

introduction to
**Digital
Electronics**

This Time with Feeling!

MIT ILLUMINATIONS SEMINAR

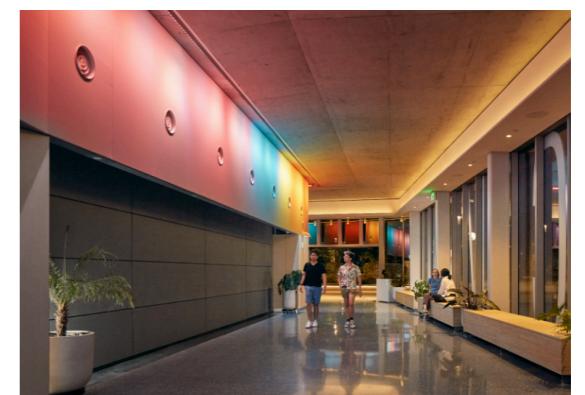
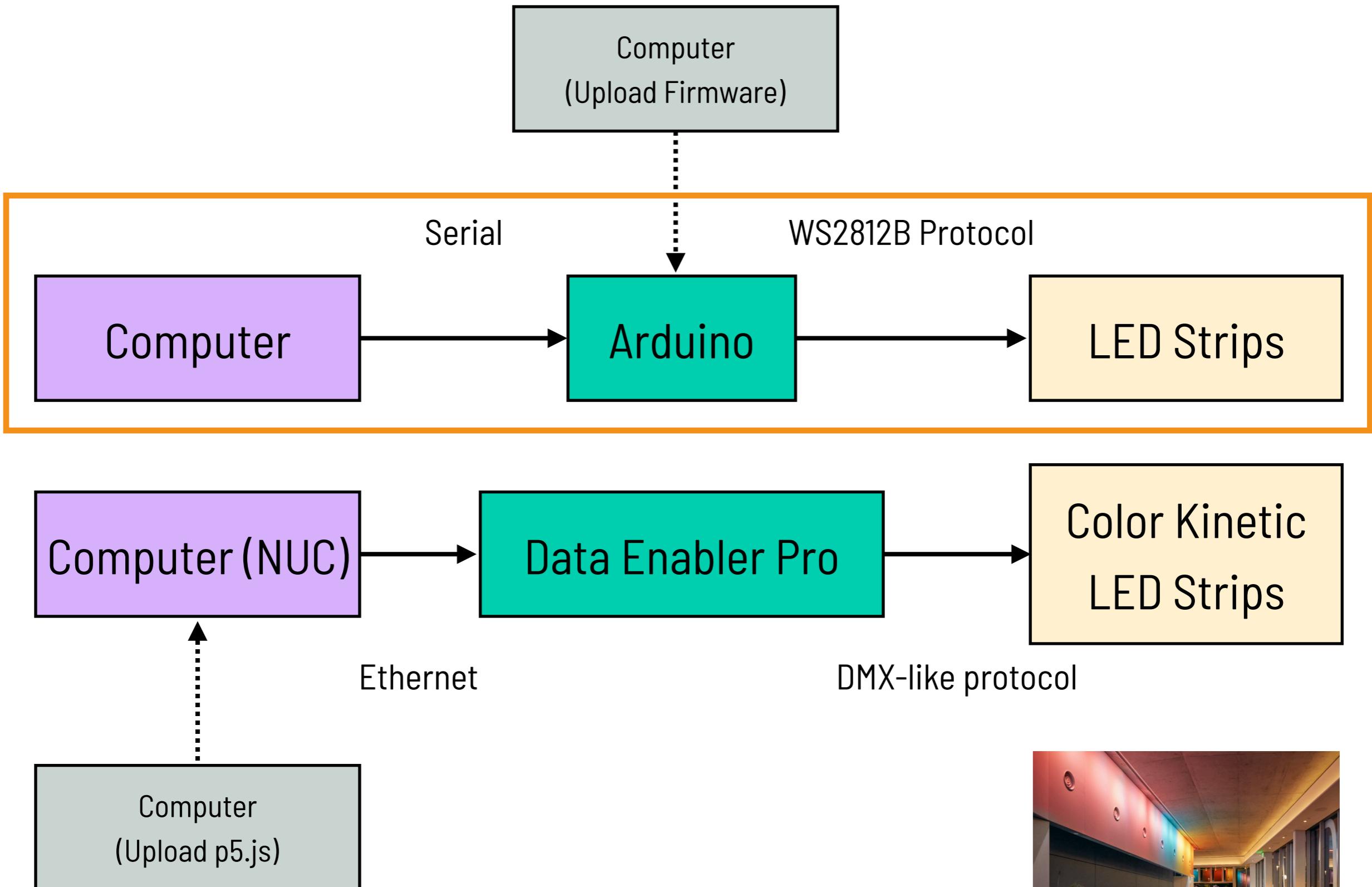
Today

