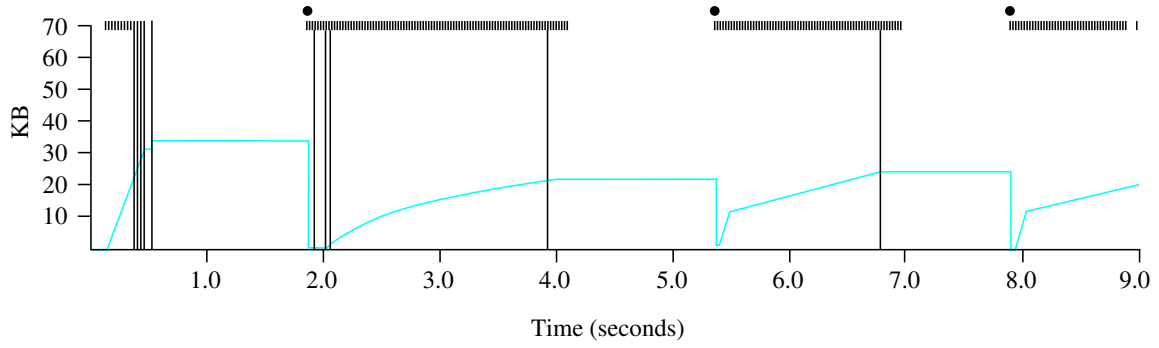
4. ARP (Address Resolution Protocol) and friends (15pts)

- Explain the basic functioning of ARP. Be explicit.

- A large campus decides to implement subnetting. Explain what changes for two computers trying to communicate if they are now on different subnets. Be explicit (e.g., give before-and-after sequences of steps)

5. TCP (15pts)

- Identify all of the salient features of this diagram and explain their origin/relevance



- Show how this trace differs when fast retransmit and fast recovery are implemented. You may assume that they are implemented together.

