Recipe for a Raspberry Pi (draft one)
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Assistance provided by **Hunter Thompson** and Ms. Lavender
Additional Assistance provided by Aiden Phillips, Aiden Colonno, Michael Wise, and all of Ms. Lavender 2021-2022 PM Class
This would not be possible without the tireless efforts of my peers working on the Pis as well!

For addition questions reach out to me at +1 (757)309-1682 or mikekidthump@gmail.com
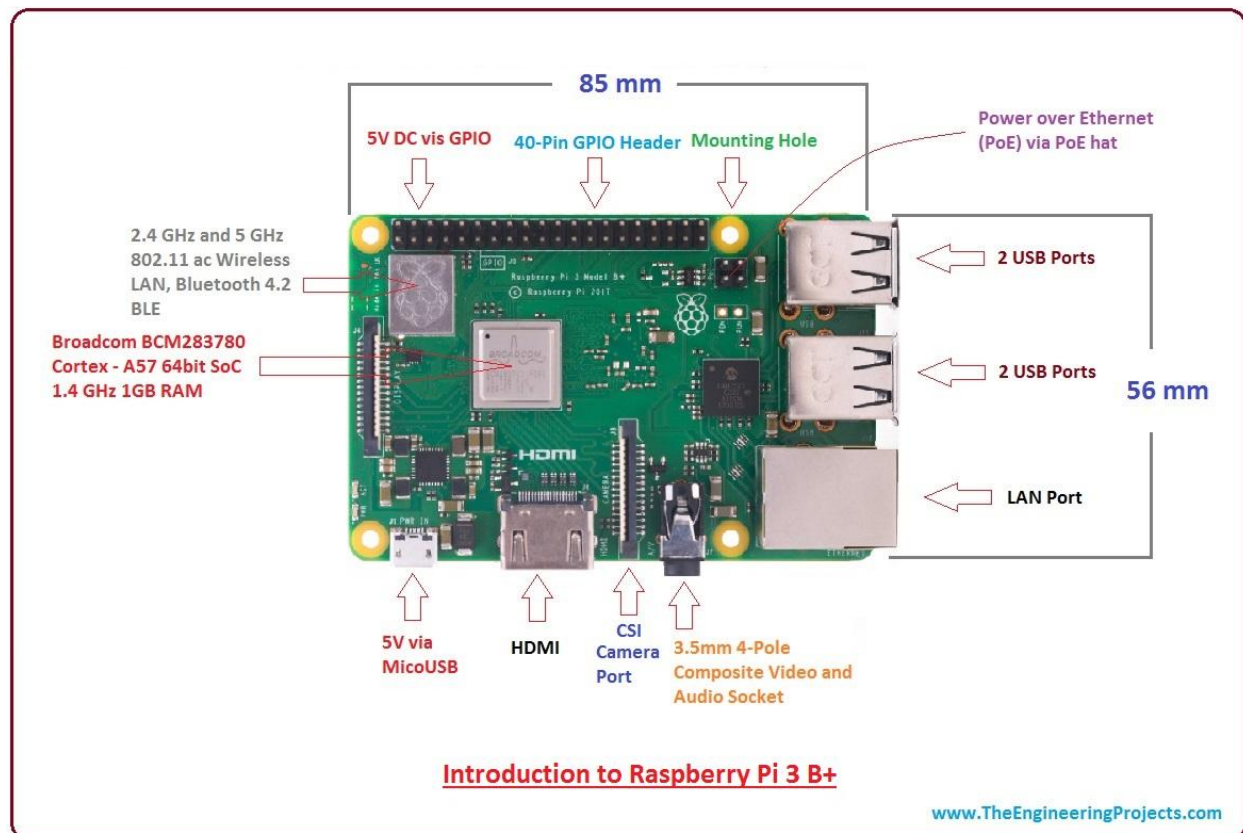
Ingredients
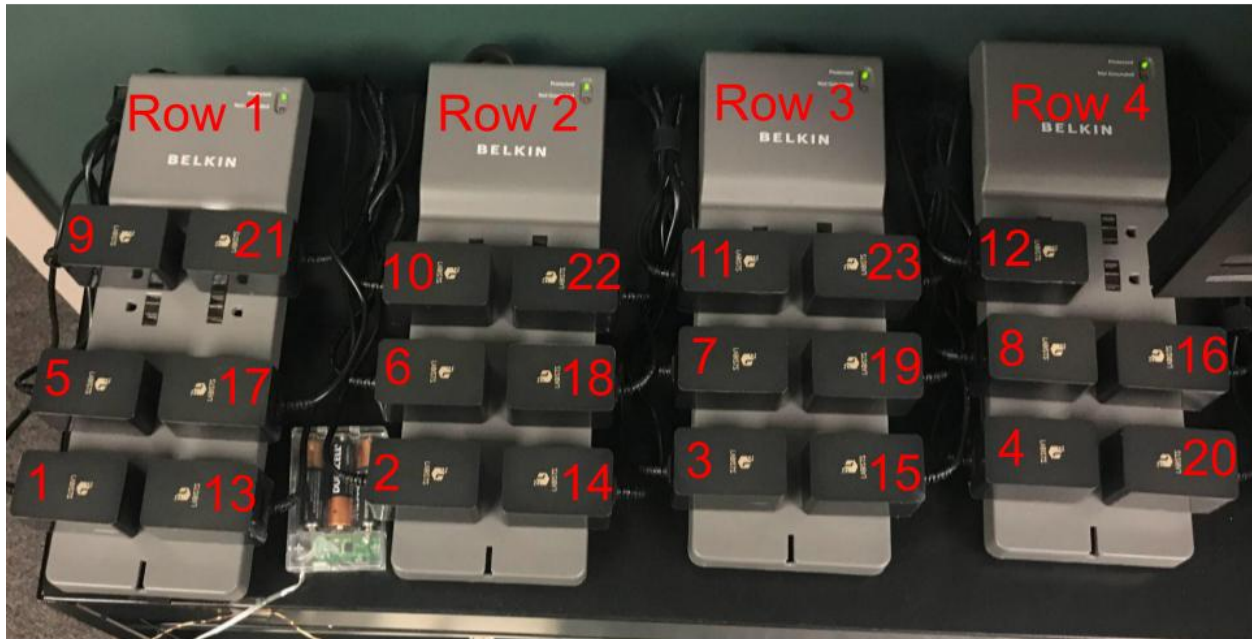A Raspberry Pi 3 B+
One classroom of rowdy students
Your PMShare folder
Spare Network Adapters
A lot of patience (:

Layout of the Kitchen:

Introduction to Raspberry Pi 3 B+

www.TheEngineeringProjects.com

I

Each surge protector is related to a row of Pis. Best practice is to keep the surge protector on and manually turn off the Pis. You can check the uptime of a Pi you're worried about by running "*uptime*" in the terminal. You'll know a Pi is on when you can see the red light through the slit, or you can take the case off.

Username: pi
Password: raspberry or Password2021

Artemis Password: Lavtastic252

Each Pi has a static ip address related to its name:
Pi #1: 192.168.0.201
Pi #2: 192.168.0.202
etc...
Pi#15: 192.168.0.215

Use Nmap and log into the Archer A7 while on "Artemis" to get a full idea of the network. The url to get into Archer is 192.168.0.1 (or whatever the default gateway is set to)

Use your own judgement for adding new Pis to the power surges.

Preparing your ingredients:

In case you want to install new Pis or need to image a Pi (and these things break very easily, so don't worry if one breaks) here's how to set them up.

Ingredients Used (everything is in the *Pie* folder in your PMShare):
Etcher/Pi Imager
Raspbian Image (2018 image or whatever image you prefer, doesn't even have to be Raspbian (though the steps will be different if you don't use a Raspbian image (also make sure the image is the ARMS version as those are designed to be run on small computers like the Pis)))
SD Card
SD to USB convertor
VNCviewer/PuTTY (if you want to run it headless)
A monitor and keyboard
Securly Certificate
mikecert.sh

Baking a fresh Pi case:

If you're setting up a new Pi the instructions fail to tell you which heatsink goes to what. We ended up putting the larger heatsink on the Broadcom BCM… and the smaller one on the ethernet controller (the little blackbox)
Also put on the bottom part of the case first, otherwise it will not fit.
Don't worry about using the Pi without a case for testing purposes, it'll live.

