Make the LoL Shield

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Being that there are a number of resources online about how to solder. I am not going to go over that here. This is a fairly straight forward kit that should be a great first time project. If you haven't soldered before I suggest you check out this page for a ton of examples and links. It's actually how I learned to solder, by reading, watching, and then practicing.

Document Map:

What you will *need* to build this kit:

- Soldering Iron (a cheap one will work, but a temperature controlled iron will improve your soldering)
- Flush Cutters
- Solder
- An Arduino (covered in the programming portion)

Things you *really should have*, but do not absolutely need:

- Helping hands
- De-soldering braid
- Multimeter

I suggest you check out this list of recommended items for a good soldering setup. I've also written up a blog post for workshop setups, but this can easily apply to someone on a budget.

Some tips before we start:

- Lay out everything beforehand, and go through the directions at least once before you start.
- Keep your iron tip clean. I Highly recommend a brass tip cleaner.
- Use 60/40 flux core electrical solder, unless you have a good iron and know what you are doing.
- The joints should look like a "Hershey's Kiss", completely covering the pad.
- Do not over-heat things. It will only take 1-3 seconds at the most to solder a joint.
- Don't abuse your tools. Use your tools for their intended purpose, and keep them maintained. This will dramatically improve the quality of anything you do.
- Double check your work.
- If you get stuck, don't be afraid to ask questions.
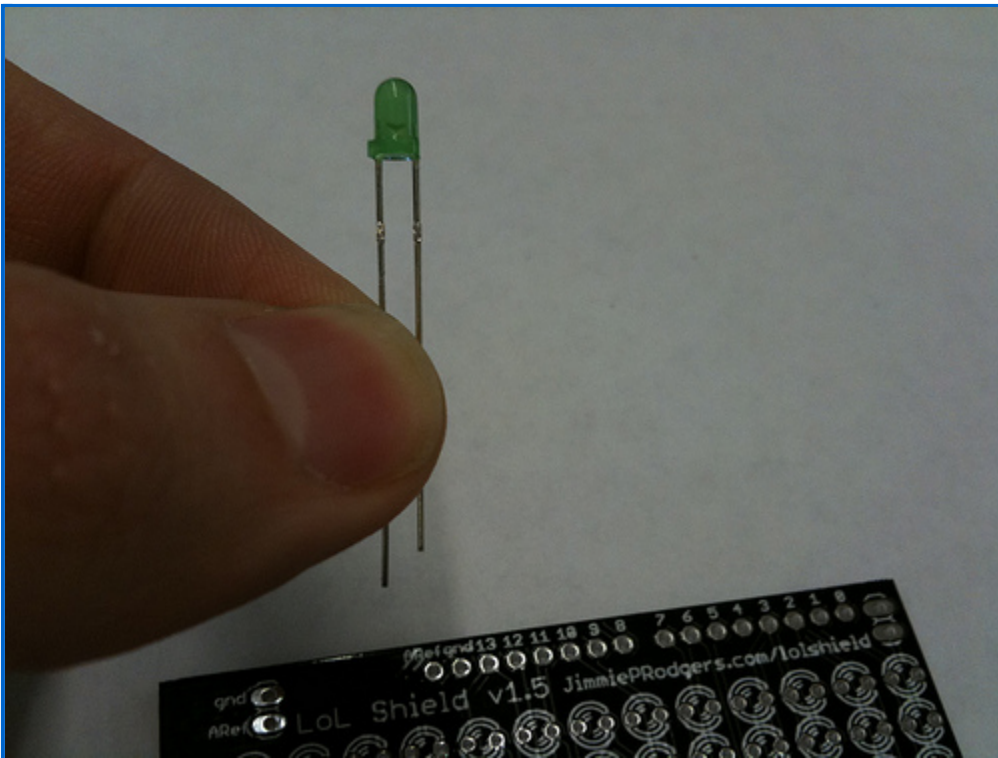
Step 1: The Parts

