

Intro to Physical Computing

Jeff Feddersen, ITP/NYU



Class 1 Agenda

- Welcome!
- Class overview
 - Big picture
 - Course logistics
- Your intros
- Intro fantasy device project
- Quick workshop tour
- [Break]
- Fantasy device group project
- Distribute parts
- Connect Arduino (if we have time)

(required class)

2022 Pcomp with Jeff!



2023 Pcomp with Jeff!



Purpose

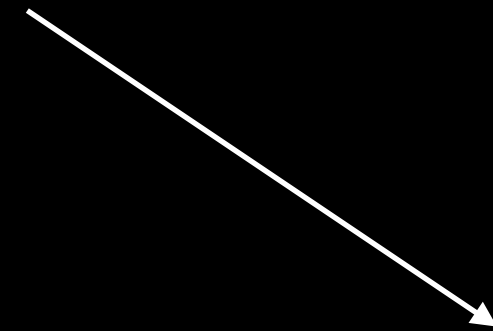
Support/Expand/Enable creative expression...

...with technology...

...focused on physical, embodied interaction.

Method

“...with technology”



Programming Microcontrollers and Circuits

to be Cool*

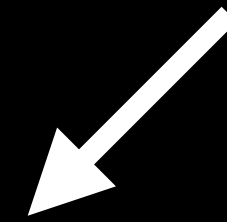
“Enable creative expression...”



“...focused on physical, embodied interaction.”

Circuits

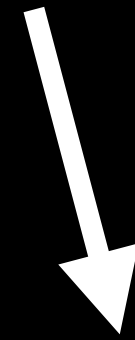
Programming Microcontrollers and **Circuits** to be Cool*



- Electrical properties (voltage, resistance)
- Basic components and simple circuits
- Breadboard prototyping
- Testing and measuring
- Handling higher power

Microcontrollers

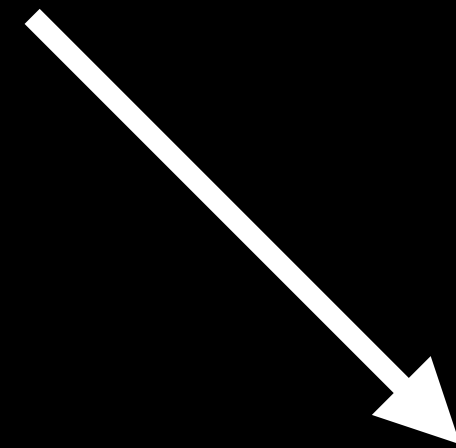
Programming **Microcontrollers** and Circuits to be Cool*



- Small cheap single-task computers
- Can sense and output voltages
- Fast (compared to us)

Programming

Programming Microcontrollers and Circuits to be Cool*



- Simple Development Tools
- Programming basics
 - Pseudocode
 - Variables, memory
 - Structure, control flow

to be Cool*

Programming Microcontrollers and Circuits **to be Cool***

to be Cool*

Programming Microcontrollers and Circuits **to be Cool***

*Up to you



Voice



AI

Metaverse



Brett Victor's
"Pictures under glass"