Cooking:

It may be helpful to make yourself root: "*sudo su*", these steps assume otherwise

1. Take the corrupted SD card you wanna reimage, or a fresh SD card, and plug it into the SD to USB converter, then plug that into your computer. Use either Etcher or Pi Imager (I've had more luck with the Pi Imager, but they are both there in case one does not work, these things are very finicky) select the SD Card and select your image, then click Flash!
2. Plug the SD card into the Pi and power the Pi on. Connect it to at least a monitor and keyboard for now.

The default password for the Pis is
username: pi
password: raspberry

3. In the gui go to the top right and select "Preferences" from the drop down menu. Select "Raspberry Pi Configuration". Then turn on SSH (PuTTY) or VNC (VNCviewer) (I've had more luck with VNCviewer but they are both there in case one does not work) If VNCserver does not download automatically (it'd be an icon in the top right tray) go to the terminal (ctrl + t) and type in "*sudo apt-get install VNCserver*" (this will not work until you have the securly certificate installed)

4. Open up the terminal if it's not open yet. (ctrl +t) Type in "*sudo passwd,*" then type in your current password and the new password you want. We have been changing them to Password2021, just make sure to write down whatever you do.
5. Still in the terminal type in "*CD /*" - "*CD boot*" - "*sudo nano config.txt*" Then in config.txt scroll down to "hdmi_force_hotplug = 0" change this value to 1, "hdmi_force_hotplug = 1" This is necessary for running the Pis headless as without it the Pis will power off when not connected to HDMI.
6. Connect the Pi to Artemis (password: Lavtastic252)
7. In the terminal type in "*ifconfig -a*" Look for your MAC address and write it down.
8. On your own computer plug in the network adapter and connect to Artemis.
9. Log into Archer A7 (type in 192.168.0.1 in the url box in a web browser, if that url doesn't work the url should be whatever the default gateway is) (password: Lavtastic252) Go to "*Advanced*" - "*DHCP Server*" Enter a new static address using the MAC Address you got and the naming scheme we talked about. (or whatever you want)
10. Back onto the Pi: In the terminal type in "sudo *dhclient*" (this will create the necessary files) then type in "*sudo dhclient -r*" (this will release the current lease) Some errors may pop up while doing this, you can ignore them. You should see the WiFi symbol in the top right corner blinking. Give it a minute then type in "*ifconfig -a*" and ensure you have the right ip address. If not, refer to *Troubleshooting Solutions* which can be found further into the packet.
11. At this point it may be worthwhile to reset the Pi.

You've been at this for awhile, don't be afraid to take a break! Cooking is an act of love and it's best not to rush.

12. Click on the VNCServer icon in the top right tray. Ensure the ip address it gives you to connect to the Pi is the same as the ip address you assigned it.
13. On your computer: Download VNCViewer or PuTTY, enter in the ip address to connect to the Pi. If this doesn't work refer to *Troubleshooting Solutions.*
14. At this point you have two options for getting the Securly Certificate and my script onto the Pi.
    ● Use the file transfer option inside the VNCserver menu on the Pi
    ● Throw the certificate and script onto a flash drive and plug the sucker in
15. Once you have both on your Pi's desktop go to the terminal and type in "*CD Desktop*" (or whatever you need to do to get to the desktop) then "*sudo chmod 777 mikecert.sh*" (this will change the permissions on the script to allow you to run it, there are far better and far safer ways to type in that command, but this is what's worked for me) and finally "*sudo ./mikecert.sh*". From there just follow the instructions the script tells you. If it's not working, nano into the script and put in all the commands manually.

Congrats! At this point you should be done. The Pi is set up for anything you want it to do.

16. As a final step I recommend installing samba, "*sudo apt-get install samba*" This will allow you to access and create shared network folders not only between the Pis but also windows. These make getting things on, off, and between the Pis much easier.

Troubleshooting Solutions

I plan to dedicate this section to going over all the troubleshooting problems we've encountered so far working on the Pis and the various ways we went about solving them.