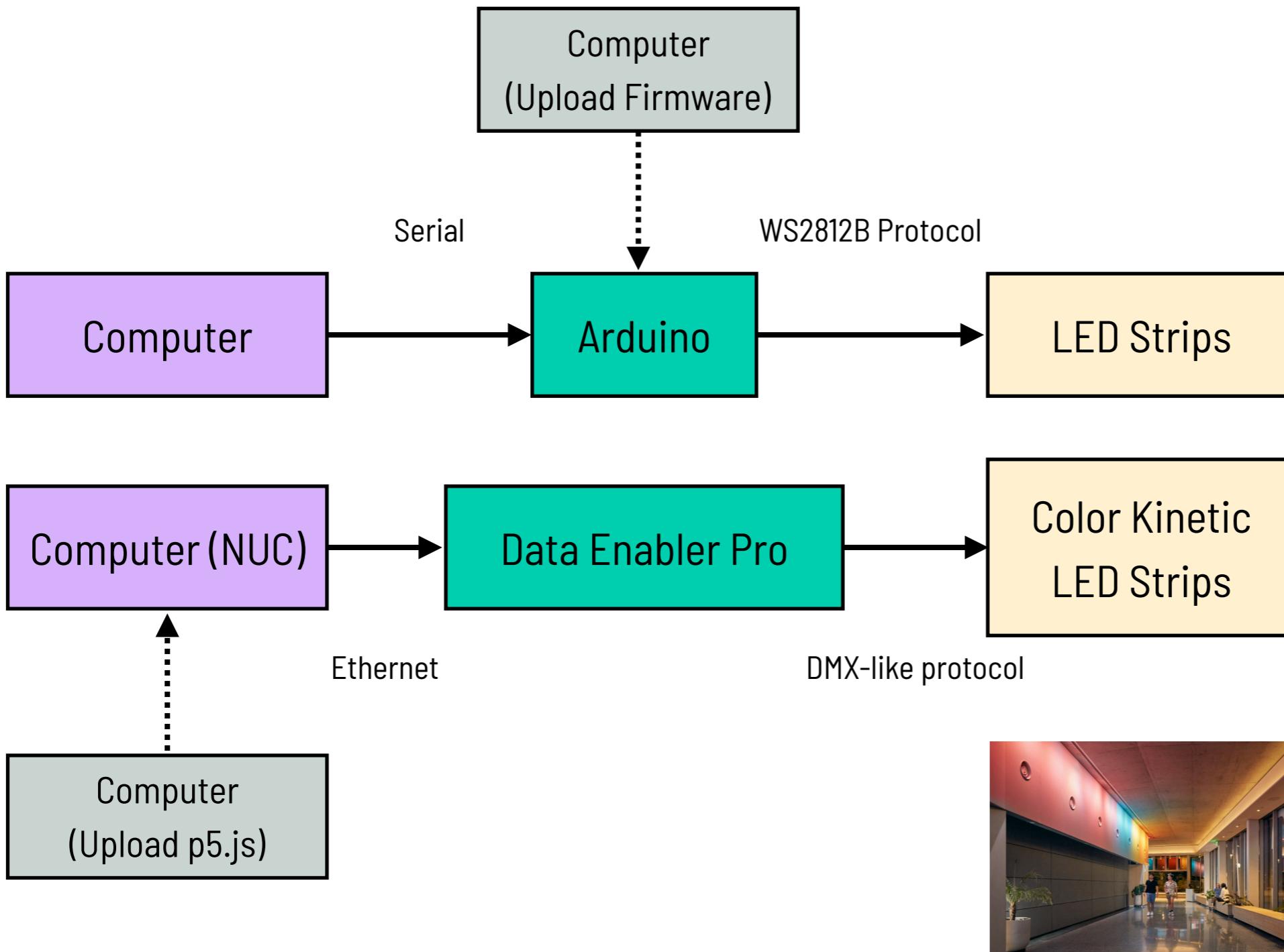
Recap

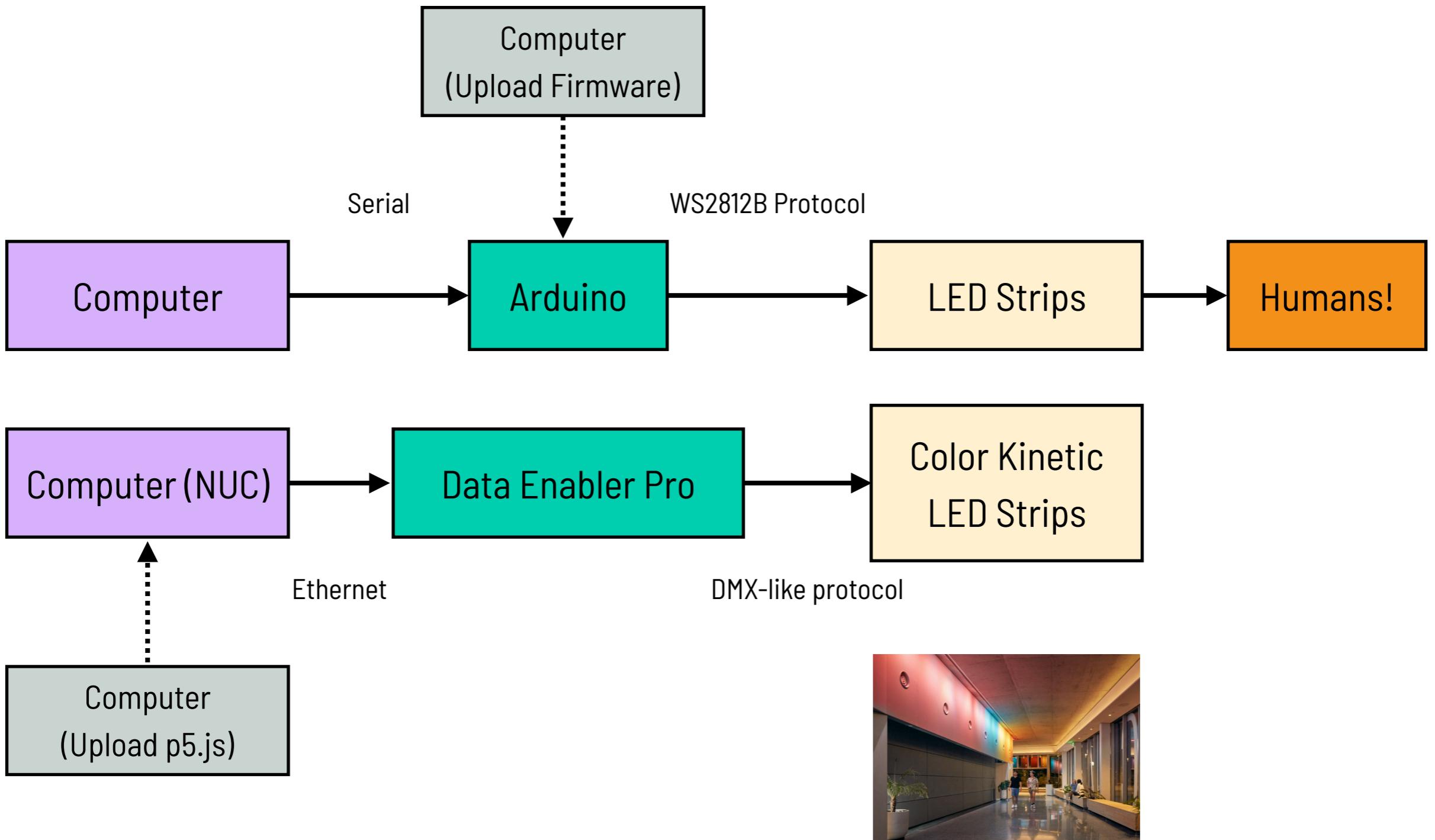
Intro to Accessibility

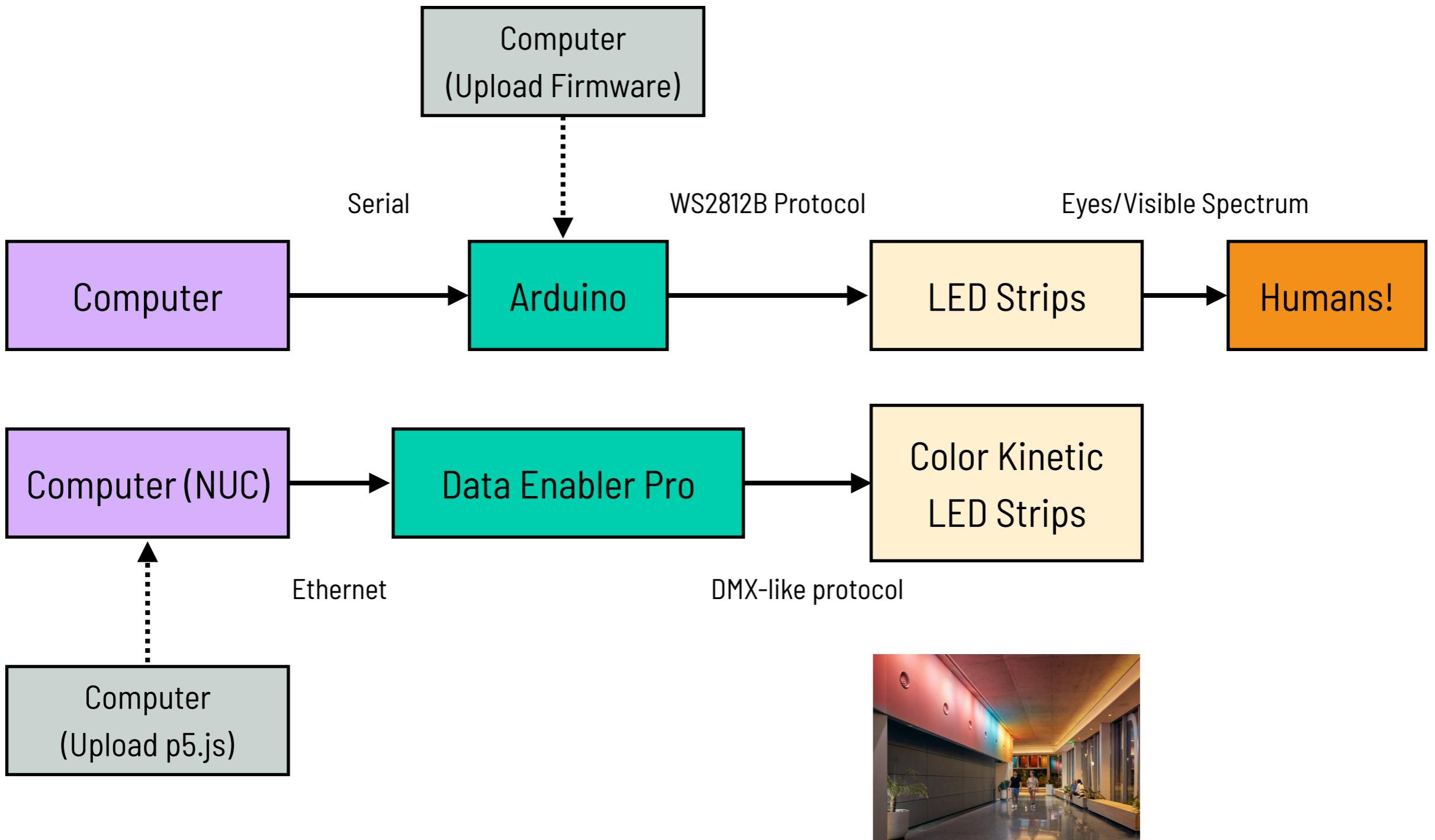