Check your kit and make sure you have all the parts you need. Click on the images for details:
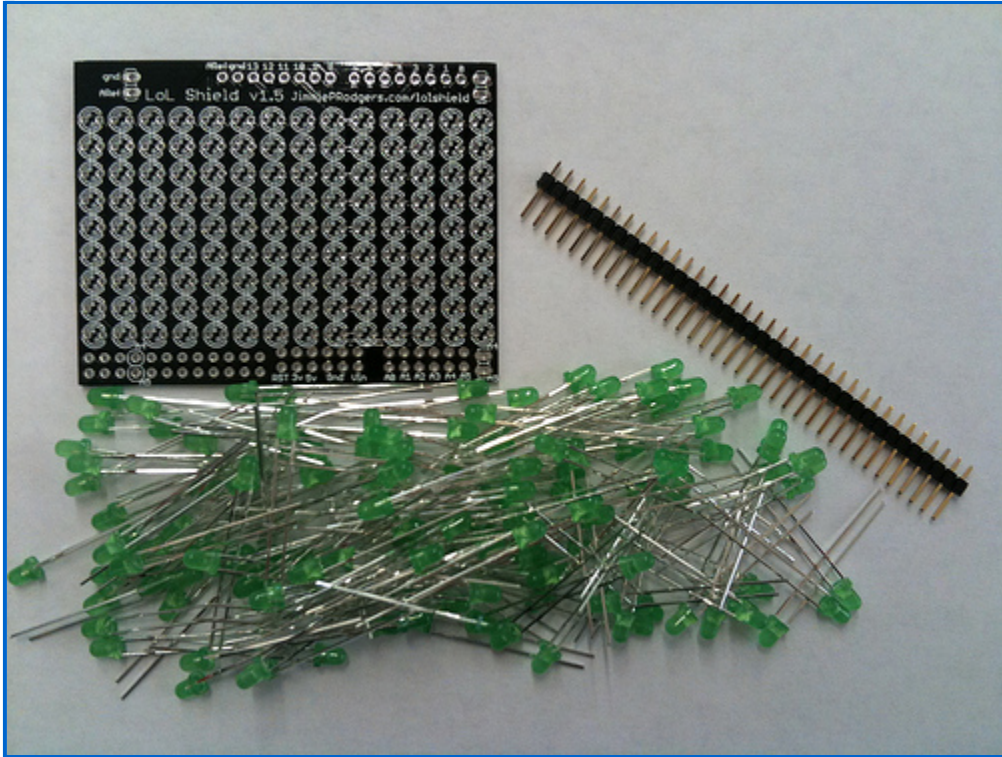
Your kit should contain:

- 1 LoL Shield v1.5 PCB
- 133 Red or Green LEDs
- 1 36-pin header

Step2: Soldering the LEDs

Since the LEDs are diodes (light emitting diodes), they go in just one direction. The purpose of a diode is to help direct the flow of electrons so that they go where you want them. The LEDs happen to emit light while doing this. That principal is also what allows us to light up so many LEDs with so few pins of the Arduino. There are actually two markers for the LEDs that allow us to tell their polarity. The first is that the long lead is positive, and the short lead is negative. You can also see above that a small notch is taken out of the LED case, that marks the negative side as well.
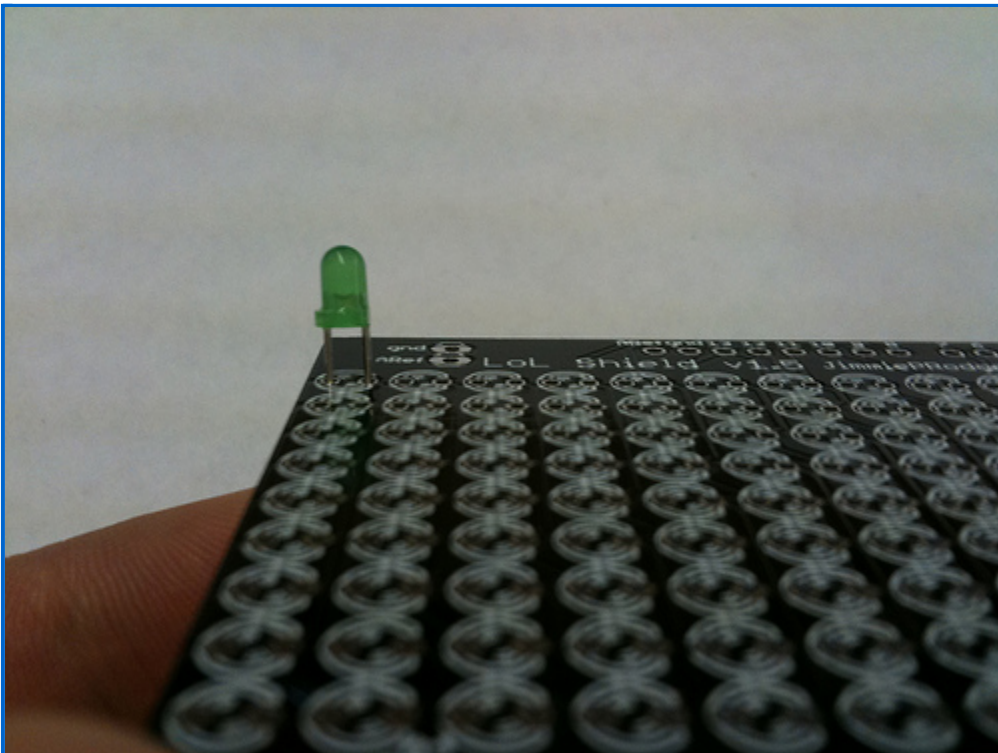
If you look at the silkscreen (the white markings) on the PCB (printed circuit board), you will find that a little notch has

