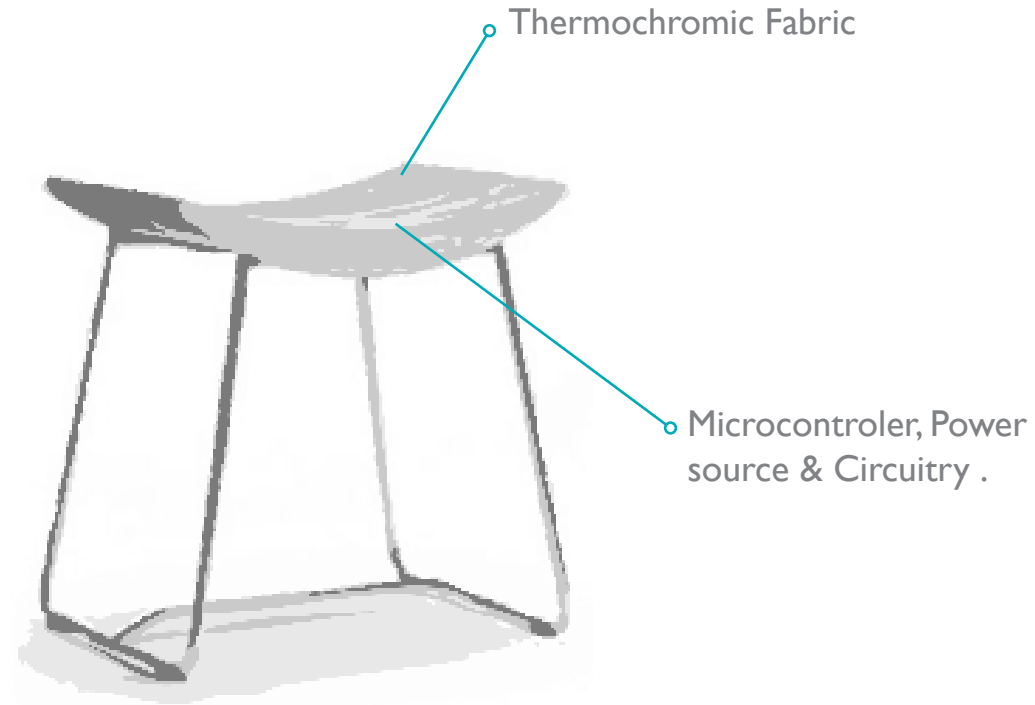


Thermometric Textiles

PROJECT PROPOSAL:

- What role can textiles and interiors play in informing us about exterior conditions?
- To create a series of textiles that are augmented by exterior conditions like weather or temperature.

PROJECT PROPOSAL:



FINAL PRODUCT:



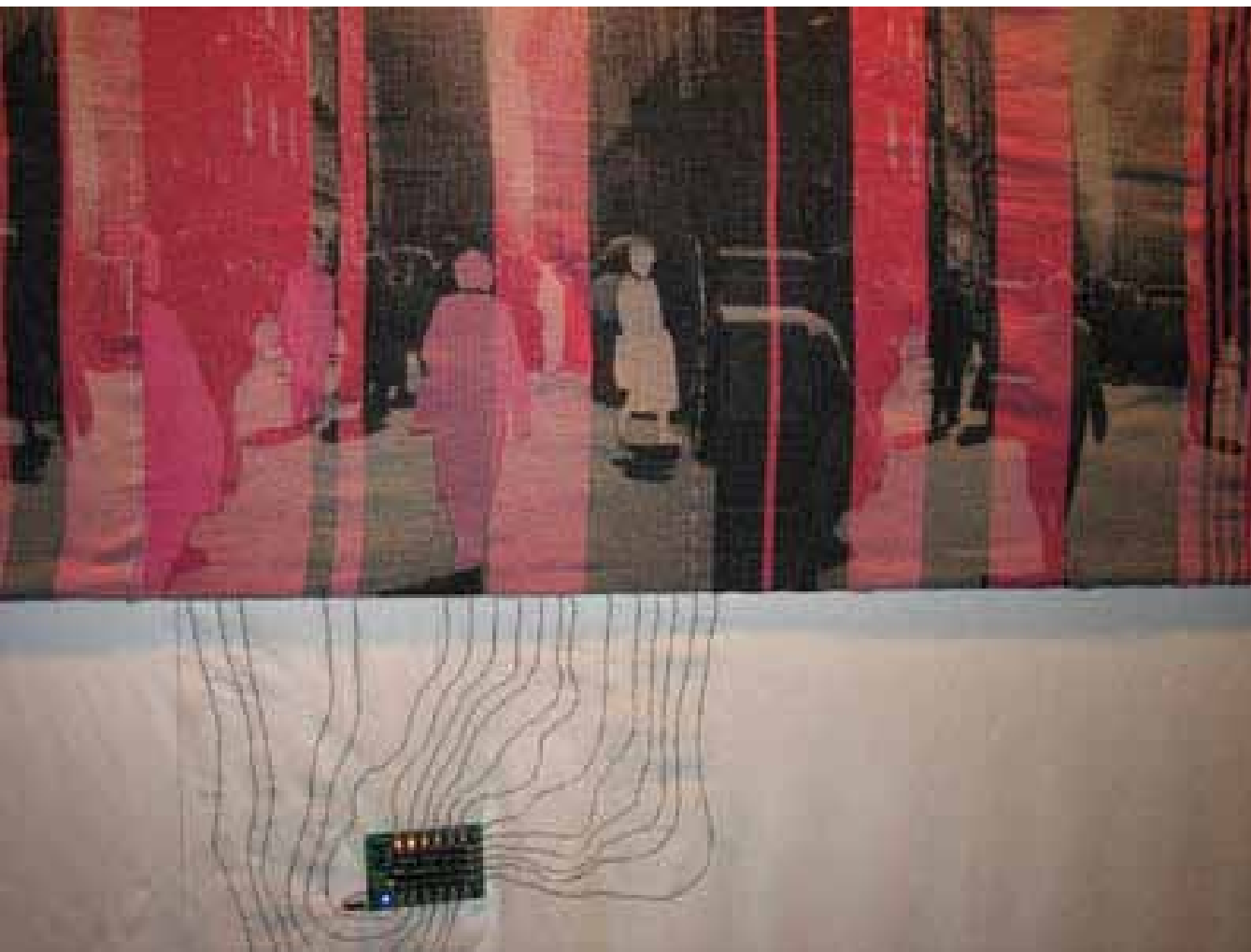
Thermochromic Woven Fabric

Microcontroller & Circuitry

USB for Serial Port Communication from Computer (data feed) to LilyPad.

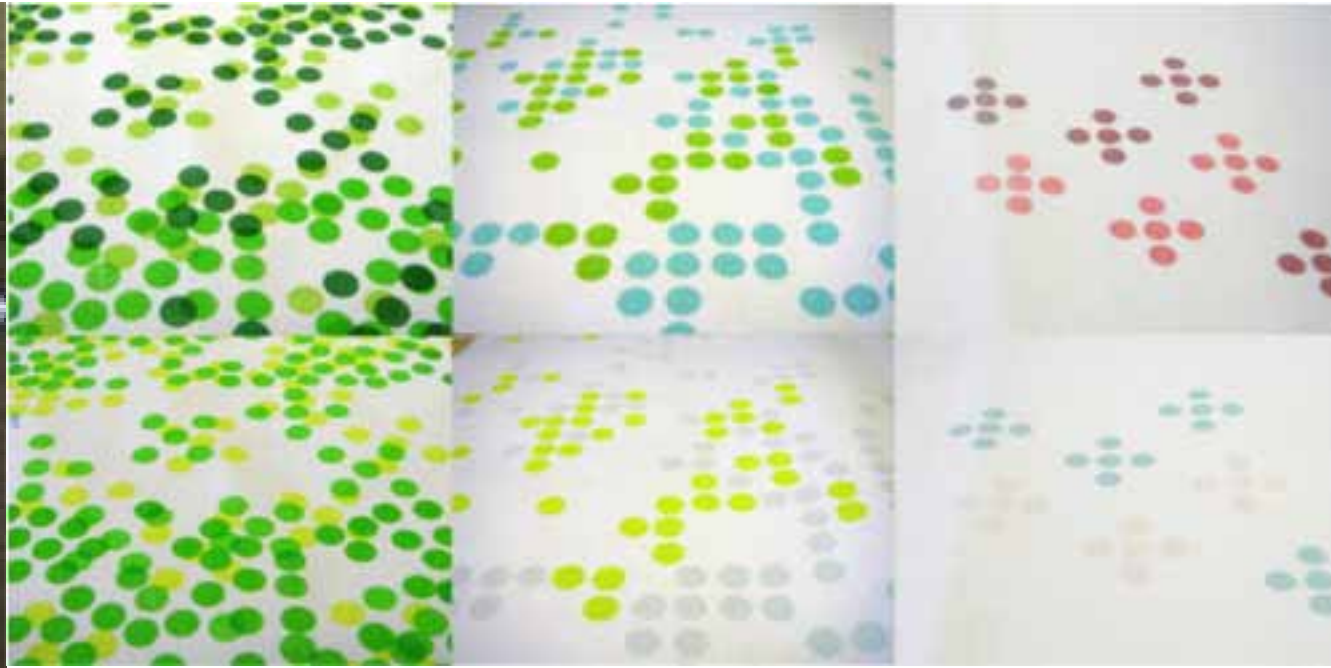
External Power Supply

INSPIRATION AND INFLUENCES:



XS Labs:

INSPIRATION AND INFLUENCES:



Linda Worbin: Fabrication Bag

INSPIRATION AND INFLUENCES:

Computational:

