Concordia University

ETUDE TWO

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CART 360
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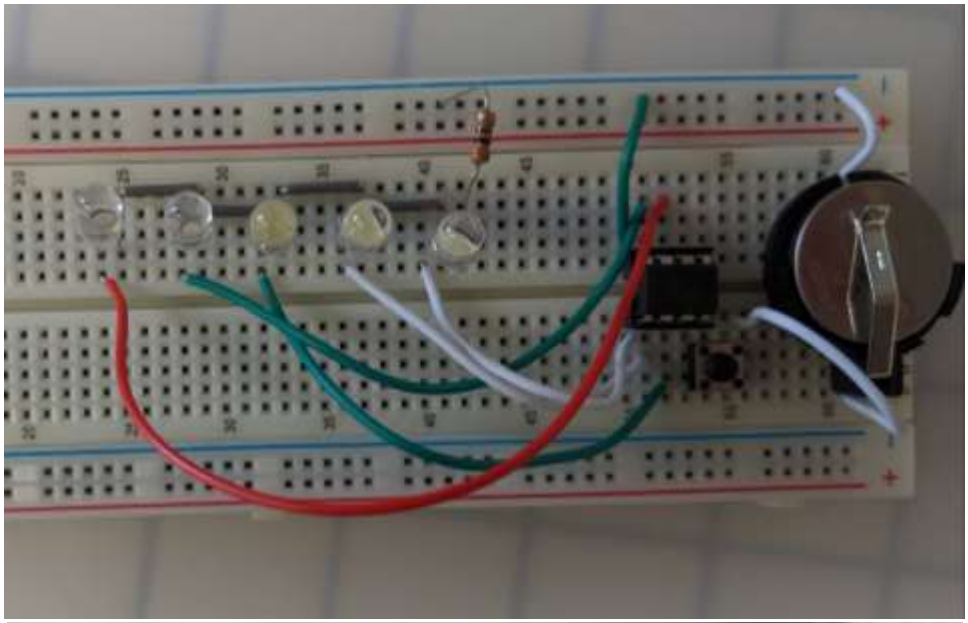
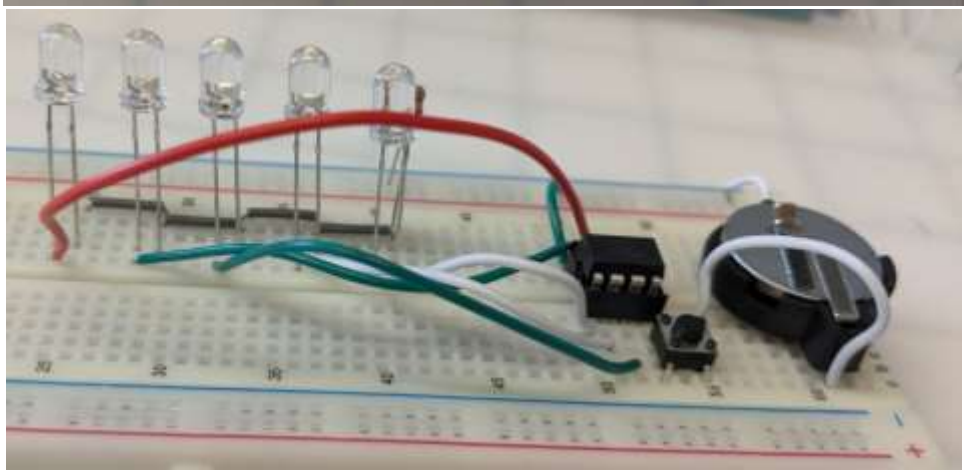
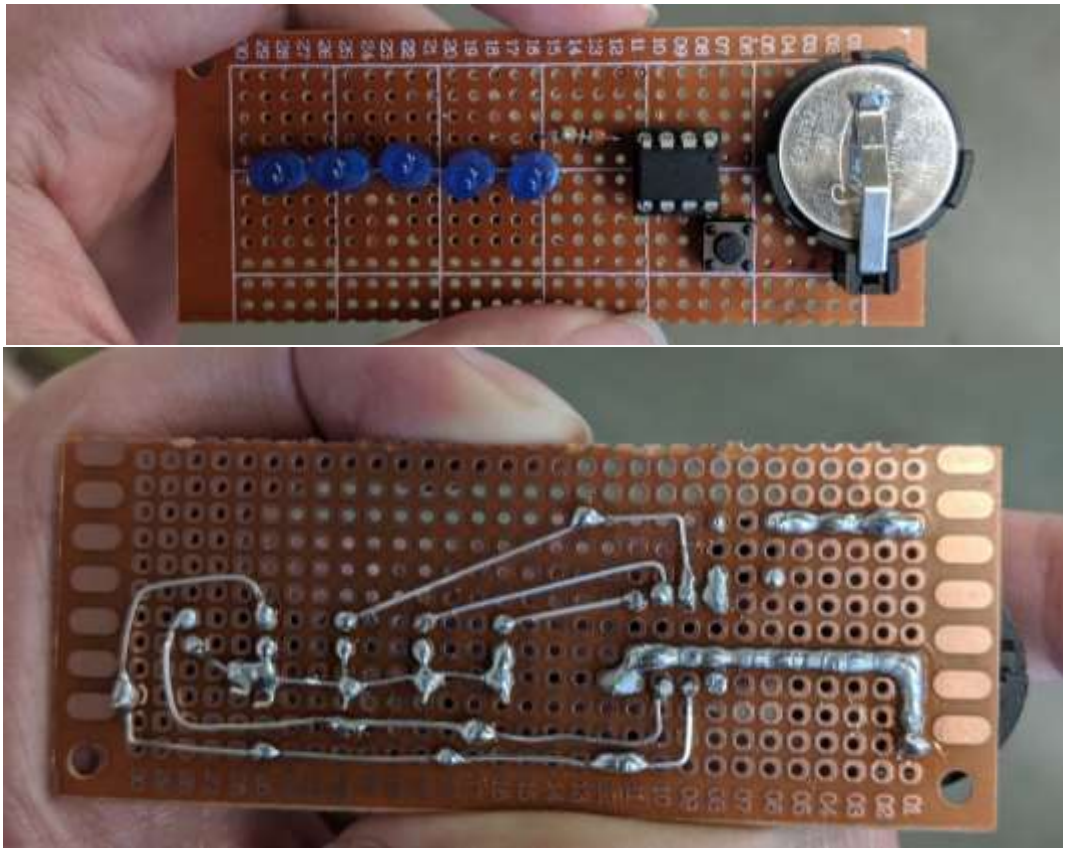
PART ONE: building

