Spring 2024, CS 3611: Computer Networks

Homework 6

Solution to problem 1

1 1 1 0 1

0 1 1 0 0

1 0 0 1 0

0 0 1 0 1

0 0 1 1 0

Solution to problem 2

If we divide 10011 into 0101101010 0000, we get 0101010101, with a remainder of R=1111. Note that, G=10011 is CRC-4-ITU standard.

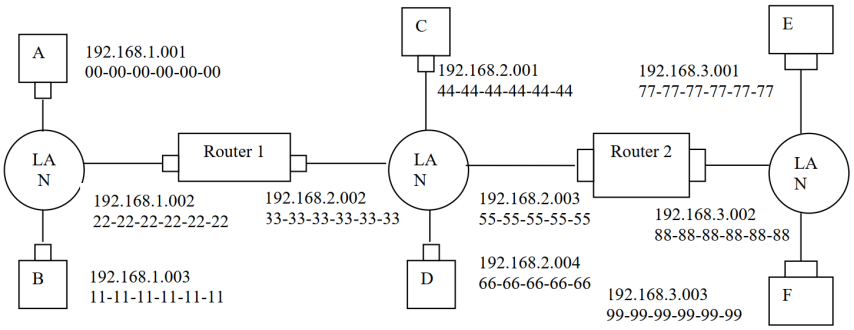
Solution to problem 3

1. we get 1011010111, with a remainder of R=1001.
2. we get 1011011100, with a remainder of R=0100.
3. we get 1000110000, with a remainder of R=0000.

Solution to problem 4

part 1,2

See figure below.



part 3

a) Forwarding table in E determines that the datagram should be routed to interface 192.168.3.002.

b) The adapter in E creates and Ethernet packet with Ethernet destination address 88-88-88-88-88-88.

c) Router 2 receives the packet and extracts the datagram. The forwarding table in this router indicates that the datagram is to be routed to 198.162.2.002.

d) Router 2 then sends the Ethernet packet with the destination address of 33-33-33-33-33-33 and source address of 55-55-55-55-55-55 via its interface with IP address of 198.162.2.003.

e) The process continues until the packet has reached Host B.

part 4

ARP in E must now determine the MAC address of 198.162.3.002. Host E sends out an ARP query packet within a broadcast Ethernet frame. Router 2 receives the query packet and sends to Host E an ARP response packet. This ARP response packet is carried by an Ethernet frame with Ethernet destination address 77-77-77-77-77-77.

Solution to problem 5

At $t = 0$ A transmits. At $t = 576$, A would finish transmitting. In the worst case, B begins transmitting at time $t = 319$, which is the time right before the first bit of A's frame arrives at B. At time $t = 319 + 320 = 639$ B 's first bit arrives at A . Because $639 > 576$, A finishes transmitting before it detects that B has transmitted. So A incorrectly thinks that its frame was successfully transmitted without a collision.

Solution to problem 6

Action	**Switch Table State**	**Link(s) packet is forwarded to**	**Explanation**
B sends a frame to E	Switch learns interface corresponding to MAC address of B	A, C, D, E, and F	Since switch table is empty, so switch does not know the interface corresponding to MAC address of E
E replies with a frame to B	Switch learns interface corresponding to MAC address of E	B	Since switch already knows interface corresponding to MAC address of B
A sends a frame to B	Switch learns the interface corresponding to MAC address of A	B	Since switch already knows the interface corresponding to MAC address of B
B replies with a frame to A	Switch table state remains the same as before	A	Since switch already knows the interface corresponding to MAC address of A