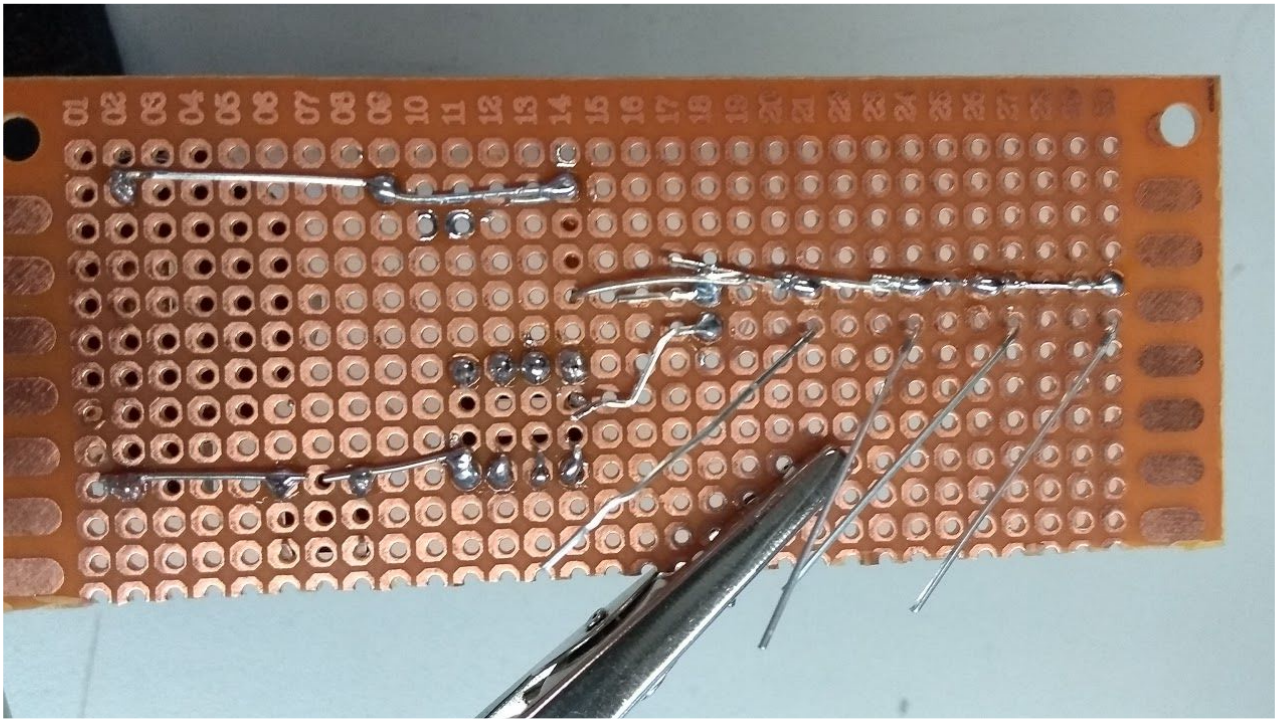
ETUDE 2

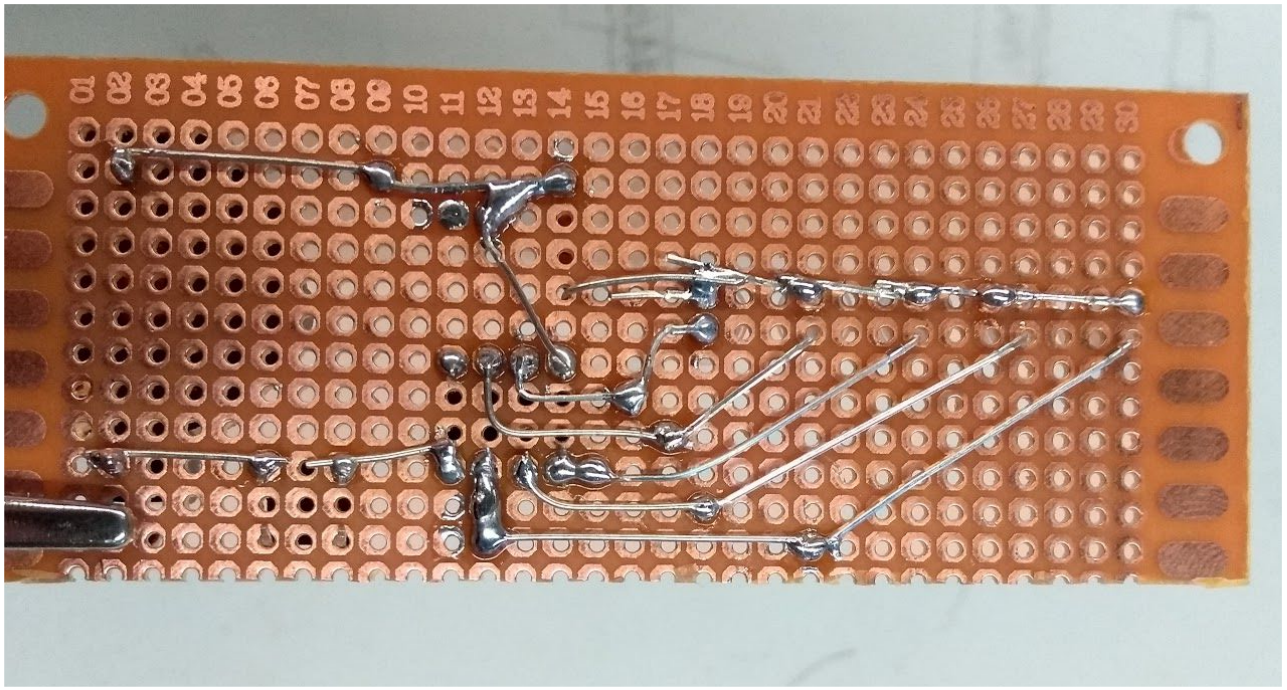
PART ONE

Observations:

- I began by leaving some space between the two pins of each LED but realized that it would not fit well on the board that way. So looking at the reference circuit from the lab, I noticed the two pins of the LED were in two adjacent holes of the board. Harder to work with but more compact design.
- I decided to use the remains of my electronic components to create the connection on the board. I found that method easier than doing it only with the solder wire.
- Using the stand and the pliers to hold my board was very comfortable.
- The order of the LED in the code had to be changed because of the way I wired them to the ATTiny85 microcontroller. I didn't think of this potential problem ahead so I had to find a solution.



- After discussing with Elio, I ended up wiring the pin 4 directly to the ground and using the two paths in the center of the chip to wire my first two LEDs. The three other LEDs were easier to connect to the microcontroller since I had more room on the Vcc side.



- It was so fun to solder!!
- The battery is outputting 3V. And the difference of potential between the Vcc and the ground of the microcontroller is also 3V. The difference of potential is null around the button when it is open.
- The potential between the Vcc and each pinout varies between 1V and 2.2V, which means that the microcontroller provides a voltage between 0.8V and 2V to the output pins.
- I noticed that the potential of the resistor is around 0.2V. Which means that the current is about: I = 0.2/220 = 0.9 mA. This seems very low!?
- The potentials around the LEDs oscillate between 0V (when the LED is off) and 1.7V (when it's on).
- The total of voltage consumed along the circuit adds well to 3V.

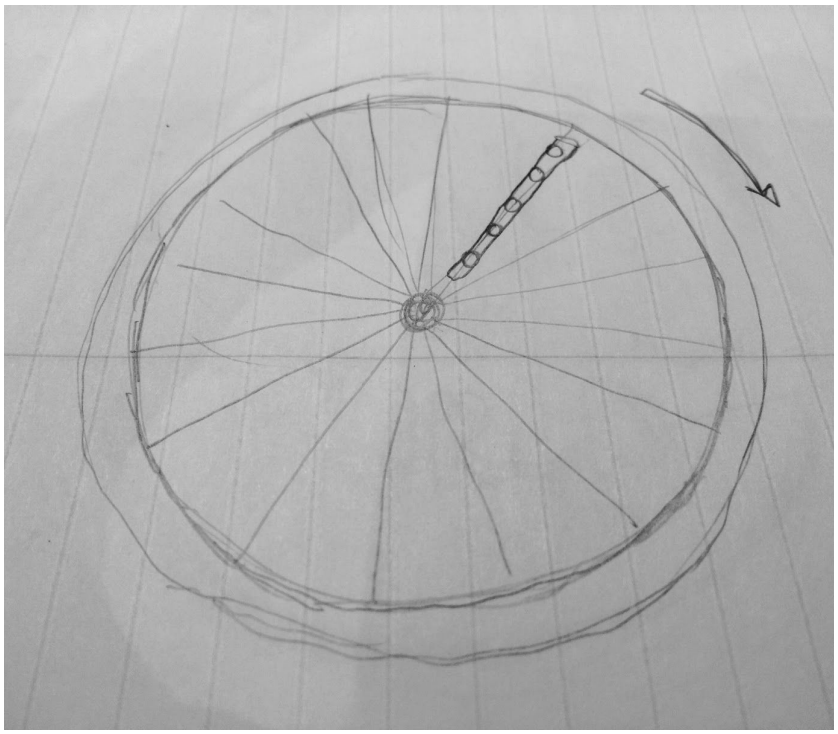
PART TWO

In the built circuit, the five LED are in series with one single resistor. In the alternative circuit, each LED is in series with one resistor forming five distinct branches.

The alternate circuit seems more reliable as it provides a resistor that limits the current of each LED. If one branch (the resistor or the LED) blows up, it will not affect the other branches and only the components of this branch will have to be replaced. The built circuit will also work as long as there are no anomalies in the resistor. If the resistor fails the work required by the LEDs will be too high, which will make them blow up soon after. If the components are not too expensive to substitute, the built circuit is a good option, in the opposite case, the alternate circuit would be better.

To push this experiment of the persistence of vision forward, I would suggest implementing this vector of LED on a bicycle wheel. The frequency of the LEDs could either adjust to the velocity of the biker using an accelerometer to track the speed or match the speed limit of

different areas within the city. When the biker ride at the right speed, people around could read the message. It would also make the biker visible at night. The power required to use this device could be generated by the movement of the wheels in a similar fashion to a dynamo. This device would beautify active transportation in a simple but efficient way.

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