The MT Lantern

Fall Semester-2023

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Survey of Engineering

Lamp Project

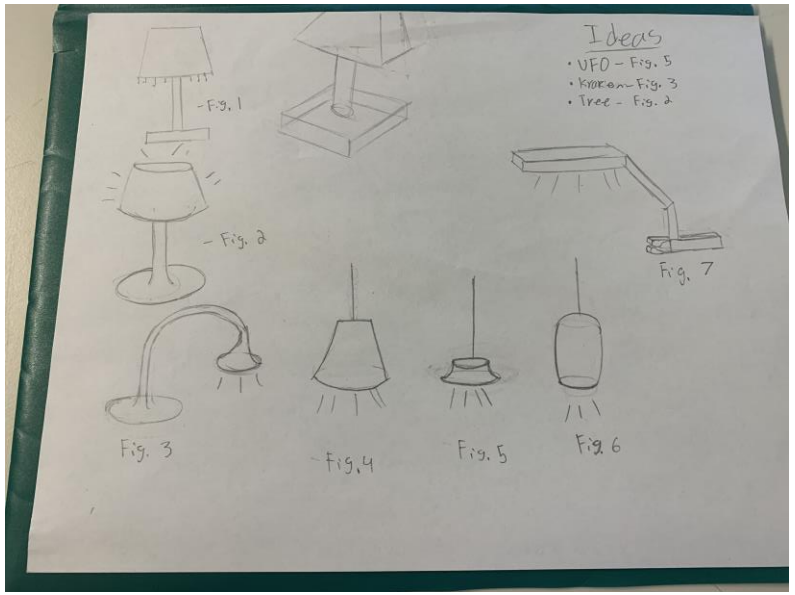
Contents

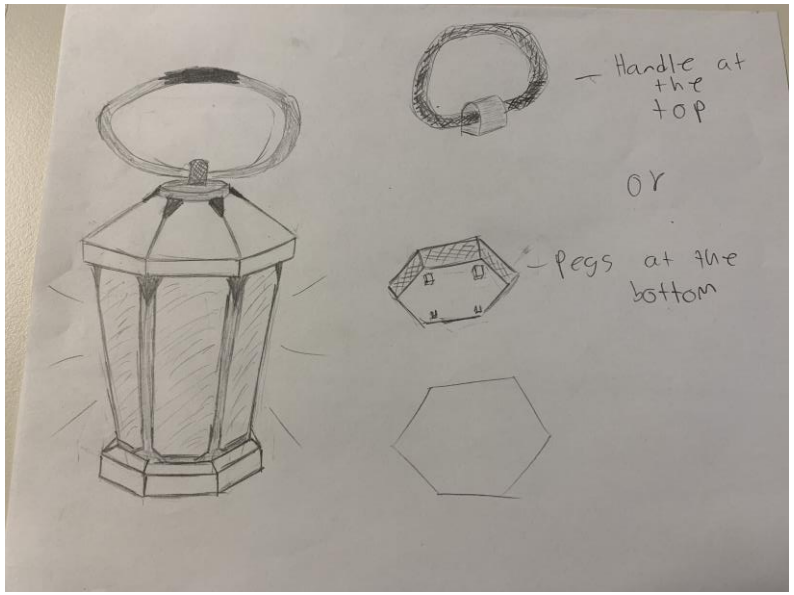



Inspiration

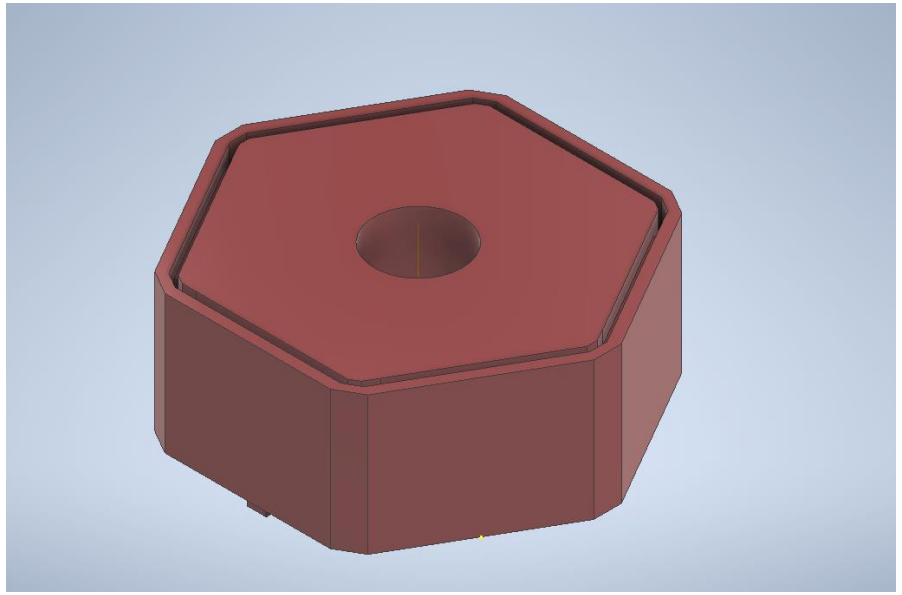
Design Process

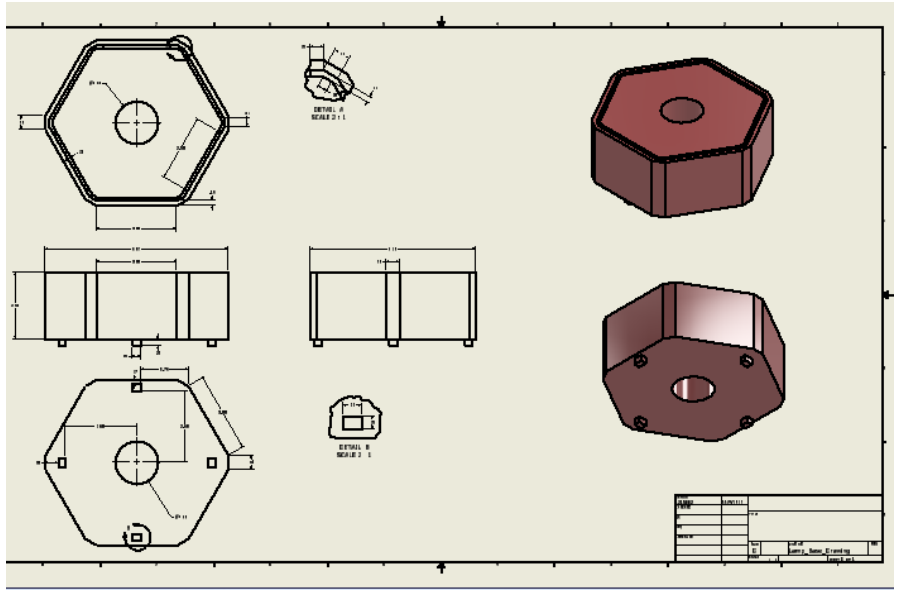
- I designed the majority of the parts for my lamp in Inventor because I had originally planned for the base and top to be 3d printed. However, after reconsidering the size of the whole project, I decided to CNC both the base and top.
- The base came out to be 2.25 inches, which resulted in me dividing the base into stackable hexagonal layers.
- The top was simpler and so I was able to divide it into three hexagons, each sequentially smaller than the other.
- For the panes on the side, I simply laser-cut amber-colored 8th-inch acrylic into small rectangles and sanded them to produce a muted lighting effect.


Ideas
• UFO - Fig. 5
• Korean - Fig. 3
• Tree - Fig. 2
- Fig. 1
- Fig. 2
Fig. 7
Fig. 3
- Fig. 4
Fig. 5
Fig. 6

