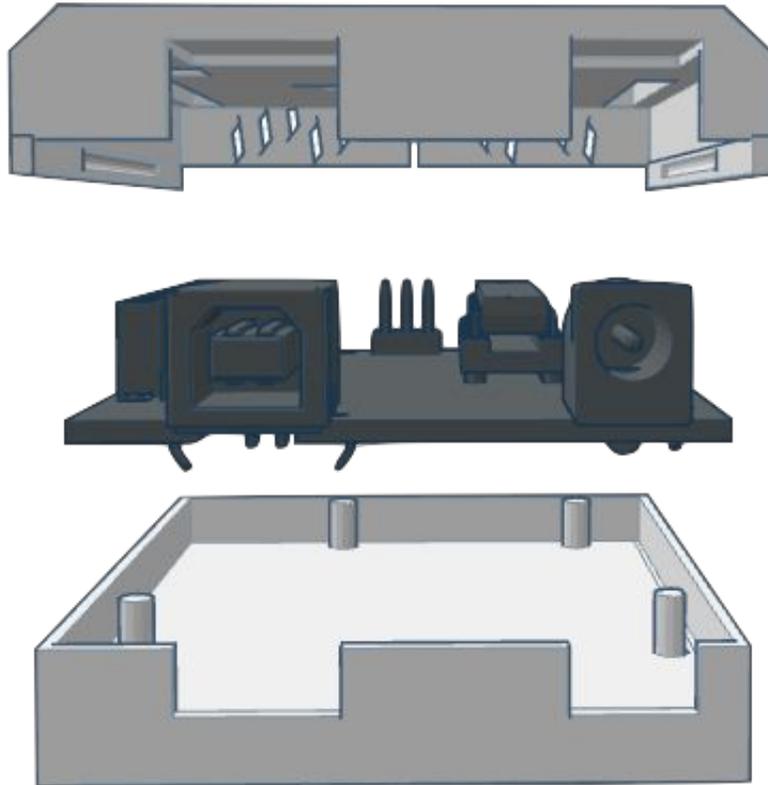


Ethan Legum

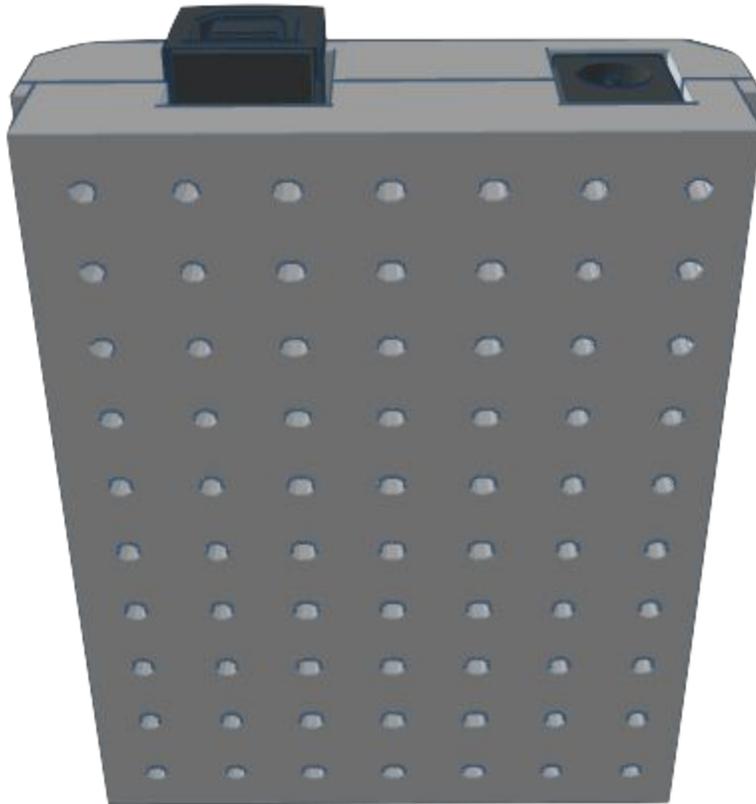
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Make It Real CAD Engineering Challenge

