

ECE435: Network Engineering – Homework 10

Due: Tuesday 5 December 2017, 12:30pm

For this homework short answers will suffice.

To submit, create a document with your answers (text, pdf, libreoffice, MS Office if you must) and e-mail them to vincent.weaver@maine.edu by the homework deadline. Title your e-mail “ECE435 Homework 10” and be sure your name is included in the document.

1. LANs / Switches

- (a) With a self-learning bridge/switch the switch learns the port/MAC mapping by looking at the SOURCE field in incoming Ethernet frames. How does it ensure the frame gets to the right destination if the DESTINATION MAC address is one it hasn't seen before?
- (b) List one reason why you might separate your LAN into separate networks, rather than having one big LAN.

2. Wireless

- (a) If you run `iwconfig` on an Raspberry Pi3 it lists the TX-power available on the wlan0 interface as `Tx-Power=1496 dBm`. Is this a believable value? Why or why not?
- (b) What is the main difference between the 802.11b DCF and PCF coordination functions?

3. Physical Layer

- (a) You have a network connection where the signal to noise (S/N) ratio is 500. What is this equal to in dB? (HINT: $dB = 10 \log \frac{S}{N}$)
- (b) You have a connection with 100MHz of bandwidth and 14dB S/N ratio. What's your maximum transmission speed predicted by the Shannon theorem? (HINT: $bps = H \log_2(1 + \frac{S}{N})$, where H is bandwidth)
- (c) Name one benefit fiber optics have over copper wire.
- (d) What is one benefit satellite connections have over fiber?
- (e) What is one benefit fiber connections have over satellite?
- (f) For your final project you decide to build a transmitter that transmits a 100W signal at 4.3GHz. Can you? Who is likely to get upset about this?