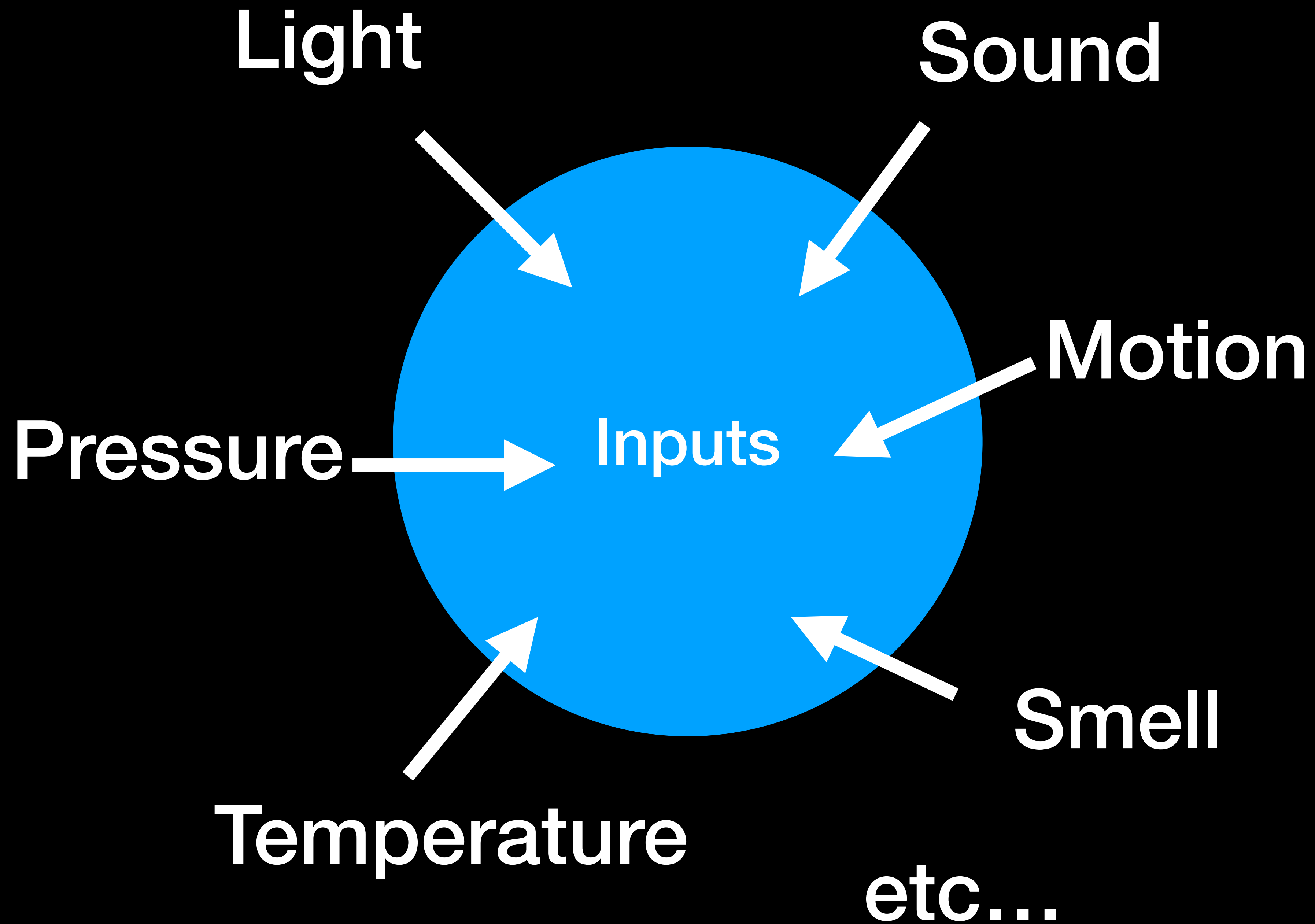


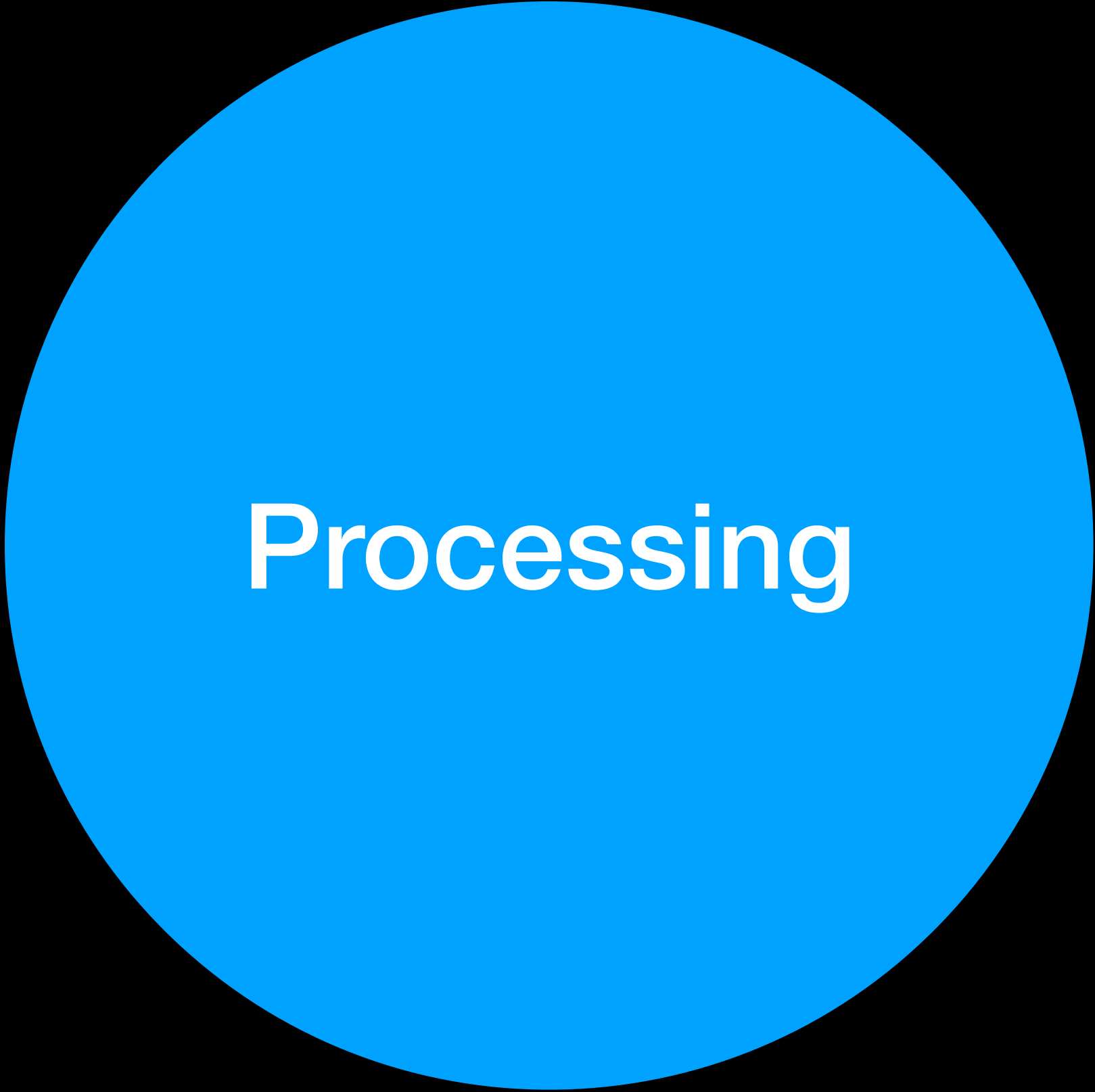