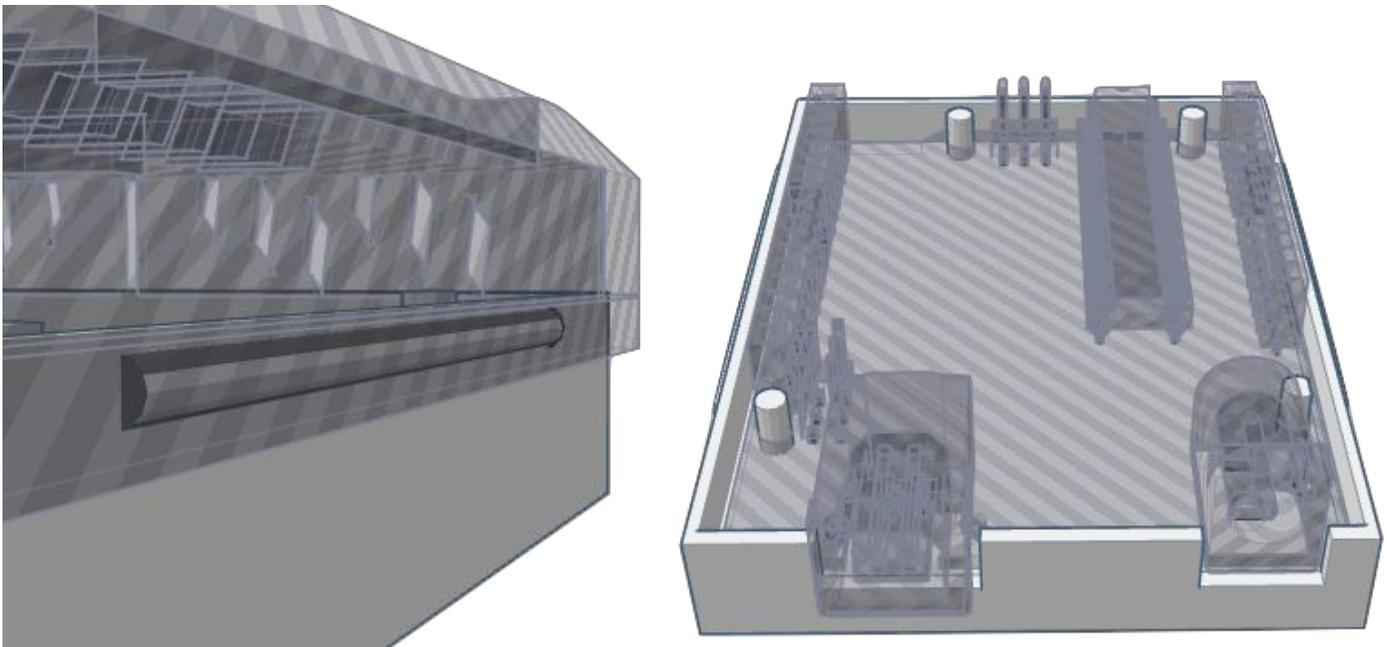


This year in my robotics class my teacher has begun to introduce us to Arduino's, small self contained computing units used to make any robot you can imagine. As versatile and cheap as the Arduino is it's main problem is that all the components on the board are exposed. Although this cuts down on price the components are susceptible to damage from falls as well as coming into contact with metal and short circuiting. In hopes to prevent this from happening many cases can be brought to protect the Arduino but they are too expensive and they lack functionality. When I realized this I set out to 3d model my own where functionality was the focus. The result is a minimalistic two part box that allows the user full access to ports but still protects the Arduino.

