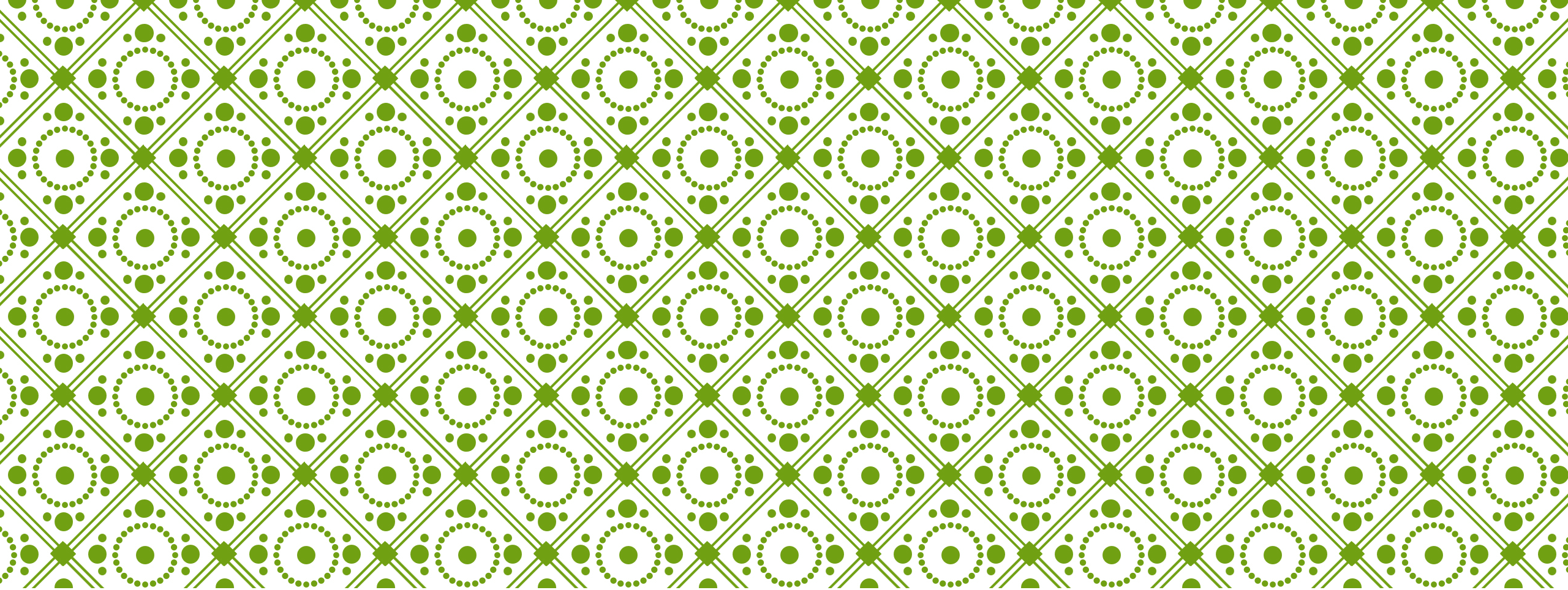


VANITY LIGHTS

Prototyping for Interaction Design

by Zeynep Olcer

USER NEED

When we have detailed close-up work to do at a mirror, existing lighting is not enough or the user can't get to the mirror close enough to see the details (on their face, in their mouth etc.) that they need a vanity mirror. However, many vanity mirrors don't provide enough coherent lighting either.

What if there was an interactive ambient vanity mirror that responded to the visual needs of the user with real-time lighting adaption?

