Pool Experiment: Devices Subteam

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Goal

- Create a signal system for pool study subjects

  - Integrated in/on pool cue

    - LED flash indicates command 1

    - Vibration of cue indicates command 2

LEDs

Hub & Motor

Figure 1: Exterior view of integrated system

Materials and Methods

Primary Components:

- Arduino to implement code

  - Adafruit Trinket M0

- Bluetooth module to relay commands wirelessly

- LEDs (in parallel)

- Vibrating motor

Figure 2:
Soldering I/O pins to Arduino

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Materials and Methods

Secondary Components:

- Conductive copper tape

- Polyimide (PI) insulating tape

- 3x 1.5 V cell batteries

- JST adapter and wire

- Transistor

- 2x resistors (200 Ω)

Figure 2:
Soldering I/O pins to Arduino

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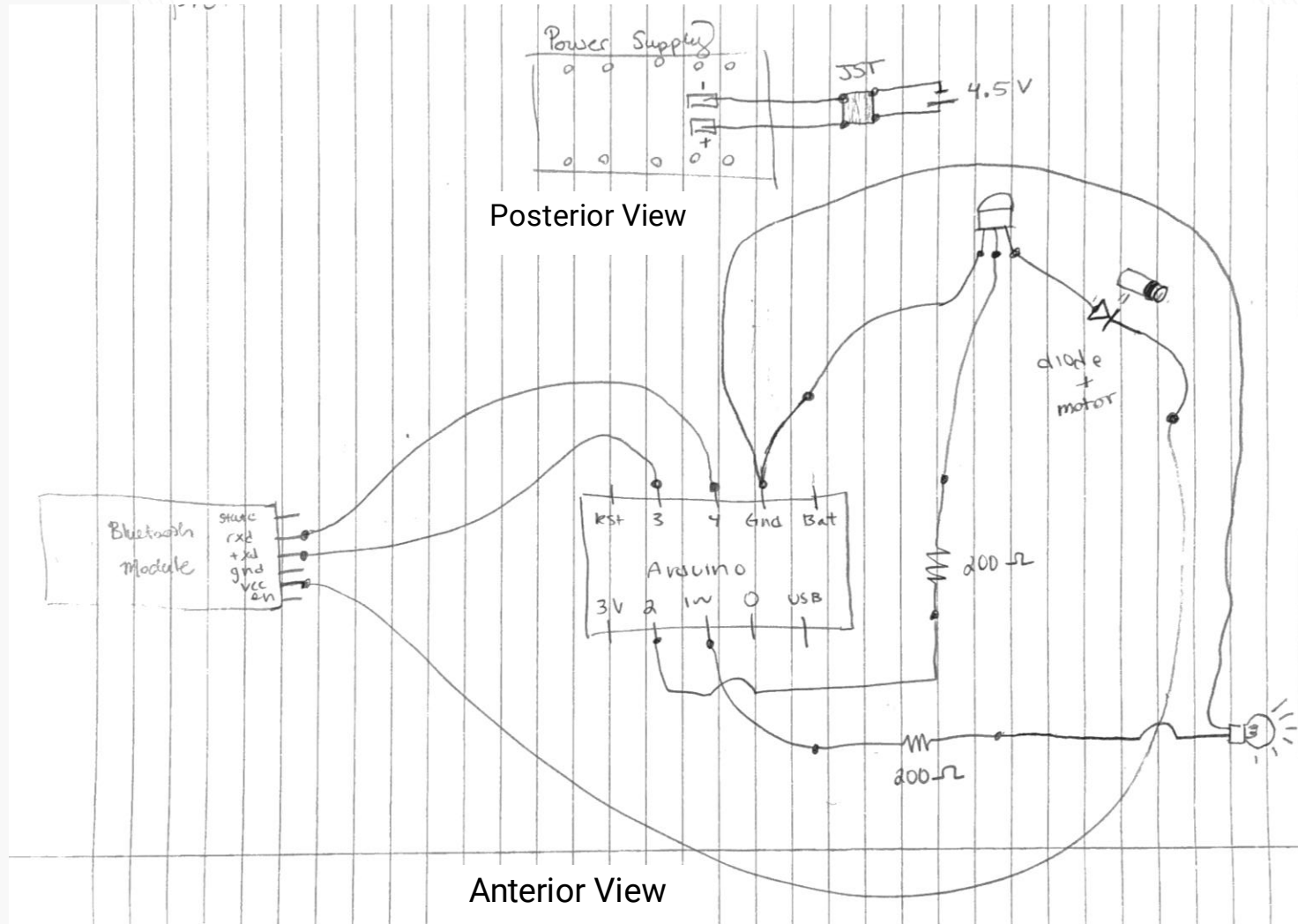CREATING THE NEXT
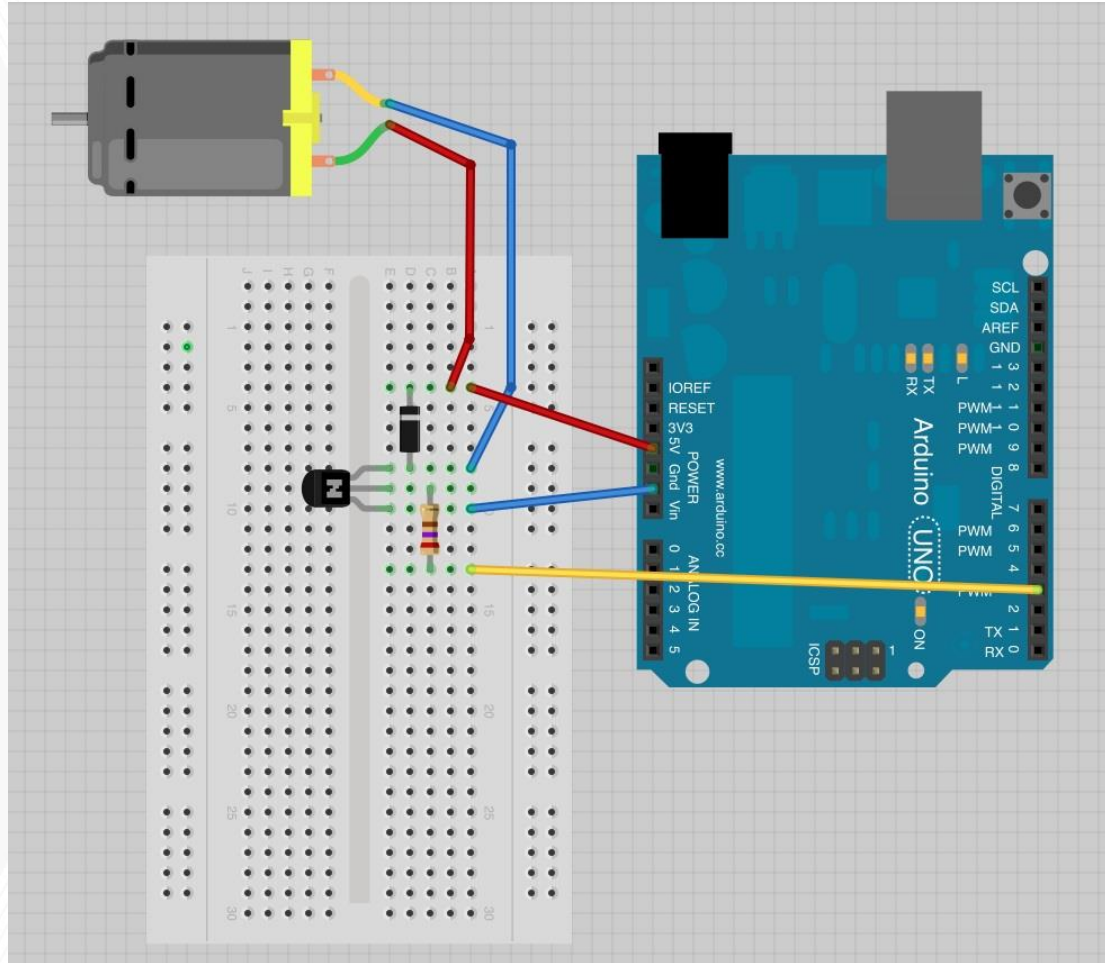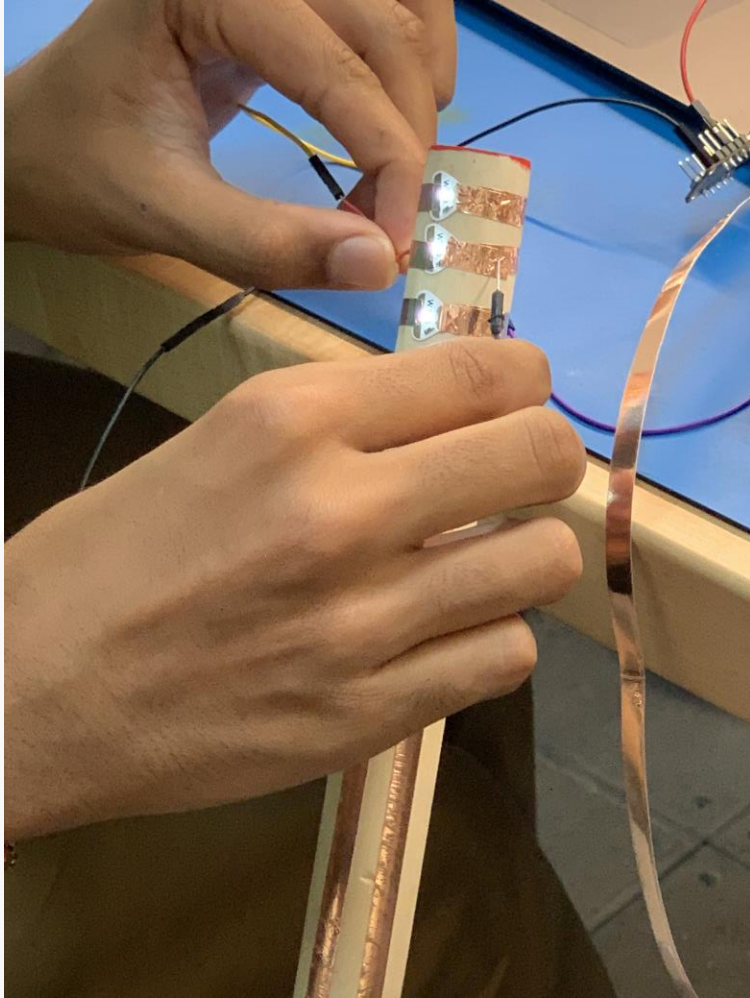
Connectivity: System Overview

