Initial Proposal for LM #4

Sarah will be continuing her work with Alexa for this learning module. For the first week, she would like to figure out how to get Alexa communicating with the Arduino so she can control the LED lights. Hopefully, she will be able to connect the three components together. Once she finishes up that project, for the second week she would like to switch gears and learn about controlling a motor or servo with the Arduino. She has some servos as well as a motor that she would like to connect to the Arduino so she can use that knowledge for another project down the line. She found another guide using another method to connect the Arduino to the Alexa that allows you to use the Alexa to control sensors on the Arduino. So, if that method ends up working she would like to be able to use the Alexa to control either a motor or servo. In the third week, she has an idea for a device that could be attached to a door that is able to turn the door handle using a voice command for people who may have difficulty turning door knobs. It was inspired by Dom and Emily's voice controlled drawer.

https://www.hackster.io/303628/arduino-iot-cloud-amazon-alexa-integration-4e6078

https://sites.google.com/d/0B62Rn2hR_hxid1RtTkJhUmZjZ1k/p/1fDSD5y7iWfi3wArEfksr_iyBUIU4hUxh/edit

Weekly Log Dec 2-9
- December 2 - 9:00-10:00
  - Sarah worked on Cyberstart for an hour tonight. She finished the first four levels and made more progress on levels 5 and 6. She is now up to 30% and is at 23,400 points. She wants to try to get to 32% percent by the end of the week.
- December 3 - 12:10 - 1:10
  - Today in class, Sarah spent most of her time researching different techniques for connecting the raspberry pi and Arduino.
  - https://www.instructables.com/Control-Raspberry-Pi-GPIO-With-Amazon-Echo-and-Pyt/
  - https://www.hackster.io/nishit-patel/controlling-raspberry-pi-using-alexa-33715b#:~:text=Head%20over%20to%20'test'%20section,you%20skill%20on%20your%20device.

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    - She looked through some of the comments to see what issues people were having and wrote down some of the solutions to try to troubleshoot her own problems
  - She also set up a basic Arduino and servo configuration that she will code later to start working on her next project
- December 7 - 2:30-4
  - Sarah continued her work with the Arduino and servo today and took a break from the Alexa. She learned how to control and set up a servo with her code.
    - https://www.arduino.cc/en/Tutorial/LibraryExamples/Sweep/
  - Going a bit further, Sarah then connected a button to her Arduino and then was able to use the button to control the servo. She had a bit of trouble with the wiring but was able to resolve the problem
    - https://create.arduino.cc/projecthub/akshayjoseph666/control-servo-motor-with-arduino-uno-and-pushbutton-18613f
  - Videos of project
    - https://drive.google.com/file/d/1GscyuEd0lmdi8EuoaMdnO3NNQ0PnkdSX/view?usp=sharing
    - https://drive.google.com/file/d/1bd-7MuYfd7zOnNgTNo3F8H7EyzwQcjGe/view?usp=sharing
- December 8 - 1:00-2:15
  - Today Sarah switched from a servo to using a motor. She first did some research on the motor shield and all of its components. She then looked through different guides on how to connect a DC motor to the motor shield.
    - https://lastminuteengineers.com/l293d-motor-driver-shield-arduino-tutorial/
  - She had to download the libraries that are used with the V1 shield. She also had to use a battery from the Microbit kit as an external power source, but was able to successfully connect to motor to the shield.
  - Videos of project
    - https://drive.google.com/file/d/1gBNt1zY6vJ0nXuK64Wnr5EpeL2Ubta4M/view?usp=sharing
   - https://drive.google.com/file/d/1Nv2gDhSVLT3YWRYgfVVsm3ZvOJXrvk6U/view?usp=sharing

Weekly Log Dec 10-17
- December 10 - 11:05 - 1:15
  - Today in her study hall and in class, Sarah worked on her Arduino project. She connected both the servo and the motor to the motor shield and had the two running at the same time. She then played around with different code to see which would be the most efficient for having the servo start to run after the motor ran. She then used the rest of the time researching how to set up her ultrasonic sensor and how to code it. Her goal is to be able to have either servo and motor move when it senses something based on how close or far away it is
    - https://create.arduino.cc/projecthub/Isaac100/getting-started-with-the-hc-sr04-ultrasonic-sensor-036380

- December 10 - 9:00-10:30
    - Sarah worked on Cyberstart for half an hour tonight. She was not able to get any progress because she has been stuck on one problem for a while now on one of the harder levels. She has been having some difficulty with her VM that she will try to fix later in the week.
- December 11 - 9:00 - 10:00
    - Sarah finally got her ultrasonic sensor set up on her Arduino. She started with just connecting the ultrasonic sensor to the Arduino and breadboard, leaving out the motor and servos. However, she didn't like this setup so then she just connected the ultrasonic sensor directly to the Arduino using the wires. Sarah then wrote out code that would show the distance an object was away in centimeters, and tested her ultrasonic sensor using the serial monitor
        - Video of the serial monitor: (Sarah moved a rubber duck closer to the sensor)
            - https://drive.google.com/file/d/1koe1cbOvC6m3Zi2x26_IxVaQvBSTCcSs/view?usp=sharing
- December 15 - 7:00 - 8:30
    - This morning, Sarah started to connect the servo to the ultrasonic sensor. However, she has been having difficulty getting the servo to move as the ultrasonic sensor senses something coming closer to it. She will have to look into it more before adding the motor.
    - She also fixed her VM so she will be able to work more efficiently on Cyberstart now.