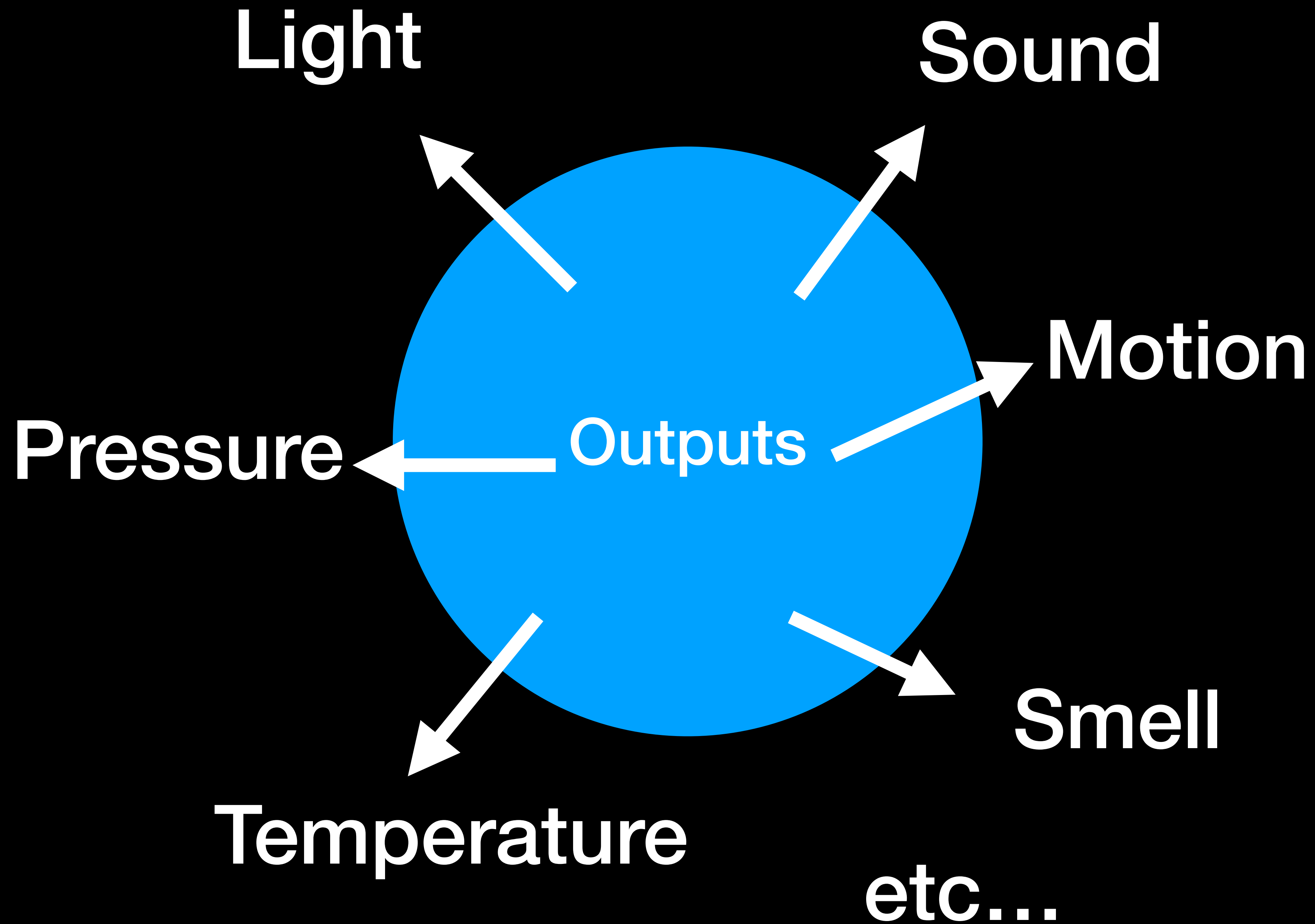


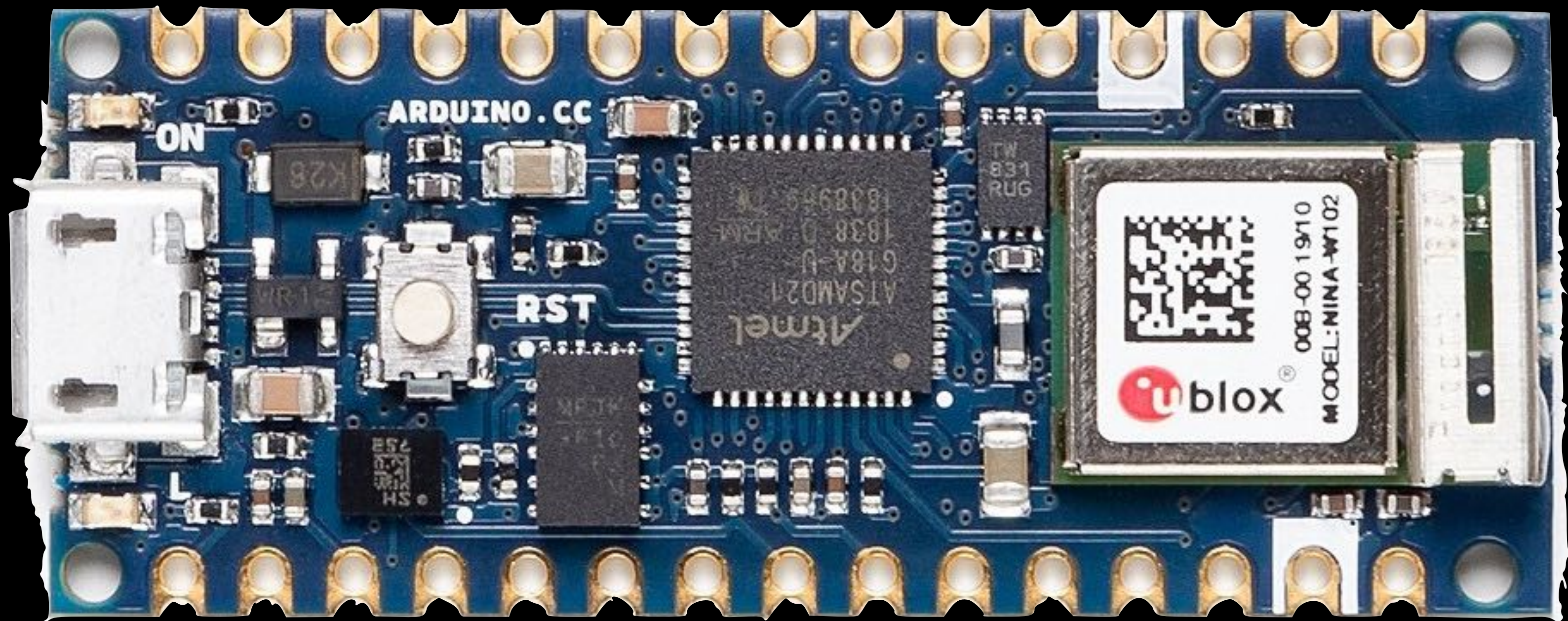


