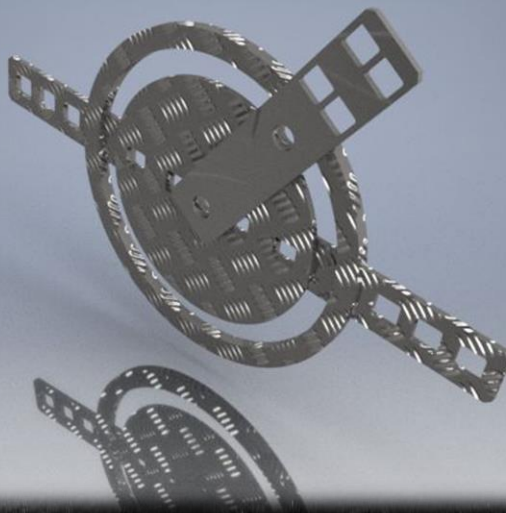


VEX  
PROTRACTOR

# Introduction:

---

The Vex protractor is designed to provide an easy way to adjust the precise angle that I want, which help to build angular mechanisms by the protractor hand that I have designed.

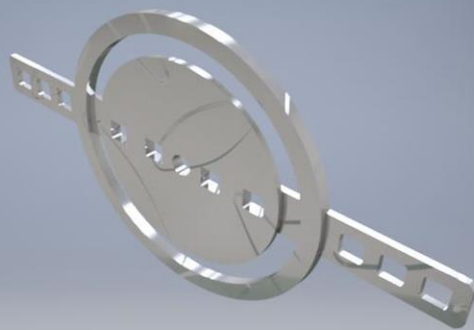


# Design Process:

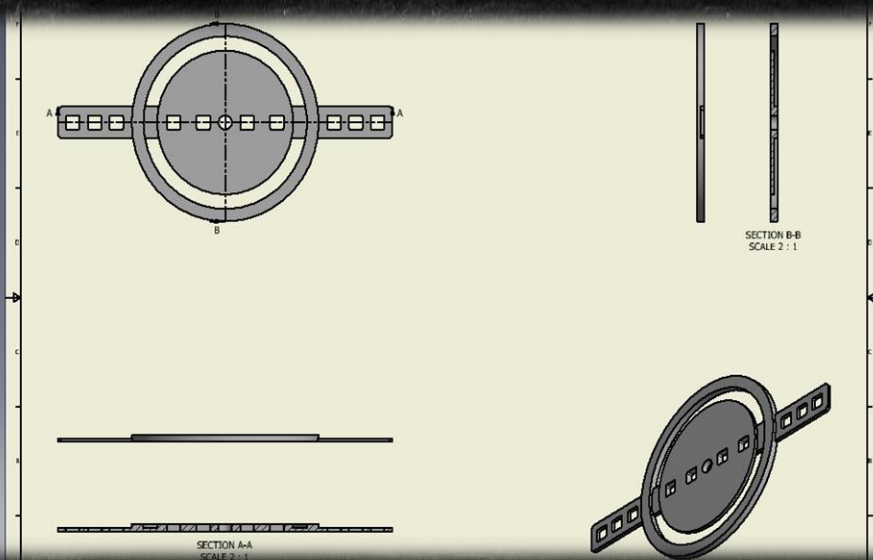
I started by gathering information from my team and my school's teams about the designing and constructing problems that they faced in the last year's Competition "Nothing But Net". I noticed that many problems were about adjusting the angle of the launcher so I started thinking about how to adjust a mechanism with an adjustable angle. I started designing and developing models and prototypes until I derived this design. Some of the prototypes:



The angle is about a circular part made of iron to hold stresses with two sides to construct it with any other part of VEX kit.



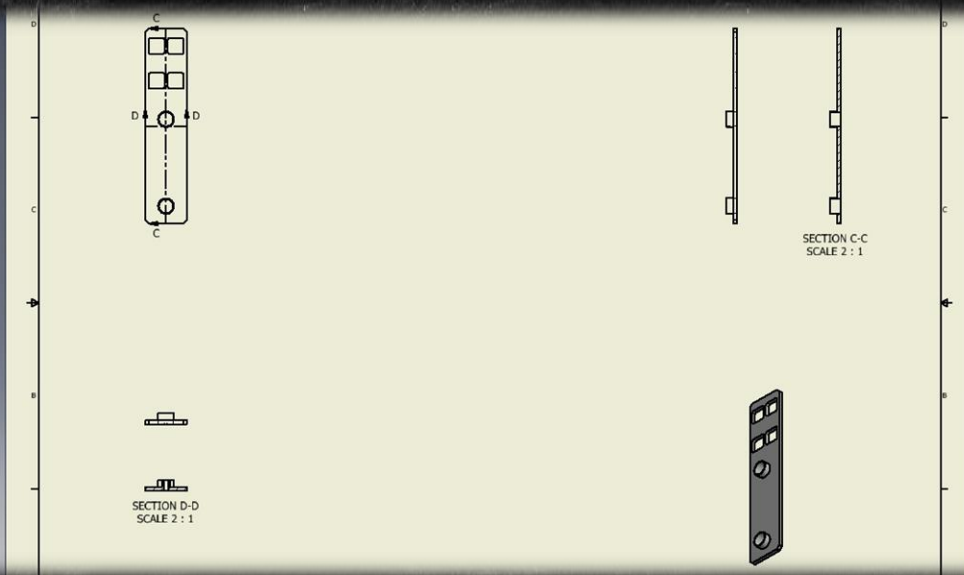
Drawing:



Second part of the Protractor is the hand, which adjusts the required angle.

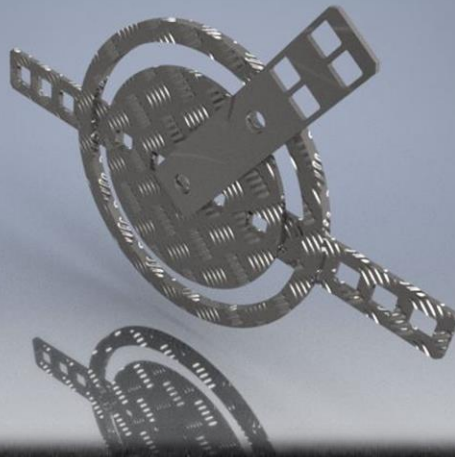


Drawing:



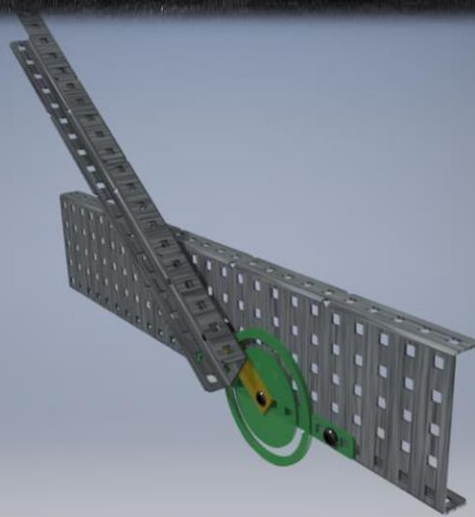
I also took into account how it will fit with the VEX parts as its size, the connection holes, slots, etc.

---



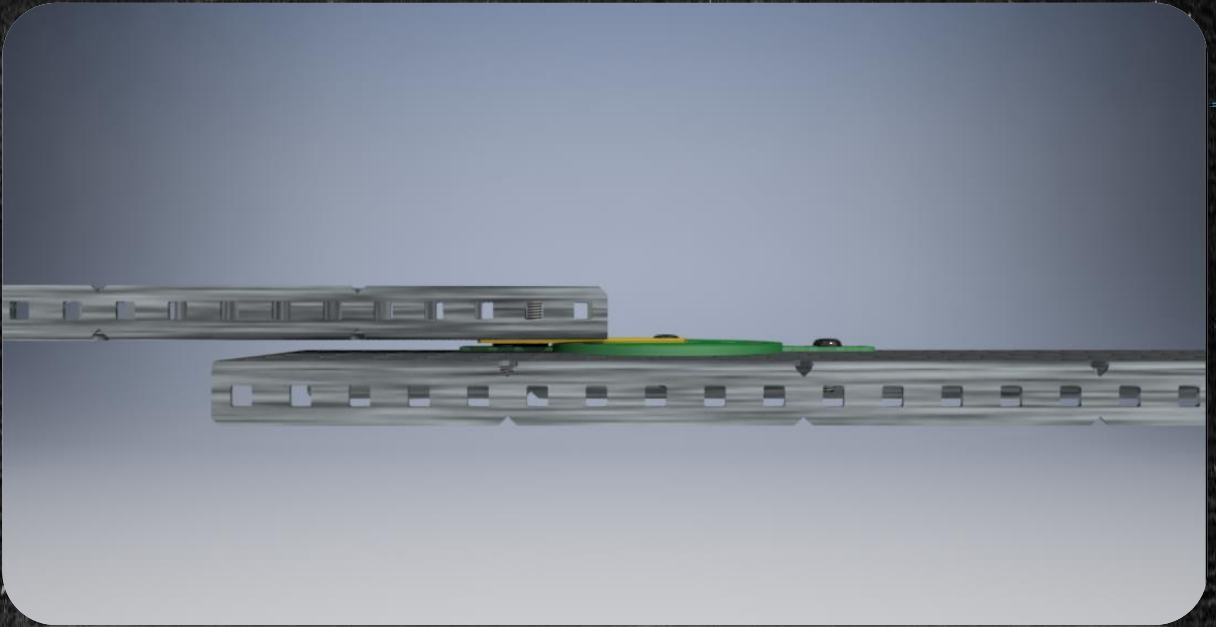
# How “VEX protractor” “ would be used:

It is easy to be used and construct with a VEX robot as I can easily set the protractor wherever I want and construct it using usual VEX screws and nuts. Then I can adjust the required angle and set the screw with a nut to prevent the hand from deviation. After that I'd connect my mechanism to the hand of the protractor.