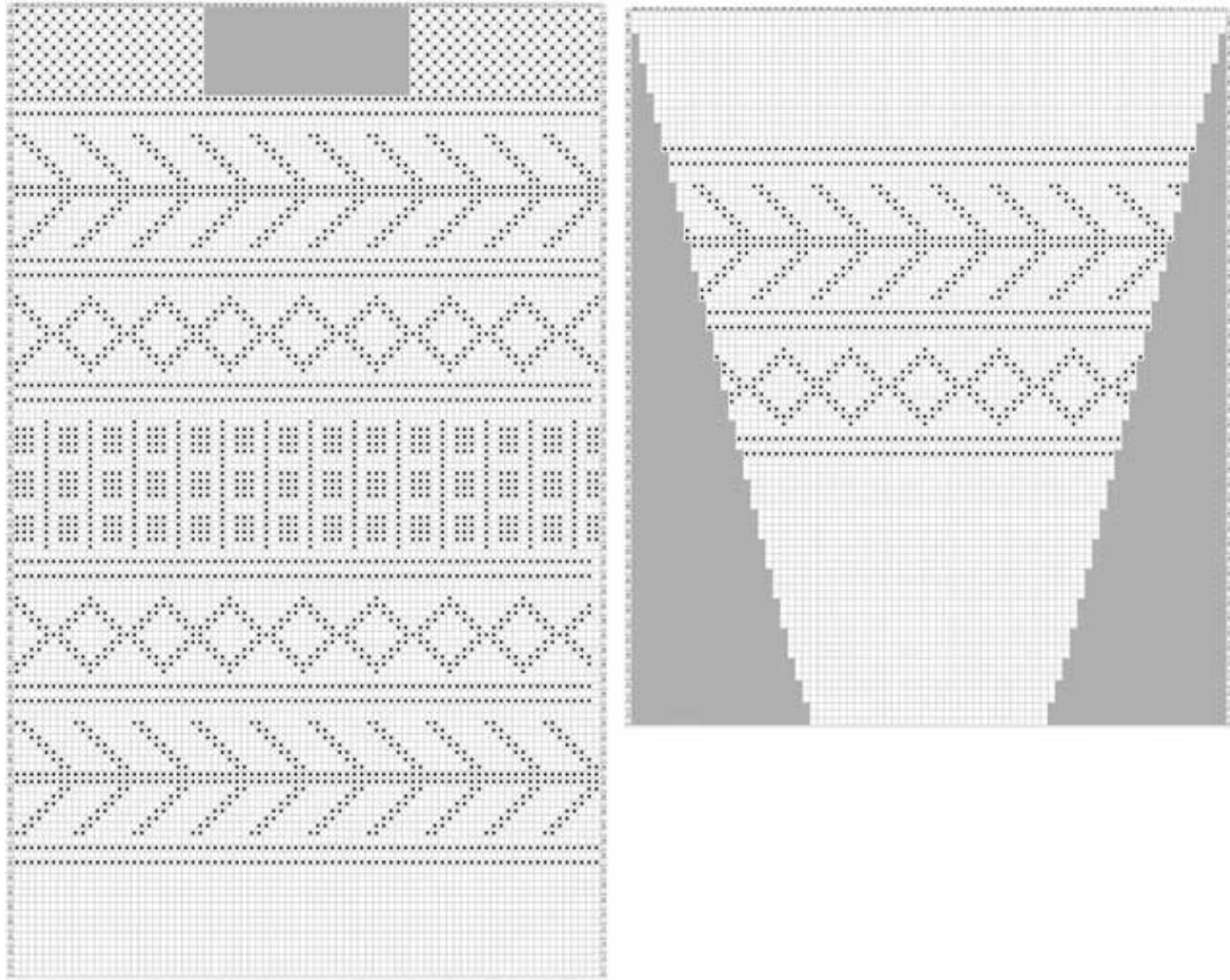
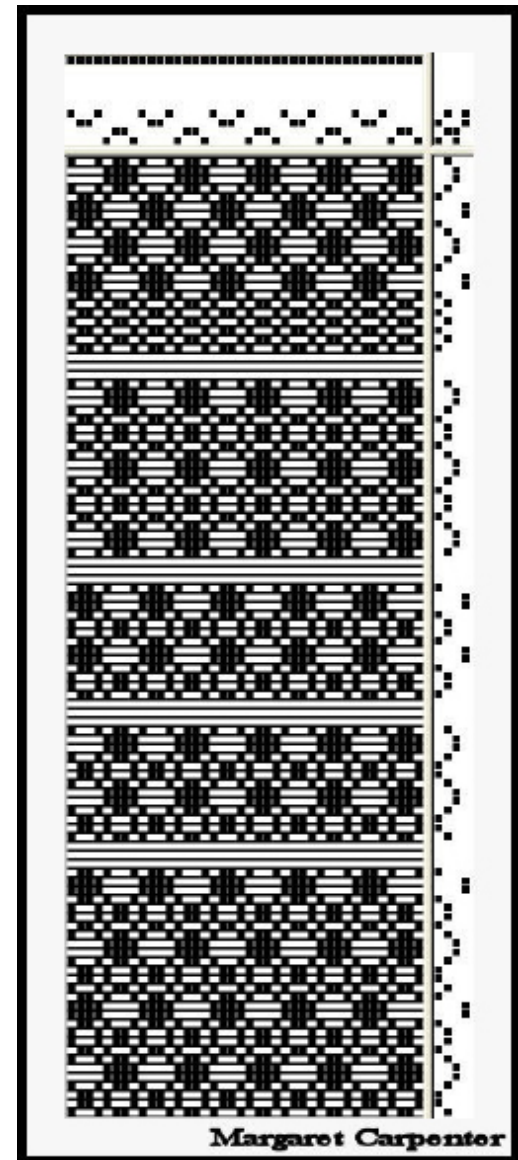
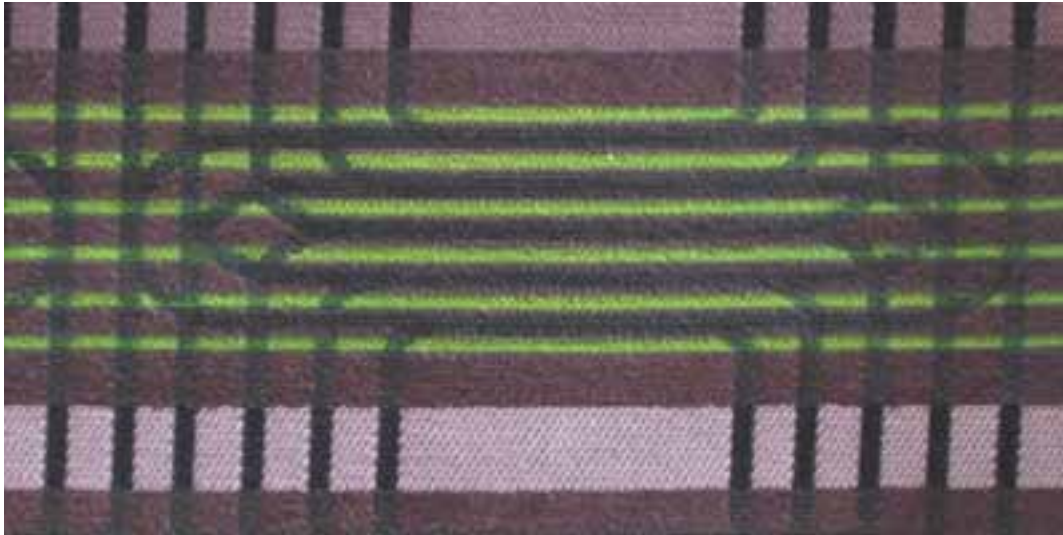