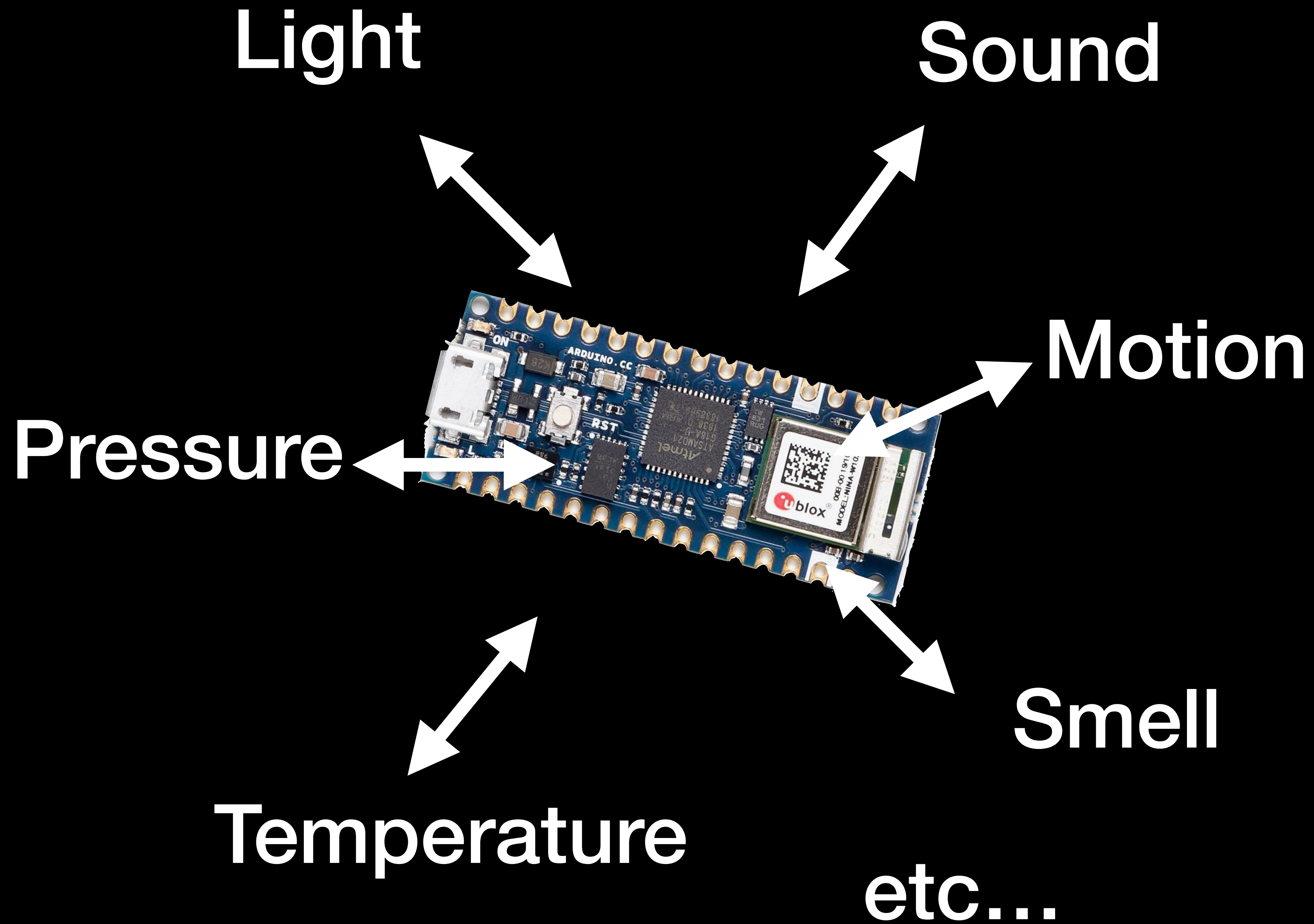


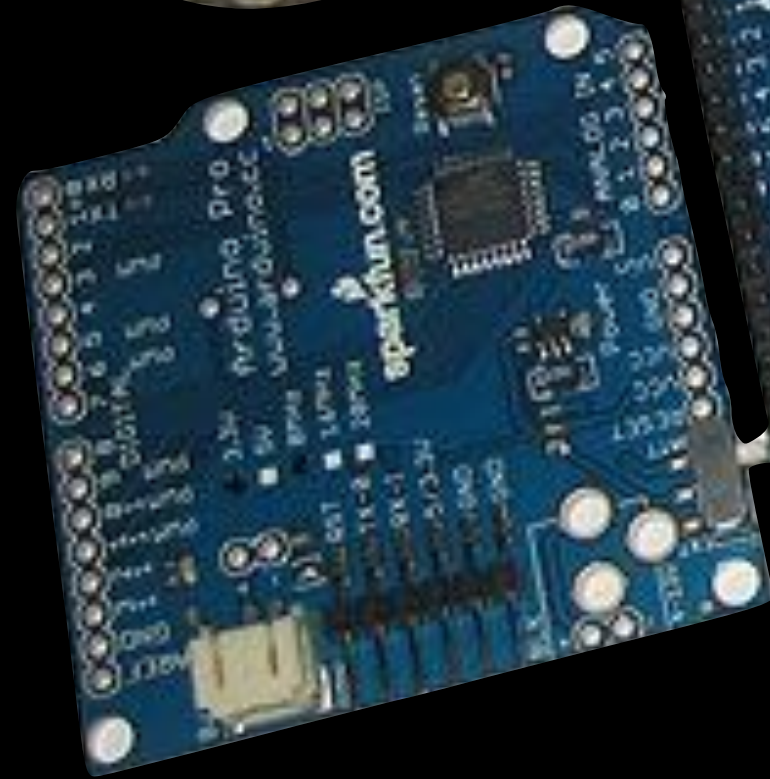
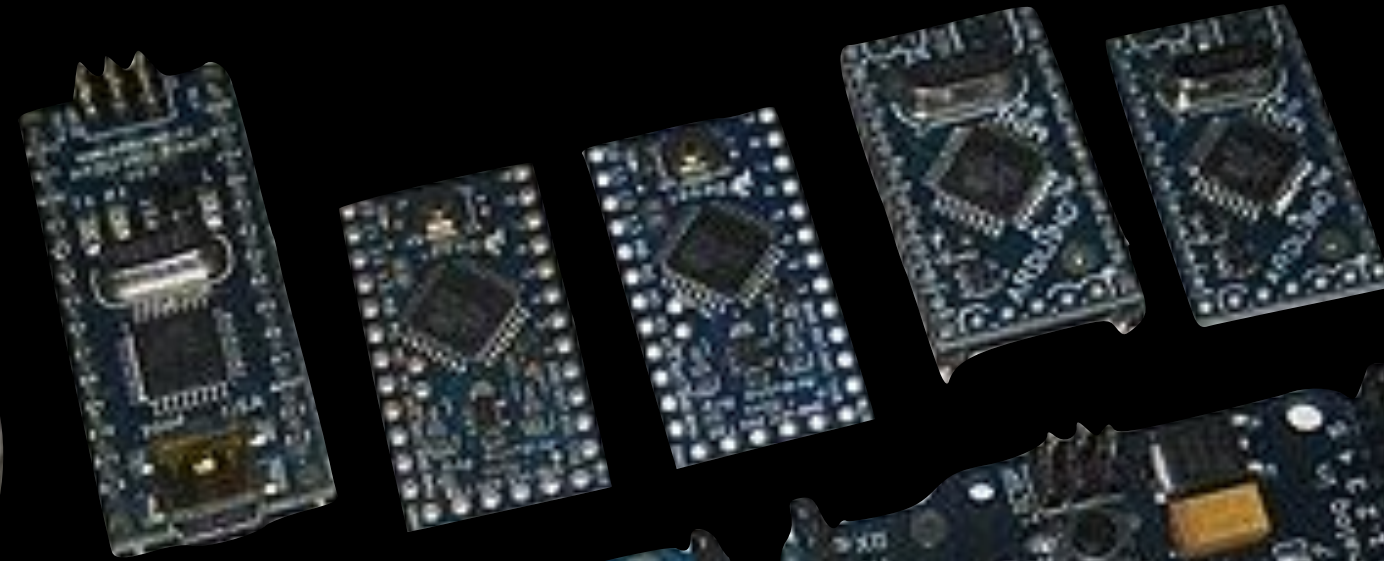