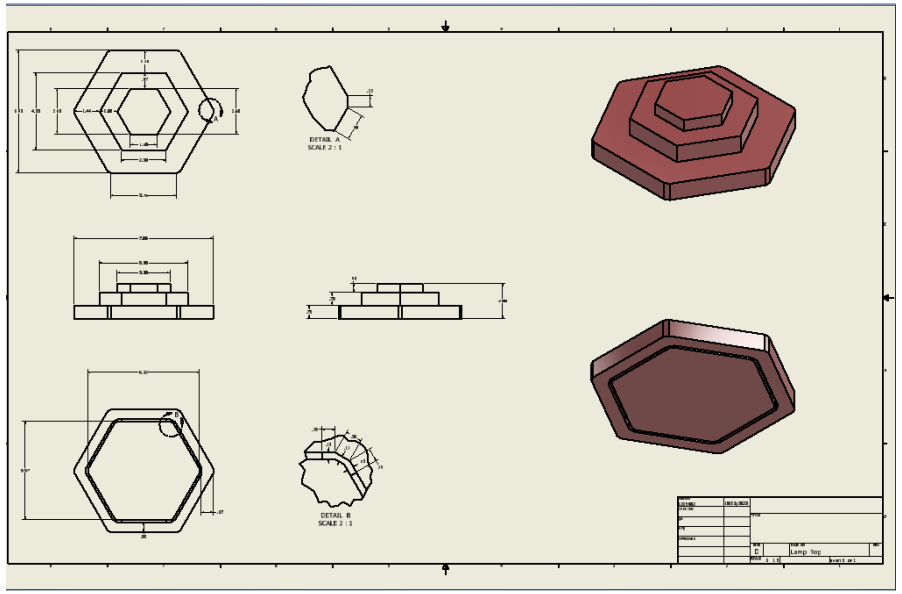

- Handle at the top
or
- Pegs at the bottom

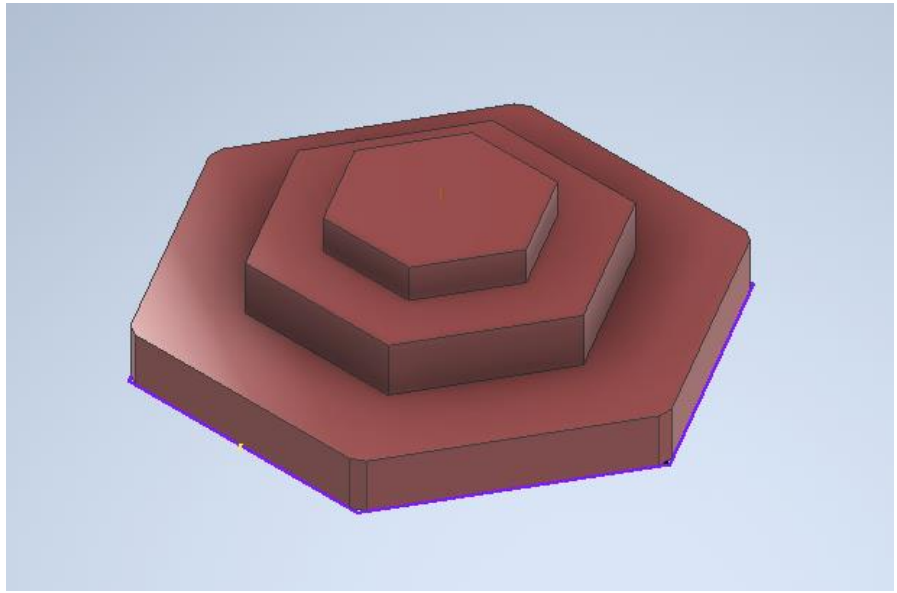
Sketches





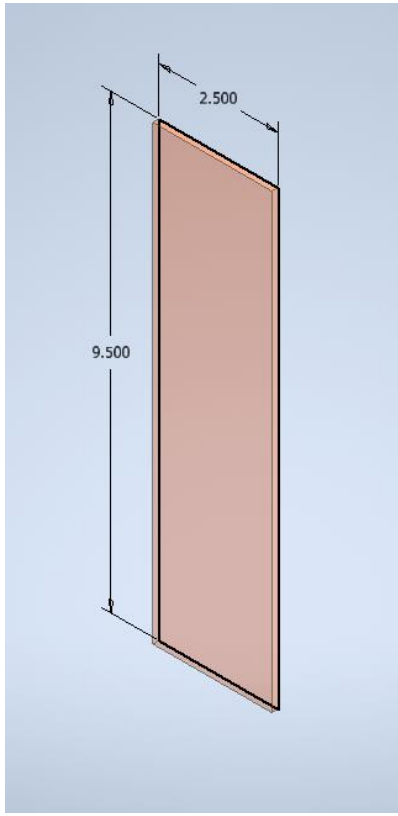
Base