Figure 3: *Overview of System Connectivity*

Connectivity: Motor

Figure 4: *Overview of Motor Connectivity Relative to Arduino*

Connectivity: Lights

Figure 6: *LED circuit prototype with DC input*

Figure 7: *LEDs in parallel connected to battery source*

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Connectivity: Wireless

- Wireless connectivity facilitated by Bluetooth module

- Code converted from CircuitPython (.py) to Arduino (.ino)

- Allows control via mobile devices


```
Bluetooth_led

void setup() {
Serial1.begin(9600);
 pinMode(1, OUTPUT); // put your setup code here, to run once:
 pinMode(2, OUTPUT); // put your setup code here, to run once:
 }

void loop() {
  // put your main code here, to run repeatedly:
  if(Serial1.available()>0)
   {
     char data= Serial1.read(); // reading the data received from the bluetooth module
     switch(data)
     {
       case '0':
       digitalWrite(1, LOW);
       digitalWrite(2, LOW);
       break; // when 0 is pressed on the app on your smart phone turn off
       case '1':
       digitalWrite(1, HIGH);
       digitalWrite(2, LOW);
       break; // when 1 is pressed on the app on your smart phone lights on
       case '2':
       digitalWrite(1, LOW);
       digitalWrite(2, HIGH);
       break; // when 2 is pressed on the app on your smart phone motor on
       default : break;
     }
     Serial1.println(data);
   }
   delay(50);
}
```

Figure 8: *Code uploaded to Arduino*

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Results

Visual Demonstration

Next Steps

- Adjust battery

- Scale-down

- 3d print cap

- Flexible circuit (?)