3D Printing Assignment

DESIGN REPORT

Manjot Dola

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Situation

A 3D object must be designed and 3 printed using a 3D designing software (TinkerCAD, Inventor Professional, AutoCAD, etc.). The object must efficiently solve a problem you encounter in your daily life..

Problems & Possibilities

Design Brief: There is a telescope which is currently mounted on a stand that rotates. This stand has to be placed on a table whenever the telescope is being used which is highly inefficient. A part must be designed which effectively mounts the telescope to a tripod.

Problems:

- The only surface that can be mounted without compromising the usability of the telescope is the optical tube.
- There is not already a part that clicks into the bracket so a custom one has to be designed.
- The telescope is quite heavy so the mount must have enough support to prevent it from falling when mounted.

Specifications:

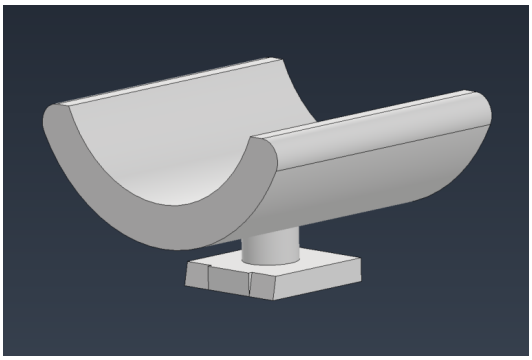
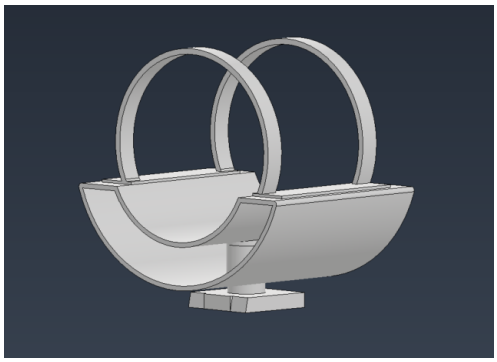
- The way the telescope is mounted to the tripod
    - The complexity of it
- The color of filament
    - Constrained within material availability

Constraints:

- Cannot be wider or taller than 3D printable area
- Must be scaled down if necessary
    - Due to multiple 3D prints and material constraints
- Must efficiently mount the telescope to the tripod without it falling
- Must include a component that clicks into the tripod mounting bracket to hold the telescope steady in place.
- The tripod has to be used for other things as well so the mount cannot be permanent.
    - Taking it off and mounting it back on should be easy and efficient.

- The entire object must be the same color
    - 3D printing constraint as the printer can only print with one filament color at a time.
- Object must be 3D printable
    - Adding supports if necessary

Investigation & Ideas

<table>
<tr><th>Design #1:</th><th>Design #2:</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Advantages:

- Simpler Design
- Easier to setup 3D Print
- Prints Faster
- Requires Less Filament</td><td>Advantages:

- More efficient in holding the telescope in place due to cage support
- Hollow mounting part which saves filament</td></tr>
<tr><td>Disadvantages:

- Not as efficient in holding the telescope in place
- Possibilities of the telescope slipping out of the mount
- Filament is wasted in infill</td><td>Disadvantages:

- Takes longer to print as there are more parts
- Complex Design
- Difficult to setup as it requires supports
- Requires more filament</td></tr>
<tr><td colspan="2">Final Design: Design 2