IDEA

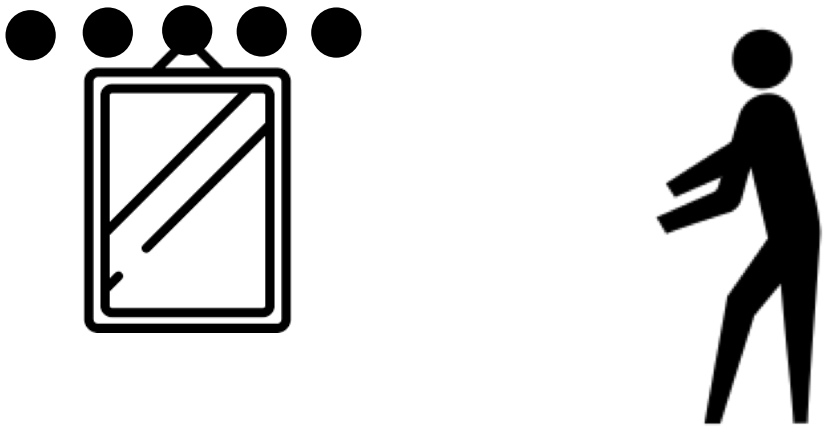
Vanity Lights is a mirror that comes with embedded lighting, which increases brightness as the user gets closer to the mirror and dims out as the user gets away. When user gets closer to the mirror, Vanity Lights will sense that user needs to see details/has a detailed work with mirror, so it provides with more lighting without the user having to make any adjustments meanwhile. When the user gets away from it, the mirror understands that it is not being used anymore, so the light fades out.

Vanity Lights is also an energy-saving, sustainable object that makes sure only enough lighting is consumed at the optimum level brightness and no electricity consumed when the mirror is not being used. Say bye to forgetting the lights on with Vanity Mirror!

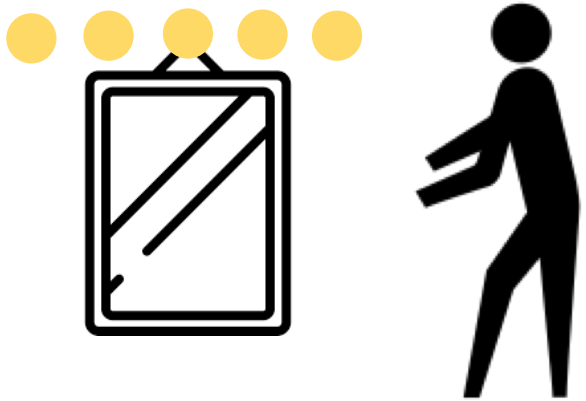
Use cases include putting on make-up, doing oral care, plucking eyebrows, putting on contact lenses etc.

CONCEPT

When there is no user close by:



When the user gets close to the mirror:



As the proximity sensor senses a closer object, it triggers LEDs to brighten accordingly.

PROGRAMMING

Step 1: Learning how to use proximity sensors and LEDs by programming them in **Arduino**

Step 2: Choosing the type of proximity sensor that would work the most accurately with less programming burden as well as the proximity range that would be relevant to my intention

SHARP IR Sensor *(GP2Y0A21YK0F)*

Step 3: Choosing LEDs that would give the necessary lighting setting that would respond the need of the user

