

Learning Module #5 ~ Final Writeup

- Original goals
 - Nico and Lenny's initial goal was to control the RC Car via Virtual Reality. Wearing a Quest2 VR headset, a user should be able to tilt their head forward, and the RC Car would move forward. Tilting it left, right, and backwards would make the corresponding movements. Additionally, the user would be able to look through the VR headset and see camera footage from a little camera mounted to the front of the car. Nico and Lenny thought the learning module would not be that difficult because they wrongly believed the components would connect with each other and be easy to integrate. They were sorely mistaken as they quickly discovered the joys of **integration hell**, making the project much much harder than expected.
- What did you actually accomplish?
 - After encountering a lot of difficulties at the beginning, Nico and Lenny began to reconsider the overall goal of this project. Temporarily switching gears to a two motor, omnidirectional camera thing, they quickly readjusted their goal to only making a bluetooth controlled RC car while they continued to investigate VR things at home. Nico and Lenny were able to successfully control the RC car using their phones' bluetooth capabilities and an app which would send commands to the Arduino. This was done by reconstructing a gutted RC Car, by adding an Arduino and its corresponding L923D Arduino Motor Shield component. Since they used the motor shield, they couldn't access the pins on the Arduino directly, so Nico and Lenny soldered a bluetooth chip to it directly after some unusual difficulty where the solder wouldn't stick. Additionally, after this milestone, Nico tried to make his own bluetooth app in Unity that theoretically could have been downloaded onto the Quest2 headset and it would have been able to transmit the desired commands based on some conditionals.
- What problems did you encounter and how did you deal with them?
 - A minor hardware issue Nico and Lenny experienced was with the wires not sticking with the solder, which Nico and Lenny spent a whole class period trying to figure out. They also had a problem when Mr. Detrick broke Nico and Lenny's RC Car, but in replacing it their new car was actually able to turn a lot better. Software wise, Nico and Lenny encountered multiple problems relating specifically to integrating all the systems, unity, arduino, bluetooth,
- What did you learn from this activity?
 - Due to Nico and Lenny's differing experiences with Arduino IDE, Arduino Motor Shield, and functionality of RC Car, Nico learned less than what Lenny learned.

Lenny learned more about the functionality of the Arduino and Motor Shield, and how the two could be connected with one another to run and act as a controller, and power source for an external object like an RC Car. Lenny also learned a bit of knowledge on reading circuit diagrams from the help of Nico. Lenny acquired more knowledge on coding in Arduino with the help of his partner Nico. Overall, Lenny gained a better understanding of Arduino and the Motor Shield in general, and would like to thank Nico a lot for dumping all of Nico's knowledge into Lenny's brain.

- What would you do differently if you did this again?
 - If Nico and Lenny were to do this learning module again, we would definitely try to gain much more pre-knowledge of VR, and connecting its movement to an external object as it would have greatly improved Nico and Lenny's progress in the beginning going off of Nico and Lenny's original idea or goal for the learning module. So definitely gain a better understanding of VR, and Arduino as well as both of these are major aspects into expediting the learning process.
- What suggestions do you have for others who might pursue this activity?
 - Definitely stick to a more easier topic dealing with RC Cars in general, and not expand too far into the VR realm of things due to its complexity. For example, building an RC Car that avoids obstacles, or an RC Car that is controlled by a video game controller. These ideas are much easier to execute within the time frame of 12 days and would still allow the 2 people or 1 person to learn much about RC Cars and Arduinos.
- Summary of experience
 - Overall, the learning module was an absolute blast and experience working with one another since Lenny was lucky enough to work with someone very knowledgeable on the learning module to further speed up the process and get to the finishing result. Although Nico and Lenny's original goals did not come to fruition, a compromise was made which is still impressive to say the least. The compromise integrated both Nico and Lenny's soldering skills via soldering a Bluetooth Chip Module to the Arduino board, and soldering the wires to its corresponding locations to power the Bluetooth module. This in turn allowed Nico and Lenny to control the RC Car via a smartphone app. Nico and Lenny definitely would have no problems working with each other again in the future.