

ECE435: Embedded Systems – Homework 7
Ethernet Cables

Due: In class Wednesday, 2 November 2016, 3pm

This will take place during normal class time, but in Barrows 292 (the former Power Lab).

Hopefully a TA will be there and let you in.

In this activity, you will create an Ethernet cable and test it by running the `iperf` bandwidth tester.

1. Make a cat5 cable. Please work in groups of two if possible as there aren't enough cables for each person to do their own. It would be great if people who have done this before can give advice.
 - (a) Strip about an inch of outer insulation off the cat5 cable. Use the wire stripper (the crimpers have them too). There is no need to strip the internal twisted pair wires. *PLEASE* do not cut yourself on the blades.
 - (b) Untwist the twisted pairs
 - (c) Group them together in the right pattern: White-Orange, Orange, White-Green, Blue, White-Blue, Green, White-Brown, Brown.
(You can also find a known-good cable and make sure your colors match that).
 - (d) Trim the wires so there's about 1/2 inch sticking out from the insulation
 - (e) Carefully push the wires into the RJ-45 connector. They should separate nicely. Be sure the colors are in the right order, and that the wires reach the whole way to the front.
 - (f) If the wires look good, carefully put the connector in the crimper and squeeze the handle until crimped.
 - (g) There are various references online, here's one that seems reasonable:
<http://www.groundcontrol.com/galileo/ch5-ethernet.htm>
2. Use the cable you created to connect to the Raspberry Pi server that's on the desk. It's attached to the gigabit switch.
3. The first group that's ready can set things up.
 - (a) First plug in/power up the gigabit switch (it's really loud, sorry about that).
 - (b) The raspberry pi server should already be running.
 - (c) You will need an ethernet capable machine (laptop, raspberry pi, etc). If you need an HDMI display/USB keyboard you can *carefully* disconnect the one hooked to the Pi server.
 - (d) Use your ethernet cable to connect to the gigabit switch.
 - (e) In theory I have DHCP running on the Pi server and it should automatically give you an IP in the 192.168.8.0 range. This is untested. If that doesn't work, then you'll need to manually configure your system with a proper IP address (pick one in the 192.168.0.0/24 network), netmask 255.255.255.0, gateway 192.168.0.1
 - (f) ssh into the pi which is 192.168.0.1. You can use the ece435/ece435 account
 - (g) Start iperf in server mode
`iperf -s`

4. Each group should test their cable. You will need to have a machine with iperf installed (on a Debian system you can just do `apt-get install iperf`) You'll have to do this before hooking up to the gigabit switch, it is a standalone network without external connectivity.
5. To test your bandwidth once connected, run
`iperf -c 192.168.0.1`
6. Report the speed you get on the TA's checkoff sheet.
7. That's all for this activity.