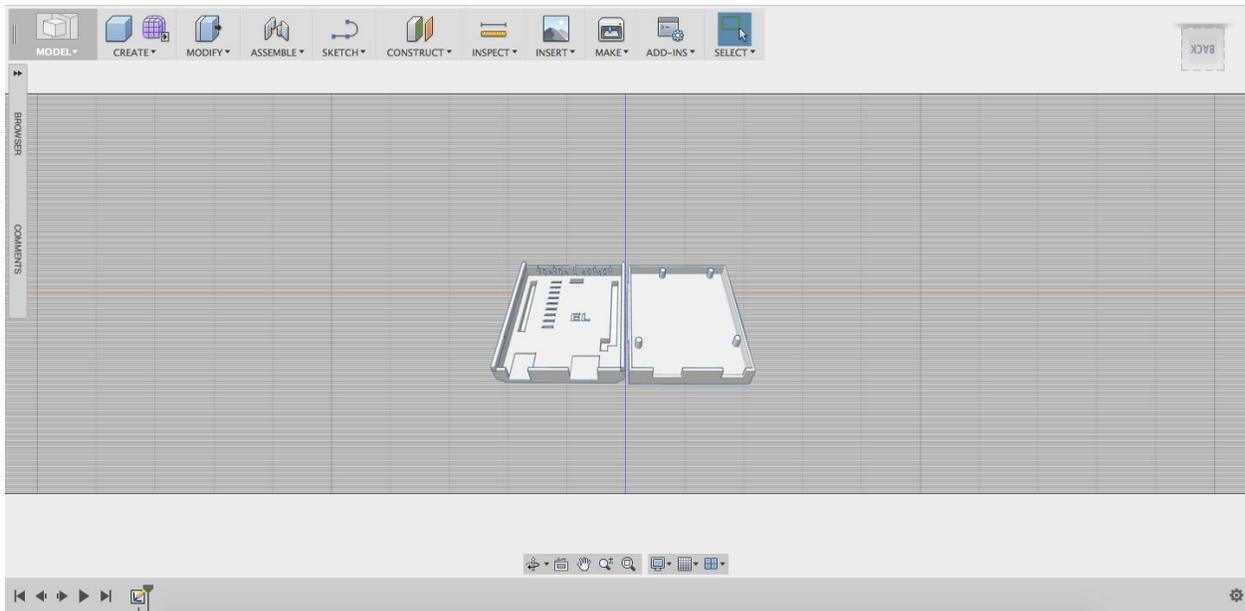
Another one of the main problems with the cases that already exists is that they all require proprietary mounting and only mount to specific surfaces. Rather than just design this part to fit my needs I decided to create an array of mounting holes on the bottom(As seen below). This allows anybody to stick one of the provided pegs into the holes that fit their needs best. The peg system is simple enough for anyone to use yet is complex enough to mount on practically any surface or robot.



Two more big issues that I felt I had to consider was stopping the Arduino from rattling when inside the case and how well the lid held on. Luckily for me the Arduino comes with four screw holes already installed so with no modding I was able to make a easy way to keep the Arduino in place(As seen below). Holding the lid on was a problem because most 3d printers used hard plastics that are not flexible making it hard for the lid to slip over the extrusions holding it in place(As seen below). The simple fix for this was changing the printer material to something with that had more give like polyamide, a plastic nylon hybrid used in 3d printing. now the lid is able to slip onto the extrusions and be held in place.



Although I have used 3d modeling programs before when I used Fusion 360 for the first time I was overwhelmed. Most programs don't give the user so much freedom to create and so many tools to do it with, at first this threw me off guard and made it difficult to model my piece but after watching a few short tutorials I was already modeling at a much more advanced level. Even with all this control over my model I still found the UI to be a bit clunky and took some time to get used to.



This project taught me a lot about 3d modeling and its advantages I plan on using this information to go back and fix some older models to improve them. This project also gave me the opportunity to learn how to use Fusion 360 which I would have otherwise not pushed myself to learn and I plan on using it for some of the more complex projects in the future. Hopefully the advantages of this program will allow me to make less mistakes saving me time and also allows my team to use my skills to improve their own bots. Luckily 3d printing allows me to print things such as gear at a fraction of the what they usually cost as well as custom design parts that give our robots a competitive advantage at competition. Lastly, my ability to use such cutting edge technology will help me pursue a career in electronic engineering which is moving more and more towards customization at a miniscule level, something that knowing how to 3d print helps greatly.