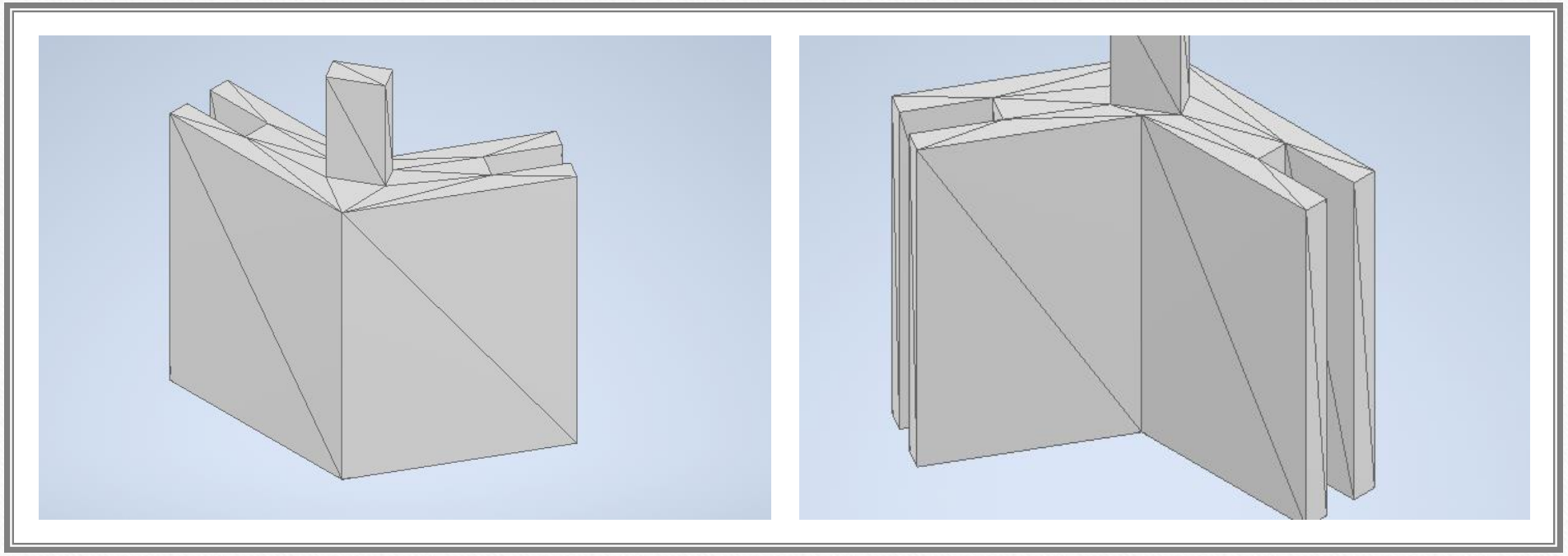




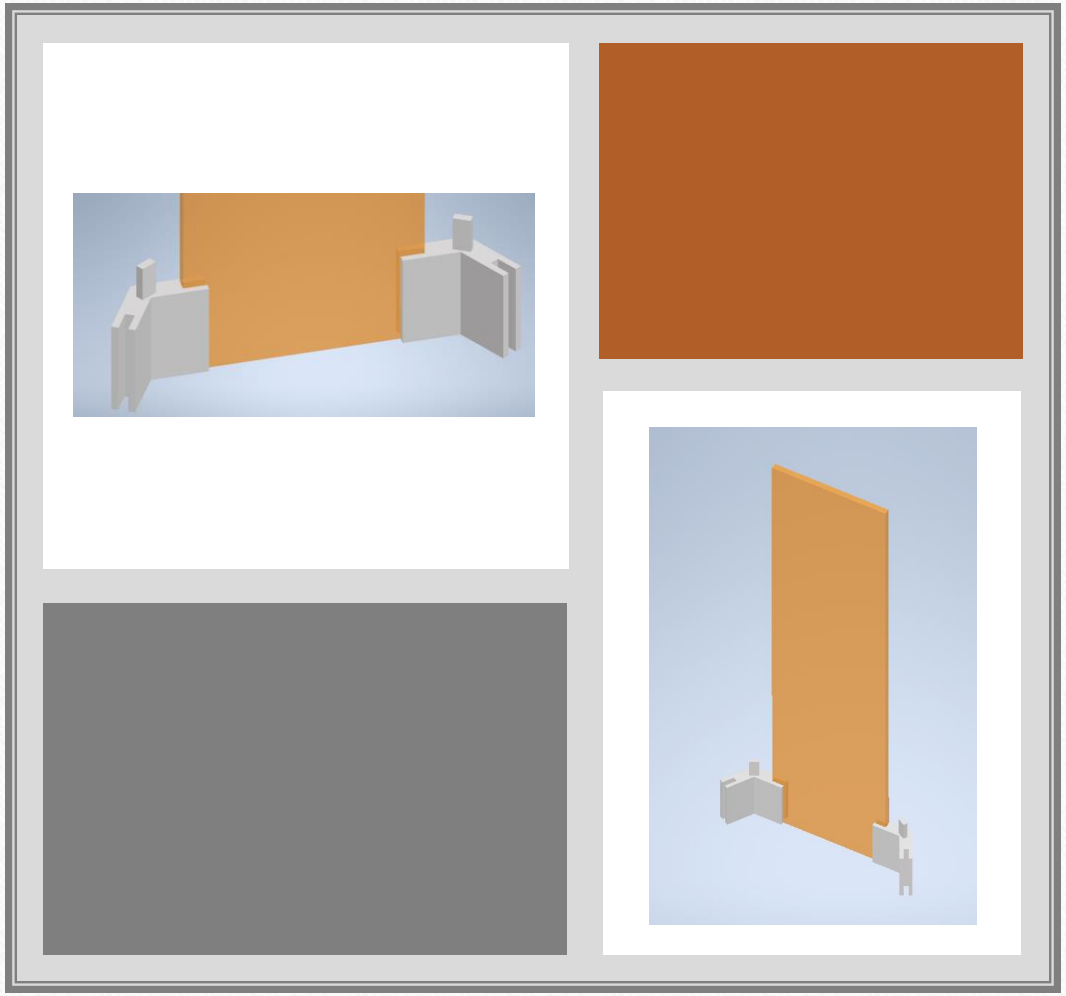
Top

Panes





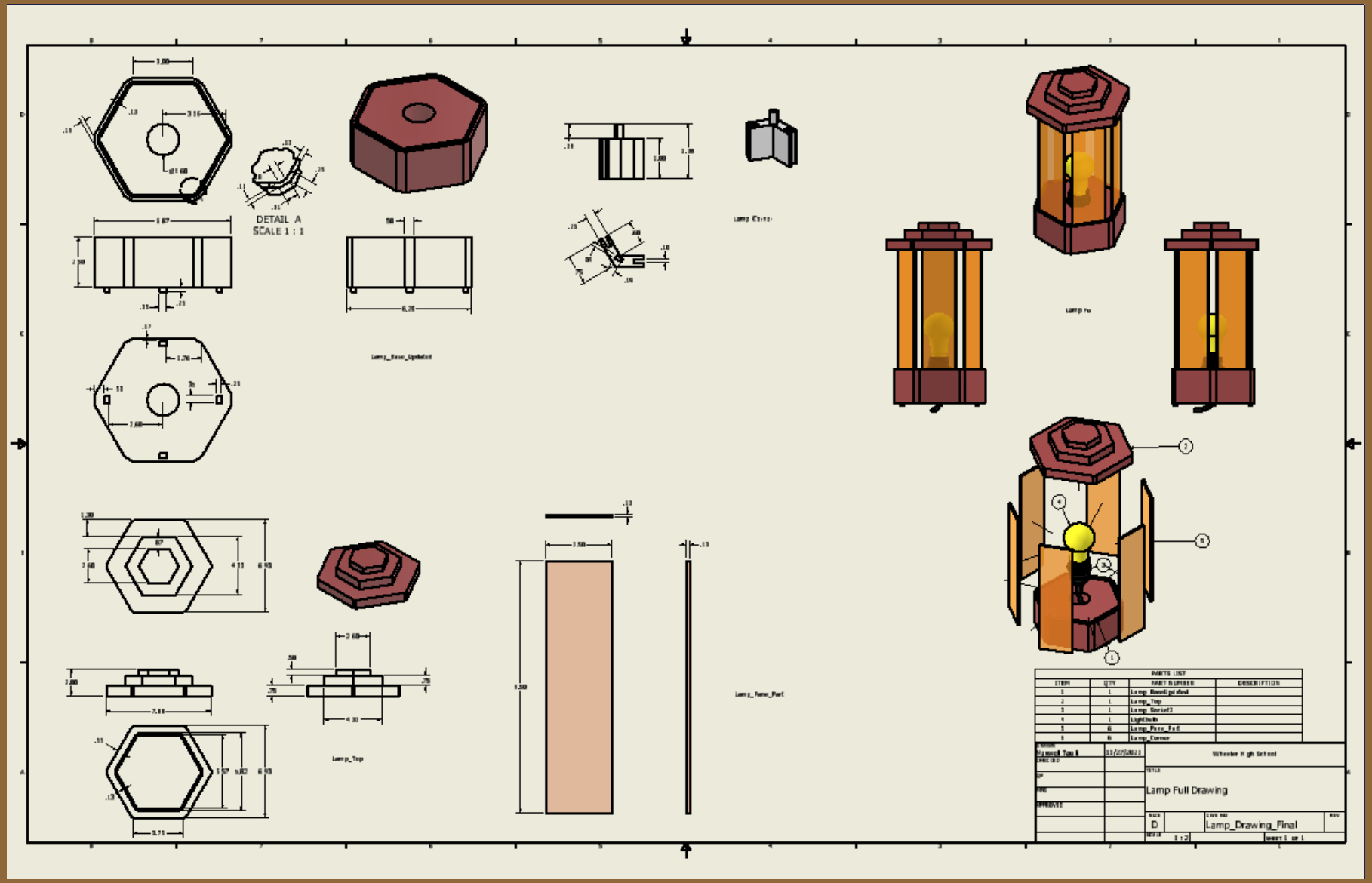
Corner

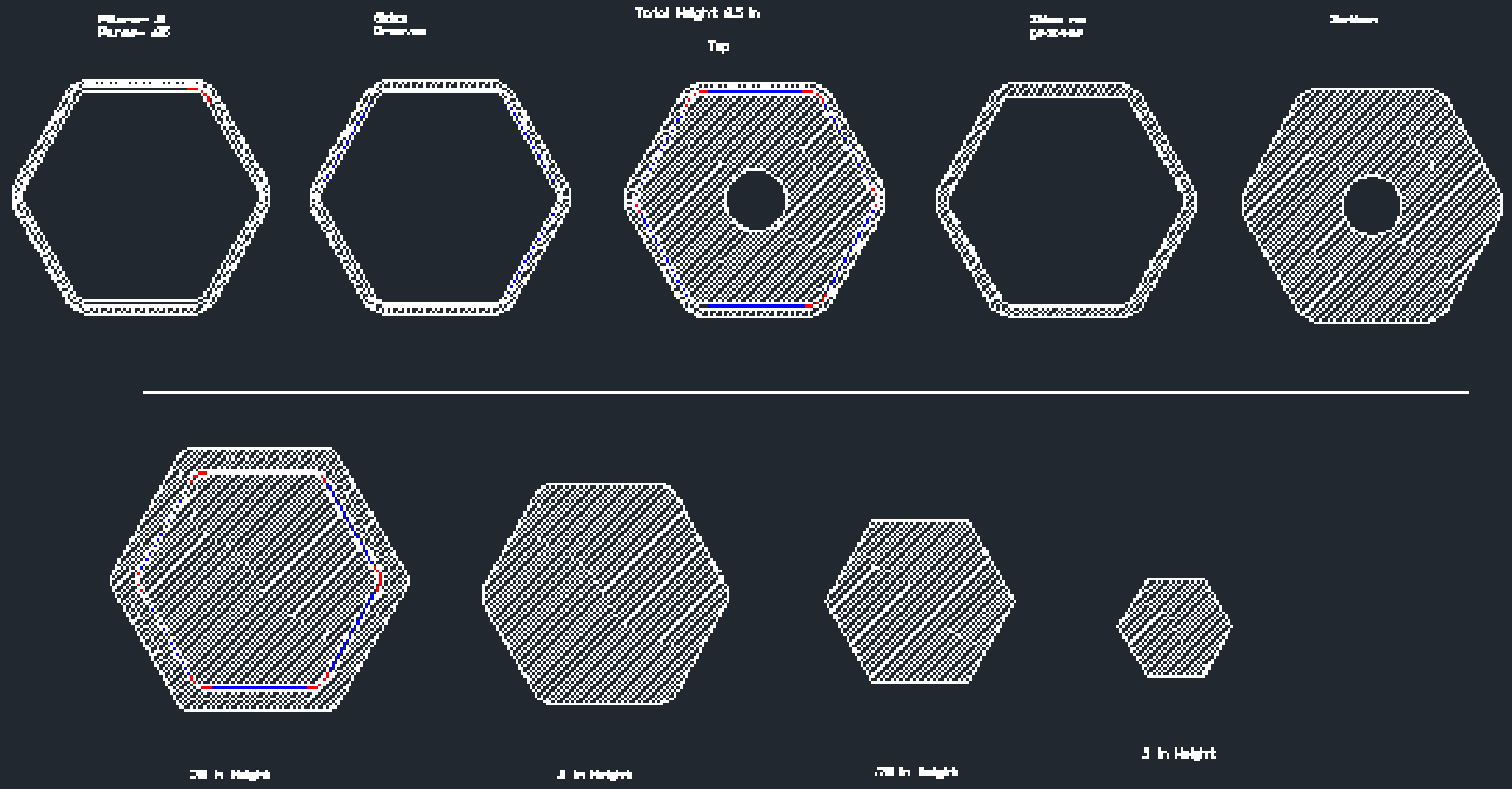