Intro to Emotional Design

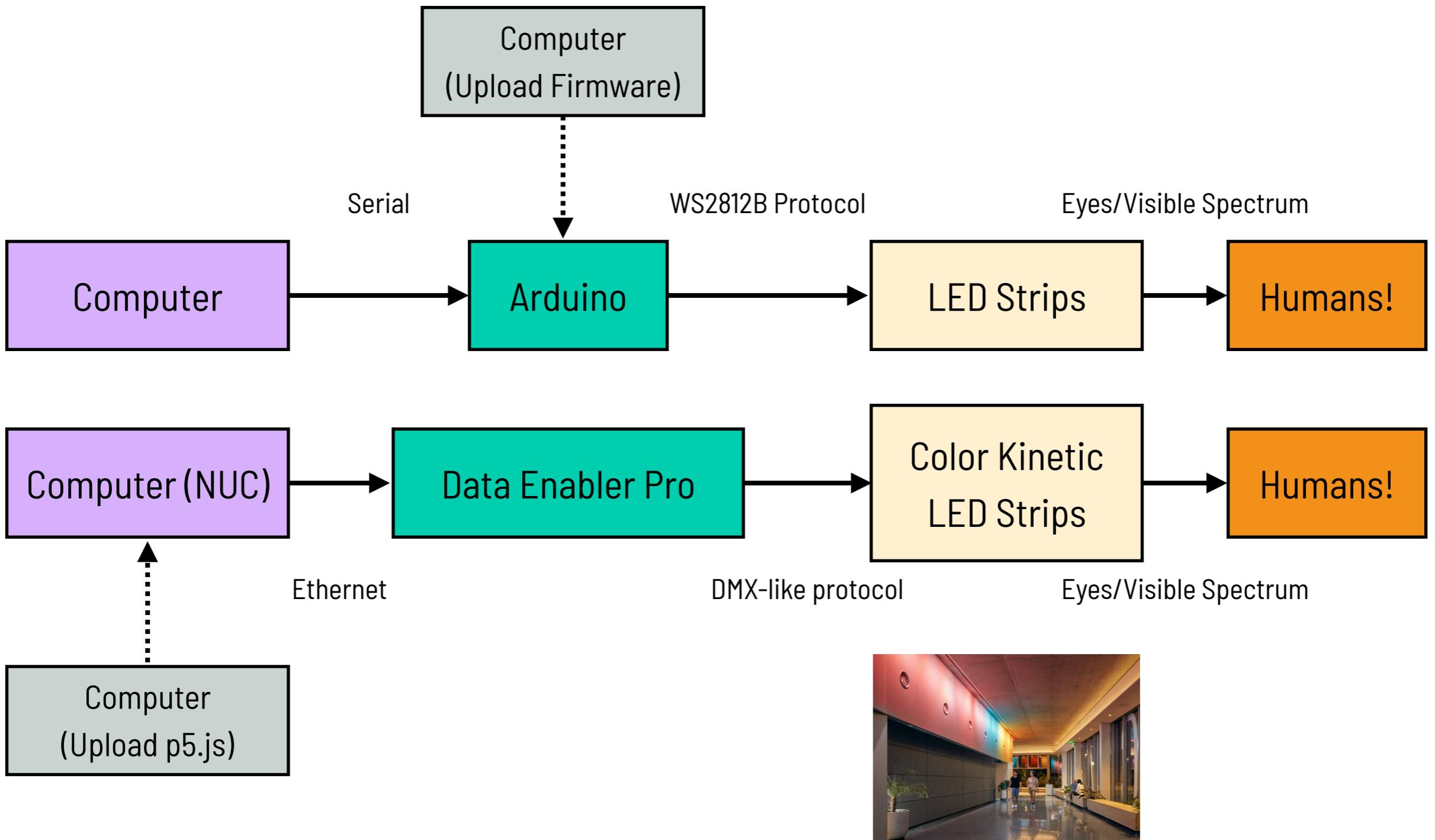
Time to work on Arduino & Node.js (from last time)