been taken out of the LED drawing as well. You are going to be placing all of the LEDs in the same way, matching both the notch and short lead to the marked spot on the PCB. Essentially, with the text being upright and readable, you will place the long lead on the left side, and the short lead on the right side.
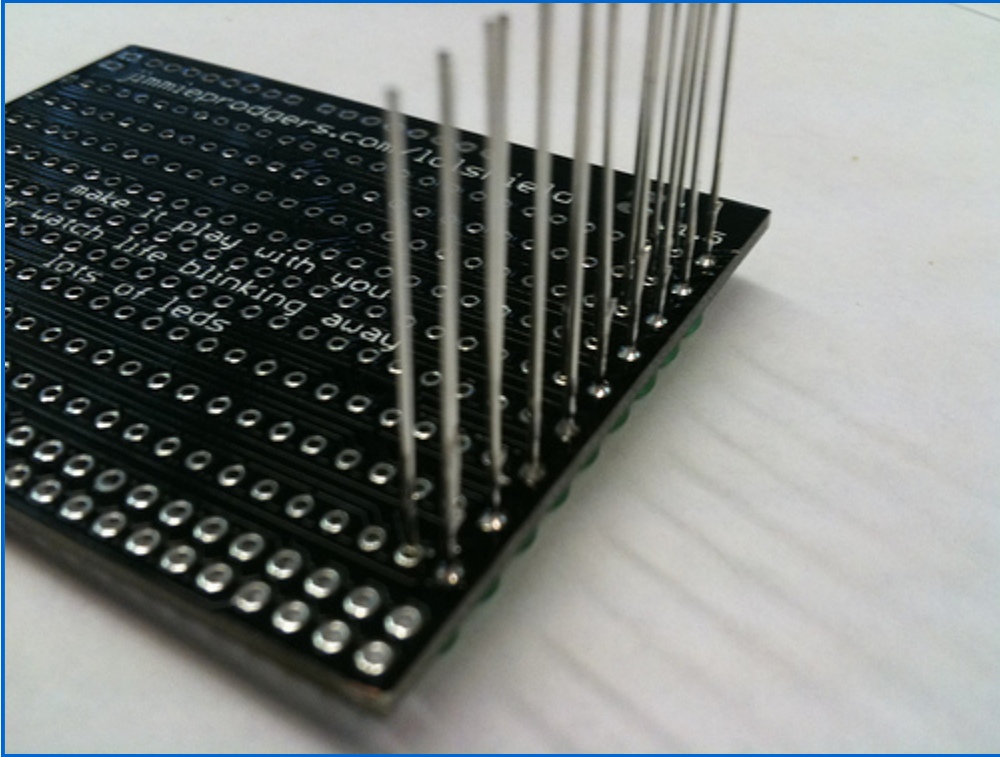

It's much quicker if you do these in columns. Place them all in, and gently pinch with your fingers to flip the board over. You will then solder just one side of the LEDs before you straighten them. Check out this video for more information:

LoL Shield – LED Straightening
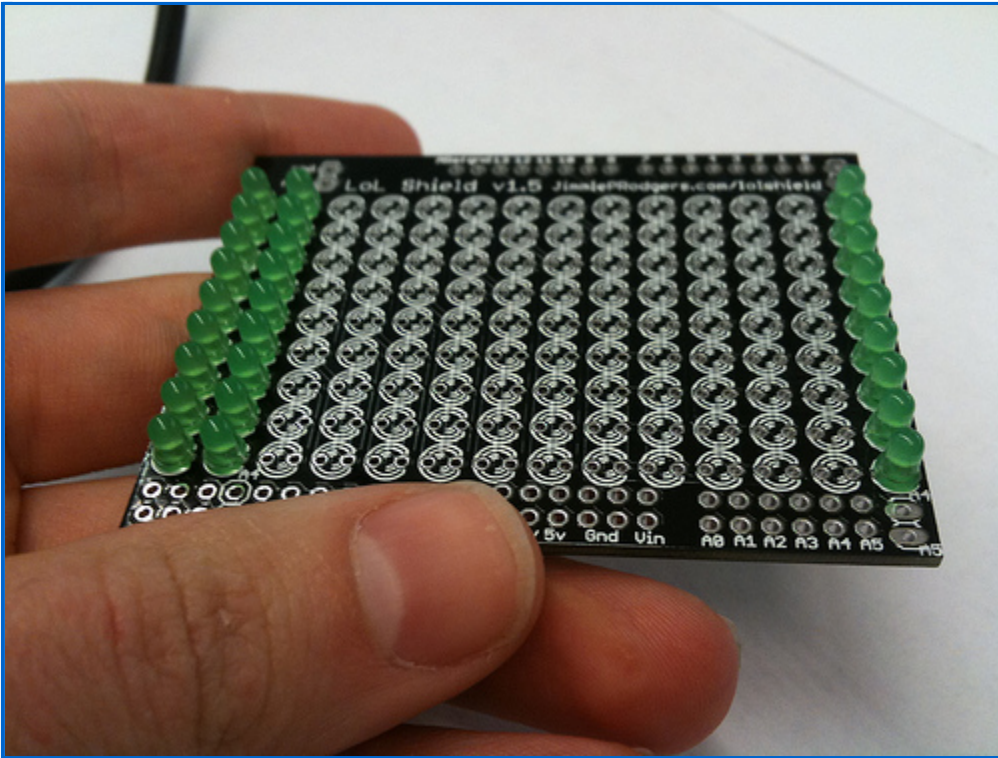
To straighten the LEDs you solder one lead of each LED so that it sticks to the PCB. Then you gently place your finger on the LED and press on it as you re-heat the soldered joint. By pressing it flat against the PCB, the LED will automatically straighten up. Keep filling in each column and work your way down in this way. Some people also find it helpful to place a column on the opposite side