Practice Examination

CSC317 Computer Networks

16 October 2014

1. The table below represents bits as they arrived at a receiver. As usual, the data lies above and to the left of the lines. The parity bits lie below and to the right of the lines.

During its passage through the network, the value of one bit changed.

Detect and correct the single-bit error.

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2. The name “10BASE-T” has three parts. What do each of the three parts mean?

3. In what sense are the terms “message,” “segment,” “datagram,” and “frame” related? What distinguishes them?

4. Explain how a packet in the Internet might resemble a set of nested Russian matryoshka dolls.

5. (a) What is the IP address for broadcasts?
   
   (b) What is the MAC address for broadcasts?

6. (a) How does a host find a DHCP server on the network to which the host has just connected?
   
   (b) How does a sender find the MAC address that corresponds to a given IP address if its ARP table does not already contain that information?

7. Define:

   hub
   bridge
   switch
   router
8. How do contemporary Ethernets differ from early Ethernets?

9. What accounts for the continuing popularity of Ethernet in local area networks?

10. (a) For what purpose did we use finite state machines?
    (b) Set aside our particular application of finite state machines. What, in general, are the components of a finite state machine?

11. Ethernet frames contain CRC (Cyclic Redundancy Check) bits. A Cyclic Redundancy Check code that attaches $r$ CRC bits to each $d$ bits of data can be used to detect any burst error of up to $r$ bits. It can also sometimes detect longer burst errors, but the probability of detecting longer burst errors is less than one and diminishes with the length of the burst.

    We did not speak of burst errors when we studied the use of checksums and parity bits. What are burst errors? Why is it important to have a method of detecting them?

12. List pairs of adjectives that we could use to characterize routing algorithms. The two words in each pair should have opposite meanings. For example, if we were comparing automobiles instead of routing algorithms we might begin our list of contrasting attributes with “sporty/practical.”