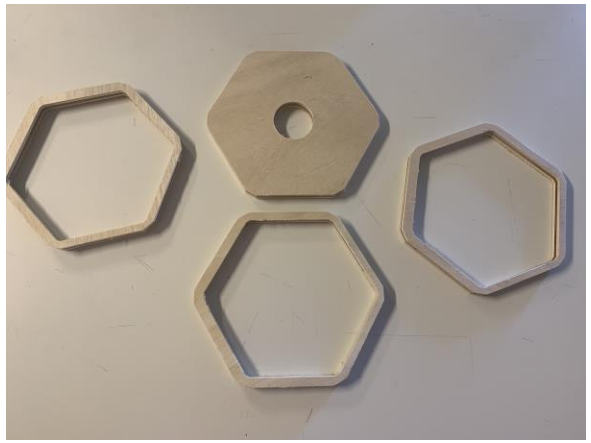
Corner With Pane

The Curse of the Unprintable Pillars

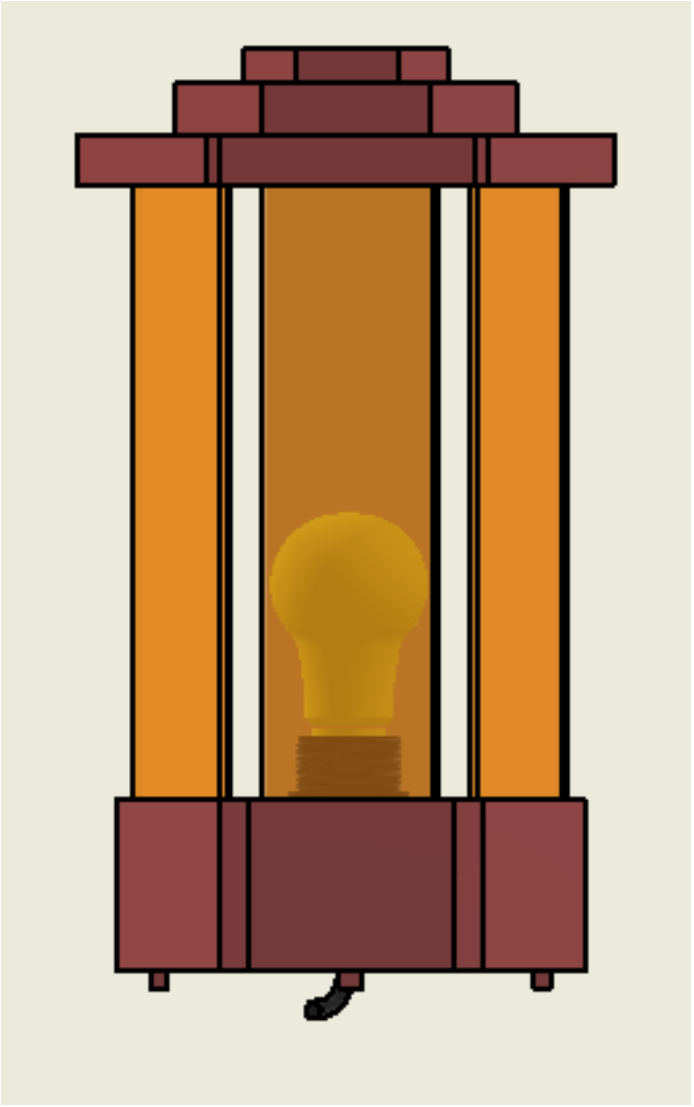
- I had originally chosen to make pillars that would be on the corners of the hexagon adjacent to the acrylic panes, in order to block light from seeping out of the lamp.
- However, after many redesigns and wasted filament, "I" had to scrap the idea of the pillars and create a new part.
- While this new part would accomplish the same goal of holding the panes in place, it had to be shorter and fatter which caused it to not block light from seeping through the corners of the lamp.