Recap!

Recap... of the Mini Quiz from last time!

Recap... of the Mini Quiz from last time!

1. What is the name of the LED strip we've been playing with? (no peeking!)

WS2812B

2. What does PWM stand for?

Pulse Width Modulation



3. When this code to the left is run (assuming the 'setup' function is correct), the lights turn on one at a time (100ms delay). It's **supposed** to wait 2000ms then turn off. But why doesn't it? How do you fix it?

```
FastLED.clear();  
FastLED.show();
```

2. Pulse width modulation
3. There is no FastLED.show();
after the last clear command.

Recap... of the Mini Quiz from last time!

1. What is the name of the LED strip

we've been using?

Miniquiz - Erick Liang

WS

2. What is

Pulse

1. W - - - -

(unimportant letters and numbers)

3. What is

(assumptions)

2. Pulse Wave Modulation

correction: after cleaning the LEDs, you
time: 3. It doesn't turn off because after cleaning the LEDs, you
wait: do not run FastLED.show() again, which is what actually updates
does: the LED lights to turn off.

FastLED

FastLED

TODAY'S MINIQUIZ

1. We're trying to power this 5V WS2812B Strip, and the Arduino isn't enough power. We'll need to source a power supply. Which should you use? Why?



**5V
10A**

2. What is one communication method used between Arduino & Laptop?

Power Supply 1

12V & 10A



Power Supply 2

5V & 15A



RECAP

Only works when sourcing for products with power requirement ratings:
e.g. LED strip. Does **not** work for a single LED!

Maximum current for the standard 5mm diameter LEDs is typically 20mA.

5V
10A

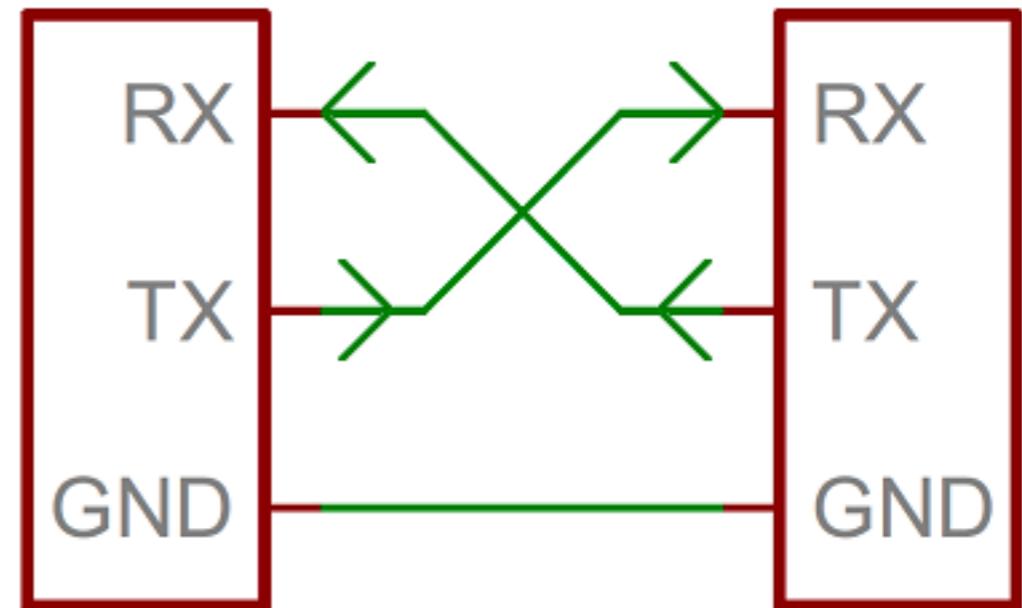
Power Supply 2
5V & 15A



RECAP

What is one communication method used between Arduino & Laptop?