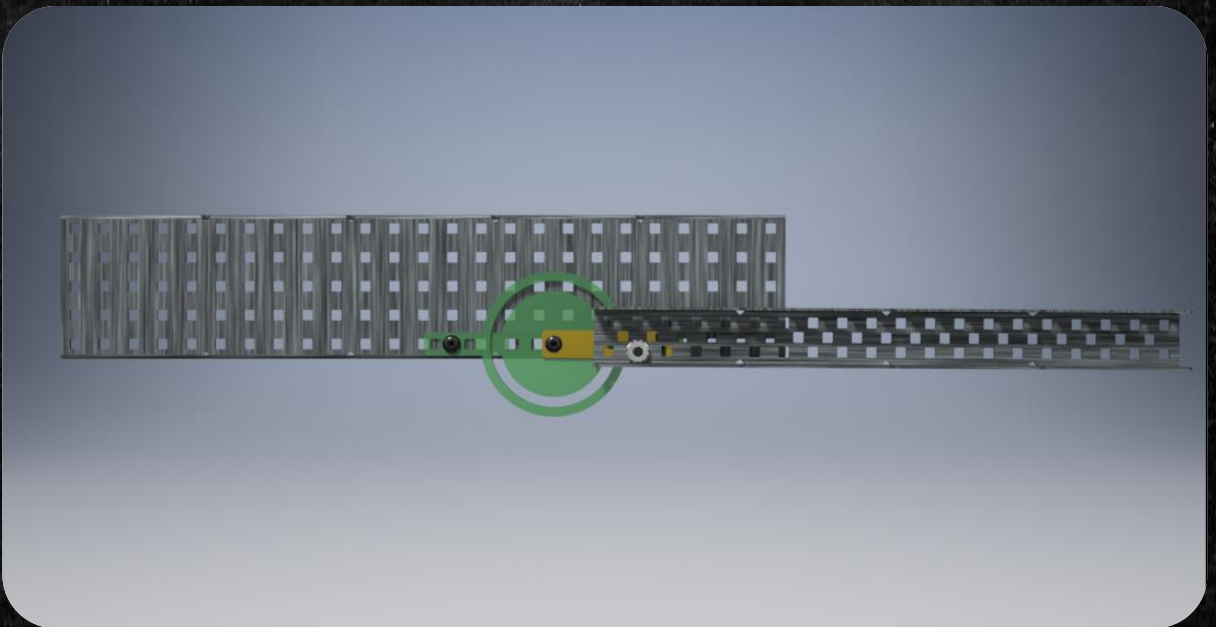


Isometric view

# Projected Views:



Top View



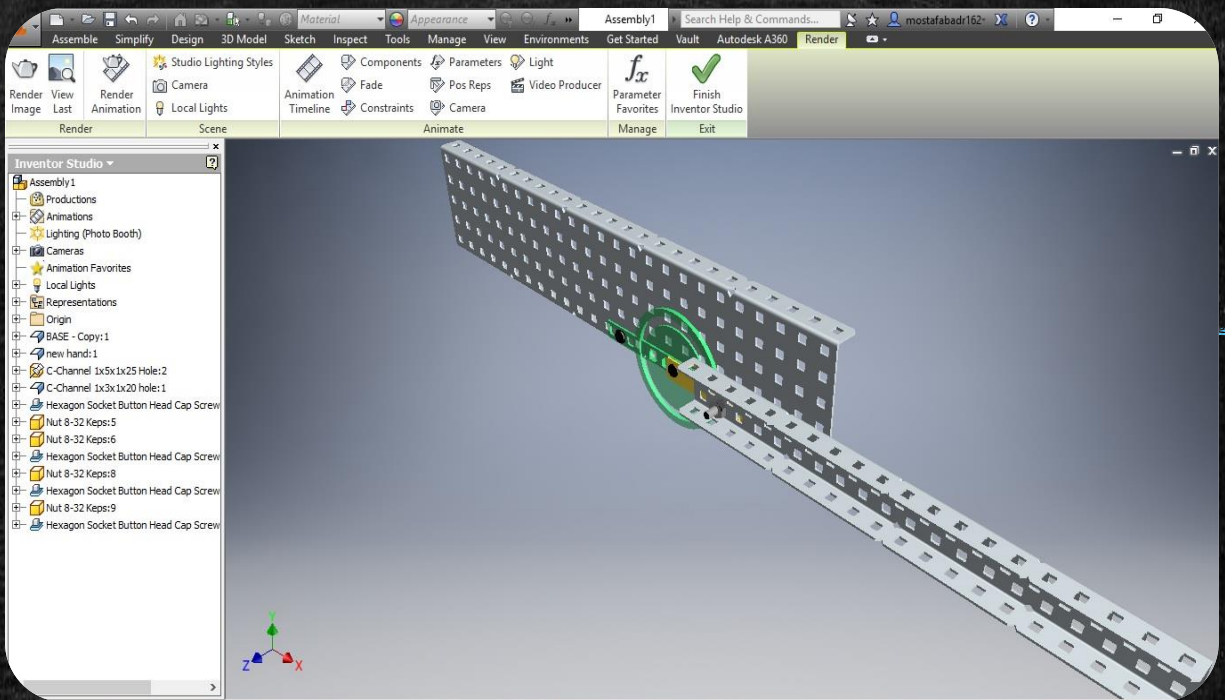
Front View



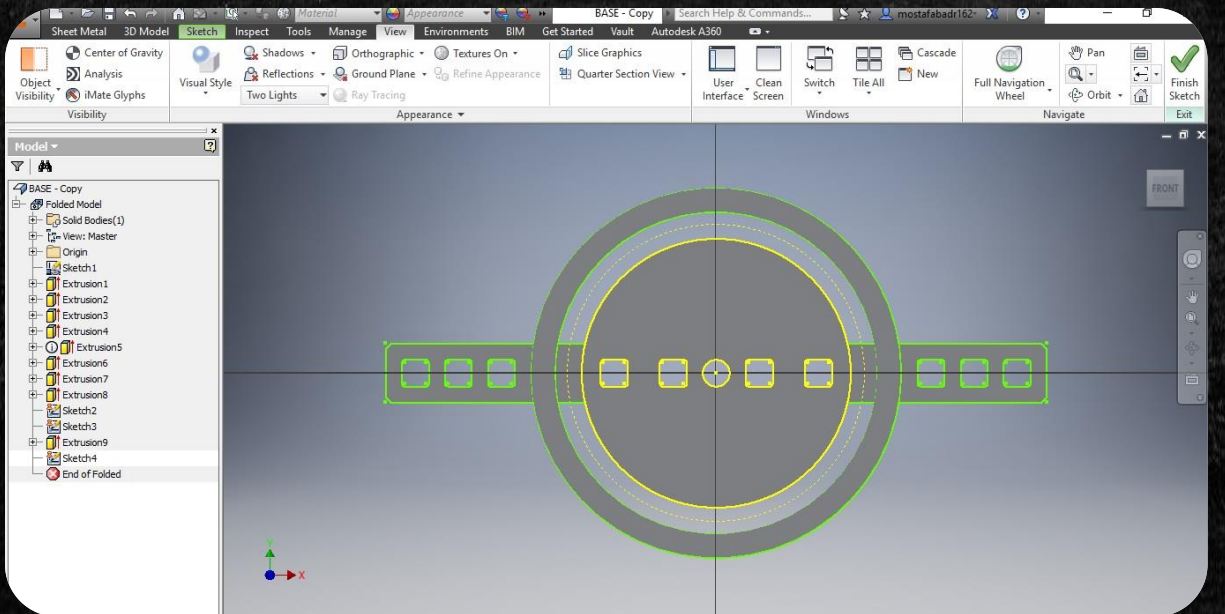
# How Autodesk Inventor® was used:

---

Inventor® 2016 was used to design, render and animate the new VEX protractor. First of all, I used the sketch to make the 2D design of the protractor. Then using fillet, chamfer, and extrude to adjust the 3D design. Also using assembly environment to try the new parts and make sure that they will fit with each other and with VEX kit. Also Inventor® was very useful in taking pictures of the new Protractor using the studio environment.



# Inventor Studio



# 2D designing

# Conclusion:

---

Using Inventor to design my new VEX part helped me to gain great experience in 3D modeling field so I used Inventor not for designing this part only, but also for my projects by simulation and mechanical tests that can be made easily using Inventor as it helped me to know whether my design will be feasible as expected or not before pursuance and purchasing it. So I intend to keep using 3D CAD software in designing so I can save more time and effort. I also know that Autodesk® carries the future of engineering designs in their hands. That's the reason of my passion to gain that proficiency to keep pace with the development.