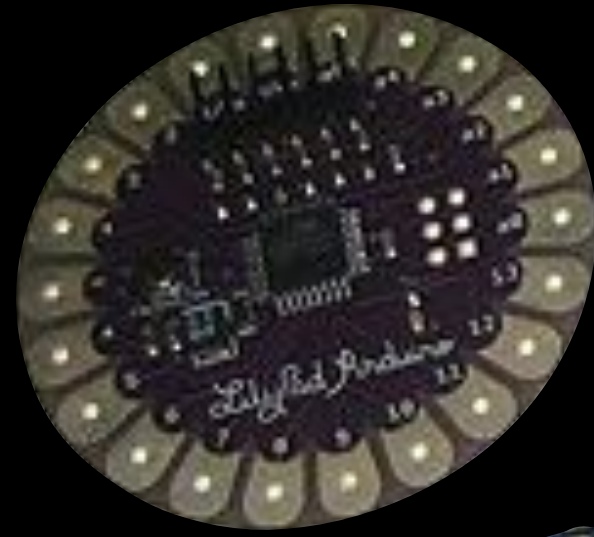
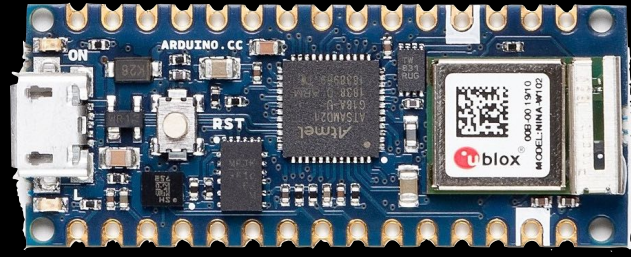