Neopixel strip *surrounding the mirror (4 LEDs)*

Step 4: Integration - making proximity sensor talk to LEDs through the code

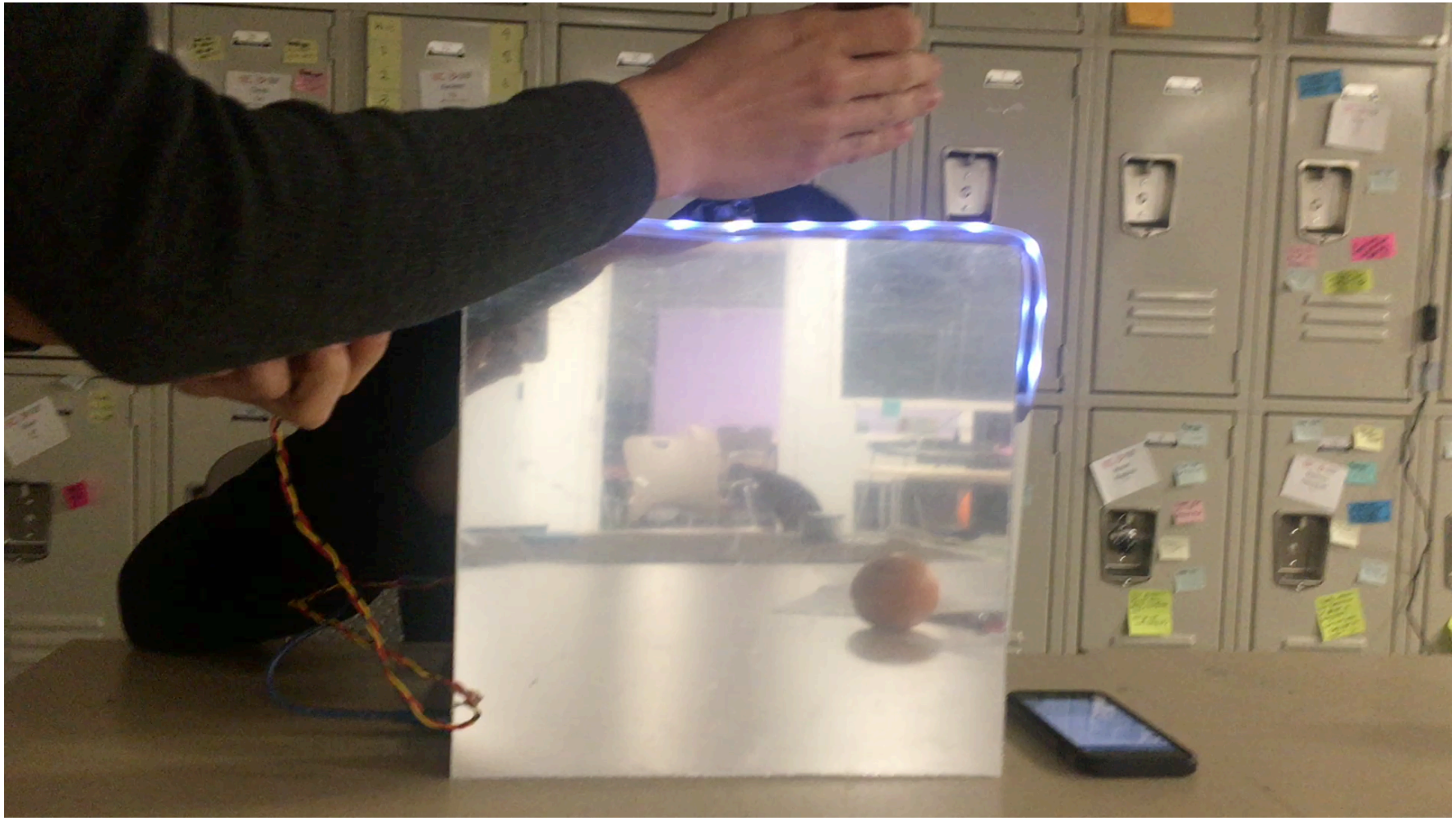
Analog reading and mapping out the distance to LED brightness values

Step 5: Laser cutting **acrylic mirror** and **plywood box** to cover the sensor and breadboard