Weekly Log Dec 16-23
- December 16 11:45 - 12:15
    - Sarah attended the midnight madness cyber start meeting with Sloan, Jenna, Gabby, Tom, and Ava tonight and worked on cyber start for about forty-five minutes before she fell asleep.
- December 17 12:30-1:45
    - Sarah had internet issues today during class and was unable to join the meet. During this time, Sarah worked on designing and building a structure to hold her Arduino for her project. Due to her internet issues, she had to change her project to not include Alexa for now. Instead, she decided to use the ultrasonic sensor. She tried to build something that would hold the ultrasonic sensor and servo so that it could be attached to a door. Her first attempted with cardboard did not work out so well because there was no room for the excess wires and she did not want to squish them. She then tried to use old wrapping paper tubes however that did not attach to her door well. However, she had the idea to use a piece of plastic that came in the Microbit box which ended up working very well. (She left the space in the middle open in case she want to add another sensor later)
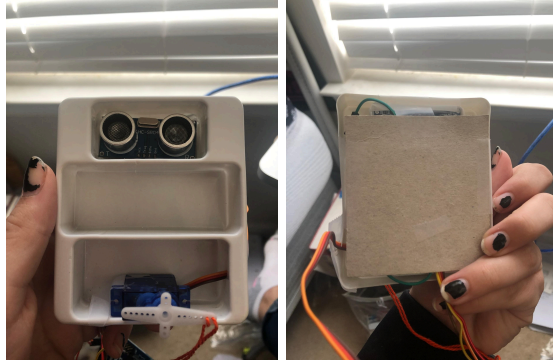
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  - For her offline assignment, she has to describe this block of code. This code sets play video games to false. Then in a while loops, while there is snow on the driveway, the user has to repeat putting the shovel in the snow, picking up the shovel, and throwing the snow off the driveway. Once there is no more snow on the driveway, the user is kicked out of the while loop and can drink hot chocolate.

    ```
    playVideoGames = False;
    while (snowOnDriveway())
    {
        putShovelInSnow();
        pickUpShovel();
        throwSnow();
    }
    drinkHotCoco();
    ```

- December 20 8:00 - 8:30 & 4:00-5:30
  - This morning, Sarah worked on coding her Arduino. She was having a lot of difficulty with reading the ultrasonic sensor on the serial monitor. She made a few small mistakes such as forgetting a bracket. She also added in the code for making the servo move but was not able to test it yet
  - After work, she continued to work on her project. She secured some of the connections with her Arduino and began to test her code. She got the servo to move when she waved her hand in front of the ultrasonic sensor. However, it was not as accurate and did not work every time however she thinks it has more to do with the sensor and less with her code because when she would contort the wires, it would work.
  - https://drive.google.com/file/d/1FlE_pBkdS8X83GUFA5NsBv4fxmVkD0FP/view?usp=sharing
- December 21 11:00 - 12:00
  - During her study hall today, Sarah began to attach the fixment to her door. She had to come up with a way for the servo to be able to turn the doorknob. She used a cut piece of a wrapping paper roll to wrap around the handle like a hand would. She then connected the string to the servo and connected it to the cardboard on the handle. Once that was done, she put everything on the door. It worked okay but she will need an external battery and more support on the servo. She will work on that over the holidays before her final presentation.

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What did you learn?

       Sarah learned a lot about different types of hardware add ons for the arduino. She first learned how to code a servo, as well as how to connect it to the arduino. She also incorporated other things she knew how to do, like using a button, to use it to control the servo. She also did quite a bit of research on the motor shield. She had to figure out what kind of motor she had, which was a DC motor, and how to connect it to the shield. She didn't end up using the motor in her final project, but it was still valuable to learn how to use and code it. Sarah also learned how to use the ultrasonic sensor to control other aspects of the arduino. She had to come up with a way to be able to connect her components together in a single device that could be connected to her door, which was something she has not yet gotten to do in this class.

What problems did you encounter?

       Originally, Sarah wanted to use the Alexa for her project. The user would be able to say, "Alexa, open the door" and the arduino would be able to turn the knob for them. However, in addition to the problems she was having before, the snow storm took a good toll on her internet and she was not able to have a stable connection. Which led her to using the ultrasonic sensor instead. She also had some trouble connecting the motor to the motor shield because there were a lot of different tutorials and they all said different things, and she didn't want to damage her arduino. However, she was able to find a good guide, which she put in her resources in her presentation.

What suggestions do you have for other students?

Sarah would suggest learning each of the components separately before combining them together. On the first day, Sarah had her idea in hand however, tried to tackle too much and came up with multiple dead ends. Breaking her idea and problems down into smaller tasks made learning a lot easier, and gave her more positive results.

A summary of your experience

Overall, Sarah really enjoyed this learning module. She was able to build something which was really fun and it was gratifying to make a device that could potentially be used on an everyday basis for some people. Although it was not perfect, it was definitely a good start. She also learned a lot of useful skills that revolved around moving components such as the servo and motor that she can use later in the year as well.