

# Hinged Panels

## Introduction

The designed parts are two halves of a hinge. The reason I chose to make a hinge part is I found that students were limited in options for design and current methods were insufficient for carrying heavy loads. I am improving the current methods by creating a sturdier joint and adaptable design.

## Explanation

The size is flexible meaning by simply adding another part you multiply the strength. You accomplish this by connecting two of these side by side transforming the hinge into a 4x to 4x connection joint. The part can also be used to create a hatch so that you could get into places typically obstructed by parts connected with pegs. The hinge has the connections parallel to the 2x, meaning it is much stronger than a peg because a peg has the connection part perpendicular to the 2x. One of the many reasons why I want to improve upon a peg is because a peg is incapable of efficiently carrying heavy loads, this will help with that.

One of the multitude of ways the new part could be used is making new shapes which increase structural integrity. Using the length of the 2x and connecting hinges you could get any angle and any shape for example you want a right triangle with one of the other angles being 32 degrees you could do that, you want an octagon you can do that, you can make any shape. The hinge works similar to a door hinge, you attach the first part to a 2x the second part to a 2x and then you add an axle in between with rubber collars at the end to prevent the axle from falling off. I designed my parts using Autodesk Tinkercad version 2019\_10\_14.

To create the part, I started with a two by two panel then used Tinkercad in order to add tubes with supports to give it the hinge capability. I made sure the axle fits, working through the design process to thicken the walls of the tube (for strength) while continually verifying the shaft fit correctly.

The first time I printed it out, it was not very strong and it ended up breaking while testing the parts. I strengthened the sides and make the axle fit more snug to overcome the breaking issue.

## Conclusion

I learned that designing in 3d is challenging but also a great way to put my thoughts into design and eventually into practice building robots. In the career that I see doing I will most likely not design in 3d but I will utilize the models to visualize how I will program the machines designed using 3d cad. I will most likely continue using Tinker cad for hobby grade design. Doing this challenge has made me aware of Autodesk Fusion 360 and Autodesk Inventor. My Next task is to learn Autodesk Fusion 360 and see how it differs from Tinkercad.