Building the circuit on the breadboard allowed me to understand how the nodes could be positioned. It also allowed me to visualize the direction of the current.





Soldering proved to be slightly tricky. I started by connecting the battery's negative to the resistor. Since they were at a significant distance apart, a lot of solder had been used and it was difficult to connect a molten drop to another. For the remaining paths, I decided to use scrap wire from the resistor's or LED's tails. Another difficulty arose when I was connecting the LEDs to the microcontroller. Since the controller's pins are quite close to each other, there were times were a drop of solder material covered two of them. A pump was used to extract some of it and make the drops smaller.

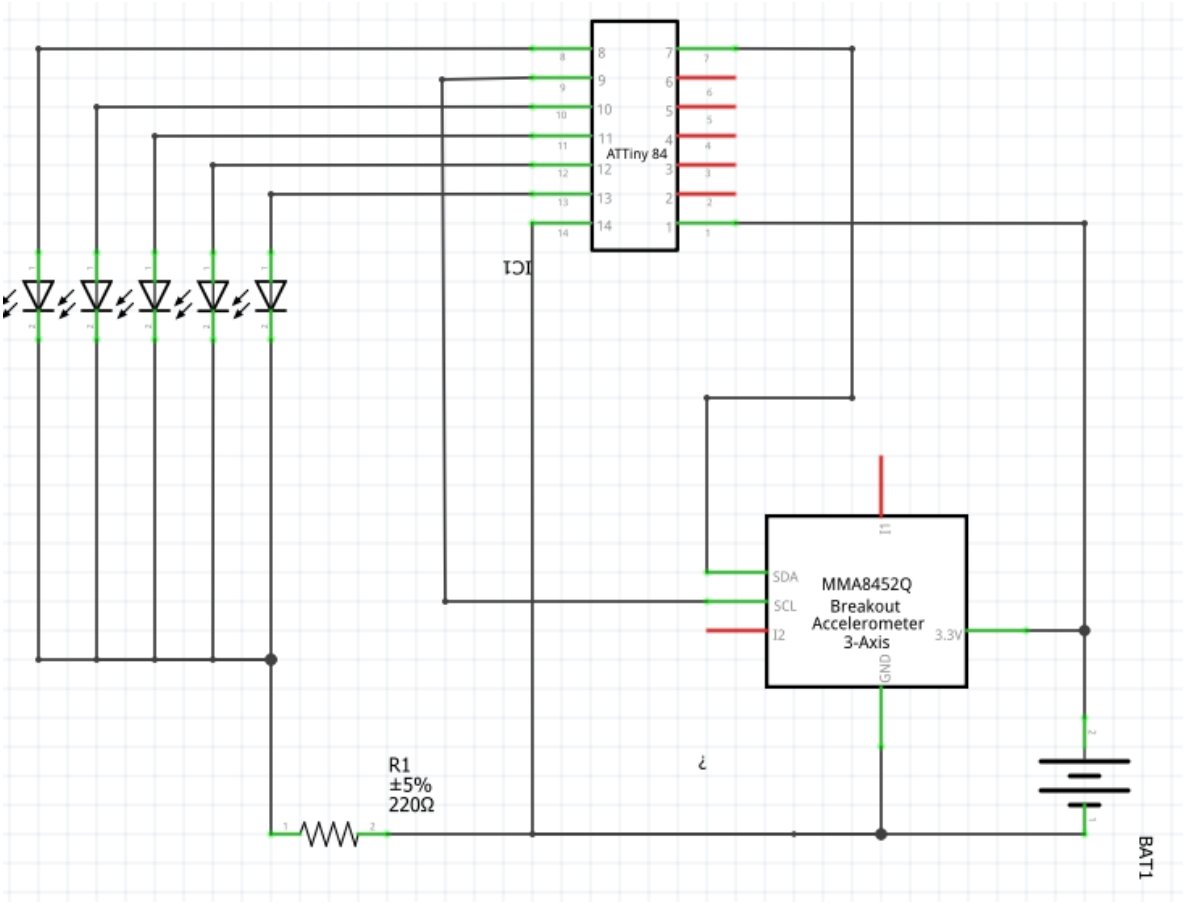


PART TWO: alternate circuit

The main difference between the two circuits is the amount of Current that the LEDs receive. In the original circuit, the 3V coming from the battery combined with the 220 Ohm resistor create a current of 0.0136 A or 136 mA (following Ohm's law). This means that every LED gets one fifth of it, or 27.2 mA.

On the alternate circuit, since there are multiple resistors in parallel, the total resistance is equal to 44 Ohms. The total current is thus of 0.0681 A or 681 mA. This means that every LED receives 136 mA and 3V. This current exceeds the limit of the LEDs and they might become damaged.

To make the experience with the Perceptron-P more meaningful, an accelerometer may be added to the board to control the lights. Once the accelerometer detects movement, the lights would start flashing. The strength at which the board is waved could modify the delay time between each flash. Thusly, the letters would not be distorted from waving too quickly or not quickly enough. Additionally, the message could change depending on which direction the board is waved. For example, waving to the right might say "hello" whilst waving to the left might say "goodbye". Waving quickly from left to right, then right to left, in front of someone lets you have the briefest encounter/conversation with them, without even saying a word. Instead of using an ATtiny 85, this project would necessitate an ATtiny 84, since an additional pin is needed.


ATTiny 84
IC1
SDA
SCL
I2
MMA8452Q
Breakout
Accelerometer
3-Axis
3.3V
GND
R1
±5%
220Ω
BAT1