COSC 4377 – Networking - Kevin B Long

# interlocking-uh-m-186.eps

Homework #4

Summer 2023

100 pts possible

Name:      ID #:

1. Here’s a modified version of the exercise located <https://gaia.cs.umass.edu/kurose_ross/interactive/collisions.php>.

You can use that simulator to gain some experience and then answer the questions below. Select the CSMA-CD protocol.

Assume you have 6 messages for transmission at different multiple access nodes at times t = < > and each transmission requires exactly one time unit. Propagation delay is 0.4 time units, so the rules in the simulator apply.

Calculate two start times:

Let A = ((ID mod 10) \* 0.1 + 0.7). What is that value?

Let B = 2.3 - A. What is that value?

Your other start times are: 0.2, 0.65, 1.9, and 2.4

Insert A and B into the list chronologically, and then write out the string as you would in the simulator: state the times if transmitted, and a “s” if skipped. Separate everything with commas. Practice with the link above to see how to format your answer.

1. Open the 802.11 CSMA/CA WITHOUT Hidden Terminals animation at<https://media.pearsoncmg.com/ph/esm/ecs_kurose_compnetwork_8/cw/content/interactiveanimations/csma-ca-without-hidden/index.html>
2. Run the simulator. Find an example proving that station 2 can hear station 1. Note that this is different than when Station 2 detects the network is busy. That is a superset of this example. Copy and paste the image here, and mark where in Station 2’s trace you see the proof. Please include a window to the side in your screen capture that shows you are logged in.

< insert your image here>

1. Find an example proving that a station will employ random backoff / countdown when no other station has packets to send.

< insert your image here>

1. Find an example of two or more stations transmitting at the same time, causing a collision.

< insert your image here>

1. True or False. It is possible for two stations to be within range of each other but the third to be in range of neither of them?
2. True or False. It is posisble for station 1 to be within range of station 2, and for station 2 to be within range of a station 3, but for the 1st and 3rd to not be within range of each other.
3. True or False: wireless ensures that a station with say, 100 packets to send and another with only one will work fairly, guaranteeing that the one will never have to wait for the 100 to finish first.
4. True or False: It is theoretically possible for two stations to continue colliding sending CTS signals, rolling the same random numbers, backing off the same amount each time, and colliding forever, never getting back an RTS.
5. Open the 802.11 CSMA/CA WITH Hidden Terminals animation at <https://media.pearsoncmg.com/ph/esm/ecs_kurose_compnetwork_8/cw/content/interactiveanimations/csma-ca-with-hidden/index.html>
6. Run the simulator. Find an example proving that Station 2 cannot hear station 1.

< insert your image here>

1. Find an example showing that a station will still employ random backoff / countdown when no other station has packets to send.

< insert your image here>

1. Find an example showing that a station can send an RTS, and at the same time the AP is sending a CTS, another station transmits.

< insert your image here>

1. True or False. CTS and RTS signals are not only helpful at reducing collisions, but are requried for the network to function at all.
2. True or False. It’s possible in both the with and without hidden terminals simulators to have all three stations sending simultaneously.
3. True or False. It’s possible for a station to be withing range of another at first, but then to not be within range of it later.
4. True or False. A station can show busy when some stations send RTSs but not for others.
5. True or False. Wireless users may not hear each other collide, but at least the access point hears collisions and knows who the offenders are.