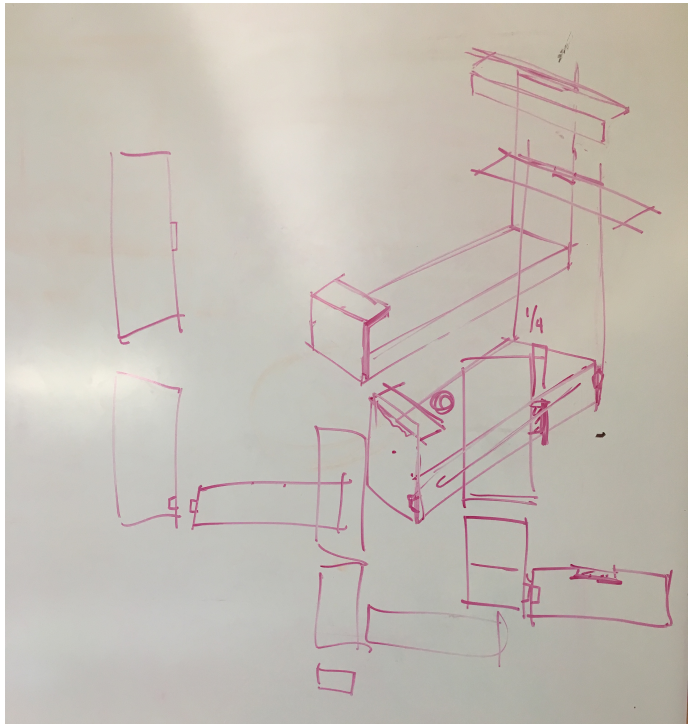
CODE

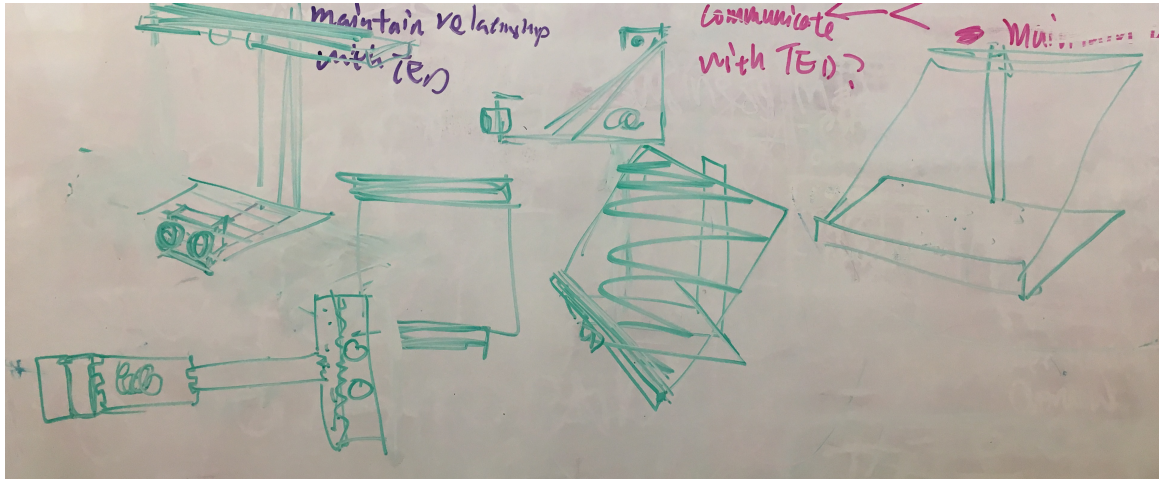
```
int sensorPin = A0;

#include <Adafruit_NeoPixel.h>
#ifdef __AVR__
  #include <avr/power.h>
#endif


#define PIN            5
#define NUMPIXELS      4
Adafruit_NeoPixel pixels = Adafruit_NeoPixel(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);


void setup() {

#if defined (__AVR_ATtiny85__)
  if (F_CPU == 16000000) clock_prescale_set(clock_div_1);
#endif


  pixels.begin();
}

void loop() {

int sensorValue = analogRead(sensorPin);

int ledBrightness = map(sensorValue, 100, 600, 255, 0);

if (sensorValue < 600) {
  for(int i=0;i<NUMPIXELS;i++){


    pixels.setPixelColor(i, pixels.Color(ledBrightness, ledBrightness, ledBrightness));
    pixels.show();

  }
}else {
    for(int i=0;i<NUMPIXELS;i++){

    pixels.setPixelColor(i, pixels.Color(0, 0, 0));
    pixels.show();


  }
```