to stabilize the PCB. I tend to work my way in about halfway, and then start filling in the opposite direction. With the amount of time you are going to spend, you'll find a method that works best for you. Take your time, and rest if you get tired.
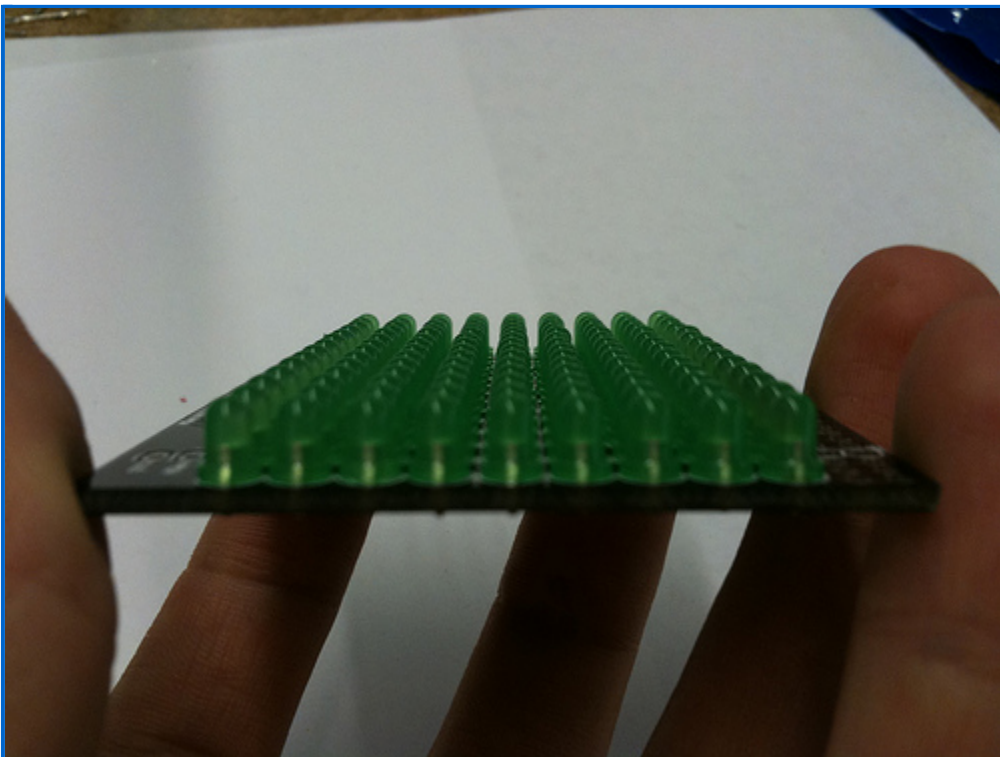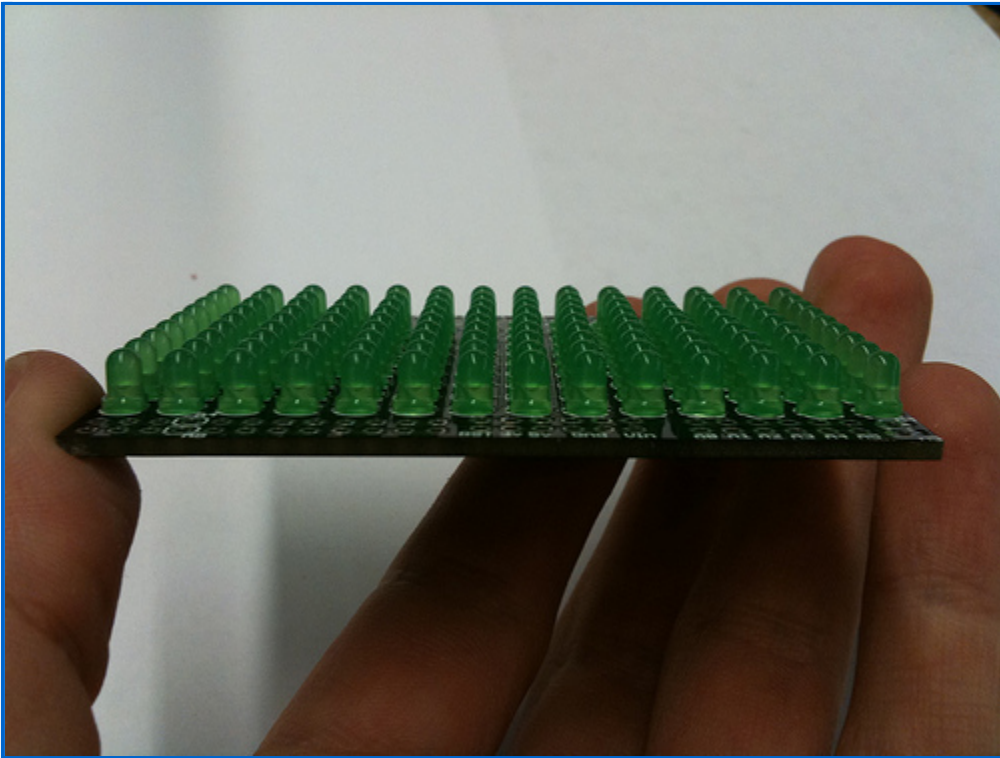
By looking down the rows and columns, you can see which LEDs are straight or crooked. This is much easier to fix when only one lead