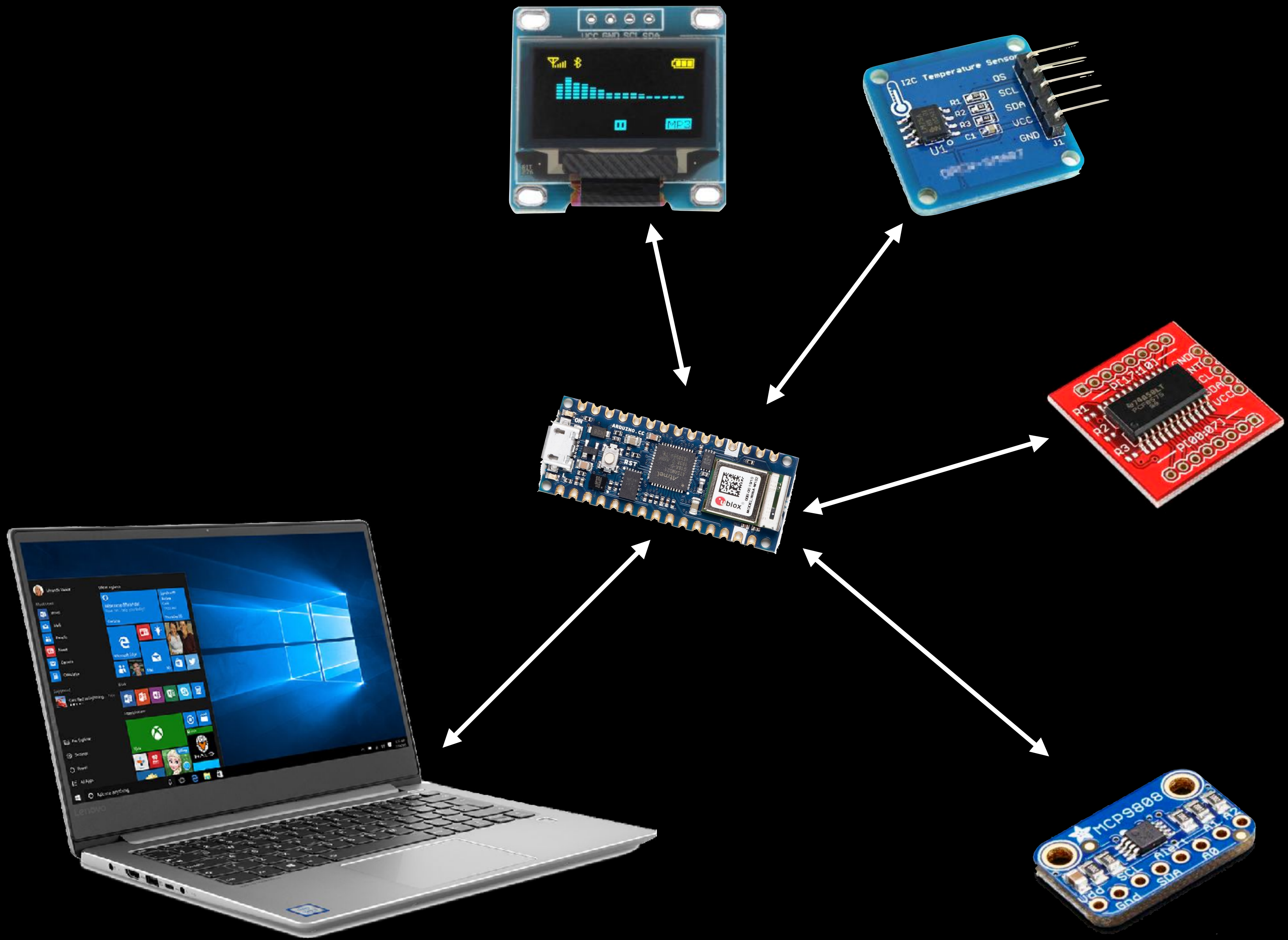
Processing



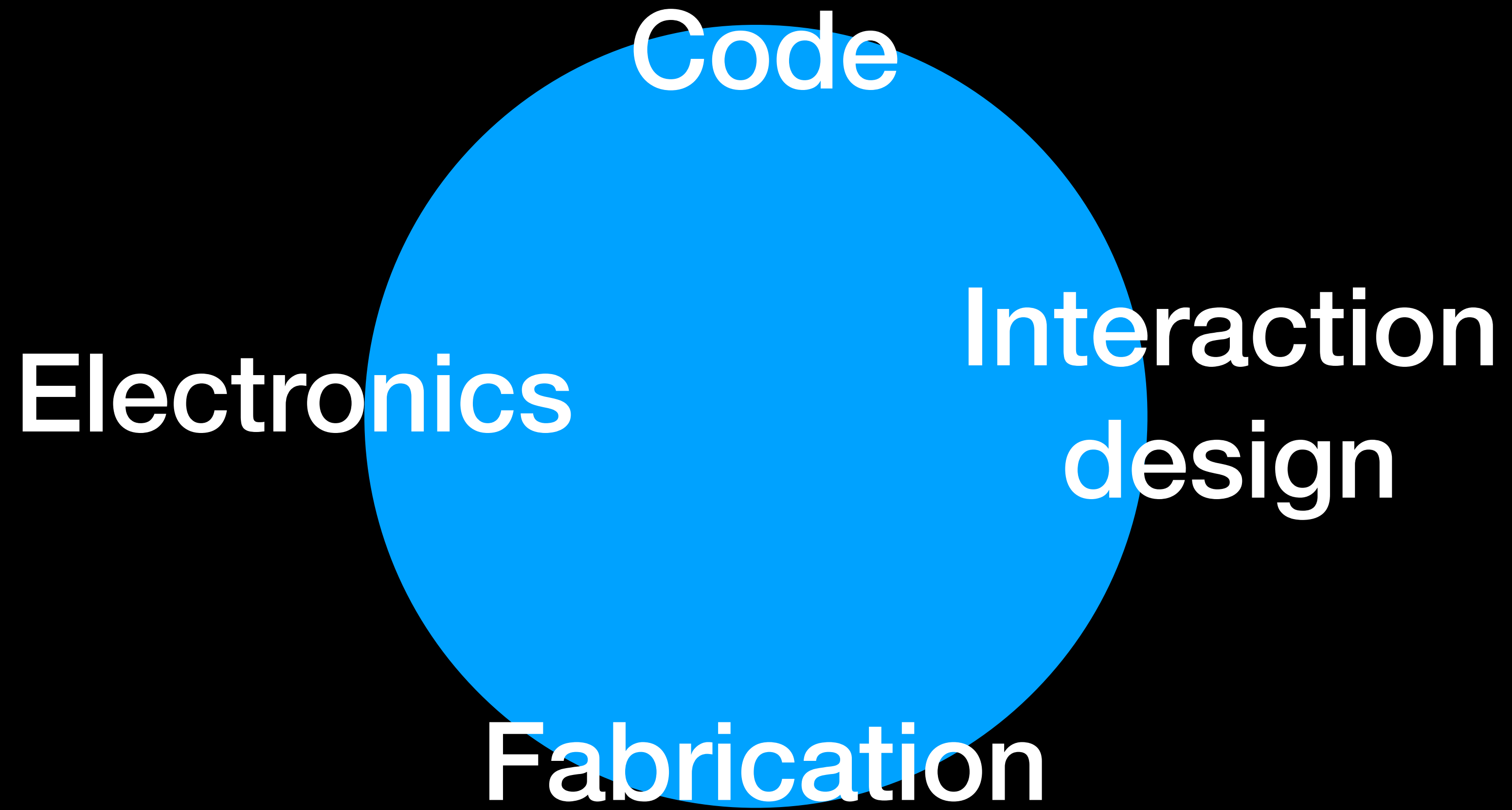








- Methods for handling larger projects
- Fabrication
- Play testing and User Testing
- Presenting and documenting



Code

The Unpredictable Abilities Emerging From Large AI Models

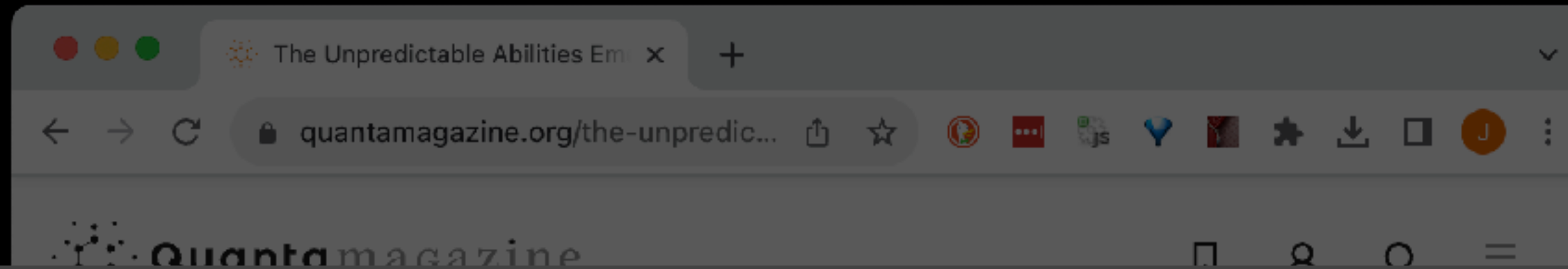
By STEPHEN ORNES

March 16, 2023

Large language models like ChatGPT are now big enough that they've started to display startling, unpredictable behaviors.