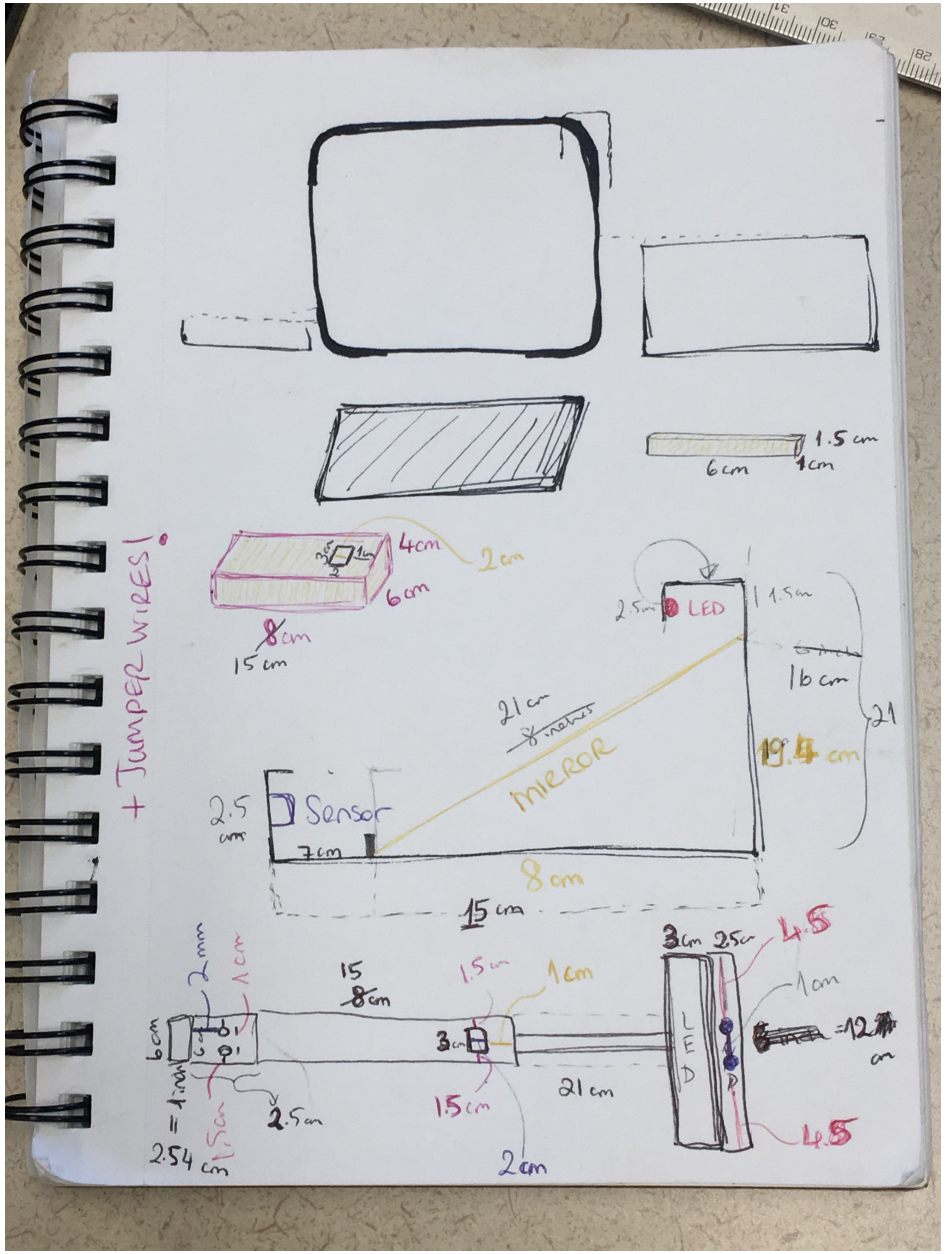
PROTOTYPE 1



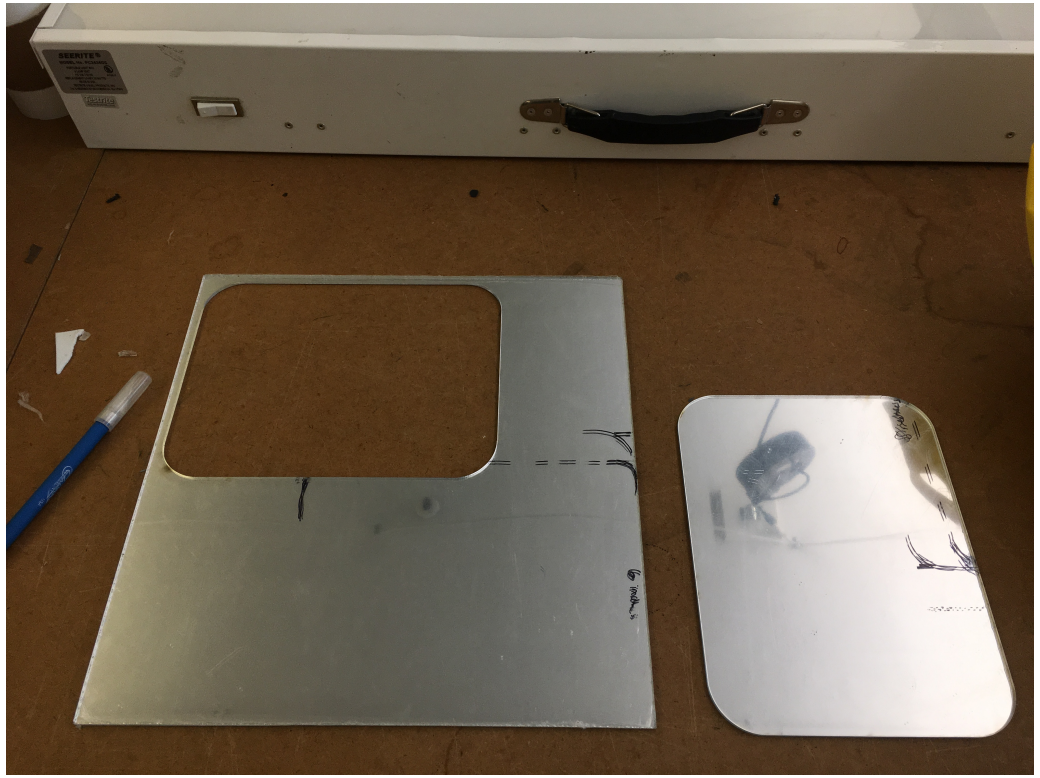
ITERATIONS