Serial

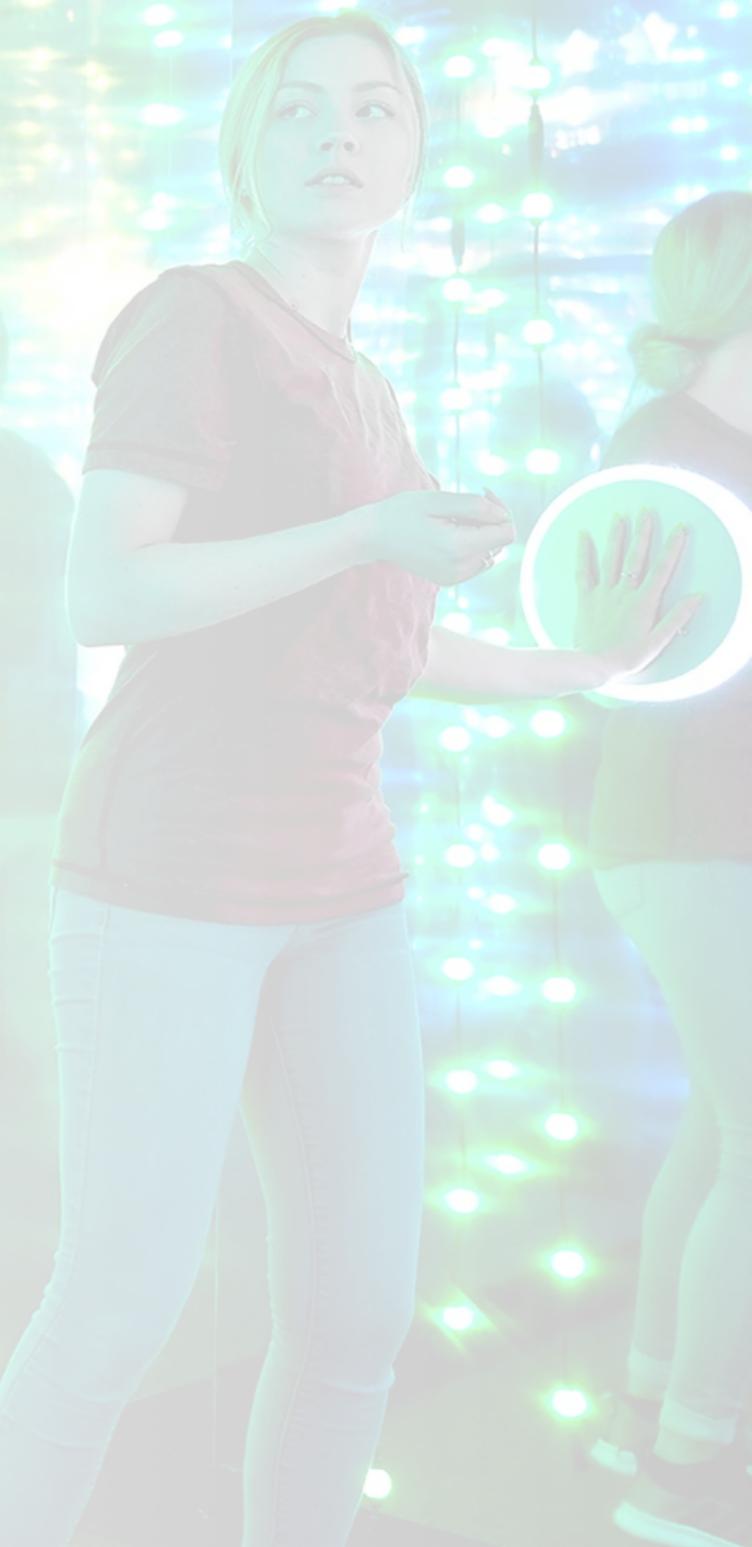


Accessibility

Considerations for your work when you're creating something for the public

MIT Disability & Access Services is a resource available to the community

It doesn't mean **not** doing something, it means being accommodating, providing access, and informing the user.



Photosensitive Epilepsy

Possible Triggers:

- Flashing or flickering lights or images between 3 and 60 hertz (flashes per second).
- Contrasting dark and light (often a geometric pattern) such as alternating black and white

Color Psychology



Color Psychology



Energy & Excitement
Passion
Urgency
Aggressiveness
Increased heart rate

Color Psychology

Love Excitement Strength Energy Passion	Confidence Success Bravery Creative Friendly	Opportunity Optimism Clarity Energetic Warmth	Nature Peaceful Quality Growth Health	Trust Peace Loyalty Tranquility Security
Compassion Sincerity Possibilities Assertive Nurturing	Wealth Noble Power Whimsy Ambitious	Dependable Rugged Practical Natural Comfort	Authoritative Classic Luxury Powerful Bold	Clean Honest Innocent Pure Hopeful

What parameters do we control?

Color/Hue

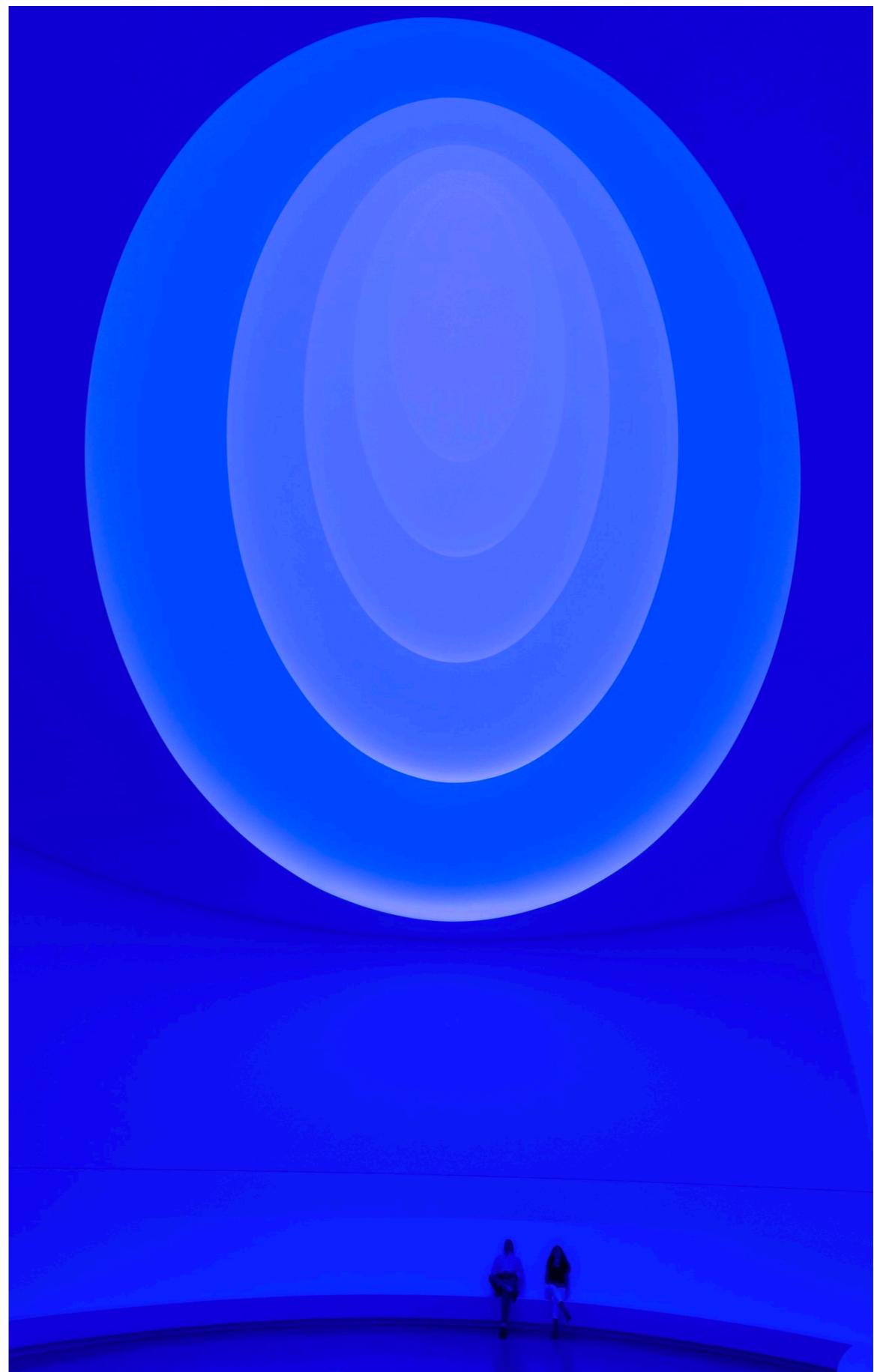
Intensity/Brightness

Location

Darkness & Light



James Turrell



What parameters do we control?

