



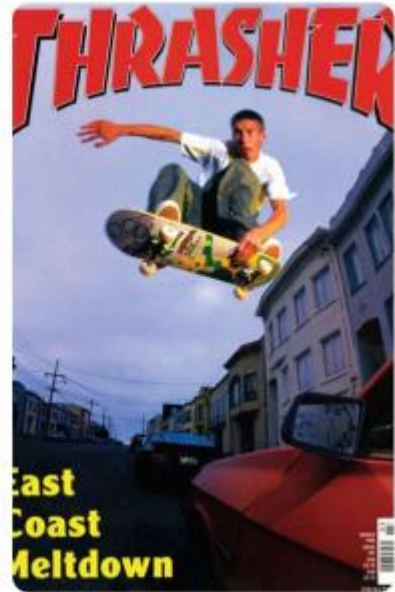
Project Documentation



1 - All useful/helpful sites:

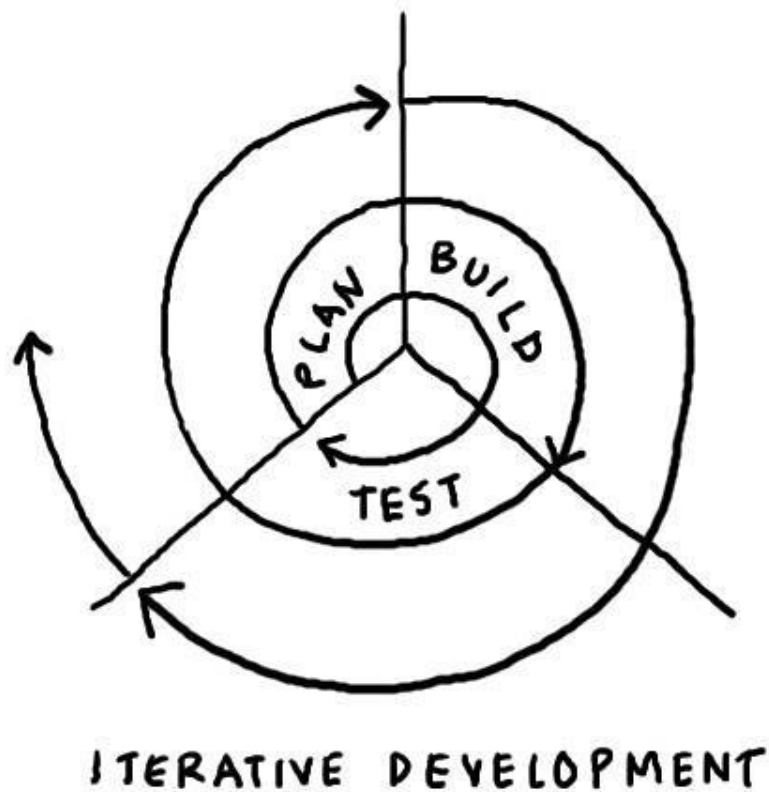
- [LED Controls](#)
- [Skateboard Ramp Design](#)
- [Understanding MPR 121](#)

Idea Formation



- Project idea started from being awe-struck when seeing the street lights on the motorway in the first image.
- I felt compelled to include a light effect in my work and I decided to adapt it by using a skateboard ramp.
- As the project required an input/output, I looked back at my course materials and week 5's topics (titled : Materials, Conductivity and Capacitance) aligned best with my idea. I chose to make a ramp with a LED strip attachment that lights up when the skateboard makes contact.

Iterative design

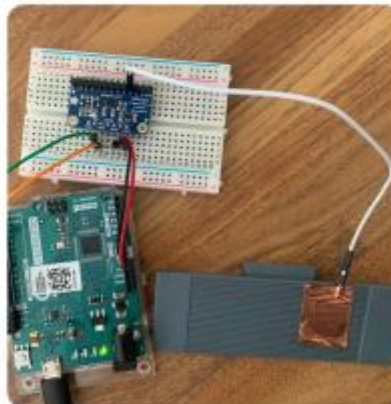
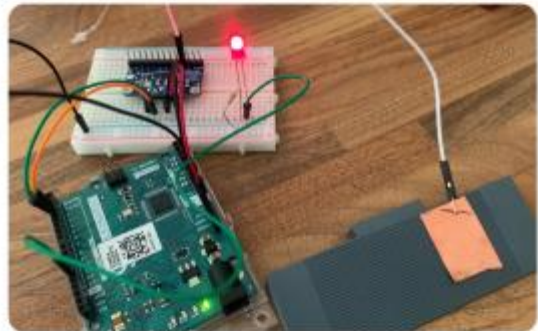
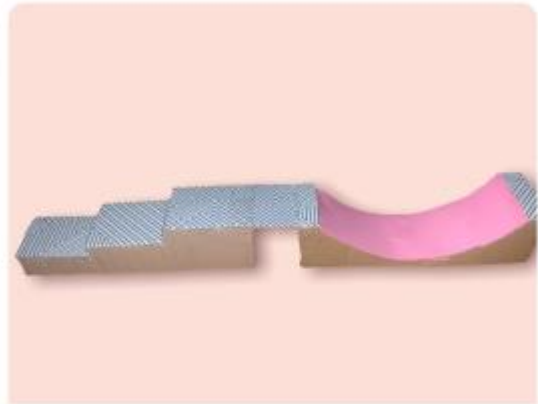


To check for the required items, I asked the technical team. Also, to research how the ramp will light up when the board connects, I re-read the weekly lectures.

I broke down the building of the circuit into 5 sections:

1. Attach one light to a piece of wood to ensure it works by touch
2. Build a connection between the piece of wood and the skateboard
3. Attach a LED strip to the circuit
4. Build the ramp
5. Make the ramp conductive so it completes the circuit when skateboard touches

Development process





<https://sway.office.com/mN8TIHXX81FktJ6R#content=KqAR517u69DmtU>



<https://sway.office.com/mN8TIHXX81FktJ6R#content=2v8vog4U7dOgIk>

Coding & Building circuit

As I was building my project, many components I initially planned to use eventually changed. I quickly realized using an ultrasonic sensor to make the board and ramp connect wasn't best suited. It would've been difficult to track the location of the board as it moves across the ramp and further away from the sensor. Applying conductive paint onto the wheels was not suitable because it has a high resistance and was difficult to apply onto the wheels. I replaced it with copper tape thanks to its low resistance and easy application onto the wheels.

Components needed to build project:

1. MPR 121
2. Copper Tape

3. Wires & Exposed wires(so conductivity from person transfers to tape to wheel)

4. Neopixel LED strip

In terms of the code, I researched and referenced parts of the MPR 121 example code to help detect when the user touches the pins. This allowed me to match the LED strip in the direction of the skateboard.

As the skateboard goes across the ramp, the color on the LED changes from a pink to blue hue. Another different effect is when the user touches the pole, two colors appear on the LED, on opposite ends, and they interchange with each other as they pass through.

Building Ramp

The ramp is made from cardboard and paper. I followed a tutorial to understand the architecture and tweaked it to create my own design. Also, I added graffiti to create a more realistic atmosphere.





Possible Improvements



Dependent on the position the board is on the ramp, the LED's position could match so if the skateboard starts in the middle then the middle lights should turn on.

In terms of the design aspect, it would be good to make the ramp wider so there is enough space to tricks.