Image From Knitvisualizer Software

INSPIRATION AND INFLUENCES:

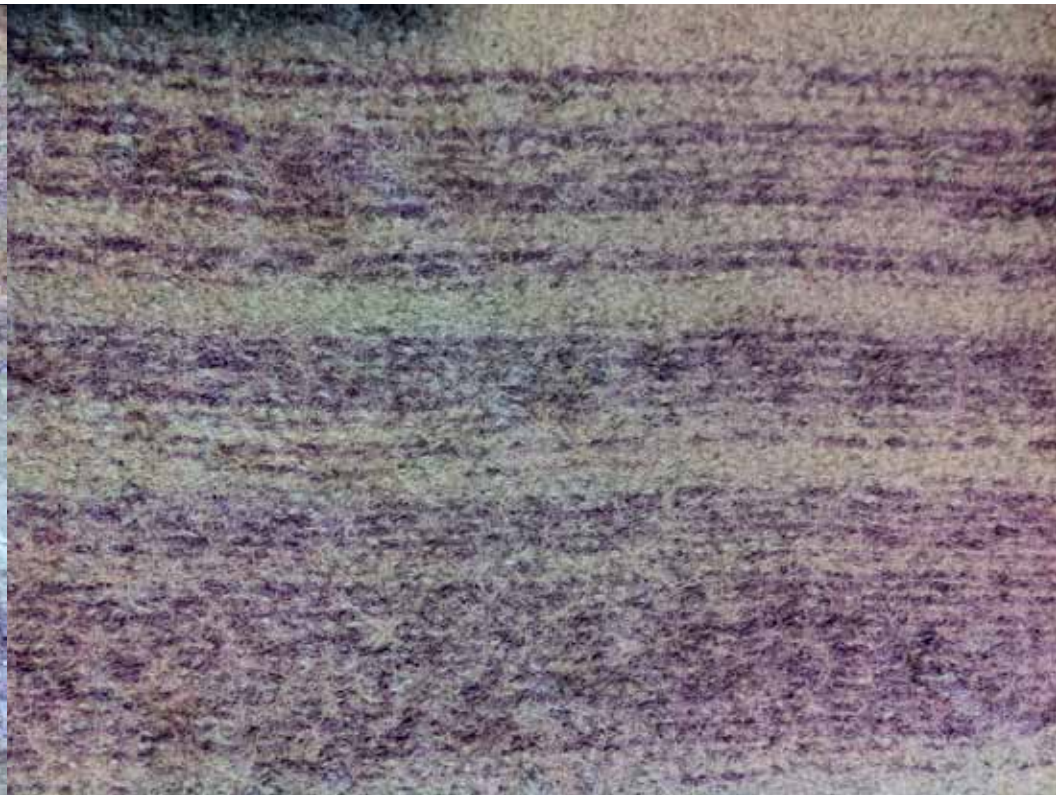
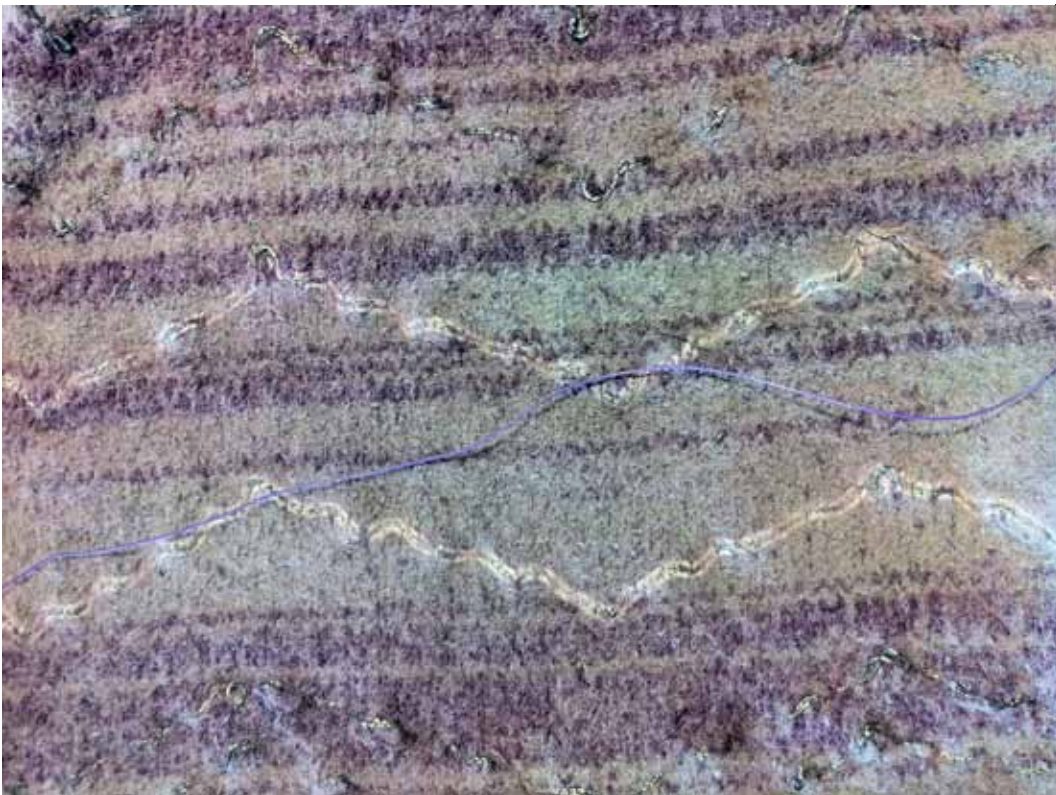
Electric Weave:



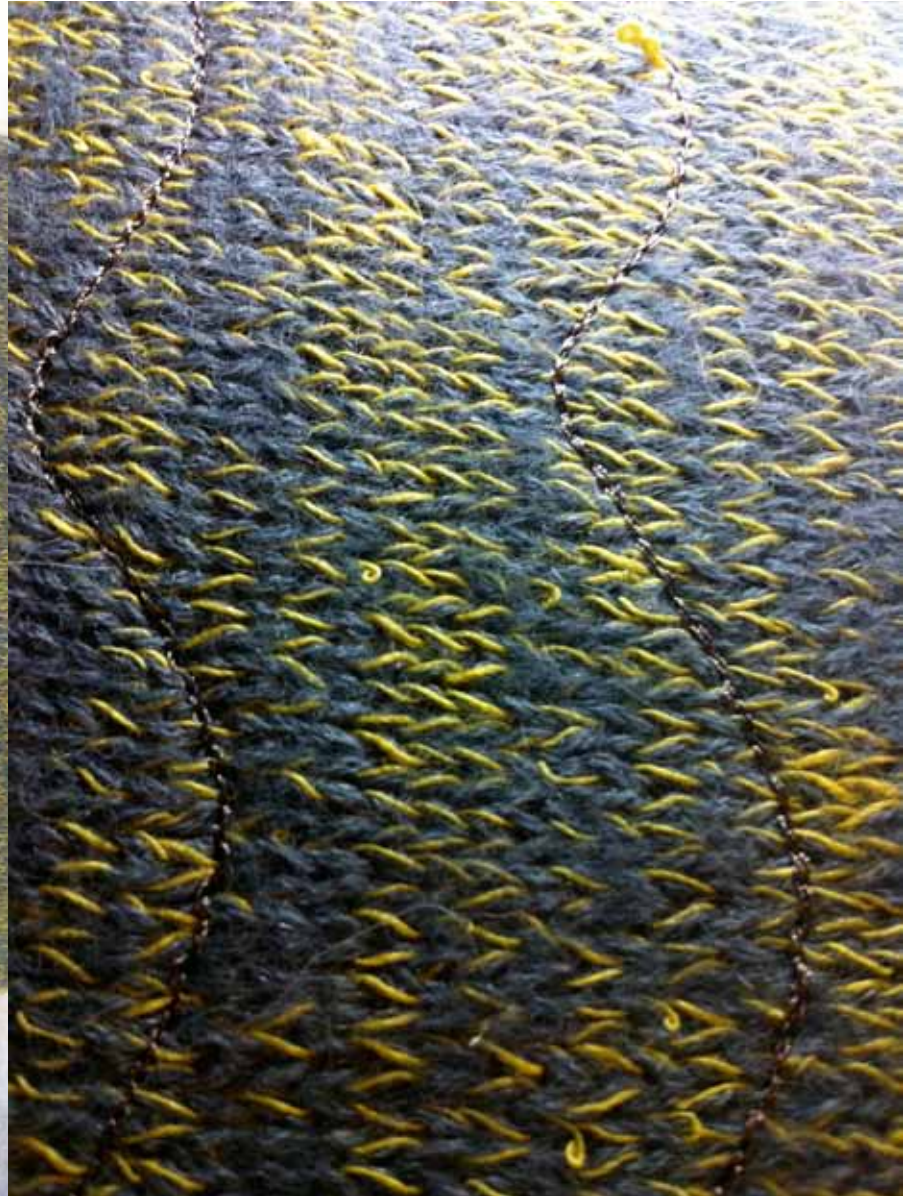
TESTS & EXPERIMENTS:



TESTS & EXPERIMENTS:



TESTS & EXPERIMENTS:



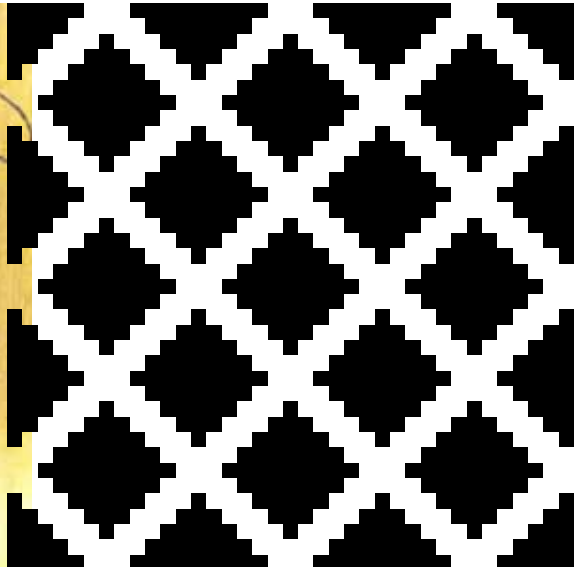
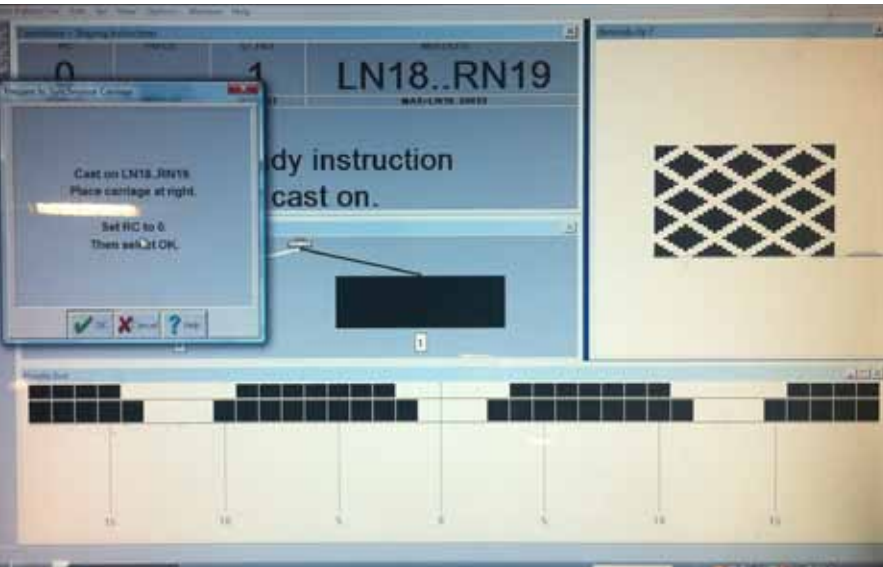
TESTS & EXPERIMENTS:



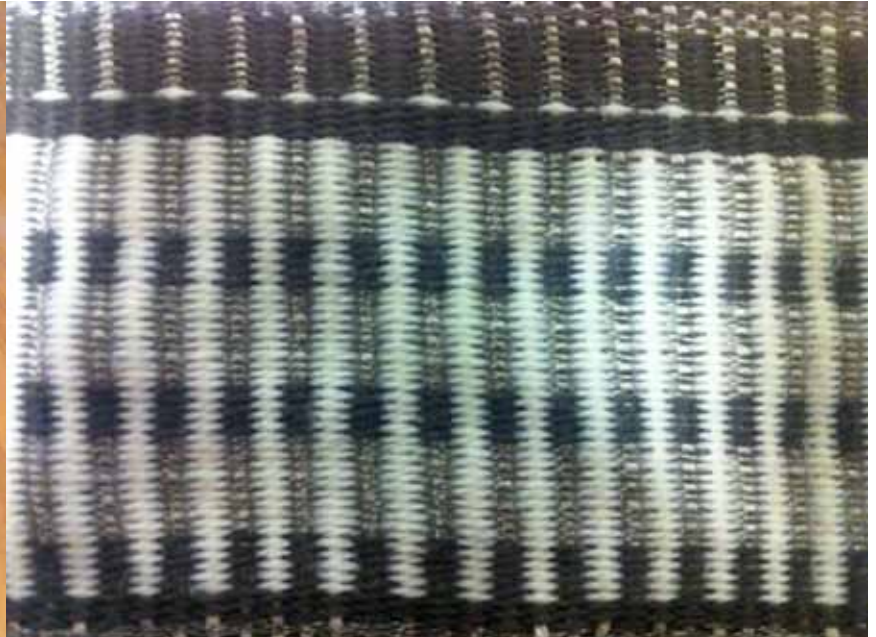
TESTS & EXPERIMENTS:



TESTS & EXPERIMENTS:



TESTS & EXPERIMENTS:



SYSTEM:

INPUT

24 hours of recorded Temperature data for 12. 2. 2011 sped up in order to see the change over one day in 2 minutes.

OUTPUT

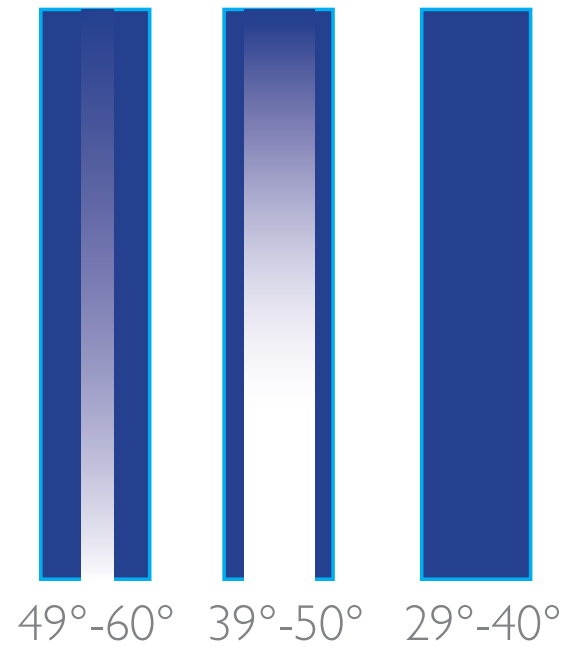
3 thermometric strips changing in secession depending on the temperature outside.

SYSTEM:

INPUT

44	38	50	35	41	45	46	56
44	39	47	36	42	43	44	
43	40	49	35	44	41	47	
41	41	50	36	45	40	47	
38	42	49	37	46	39	47	
35	43	47	37	47	40	48	
35	46	44	37	49	41	49	
35	47	41	38	48	42	52	
36	49	39	39	48	44	53	
37	49	37	40	47	45	54	

OUTPUT



**A strip turns white when the outside temperature falls into its temp. range.*

PROCESS:



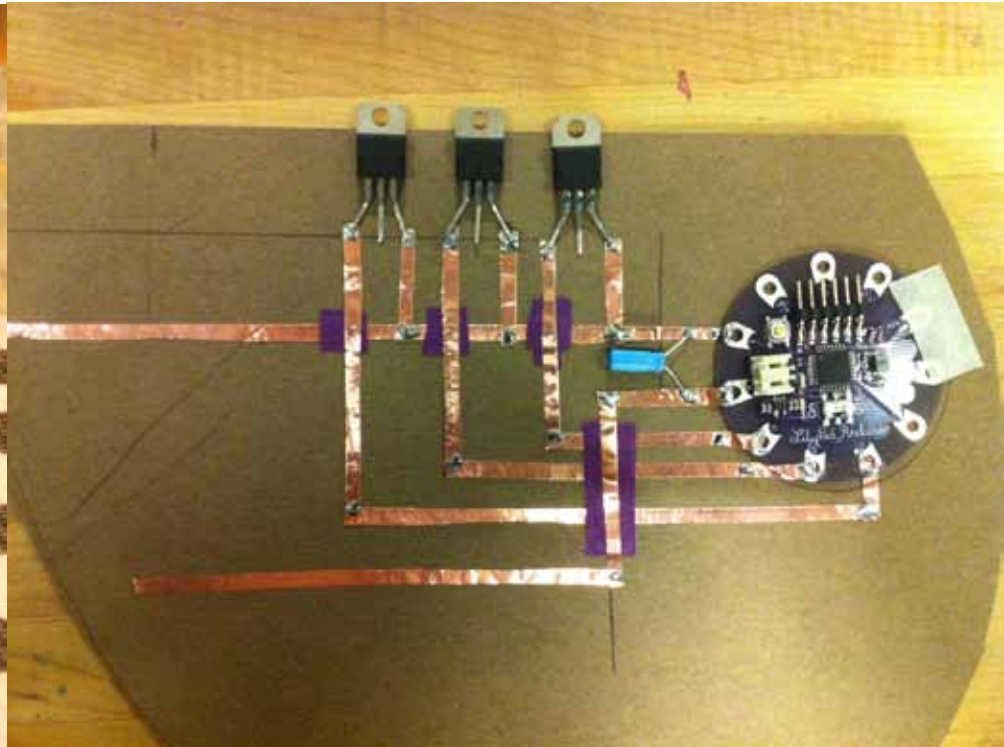
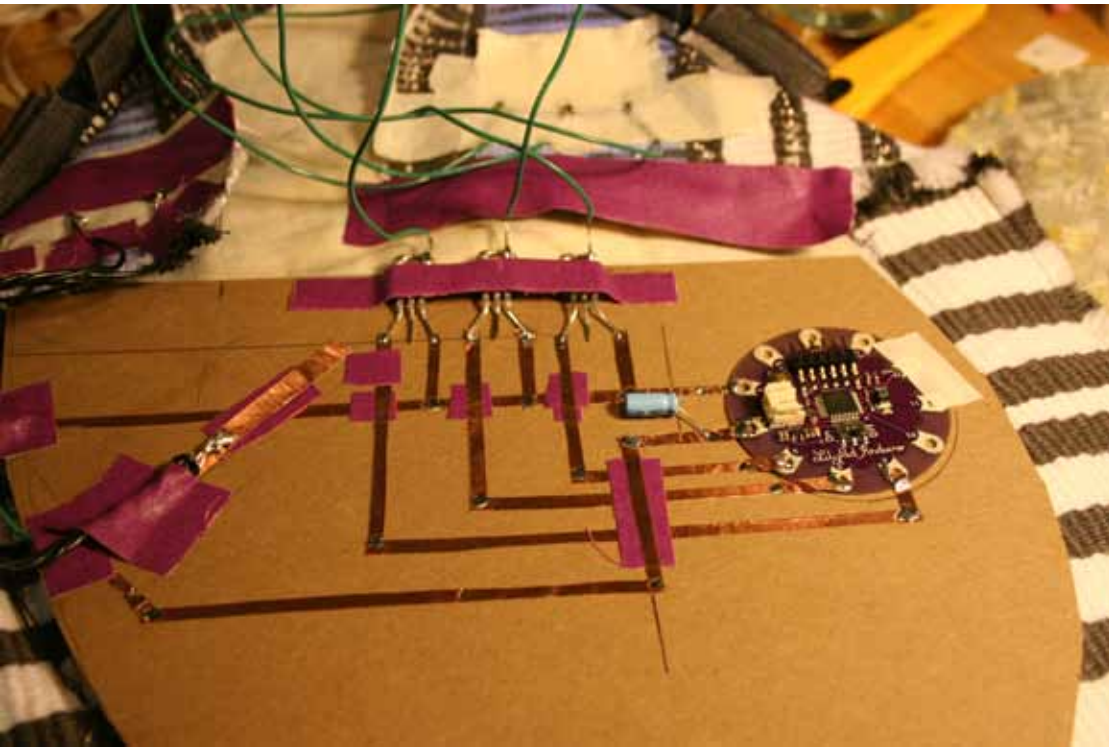
PROCESS:



PROCESS:



PROCESS:



PROCESS:

The image displays two side-by-side screenshots of code editors. The left editor is the Arduino IDE, titled 'ThermochromicFabricArduino7 | Arduino 1.0'. The right editor is the Processing IDE, titled 'ThermoFabric4 | Processing 1.5.1'.

```
int inComingCharacter = 0; // incoming serial byte
//int inComingData[10] = {'A'};
int inComingNumber;
long i;

void setup(){
  Serial.begin(9600);
  pinMode(13, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(9, OUTPUT);
}

void loop()
{
  // if we get a valid byte, read analog ins:
  if (Serial.available() > 0) {
    inComingNumber = Serial.read();
    Serial.write(inComingNumber);
    digitalWrite(13, HIGH);
    delay(100);

    if (inComingNumber > 29 && inComingNumber < 40){
      digitalWrite(5, HIGH);
      digitalWrite(6, LOW);
      digitalWrite(9, LOW);
    }
  }
}
```

```
import processing.serial.*;

String[] temp;
int index = 0;

Serial myPort; // The serial port
int[] serialInArray = new int[3]; // Where we'll put what we receive
int serialCount = 0; // A count of how many bytes we receive
boolean firstContact = false; // Whether we've heard from the microcontrol

void setup(){
  temp = loadStrings("positions_2.txt");

  println(Serial.list());
  myPort = new Serial(this, Serial.list()[0], 9600);
}

void draw() {
  if (index < temp.length) {
    String[] pieces = split(temp[index], '\t');
    println("Sent: " + pieces[0]);
    myPort.write(int(pieces[0]));
  }
  // Go to the next line for the next run through draw()
  index = index + 1;
  delay(5000);
}
```

At the bottom of each editor window, there is a status bar. The left status bar shows '1' and 'LilyPad Arduino w/ ATmega328 on /dev/tty.usbserial-A700eHVV'. The right status bar shows '1'.

CHALLENGES:

1. Power: *(less voltage and more amps)*.
2. Mosfets: Burning a few out, not getting enough power from the LilyPad pin to activate the mosfet *(3v instead or 5v)*.
3. Programing: sending and reading data of the same type.
4. Weave: low resistance (the stripe would not heat up, a few threads were isolated).
5. Dye: washability, tested different techniques.

FUTURE EXPANSION:



1. Wireless: eliminate the USB to LilyPad and use Xbee instead.
2. Consider other applications: wall coverings, window treatment.
3. Implication other systems discussed: clear, partly cloudy and cloudy. Imagery?

Demo

THANK YOU.