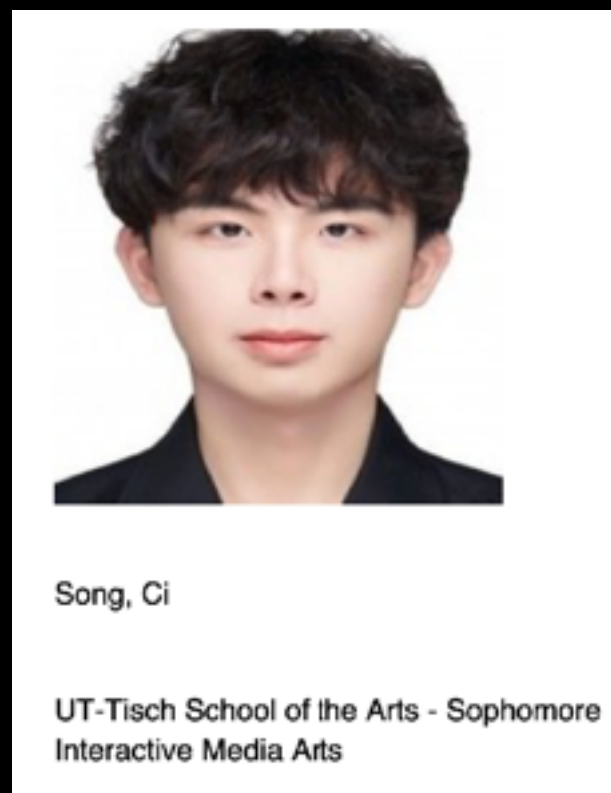
58

Code



Recent investigations like the one Dyer worked on have revealed that LLMs can produce hundreds of “emergent” abilities — tasks that big models can complete that smaller models can’t, many of which seem to have little to do with analyzing text. They range from multiplication to **generating executable computer code** to, apparently, decoding movies based on emojis. New analyses suggest that for some tasks and some models, there’s a threshold of complexity beyond which the functionality of the model skyrockets. (They also suggest a dark flip side: As they increase in complexity, some models reveal new biases and inaccuracies in their responses.)





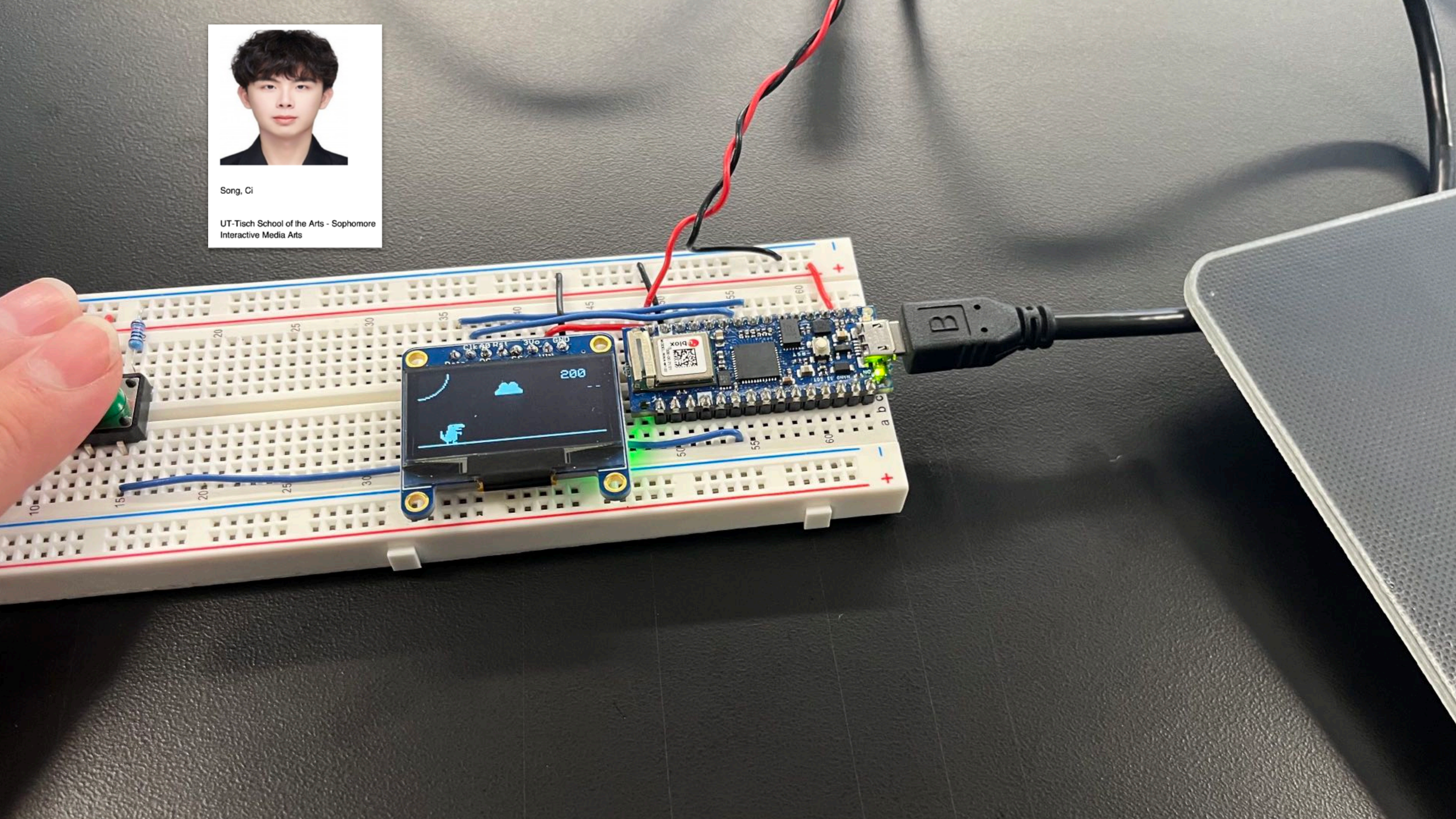
Ci was an undergraduate student in my 2022 IMA Energy course.

