Solutions **CS 460 Computer Communications & Networks** **Chapter 5 part 1**

Review Questions

1. It is not completely redundant. Although it is most likely that corruption occurs while bits are in transmit on a link, it could also occur in other parts of routers (memory/bus/…) and the reliable delivery from NIC to NIC would not catch this. Also, although each link could guarantee that an IP datagram sent over the link would be received at the other end of the link without errors, it is not guaranteed that IP datagrams will arrive at the ultimate destination in the proper order. With IP, datagrams emerging from the same TCP connection can take different routes in the network, and therefore arrive out of order. TCP still needs to provide the receiving end of the application the byte stream in the correct order. Also, the IP layer can lose packets due to routing loops or equipment failures. Additionally, a router may receive a packet on a reliable link but then choose to drop it due to queuing inside the router.

2. Answer is: 1

3. Slotted Aloha:

One node sending gets R bps: Yes

With M nodes sending each gets R/M on average: It makes an attempt at this, but is not very efficient with a large number of nodes that all want to transmit. So, in general the answer would be no, but you could argue for a yes for a lightly loaded system.

Decentralized: No. Slotted ALOHA is only partially decentralized, since it requires the clocks in all nodes to be synchronized.

Simple: Yes

Token ring: 1

One node sending gets R bps: Yes

With M nodes sending each gets R/M on average: Yes

Decentralized: Yes

Simple: Yes. However, if you consider all the recovery protocols involved, then you could argue well for a no.

4. 2^{48} LAN addresses (2.8×10^{14}) ; 2^{32} IPv4 addresses (4.3×10^{9}); 2^{128} IPv6 addresses (3.4×10^{38}).

5. An ARP query is sent in a broadcast frame because the querying host does not know which adapter address corresponds to the IP address in question. For the response, the sending node knows the adapter address to which the response should be sent, so there is no need to send a broadcast frame (which would have to be processed by all the other nodes on the LAN).

Problems

Problem 1.

The rightmost column and bottom row are parity bits.

```
1 0 1 0 | 0
1 0 1 0 | 0
1 0 1 0 | 0
1 0 1 1 | 1
--------+--
0 0 0 1 | 1
```

Problem 2.

If we divide 1011 into 10101010000, with modulo-2 math, we get a remainder of R = 010.

```
        _____10011110
  1011 | 10101010000
         1011
            1101
            1011
             1100
             1011
              1110
              1011
               1010
               1011
                 010
```

Problem 3.

Determine the following values for the subnet that the systems in the Linux Lab are attached to:

The network address of the subnet: 157.201.194.128

The value of the subnet mask: 255.255.255.128

The IP address of the default gateway: 157.201.194.129

The MAC address of aus213l5 (aus213<ell>5): 2C:27:D7:30:D2:A8

The IP address(es) of DNS servers for the subnet: 10.9.160.115 or may be 10.9.160.116

Problem 4.

(Systems in AUS 221 are on 10.22.155.0)

The network address of the subnet: 10.22.155.0

The value of the subnet mask: 255.255.255.0

The IP address of the default gateway: 10.22.155.1

The address of the DHCP server for the subnet: 10.9.160.115 or may be 10.9.160.116 (might be 10.9.160.116)

The IP address(es) of DNS server for the subnet: 10.9.160.115 or may be 10.9.160.116 (might be 10.9.160.116)