Color/Hue

Intensity/Brightness

Location

What parameters do we control?

Color/Hue

Intensity/Brightness

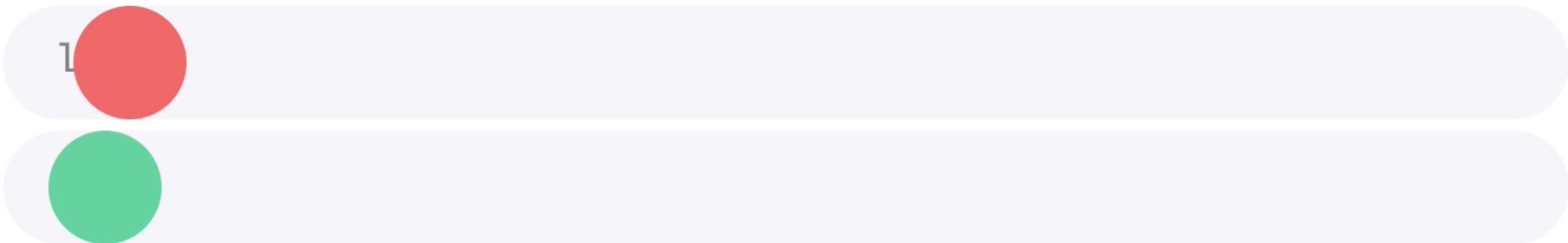
Location

Motion

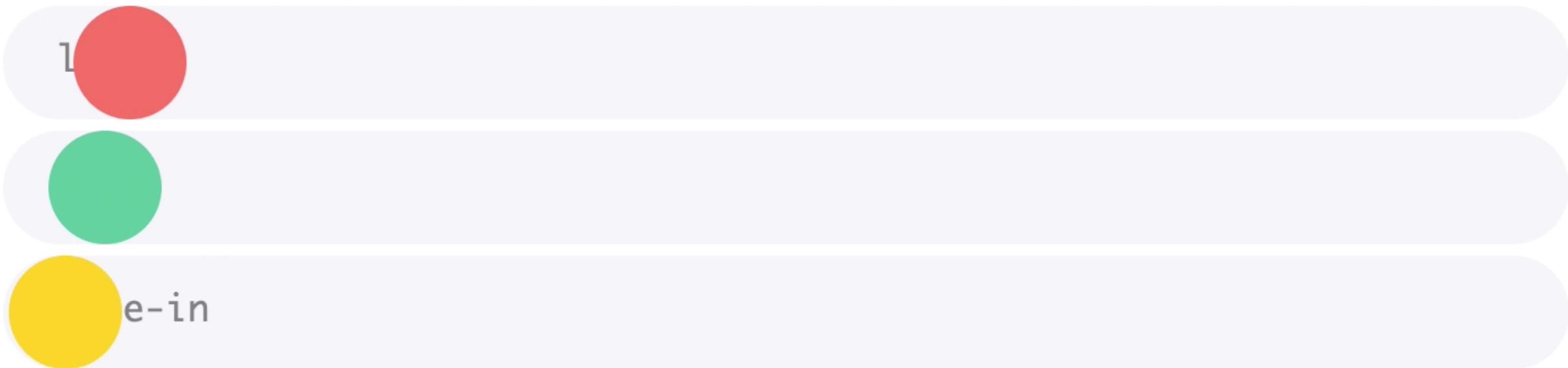
Easing



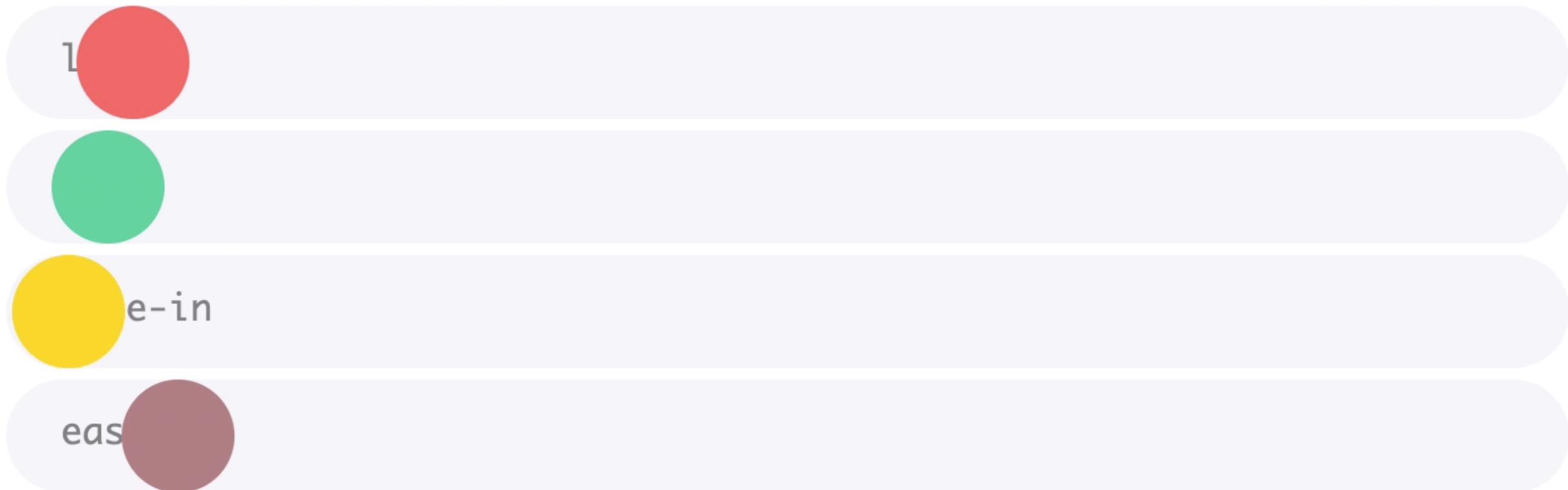
Easing



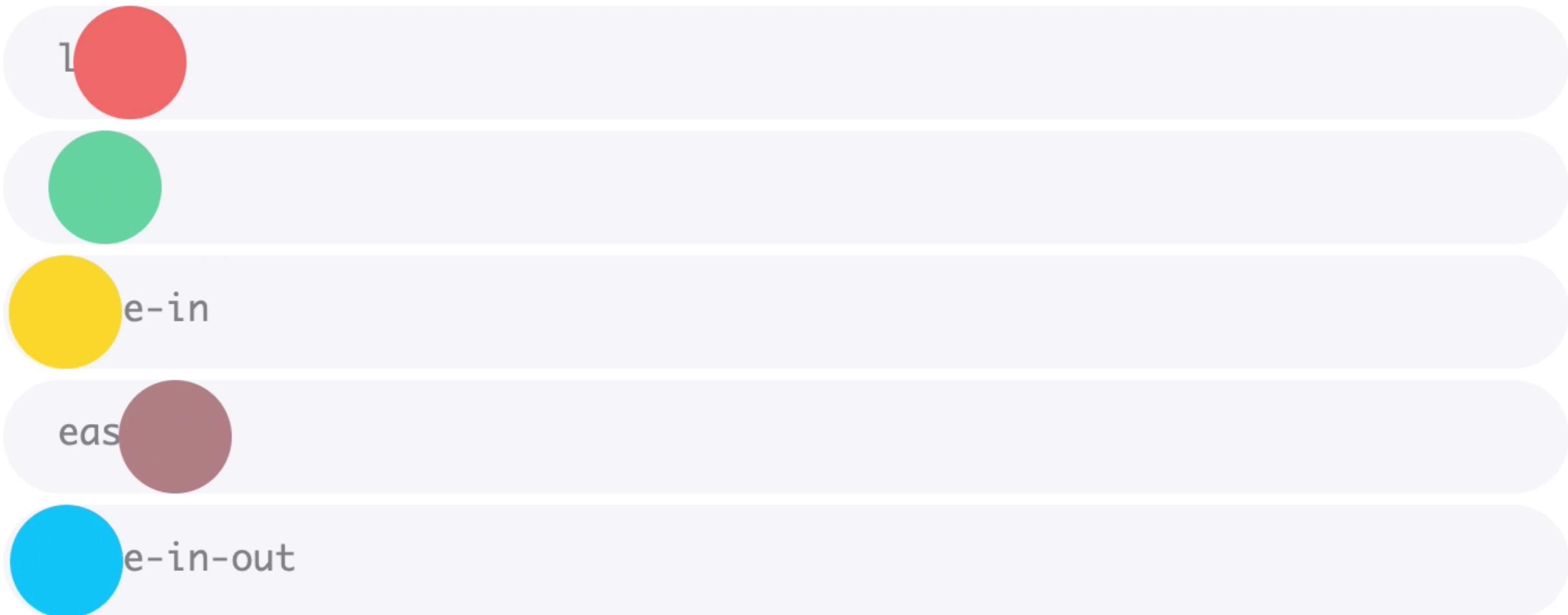
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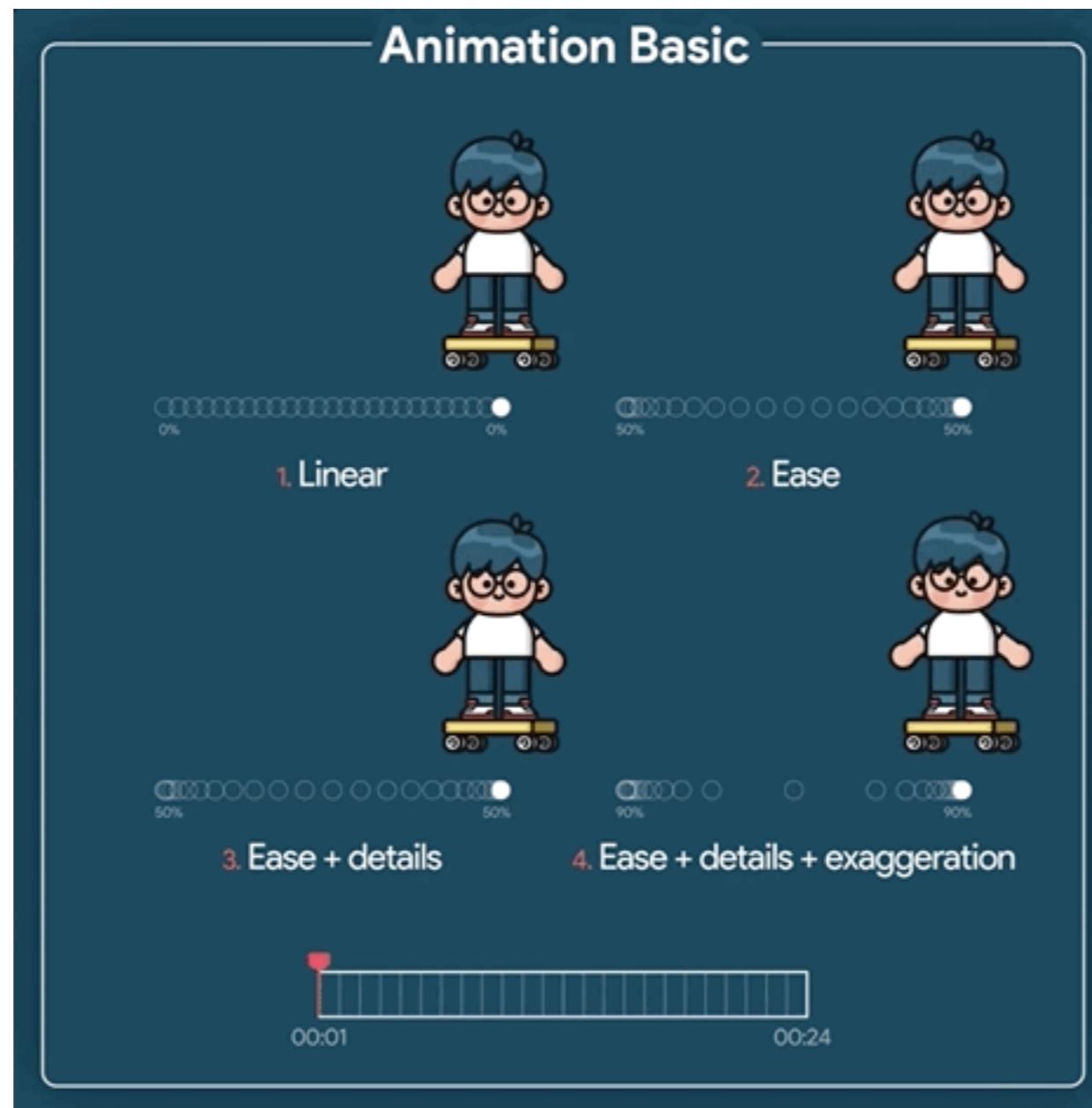