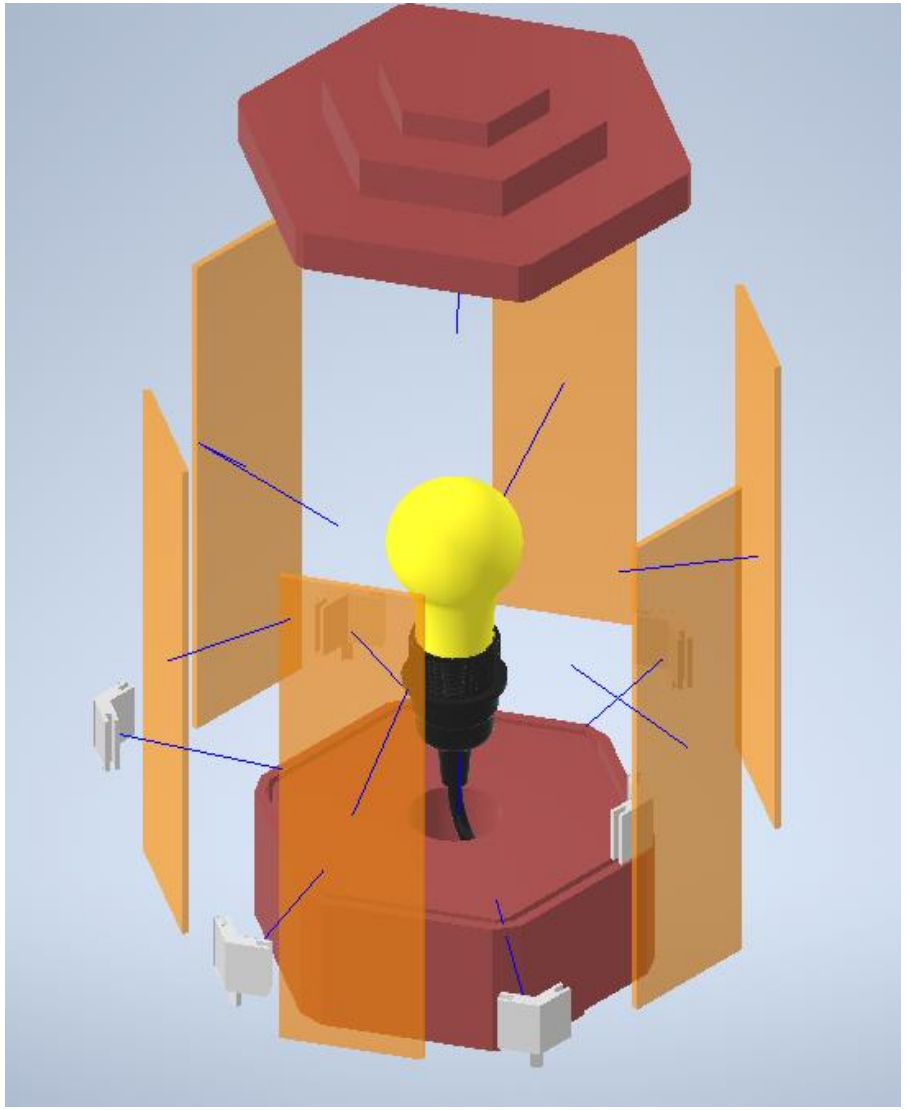

DETAIL A
SCALE 1 : 1
PARTS LIST
ITEM | QTY | PART NUMBER | DESCRIPTION
Lamp Full Drawing
Lamp_Drawing_Final

