Cart 360 etude #2
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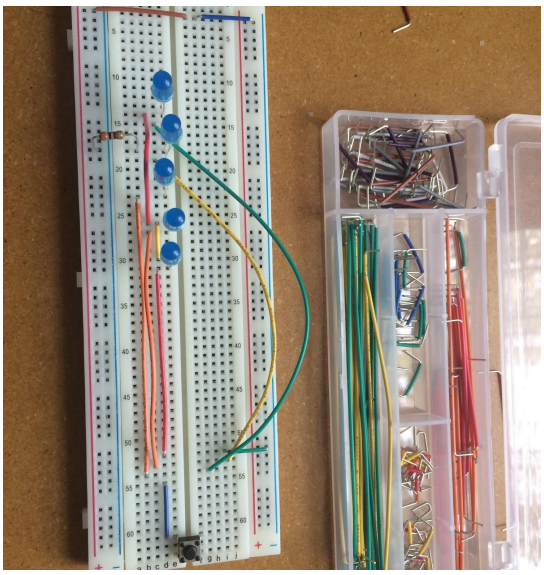
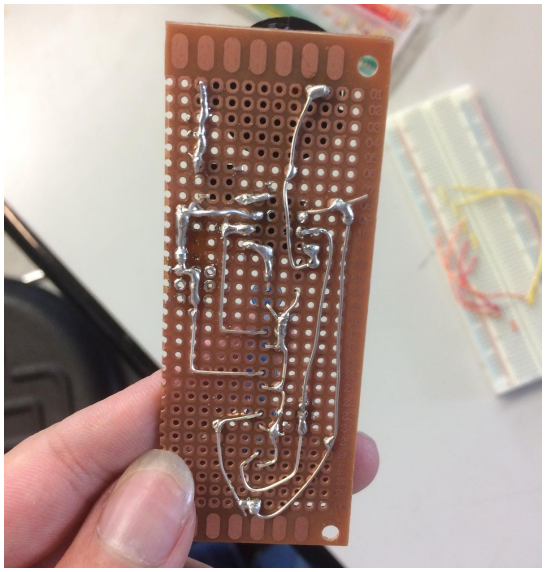
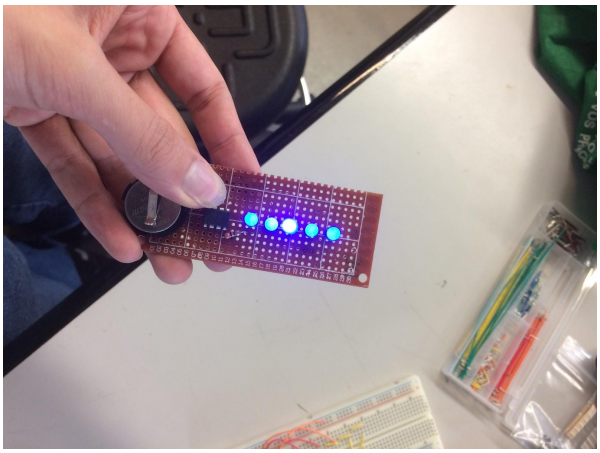
Part One:



I actually started working on part two and three since I wanted to be all set to build the circuit when I go to the lab. To test my leds and the functionality of the circuit, I first built it on the breadboard so I wouldn't have to solder anything yet. After I putted everything together I uploaded my code to the attiny85 and everything worked perfectly so I was ready to build the circuit on the printed circuit board. Hopefully we had the example to rely on and I didn't get too confused. I started by soldering my battery + to the switch using the one drop per hole method. The I soldered the other end of the switch to the pin #8 of the attiny85. Then I was all set to hook the anode of the leds to their respective pins on the attiny85. I used the same strategy as with the example so I hooked the closest leds to the closest pins of the attiny and the farther ones to the farther pins so we don't get any overlap on the board. By then I realised that my soldering was a bit messy so I tried to use as much as possible extra wire to make my circuit cleaner. I didn't want to get too much solder near the attiny and get a short circuit or something bad. I also had to cut some of the led wires come some were too long. Then I hooked all of the cathodes of the leds together and then to the 300 ohms resistor and then to pin #4 of the attiny85 and then to the battery -. At the first test my device was working perfectly.





Part two:

The difference between the two circuit is that built circuit has only one resistor that is hooked to all of the leds and the alternate circuit has 5 resistors so every led has a resistor hooked to it. The main difference is the amount of resistance in the circuit. Since every led's are in parallel, having 5 resistors will divide the total amount of resistance by 5. It is possible to have the same results with 5 resistors that have 5 times the resistance capacity of a single one hooked to the 5 led's. Even though it seems more simple to use one resistor, diodes can have small differences in how they control the current that passes through them. These small differences can have way bigger impacts when the hole circuit is in parallel so in the real world the current isn't distributed equally between every diodes therefore it is safe to use one resistor for each diodes. That way they are all in series with their respective resistor. I would for sure work this way if I had to do with a simple electrical circuit that is directly fed by a power source, but in this etude we work with a microcontroller. I don't know much about how the microcontroller works, but it can be programmable to allow a very specific amount of voltage that goes through each pin. I believe this means that every diodes that is hooked to a different pin than another will form a different circuit so they aren't in parallel. If this is right, there should be no problem using only one resistor. Since it is possible to allow the necessary amount of voltage to light one led through each pin, we won't over current a led and burn it because of a resistor problem. Another key difference between the two circuits is the amount of wattage that goes through the resistors. There's a bigger chance to damage the resistor if we use only one of them than if we split the current in 5 different resistors. If that particular resistor breaks, the hole circuit won't be working anymore and if we used 5 resistor only one of the five leds would stop to work if one resistor breaks although there would be much less chance of that happening since the current is better distributed. In order to make the experience more meaningful, I'd introduce a motor into the circuit using the unused pin1. By moving the hole circuit board back and forth with a motor it could be possible to see the words without having to move it yourself. The experience could be automated and I think it would be nice to see some circular message ''floating'' on my desk with this simple device.