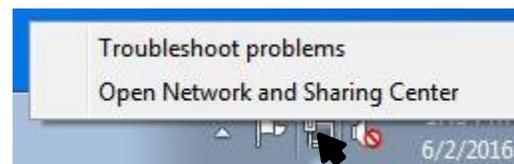


## Setting up to remotely connect to Raspberry Pi from (Windows) laptop for GWB

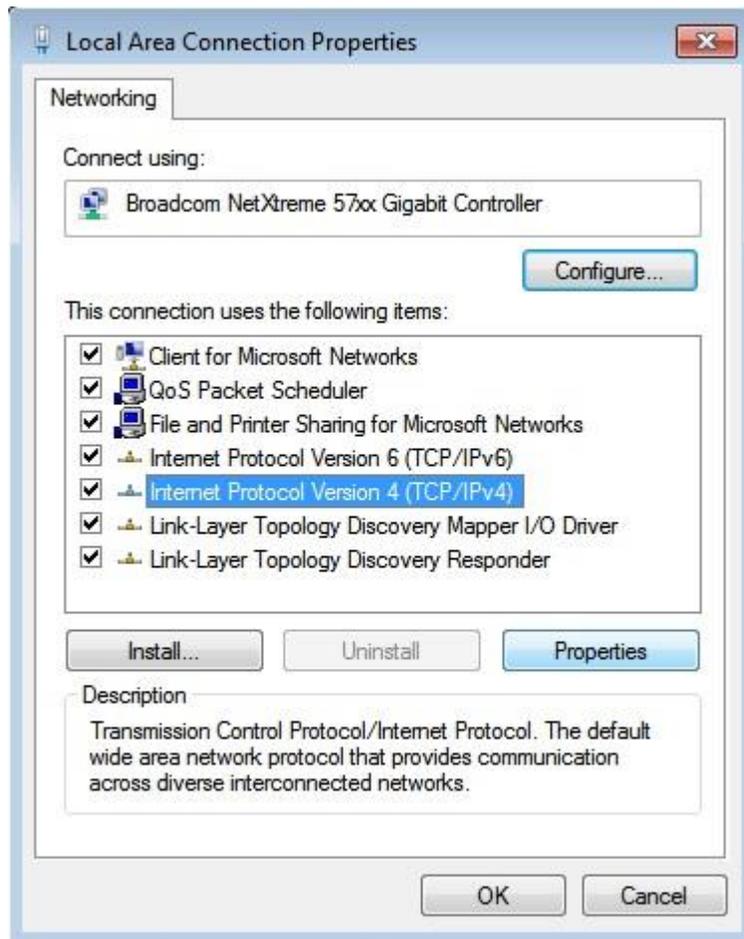
**NOTE 1:** These instructions are primarily meant for Windows computer users. Some instructions and helpful links have been included for Mac and Linux users, but we have not tested all of the steps at those links.

**NOTE 2:** If you are using the image of the Raspberry Pi provided in the Girls Who Build repository, step 2 has already been done for you. This means that if you try to turn on the Raspberry Pi, if it does not have a network cable plugged in to the network cable port that it will not finish the boot process. If you plan to plug in with a monitor and keyboard to the Raspberry Pi rather than remote-connecting using a laptop/desktop and network connection, you need to reverse Step 2 of these instructions.

1. **Set the IP address on the laptop you'll be using to interact with the Pi** – since the laptops' wifi will all be turned off, we'll be setting all of the laptops to 192.168.1.1
  - a. If your computer is a Mac: <http://www.macinstruct.com/node/550>
  - b. If your computer is running Linux: <http://linux-ip.net/html/basic-changing.html>
  - c. If your computer is running Windows:
    - i. Right click on the notification icon for the network in the System Tray and select 'Open Network and Sharing Center'
    - ii. In the left panel of the window that that opens (in Windows 7 and 10, at least) the options will be 'Control Panel Home', 'Change adapter settings,' and 'Change advanced sharing settings' – you want 'Change adapter settings', so click on that.

