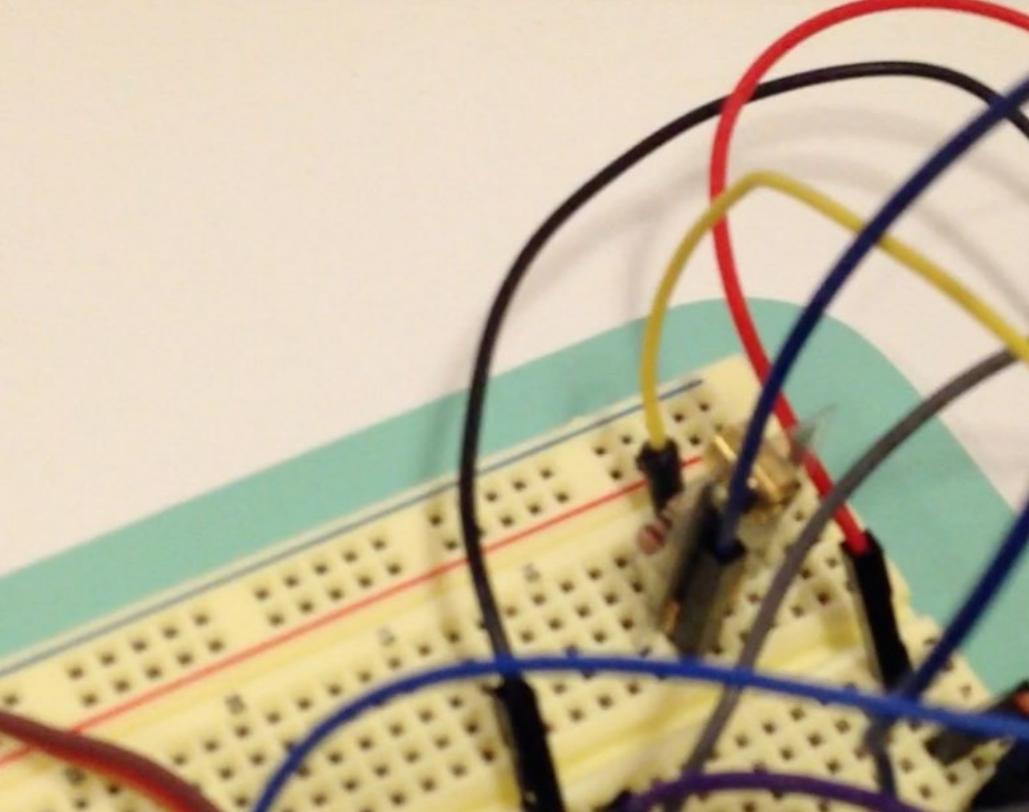


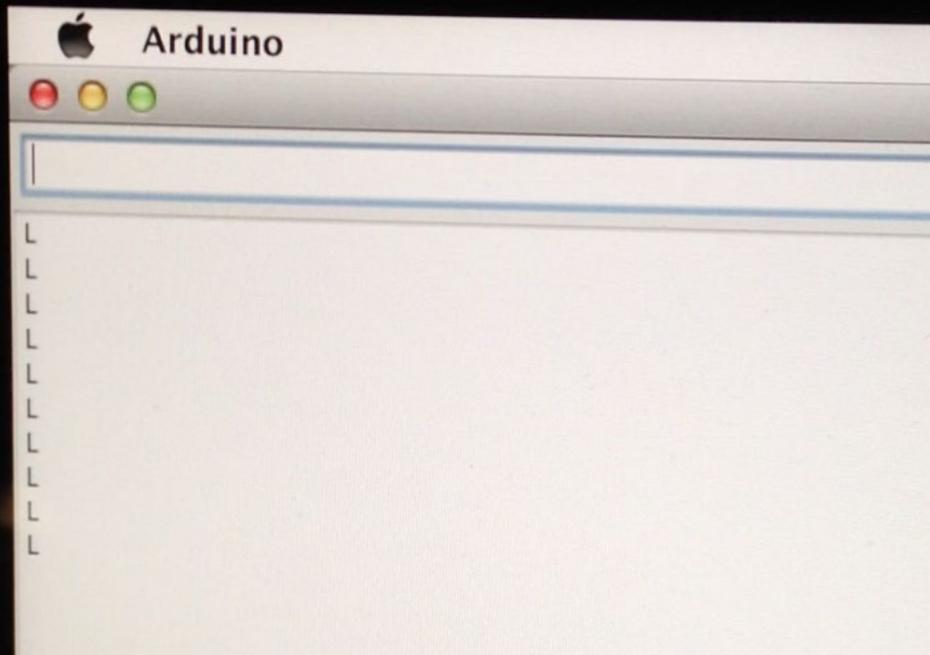
1 “KNOCK KNOCK” SERVO

The first small victory in the production of this prototype consisted of deciding how to best create a mechanically articulated knock. I decided to use a servo, and experimented with how to best program it to “knock” quickly and loudly. The small victory culminated with writing a “knock-knock” function with variables for the loudness of the knock, as well as the start and end point of the knocking motion.