is soldered in, and it's easiest to find them along the way. Straightening them all at the end is quite a bit more difficult.
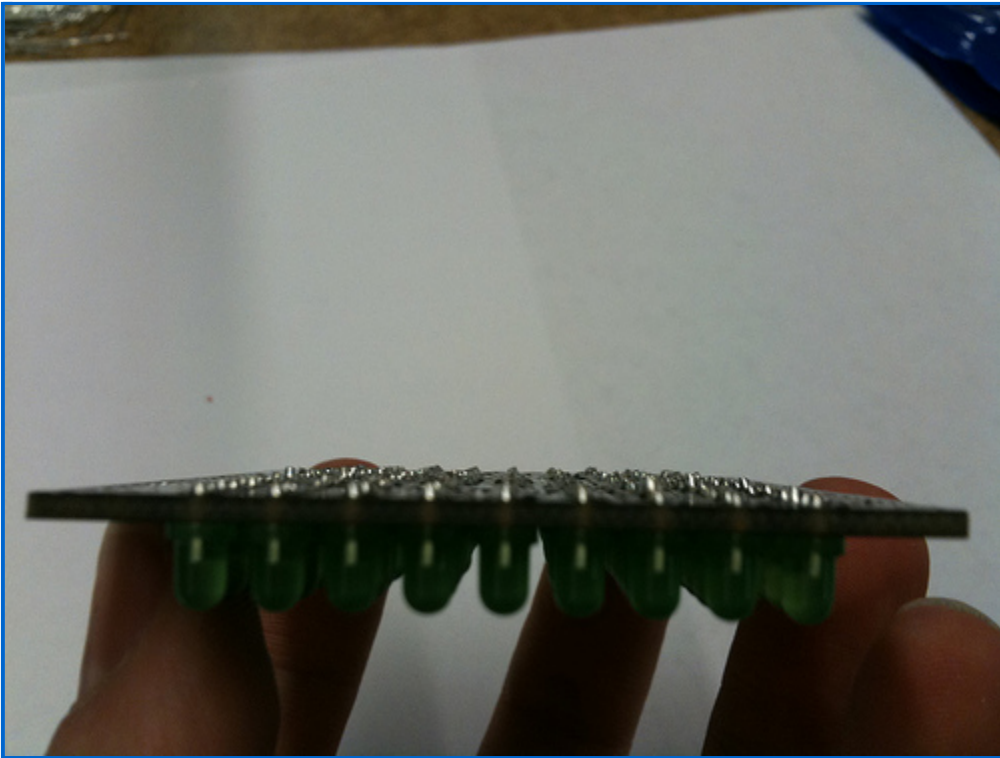
Once all of the LEDs are straight, you should try and clip the leads as short as you can without lifting pads off the PCB. Clip just at the top of the solder blob (it's okay to cut a bit into it). This is mostly important around the area above the USB port.
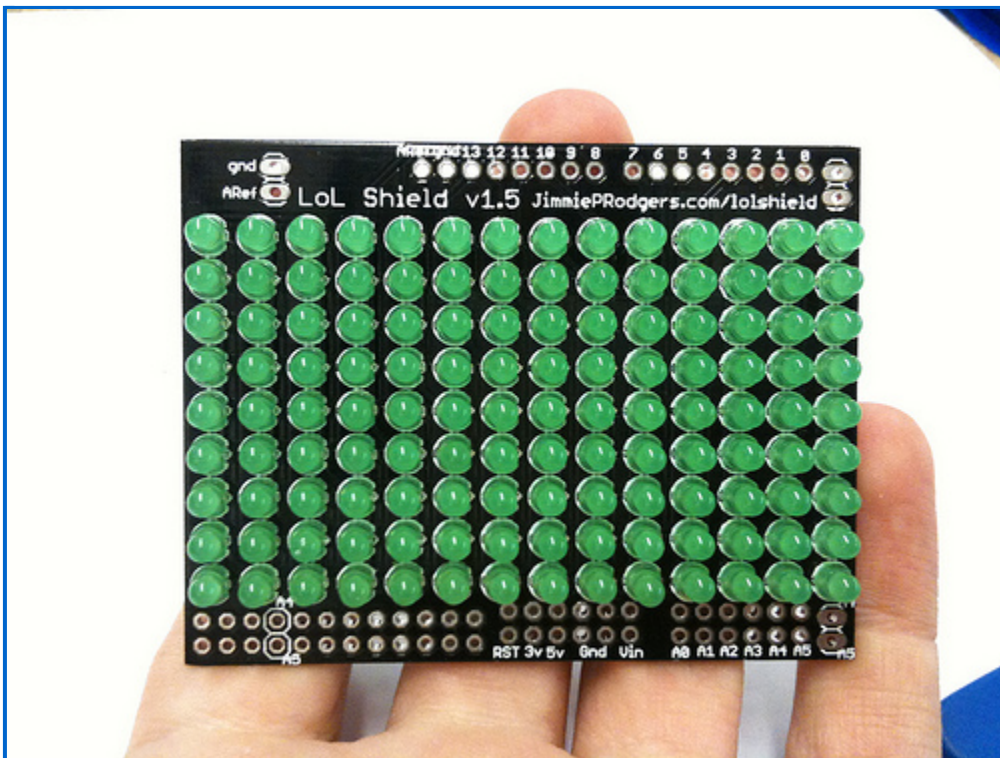

