

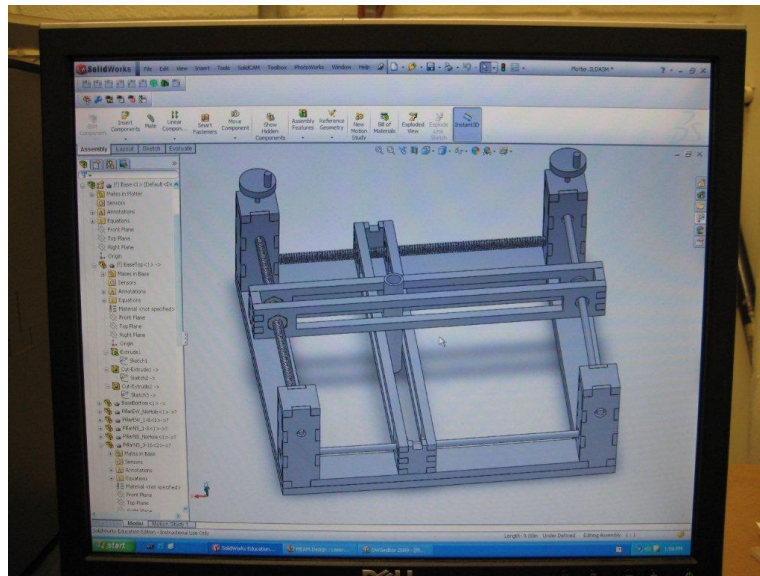
Etch-A-Sketch

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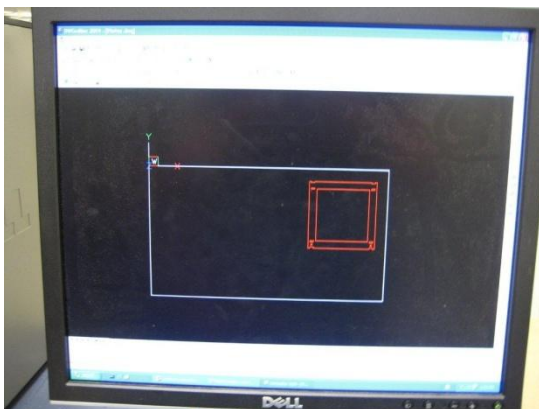
Toy: Etch a Sketch that can be used to draw on paper using a pen or a marker.

Brainstorming: During our first lab as a team, we brainstormed different ideas on how to model our toy to work the way that we wanted it to.

Solid Works Modeling: A model of all of the necessary parts was made and assembled. The calculations and dimensions of all the pieces were figured out and the model was tested for functionality using SolidWorks. We used MDF press fits for the base and tower supports of the machine and acrylic press fits for the moving arms and pen holder. We also ordered the parts that we needed, including aluminum rods, threaded rods, flanged bearings, sleeve bearings, nuts, and miter gears.



Laser Printing: After modeling the toy using SolidWorks, we went on to printing the different press fit pieces out of MDF and acrylic using the laser printers. This stage took quite a bit of time due to the testing and refining of the different sizes and press fits of the parts.



Parts Testing: After receiving the parts that we ordered and printing the necessary components of the toy, we proceeded to test the functionality and strength of most of the parts when fitted together. Alex, our MEAM150 helper, machined the parts that we ordered according to the sizes and fits that we tested. He turned the threaded rods on the lathe to take off part of the threads and mill the metal down to 1/8" in diameter.



Assembly Testing: Once our parts were ready, we began assembling and testing different parts of the toy. We tested the functionality of the movement of the acrylic arms along the threaded rod. We also tested the movement and fit of the gears that were used to slide these arms along the rods. Finally, we tested the movement of the plastic tube that would hold the writing utensil once both arms were connected with each other.



Friction: Due to excessive friction caused by the acrylic gliding on the aluminum rods, we encountered a problem with the original design for the part that would hold the writing utensil with the sliding arms. We had to redesign a simpler contraption that would smoothly glide in both directions along the moving arms.

Final Assembly: After figuring out and fixing the friction problem, we re-assembled all of the parts.