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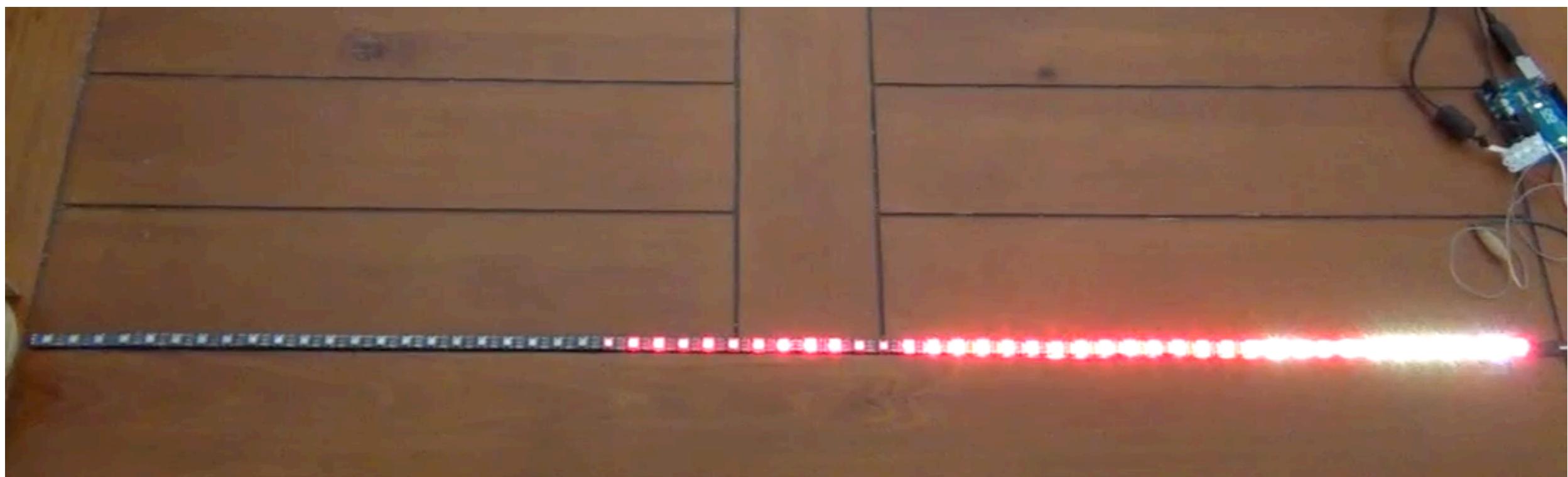
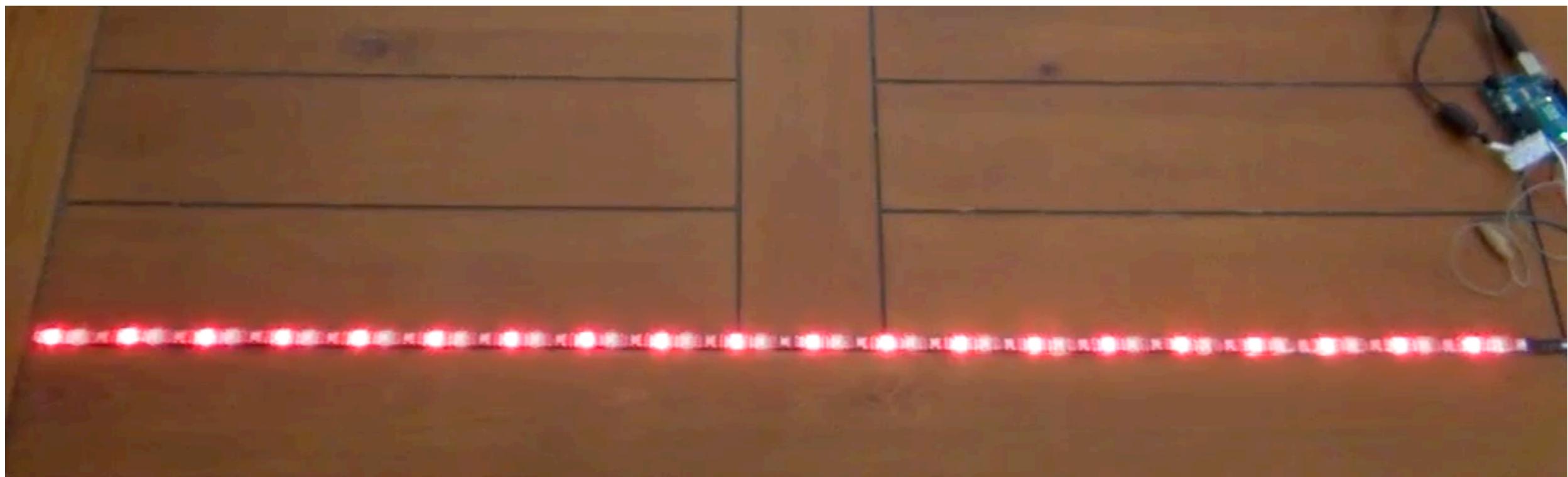
Easing



Animations



@deekaymotion



Link on learn.illuminations.mit.edu

It's your turn!

Randomly pick an emotion

Excited

Work with your team to create an LED effect that illicit that emotion (15-25 mins.) Spend a couple minutes brainstorming with your team, then implement and experiment!

Lonely

Confused

Stressed

Ecstatic

Everyone will go around to each team and vote

Jolly

Tranquil

An LA will take a video of each LED effect for later.

Confident

See you next week!

Tuesday is a student holiday! Enjoy!

Office Hours! On learn.illuminations.mit.edu. Come ask questions, hang out, etc.

We'll be on Slack if you have any questions or need any help!