Hopefully your LoL Shield should look like this. Now you are ready to move onto the headers.

Note: If you have the v1.1 kit, you will need to also short the resistor positions. There are 12 of them total, and you can use some of the leads you've just cut off of the LEDs. Otherwise the LEDs won't light up. If you have any questions, please shoot me an email.
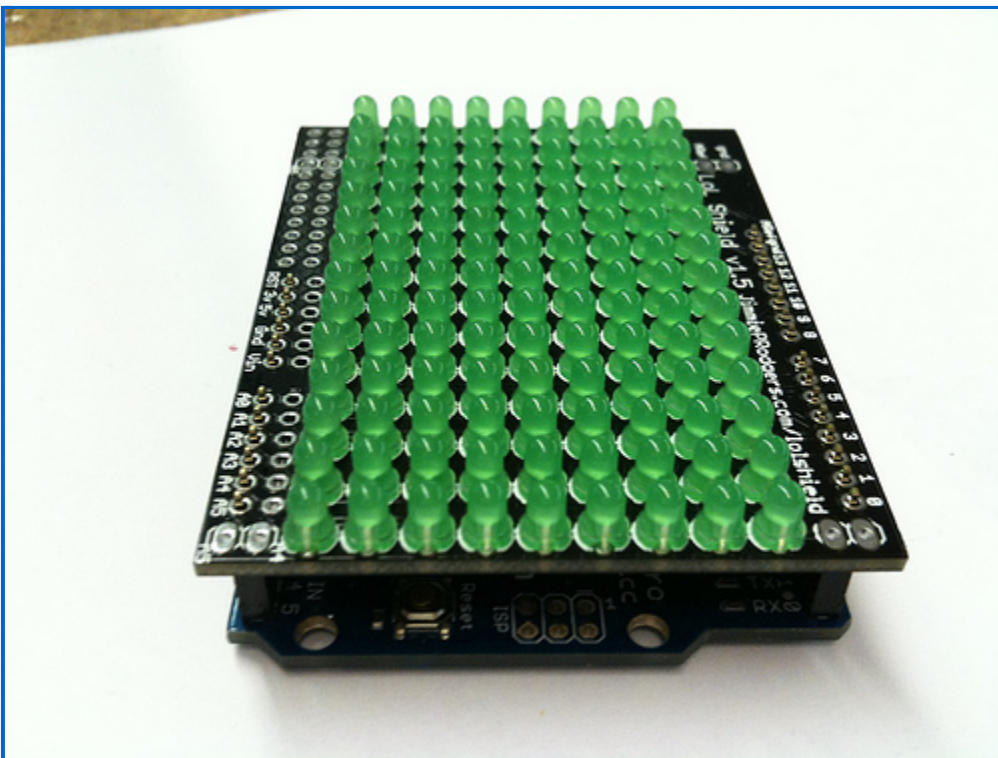
Step3: The Headers
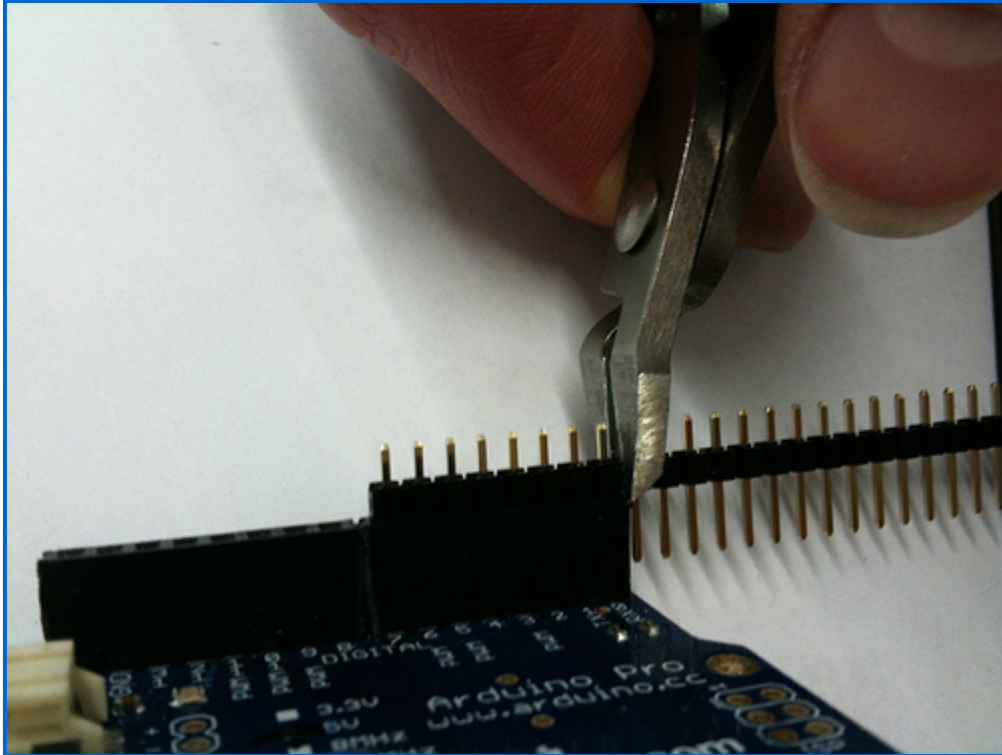
Go ahead and get your Arduino out. It's easiest to just put the headers into place and clip them there. That way the headers are all the correct size.