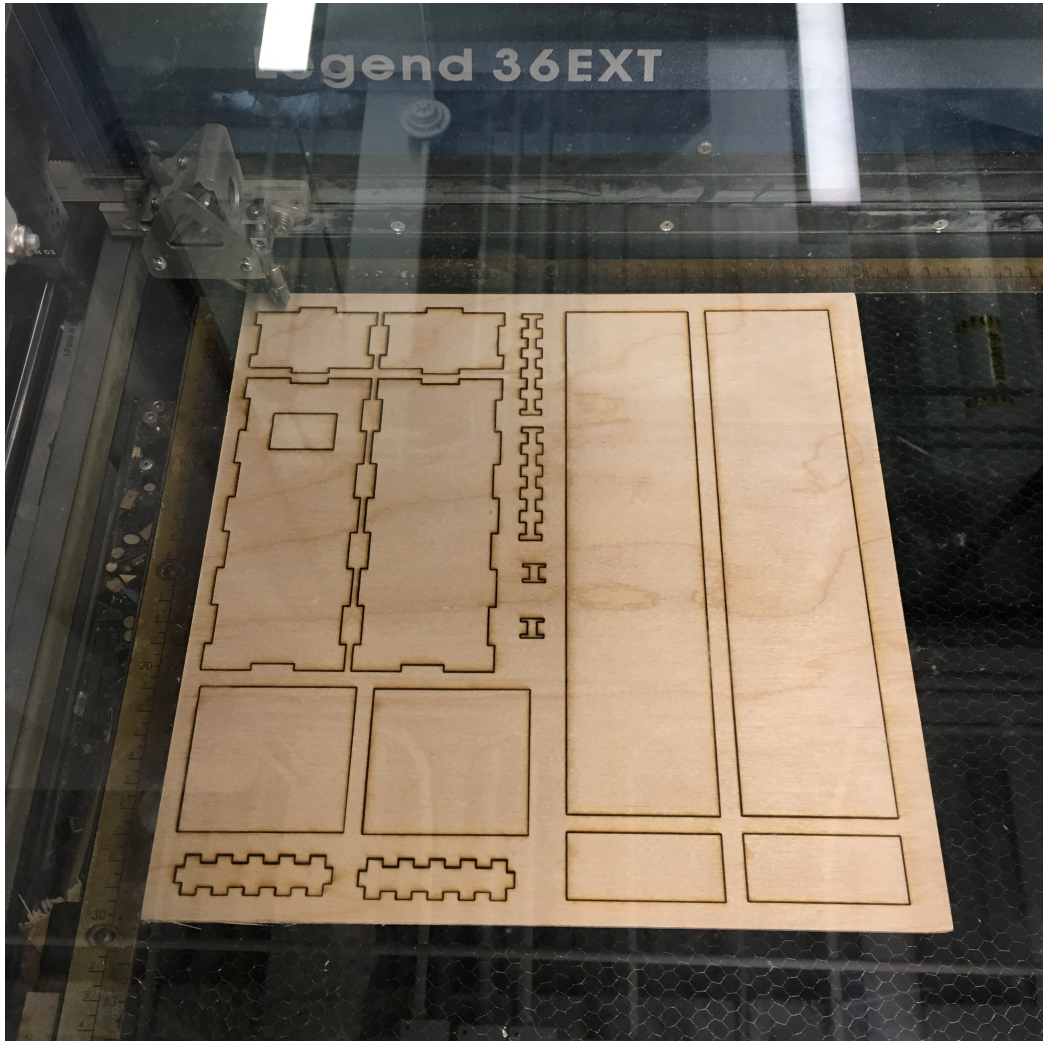



maintain relationship
with TED
communicate
with TED?

