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CS455

HW3

Chap 6

P5. Remainder R = 100, explanation: Find CRC bit by finding the number of bits in R which is G-1 = 4. Then we append the D with R that becomes 1010101010+0000 = 1010101010000. Then find the remainder by (D+R)G thus, you got 1011011100 remainder 100.

P18. Minimum frame size of A completing transmission= 512+64= 576 bit times. Since B starts transmitting before node A finish, and due to propagation delay, B starts at t = 324 bit times. Thus the total time B takes to be detected by A is going to be 324 plus the propagation delay of 325 which means t = 649. In conclusion, the answer is yes in the worst-case scenario that A completes its transmission before it reads B.

P19. At t=0, A and B start the transmission and at t=245 it detects collision. Both stops and gives a jam signal for 48 bit times, thus jam signals ends at t=245+48=293 bit times. B then must wait 512 bit times from random value, thus b starts after 293+512=805 bit times and then it needs to sense 96 bit times thus node b begins transmission at 805+96=901 bit times. Before A is transmitting, A needs to sense 96 bit times, and since the channel is busy, A has to wait until 538, thus A begin transmission at t=538+96=634 bit times. And add prop delay so A reaches B at 634+245= 879 bit times is the time A reach B. B does not run before 901 since it must wait, thus A and B does not collide.

P26.

i. Switch table learns the MAC address of B and sends the frame to A,C,D,E,F because the table is still empty and does not know E yet.
ii. Switch table learns the MAC address of E and send it straight to B since it already knows which one is B.
iii. Switch table learns the MAC address of A and send it straight to B since it already knows which one is B.
iv. Switch sends the reply without adding anything to the table because it already knows both A and B.

P28. EE =111.111.1.1, 111.111.1.2, 111.111.1.3. CS = 111.111.2.1, 111.111.2.2, 111.111.2.3. Example: EE department with IP 111.111.1.1, call it host A, tries to send IP diagram to CS dep with IP 111.111.2.1, we'll call it host B. Host A will encapsulate IP data with destination MAC into a frame. It will send it to the MAC address of router interface with port 1. Then after the router receives the frame, it will pass it to the IP layer which decide the subnet to which IP data should be forwarded to. In this case it will be 111.111.2/24. Then the router will encapsulate the IP data into a frame and send it to port 1 with 802.1q with the VLAN1. Then the switch gets the frame from port 1, then forward the frame to host B in the CS dep. Lastly, host B removes the 802.1q tag when it gets the frame.

Chap7

P6. For example, there is a station transmitting, halfway through the first frame there is another station trying to transmit. The second station will check if the channel is busy and generate a random value. The station transmitting will do the next frame while the second station will wait. If second station does not wait, there will be collision which means both transmissions will abort. Second station only needs to wait until first station reach step 2. Then they both share the channel evenly without crashing.

P7. Transmission rate = 11 Mbps, size = 1000 bytes, 802.11 frame without data = 32 bytes = 256 bits. Total time required to transmit frame and receive acknowledgement = DIFS + time to transmit RTS control frame(Trts) + SIFS + time to transmit CTS(Tcts) +SIFS + time to transmit data frame(Ttns)+ SIFS+ time to receive ack(Tack) + SIFS = DIFS + Trts+Tcts+Ttns+Tack + 3*SIFS. Now get each time, Tack = Trts = Tcts = 802.11 frame without data/ transmission rate = 256 bits/11Mbps = 23musec. Ttns = (8*(size+802.11 frame without data))/transmission rate = 751 musec. Then we can count everything thus getting the total time = DIFS + (3*23musec) +751 musec + 3*SIFS = DIFS + 3*SIFS + 820 musec.