CONNECTING YOUR RPI TO UNH-SECURE.

These steps should get your Raspberry Pi connected to the UNH secure network. To get started, you do need a monitor, keyboard and mouse connected to your RPi. If all goes well, after this initial setup you can use your RPi in "headless" mode, i.e. without a monitor, keyboard or mouse.

INITIAL STEPS:

1. Boot the Raspberry pi, and log in as "pi"
2. You will get a command prompt. To get to graphical mode, type: "startx"
3. Wait a little. You get to a pretty picture, and a "Welcome to Raspberry Pi" screen. Follow the directions on this screen carefully:
    a. "Next", then make sure the Language is correct, and set timezone to "New York". Clock "Next".
    b. Here you can change the password. I recommend you don't, just click "Next".
    c. The Set Up Screen can be skipped, just click "Next".
    d. At "Select Wifi Network" select "UNH-Public" and click "Next".
    e. At "Update Software", click "Skip" to save time.
    f. Click "Done"
4. Once you see the screen, click on the top right blue "Wifi" symbol, if should say "UNH-Public". We want to do some steps so that this changes to "UNH-Secure"
    a. If the symbol, which is the 3rd one from the right, is either two red x with grey bars, two blue arrows, or the ball with bars symbol:
    b. If you see the red x symbol, first select "Turn Wifi On", then select "UNH-Public"
    c. The blue icon will blink a few times, and then become solid.
    d. In most cases, you first need register your RPi as a guest on the network. Click on the blue ball icon on the top left of your screen and try to go to any web page outside of UNH. If you can get there, you are all set, but often you will see the UNH network registration page. **Register on the page as a guest!**
5. Follow the Easy steps below.

EASY SETUP USING A SCRIPT.

6. Open a terminal by clicking on the black box icon with the >_ symbol in it.
7. Go to the Phys605 directory: `cd Phys605`
8. Update the directory: `git pull`
9. Go to the UNH_Wifi directory: `cd UNH_Wifi`

10. Execute the update scripts: `./UNH_Secure_setup.sh`
    a. If you are user "pi" then you will not require a password.
    b. When asked, **supply the number of your RPi** (on the sticker) - only the number.
11. The Wifi icon will go to "red" state, and then after a little connect to UNH_Secure.
12. The name of your system on the network will be phys605pi##.aw4.unh.edu (i.e. phys605pi7.aw4.unh.edu). It will take a little for this new name to be registered, so be a little patient.
13. Once your system is configured, you can log into it from your own computer with ssh, using the new network name: `ssh pi@phys605pi##.aw4.unh.edu`
14. Sometimes, when you do the ssh step, it will tell you "connection timed out". In those cases it usually means that the DDNS (dynamic DNS) ip address lookup is not working properly. In those cases, you may need to go back to the monitor on the RPi, get a terminal box, and type the "ifconfig" command. This will give you 3 paragraphs, the 3rd one starts with "wlan0", the second line will start with "inet" and then 4 numbers with dots in between, eg: 10.10.120.133, you can use the number (the ip number) instead of the name: `ssh pi@10.10.120.133`
15. On a Mac or a Windows 10 PC with Bonjour installed properly, you can also connect to the RPi with: `ssh pi@phys605pi##.local`
16. If that *still* does not work, then there is a problem with the UNH network where possibly the two system are not on the same network cell. Try rebooting the RPi, and if it still does not connect, try rebooting your laptop.
    a. If neither works, then the only option is to get the ip address from the RPi using a monitor and keyboard. Connect both, log in and use: `ifconfig | grep inet` , which will give you the IP number you can use to connect.

MANUAL SETUP.

1. Open the web-browser (chromium), by clicking on the blue "world" ball on the left side of the screen.
    a. You will get a page with a certificate error.
    b. Type "cloudpath.unh.edu" in the address bar.
    c. Click the "agree" box and then "next".
    d. Click on "Faculty, Staff & Students".
    e. Use your UNH username and password to log in.
2. Select the (small) "Show all operating systems" at the bottom, and then select "Raspberry Pi"
3. Click on each of the steps: 1, 2, 3 and 4

CONFIGURING YOUR WIFI:

1. You now want to start up a terminal: Click on the black box icon with the >_ symbol in it at the top of your screen.
2. Go into your Downloads directory: `cd Downloads`

3. With the "ls" command, you can see the 4 certificate files you downloaded, "CA-27#####.cer", "CA-47#####.cer", "username@cpuserunhedu.cer" and "username@cpuserunhedu.key".
   Here "username" is replaces with your UNH username.
4. We now need to change the password on the "username@cpuserunhedu.key" file:
   a. openssl rsa -des3 -in username@cpuserunhedu.key -our cpuserunhedu.key
      And supply when prompted first your UNH username password and then the new password. Write down (or remember) this new password, you will need it below.
   b. cp username@cpuserunhedu.cer cpuserunhedu.cer
5. Copy the certificates to the directory: /etc/ssl/certs with the command:
   sudo cp CA-* cpuserunhedu* /etc/ssl/certs
6. Next, some tricky business to patch a bug in the RPi setup:
   a. edit /lib/dhcpcd/dhcpcd-hooks/10-wpa_supplicant with the command:
      sudo nano /lib/dhcpcd/dhcpcd-hooks/10-wpa_supplicant
   b. Navigate your cursor down to the line that reads:
      "wpa_supplicant_driver="${wpa_supplicant_driver:-nl80211,wext}"
      Now edit that line so that it reads instead:
      "wpa_supplicant_driver="${wpa_supplicant_driver:-wext,nl80211}"
      So you just swapped the wornds "nl80211" and "wext".
   c. Save the file with control-o and then exit with control-x
7. Now, a final editing session. You need add the relevant information into the /etc/wpa_supplicant/wpa_supplicant.conf file:
   a. Use the command: sudo nano /etc/wpa_supplicant/wpa_supplicant.conf

   Below what is already there add the following lines:

```
network={
        ssid="UNH-Secure"
        proto=RSN
        key_mgmt=WPA-EAP
        eap=TLS
        identity="<username>@cpuser.unh.edu"
        ca_cert="/etc/ssl/certs/CA-47BEABC922EAE80E78783462A79F45C254FDE68B.cer"
        client_cert="/etc/ssl/certs/cpuserunhedu.cer"
        private_key="/etc/ssl/certs/cpuserunhedu.key"
        private_key_passwd="<password you set before>"
        priority=77
}
```