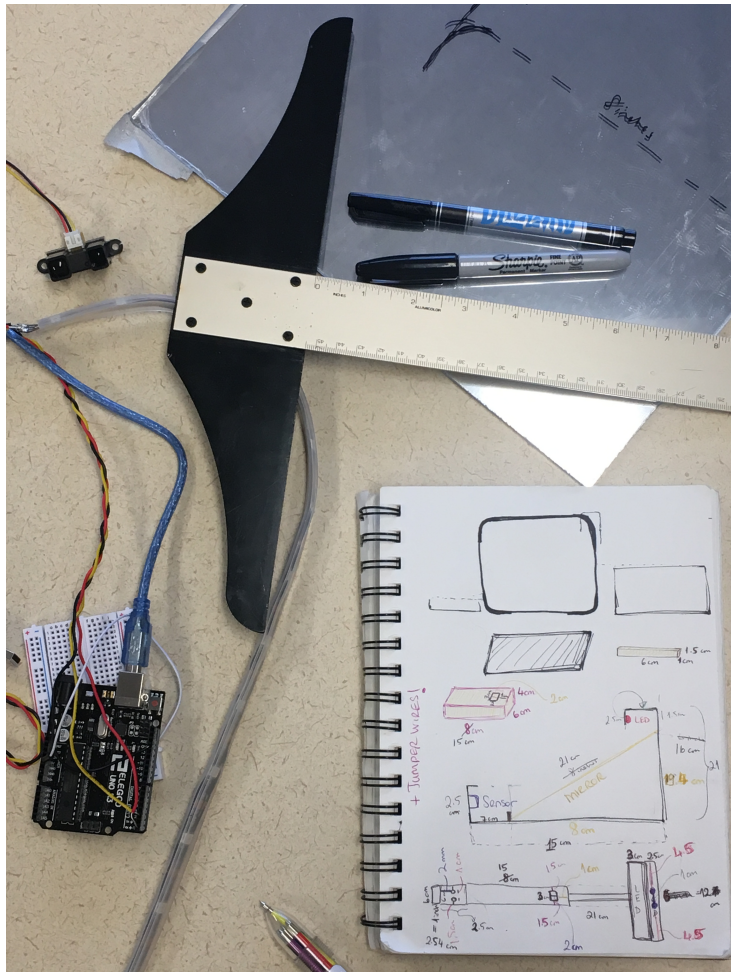

+ Jumper wires!
4cm
2cm
6cm
8cm
15cm
1.5cm
6cm
1cm
LED
16cm
21cm
mirror
19.5cm
21
2.5cm
Sensor
7cm
8cm
15cm
2mm
4cm
15
8cm
1.5cm
1cm
3cm
2.5cm
4.5
1cm
12cm
6cm
2.54cm
1.5cm
2.5cm
15cm
21cm
2cm
4.5