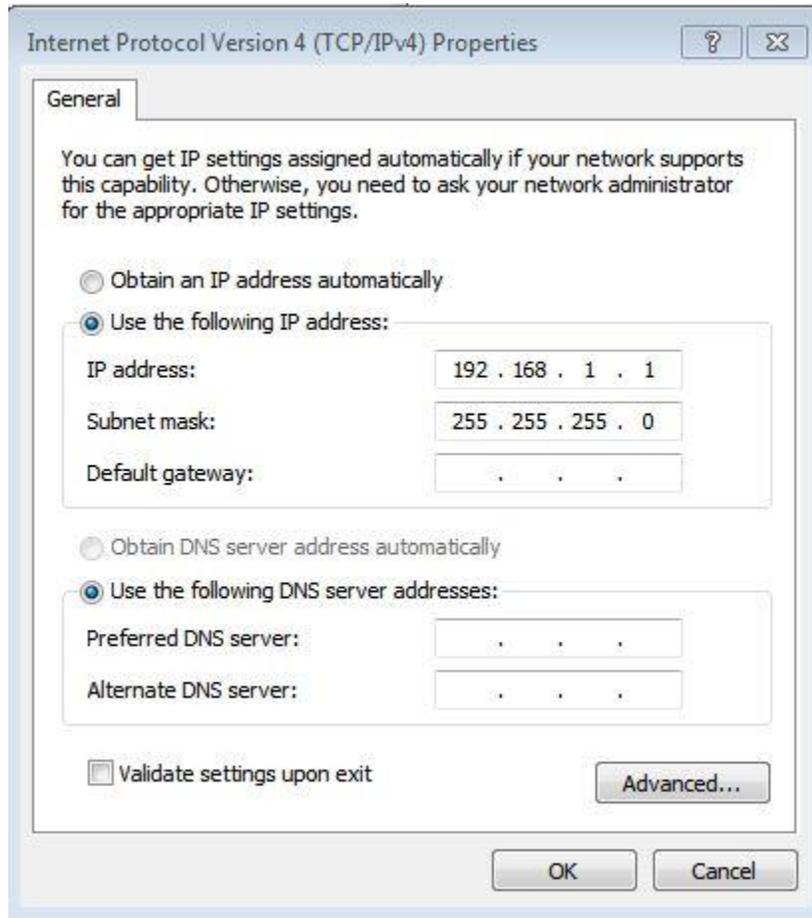


- iii. Right click on 'Wired connection' and select 'Properties' out of the menu that appears. A window like this one will open:



- iv. Select 'Internet Protocol Version 4 (TCP/IPv4)' in the list and click on the Properties button immediately below the list

- v. Select 'Use the following IP address' and assign 192.168.1.(something) – as mentioned above, we thought it safest to use 192.168.1.1 since the computers won't be networked to each other. Make sure the subnet mask is 255.255.255.0



and then click 'OK'

- vi. Your computer's wired IP should now be set properly
- 2. Set up the Raspberry Pi to default to the same IP address every time it turns on**

**SEE NOTE 2 at the beginning of this document.**

- a. If you have a computer that will recognize the volumes on a Raspberry Pi SD card (Mac or Linux):
  - i. Power off the Raspberry Pi.
  - ii. Remove the SD card and plug into the laptop's card reader
  - iii. Open the Boot volume
  - iv. Open cmdline.txt in a text editor. At the end of the first line add a space followed by 'ip=192.168.1.2'. Do not add any carriage returns.
  - v. Save the file.
  - vi. Unmount all volumes from your computer, remove the SD card, and put back into the Raspberry Pi.
- b. If you have a computer that won't do that, change the file through the Raspberry Pi:

- i. If you are doing the GWB camera exercise, you will have a touch screen LCD that you can plug in to the Raspberry Pi. Or you could use some other monitor. You will also need a USB keyboard and will likely want a mouse, even if you're using the touch screen LCD.
  - ii. Connect the monitor, keyboard, and mouse. Turn on the Raspberry Pi.
  - iii. Open the Terminal. (In the OS we were using: Menu > Accessories > Terminal)
  - iv. Type in `sudo nano /boot/cmdline.txt` to edit the `cmdline.txt` file
  - v. At the end of the line add a space and `'ip=192.168.1.2'` – Do not add any carriage returns/new lines.
  - vi. Hit Ctrl-O to save the change
  - vii. Hit enter to save as the same filename
  - viii. Hit Ctrl-X to exit nano
- 3. Connect a standard network cable between the laptop you set the IP address on earlier and the Raspberry Pi. This must be done every time the Raspberry Pi boots, but it does not need to stay plugged in.**
- 4. Connect to the Raspberry Pi from the laptop – you have two options, and may want to play with both. The first time you make a new connection, either using the command line (SSH) or remote desktop, it will ask you if you want to trust the connection. Since you have set up the connection to directly connect to the Raspberry Pi that you set up, this should be an easy “yes.”**
- a. **Option 1: SSH into the Raspberry Pi from the laptop – this means using a command line interface for the connection.**
    - i. If you are using a Mac or Linux Machine:
      1. Open a terminal
      2. Enter `'ssh pi@192.168.1.2'`
      3. Enter the password (`'raspberrypi'`)
      4. Congrats, you're in! Proceed with the exercise.
    - ii. If you are using a Windows Machine:
      1. Install Putty
        - a. Current download link is  
<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>
        - b. Save `putty.exe` to the desktop or somewhere else you will find it easily.
      2. Open Putty
      3. Set up the session (figure on next page)
        - a. Host Name (or IP address) set as `192.168.1.2`
        - b. Leave the Port as it defaults to, or set to 22. I don't know.
        - c. Connection Type – needs to be SSH
        - d. Suggest saving session as `'Camera'` by entering `'Camera'` and clicking `'Save'` in the `'Load, Save, or delete a stored session'` section before the next step
        - e. Click on `'Open'` or double click on `'Camera'` if you chose to save the session that way
        - f. If you save the session, next time you can just double click on the name you saved the session as.
      4. It will ask you for a username. Enter `'pi'` (visual needed)



This is an example of what you should enter in to the window for PuTTY if you are trying to use SSH to connect to the Raspberry Pi.