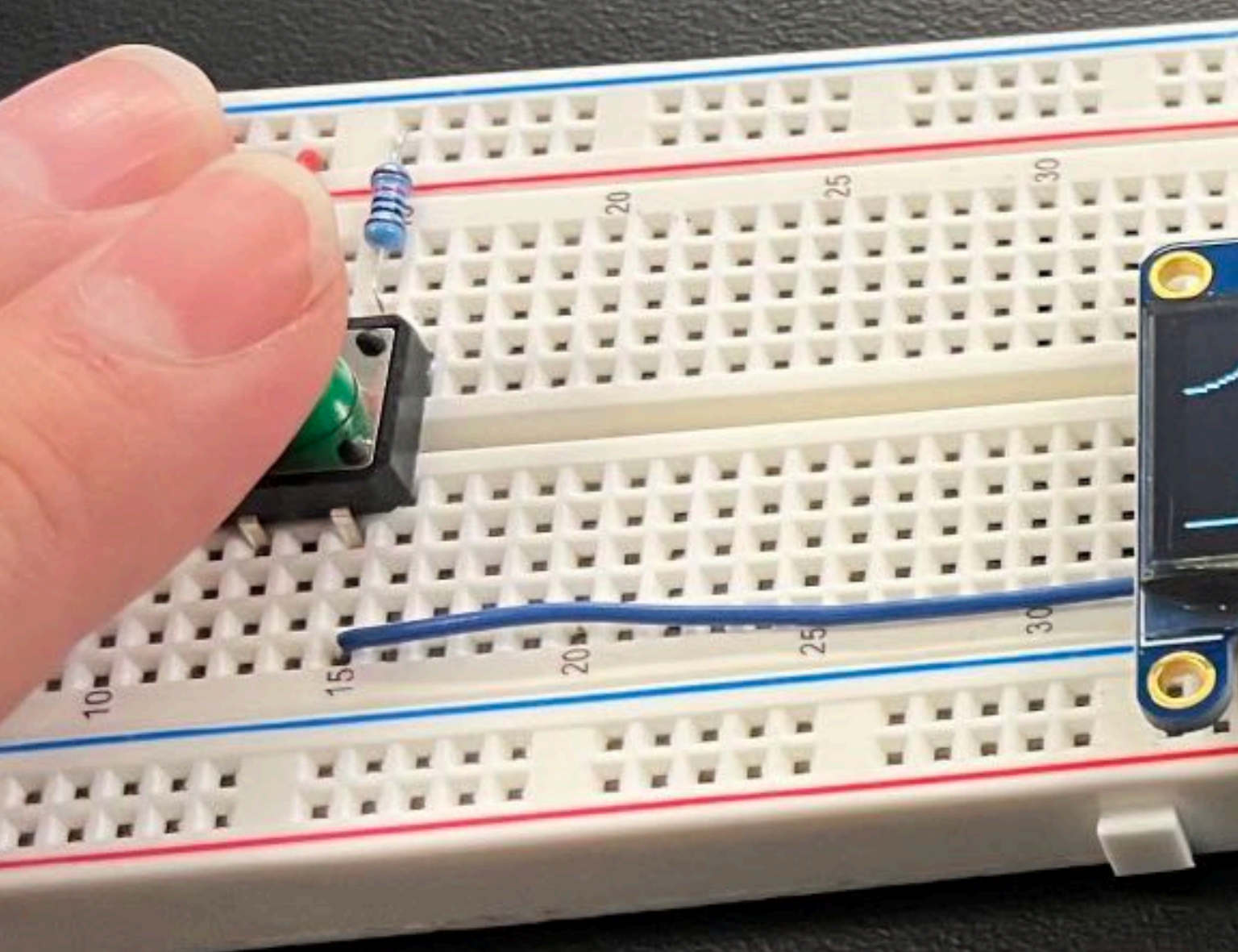
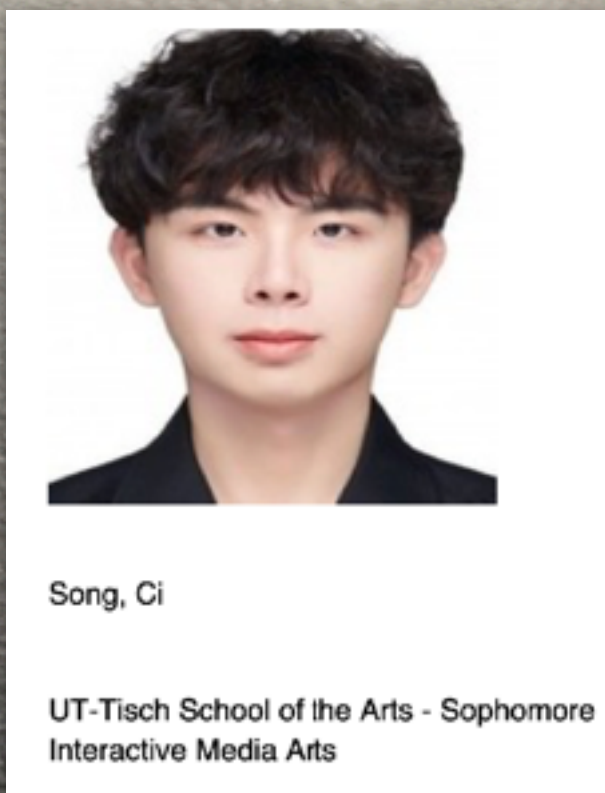
He had a little pomp experience, and wanted to make a solar-powered video game for the class final.



Song, Ci

UT-Tisch School of the Arts - Sophomore
Interactive Media Arts





Here is my chat history with ChatGPT4 re: Arduino Dinosaur Game

User: how to make a Dinosaur Game in Arduino and display it on Monochrome 1.3" 128x64 OLED Graphic Display with a bottom to play the game

ChatGPT: To create a simple dinosaur game on an Arduino and display it on a 1.3" 128x64 OLED Graphic Display, you'll need the following components:

1. Arduino board (e.g., Arduino Uno or Nano)
2. Monochrome 1.3" 128x64 OLED Graphic Display (e.g., SSD1306-based)
3. A pushbutton
4. Breadboard and jumper wires

Feel free to modify the code to improve the game or add extra features like different obstacles, variable jump heights, or a high score feature.

User: could you make the cactus more randomly

ChatGPT: Sure! You can use the `random()` function to generate random distances between the cacti. Here's an updated version of the code that introduces random spacing between cacti:

```
```cpp
#include <Wire.h>
...
```

**User:** why is the shape of the cloud look like a heart

**ChatGPT:** You're right, the cloud shapes in the code might resemble a heart due to the position of the circles used to create the cloud. We can adjust the cloud shape to make it look more like a traditional cloud by adding more circles and changing their positions. Here's the updated `displayClouds()` function with a more cloud-like shape:

```
```cpp
...
```

Excerpt of about 50 pages of interaction Ci reported

Introduce yourself!

Bonus Question: What's something you've learned in the last year that you're excited about?



Introduce yourself!

Bonus Question: What's something you've learned in the last year that you're excited about?

Fantasy Device

Physical Interaction
Goal/purpose

Resources

Syllabus

<https://itp.nyu.edu/physcomp/>

Schedule, assignments, labs, videos



Residents

Sam DeArmas, Jess Shen, Kai Cheng, and Kay Wasil

Weekly Help Sessions

First one Monday 9/9, 12-2PM

Drop-in Office Hours

Mine, other professors, residents.

Other students

If you can, do your homework at ITP and learn by osmosis!