MAKING: LASER CUTTING

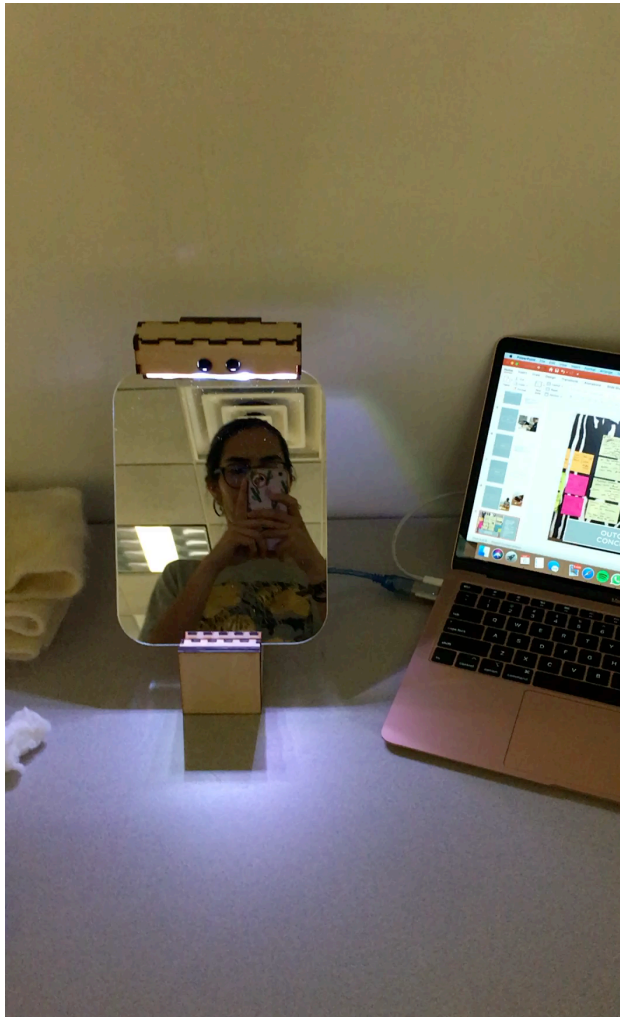




PROTOTYPE 2


+ Jumper wires!
LED
Sensor
MIRROR


Sticky Whistle
Weight Waterfall
Baby Woonon
cmu.edu/ii

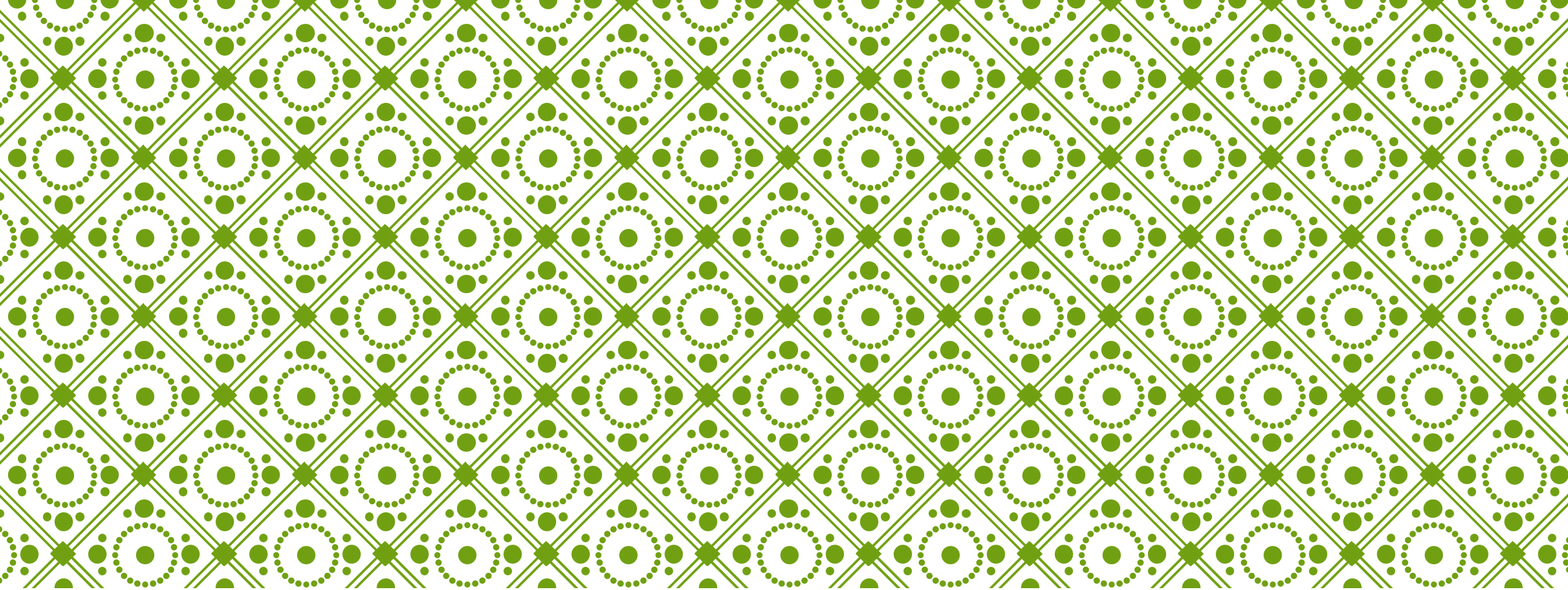


CHALLENGES

First of all, I had a big challenge with the coding for the integration of the sensor value with the LED output. I tried a couple of different ways of coding.

Secondly, the IR proximity sensor was reading values consistently. As an object got closer to the sensor, the sensor would have a consistent, gradual change in the analog read values, but the values would reverse halfway. The sensor value would increase and at some point start decreasing again although the object would get closer.

Finally, planning and designing the prototype with the components and identifying the exact measurements of laser cutting pieces (based on the placement of components) took much longer time than expected and then the making process (laser cutting, soldering, hot glueing and wiring the circuit).



THANK YOU

Prototyping for Interaction Design

by Zeynep Olcer