Note how we are suggesting that you save the session as “Camera” before clicking “Open” the first time.

If you do save the session, the next time you open PuTTY you can simply double click on ‘Camera’ in the list of saved sessions to connect to the Raspberry Pi.

5. It will ask you for a password. Enter ‘raspberrypi’
6. Congratulations, you are logged on!

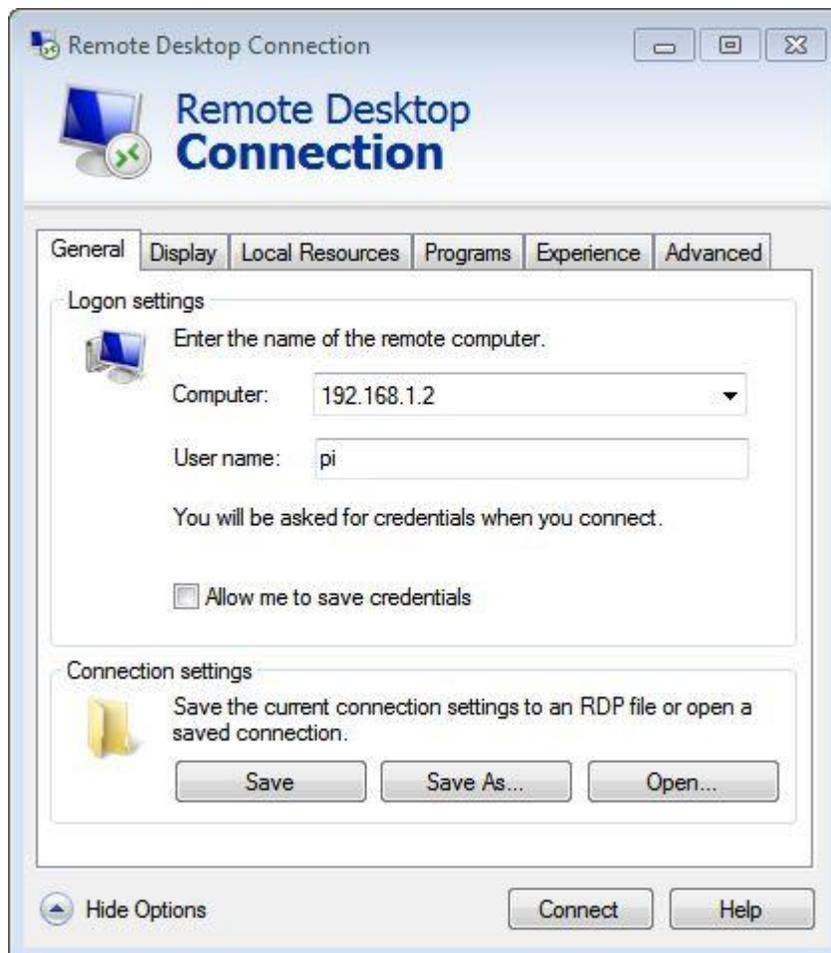
**b. Option 2: Use a Remote Desktop application – benefits: you can use the mouse and file explorer (and any other apps not based on the command line) on the Raspberry Pi.**

- i. If you are using a Mac or Linux Machine:
  1. Google for a solution. Suggestions that were found when we looked were VNC or the Windows Remote Desktop app for Mac. (sorry we are not more helpful)
- ii. If you are using a Windows Machine
  1. If you used the GWS Raspberry Pi image, you can use the Windows Remote Desktop Connection application. If you did not, then look into how to properly set up the Raspberry Pi to support Windows Remote Desktop Connection.

2. On the PC, open Remote Desktop Connection.



3. Enter 192.168.1.2 as the Computer to connect to (as shown above)
4. Optionally, you can save this connection with the username. We recommend it! Select "Show Options" to be shown the following screen:



Then enter 192.168.1.2 as the Computer, 'pi' as the username (as shown) Then click

the “Save As” button. We recommend saving as “Camera.rdp” on the desktop. Then you can double click on the Camera.rdp icon on the Windows desktop to connect to the Raspberry Pi rather than typing in the IP address again for future connections.

5. Whether you completed step 4 or not, either double click on your saved connection or click “Connect” on the Remote Desktop Connection window. If you did not save your session or saved your session without a username, it will ask you for a username. This is ‘pi’. (no quotes) Then it will ask you for a password. This is ‘raspberrypi’ (again, no quotes)
6. Congratulations, you are connected!

**Resource: Girls Who Build Cameras**  
Kristen Railey

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## Resource: Girls Who Build Cameras

Kristen Railey, Bob Schulein, Olivia Glennon, Leslie Watkins, Alex Lorman, Carol Carveth, and Sara James

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