2 “KNOCK” SENSING

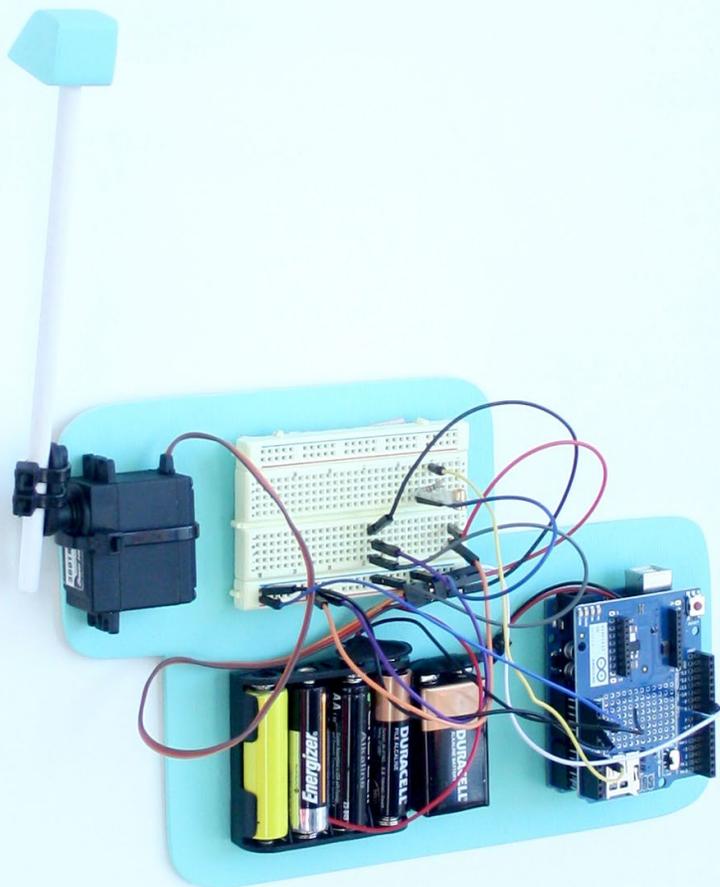
The next small victory was successfully detecting when someone knocked on a surface. Based off of research into sensors, I learned that a piezo sensor was best for detecting vibrations. The first piezo element I used did not suffice because you needed to knock directly on the sensor’s surface, since piezo elements generate voltage mechanically. I then switched to an element that had a weight on the end of it, which would detect a knock anywhere on the surface it was attached to. The final step was to calibrate thresholds so that each singular knock would print a byte to the serial port.





3 X-BEE COMMUNICATION

Once both the knock detection and articulation had been solved, I then needed to figure out how to transfer that data from one location to the other. I had first resolved to do this through a web api, specifically cosm, but this would result in at least a 5 second delay, which was not ideal for testing and displaying the prototype. I decided for the time being I would use xbee's for local communication. Eventually I managed to configure the xbees and wire them to my circuits such that when on arduino detected a knock, the other arduino would mechanically articulate that knock with a servo.



4 “KNOCK” ARTICULATION

Once I had solved the technical challenges associated with this prototype I needed to solve some interaction design problems. The first was to create the “knocking” fixture attached to the servo arm. This victory came from designing a colorful arm with a wooden piece on the end that makes contact with the knocking surface. The knocks that this setup created were a little too harsh sounding, so I added a thin felt pad to soften the sounds of the knocks. I also created a platform onto which to secure all of the circuitry components.

5 OBJECT HOUSING

The final victory in this prototype came from creating the overall housing for the object. Because the prototype is supposed to feel as if the other person is on the other side of a wall from you, I designed the object as minimally as possible. The whiteness of the object draws minimal attention to itself in order to emphasize the presence of the individuals who are knocking.