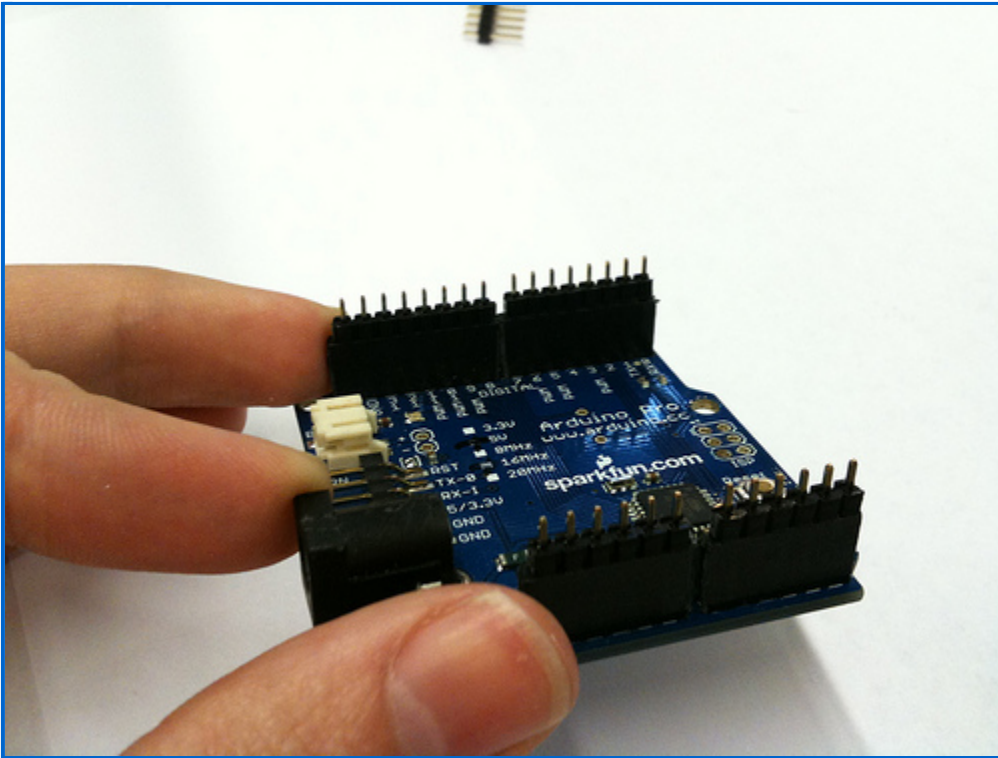
You'll end up with something like this. Go ahead and leave the headers in place, because you'll be soldering on top of the Arduino shortly.

Simply place the LoL Shield on top of the headers and solder them in place. Trying to line up headers so that they stick comfortably in the Arduino is very hard. This keeps them nice and straight. You don't have to worry about damaging anything. Just heat it long enough to solder it in place, and it should work out fine.

Now you are ready to program your Arduino!