DR0 Meeting Notes
1/23/25
Brianna Dewey
Rayna Choi as “Team Leader of the Day”

Schafer suggestions during meeting:
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Present Block Diagrams:

- Suppose that the receiver is placed in the blaster (will discuss further later)
- 2 blasters that communicate with each other via IR communication
    - Send data via wireless connection to a web server, which eliminates the need for a central hub (and thus a third module)
- Transmitter sends a modulated IR signal
    - Will need to do testing on lenses for directionality purposes
    - Should ensure that one button press results in one signal release (“semi-automatic blaster”)
- Receiver “simpler than transmitter”
    - Small unit that receives signal, aim to find a receiver with a wide width
    - Tuned to specific wavelengths / modulation frequencies
    - ESP32 IR block?
- User interface
    - Further discussion needed for ideal user interface
    - Different LEDs, displays, audio, and haptic feedback
    - Recommended doing sound I2S (digital audio will simplify the process)
        - Audio amplifiers that take audio in
        - Would want a number of pre-recorded “cool” sounds
        - Should be able to purchase an off the shelf item that has speaker and audio amplifier built in to one package
- Using 2 AA batteries to run at 3.3V
    - Anticipate power management system (recommendation?)
    - ESP will run at 3V, but would it run at 2.7V – if batteries aren’t full enough
    - Will need to consider packaging / “the fancy box” to ensure that it is simple enough to turn on/off without being in the way too much
- Web server
    - Load game server onto laptop or cell phone as “central hub”
        - Creating an app would be more difficult than web server
    - Changing game modes
        - Using WiFi protocol to connect between blasters
            - Think about how quickly it’ll drain the battery – Could we use BLO for it instead?
            - Should get line of sight (wiithin a certain distance – needs to be tested) with BLO
    - Consider more specifically what kind of control and how control occurs

- Blaster outer shell
    - Purchase hollow water guns and fit the tech inside
    - Possible to be 3D printed if we focus more on the “silly toy aspect”

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Plans for DR1 and DR2

- “Mouser is faster than DigiKey”
- Aim to narrow down options (1 or 2) and be ready to order them by the next meeting
    - Order once debit card is available
- Aim to have working subsystems prototyped by DR2 (Week of March 3) so we can start putting things together

How many receiver points do I need on the gun?

- Can they be wired in series or parallel so that they all go into the same input?
- Receivers often respond to a specific frequency with a flat output
    - Therefore room light would be at a different frequency / room light doesn’t set it off

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Safety

Spec sheets seem to exempt the devices from being eye-unsafe.

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Part selection:

- We have a list, but how do we narrow it down?
- Microcontroller:
    - ESP S3 family “you don’t need all of that”
    - Once you know how many pins you need AND decide whether doing BLO or WiFi, helps to narrow down the microcontroller
    - Might want to start with a microcontroller that is overkill to avoid issues with not having enough control in the future
    - Dual cores might be useful if there are lots of interrupts
        - But if playing sounds and other types of feedback, don’t want to interrupt the sounds
            - Therefore run sounds / feedbacks in one core and everything else (game logic and BLO) in another might be useful

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Order of Operations

- First figure out IR part

        - Once we know how to have multiple receivers for one transmitter…
    - How do we get the sounds in there?
        - Can be part of the flash code for output
        - Look into SPIFS (one layer file system that works with ESP32)
        - Sounds have to end up in flash type memory somehow
    - General tips about working as a group of 5:
        - “Lead and a second” on everything
        - “Absolute best way to fail is to do everything as a group of 5”
        - Small groups of people working on things together
        - Have fun doing it!

Next meeting: Thurs. Jan 30th @ 3:30

- Things to do in action items spreadsheet!