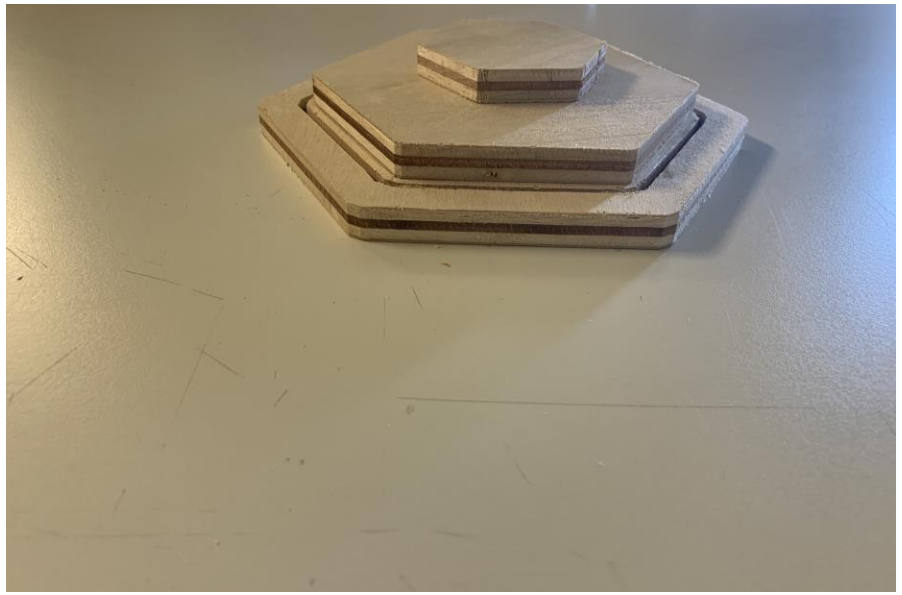

Total Height .45 in
Top
Bottom



Photos of Process:
Base

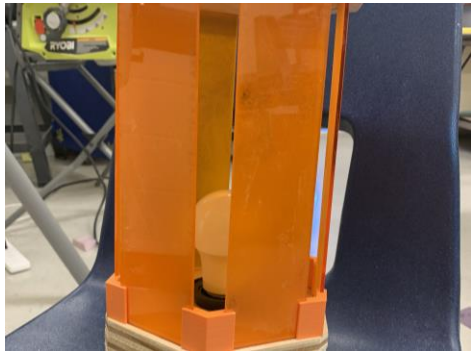






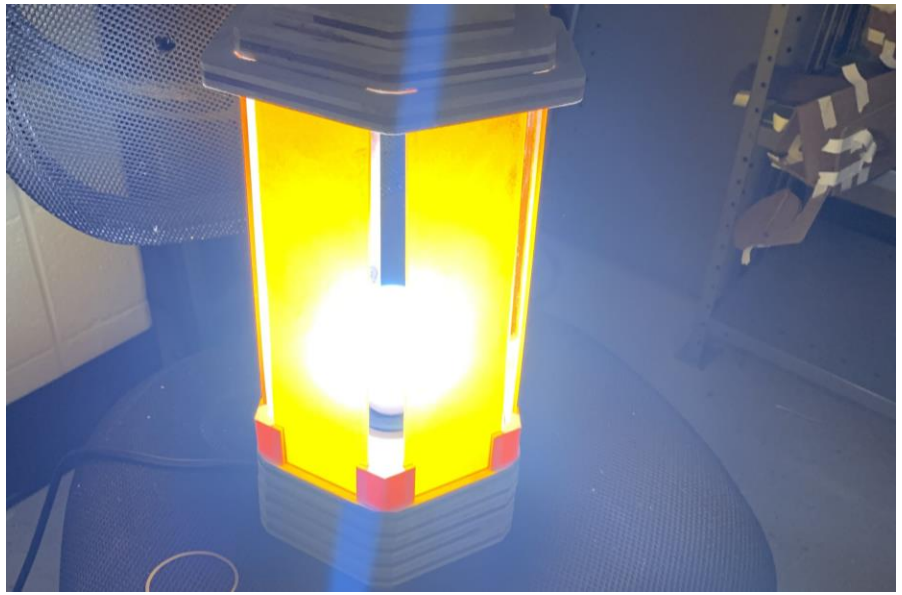
Photos of Process:
Top

Photos of Process: Panes and Corners





Final Product



Final Product With Light On

Material List

- 12" x 24" Sheet of Fluorescent Amber Acrylic 1/8 " thick
- Sheet of ½" Plywood
- Orange 3d Printer Filament
- Light Bulb + Holder
- Wood Glue
- Sandpaper

Labor Time

Machine	# of Uses	Time Used
Sketching	N/A	3 hours
CNC	2	2 hours
3D Printer	1	4 hours
Laser Cutter	2	1 hour
CAD	N/A	23 hours
Hand Tools	7	7 hours
Sanding	3	4 hours
Document Preparation	N/A	3 hours
		47 hours

Item	Amount Used	Cost
CNC	3 hours	$120
3D Printer	4 hours	$12.60
Labor Cost	47 hours	$2115
Laser Cutter	4 hours	$80
Materials	Acrylic, Plywood, Light Bulb, etc	$47.74
Misc.	Wood Glue, Sandpaper, File, etc	$22
		$2397.34

Cost Calculation

Reflection

The majority of my design worked successfully, however, the big problem that arose from this project was my 3D-printed pieces. The 3D printer can be very unreliable when attempting to print pieces that are small and intricate. If I were to redo this project, I would most likely make my corners sharper so that my pillars wouldn't have failed as much. The CNC machine on the other hand was extremely reliable and never failed to cut out my pieces correctly. If I had known that I would have been CNCing so many of my parts, then I would have been able to spend significantly less time in CAD and Inventor trying to make my parts fit into a 3D printer format.