Rationale: Design 2 was chosen as it completes the task at hand more efficiently and reduces the risk of the telescope falling off and being damaged. It is, however, more difficult to print as it requires supports and each part needs to be carefully sliced to make sure the print is possible. It is okay to accept that and deal with it because the final product should be as efficient as it possibly could be and</td></tr>
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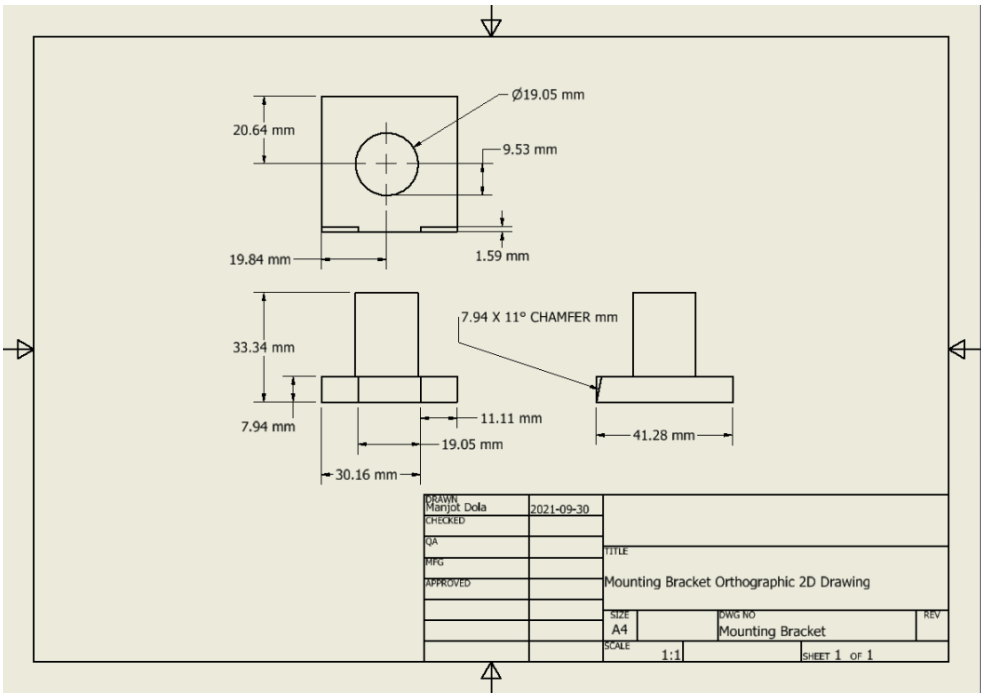
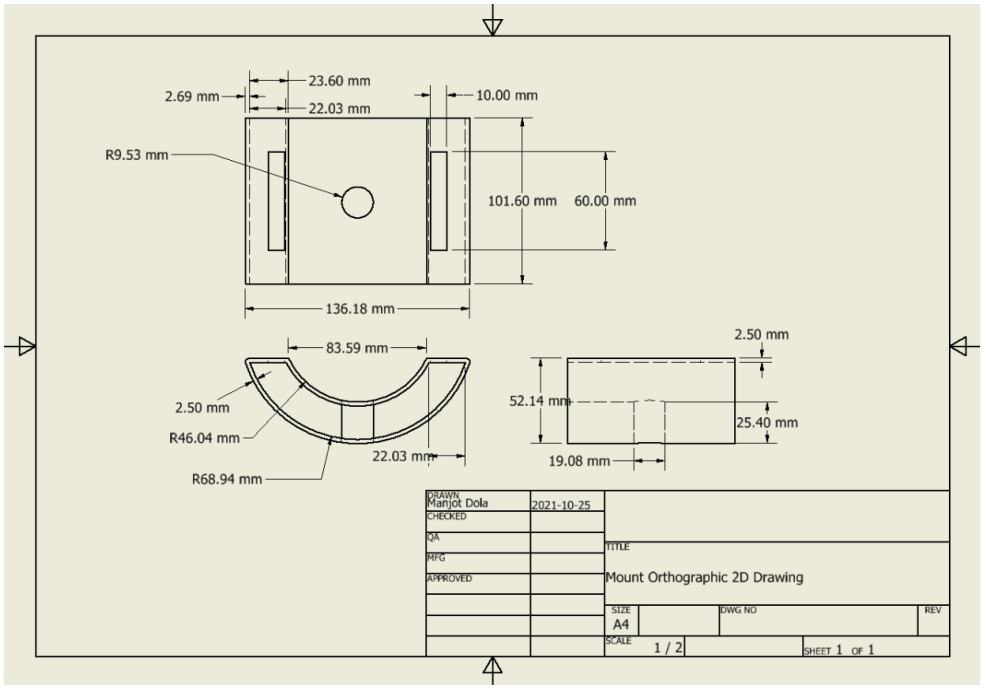
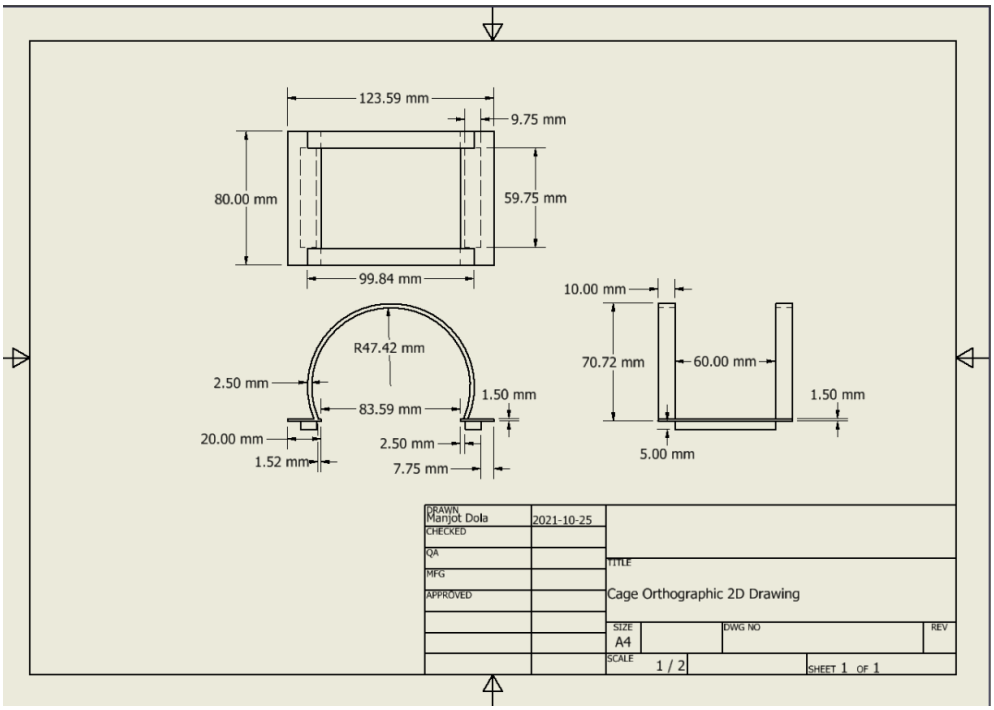
design 1 doesn't offer that.

Design 2 Orthographic Projections:







Construction


Evaluate

I think the telescope mount that I designed solves the problems I had very well. The small bracket fits in perfectly with the tripod and the actual mount also distributes the weight of the telescope evenly to hold it stable. However, the third component of the mount, which was the cage to hold it perfectly secure, did not quite fit because I forgot to take into account the stand mount installed in the telescope's optical tube. In the future, I would work around this stand mount to make the telescope completely secured.