NOVEMBER 29, 2024

INDS2018 - ASSIGNMENT #2

3D PRINTED FIDGET TOY

Plastic And Rapid Prototyping
INDS 2018 - Shinya Kominami

MITCHELL PRETAK

Assignment #2 - Fidget Toy

MITCHELL PRETAK *(3207913)*

INDS-2018 - ASSIGNMENT # 2

3D PRINTED FIDGET TOY - "FidgiGrip"

TABLE OF CONTENTS

Want to see FidgiGrip assembled and in-use? *(Higher Quality)*

Watch the Video

ASSIGNMENT PROMPT

DESCRIPTION

Using Autodesk Fusion 360, design and draw a unconventional and original Fidget Toy. Subsequently, use 3D printing method to create a working, full feature prototype.

OBJECTIVE

The objective of this project is to design and prototype a cognitive focus device, aka Fidget Toy, and demonstrate how it can relieve users of the modern, evolving world's anxieties.

The prototype must consist of more than 3 parts coming together as an assembly. One or combinations of joints, fasteners or adhesives can be used to assemble the parts.

Design parts to minimize the cost of printing by coring out or shelling the inside, etc.

See examples: https://youtu.be/BsmJ6SR_ERI?si=CsBKiPjJnnrgtDS6

DELIVERABLES

Part 1: Due beginning of Class 10, Nov. 13, 2024:

Research the variations of Fidget Devices and identify the problems they solve. Purchase an example of the existing Fidget Toys on the current market and take it apart to understand how parts are assembled.

Sketch at least 10 thumbnail sketches on two, 11"x17" paper to figure out what your product functions and looks like. In the thumbnail ideation sketches, explore different functions and forms. Use a Ball Point Pen and 9"x12" or 11"x17" paper on the sketchbook.

Freehand sketches, no markers. Submit as INDS2018_Project2_Part1_First-Lastname

Part 2: Due end of Class 12, Nov. 30, 2024

1 Fusion 360 CAD Drawing, Exploded view, of your Fidget Device.

1 Fusion 360 CAD Drawing, Orthographic Mated, Connected or Assembled view of your device. (Front, Top, Right, Bottom and Perspective Views)

1 Bill of Materials or Table of Parts, showing name and number of parts, material, etc. with the Fusion360 CAD Drawing, Assembled view.

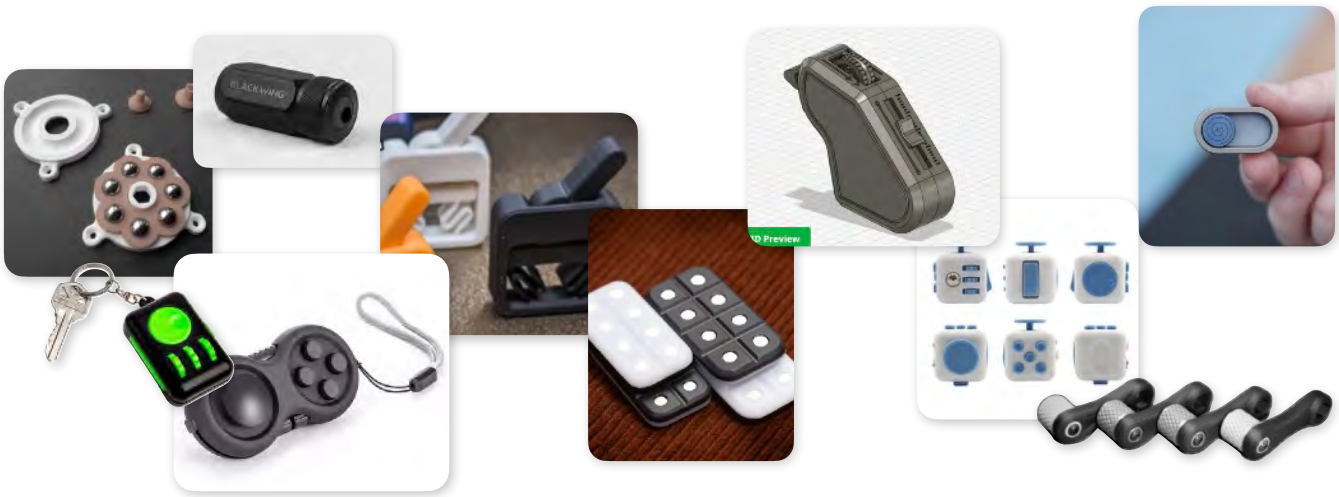
1 Dimensioned Drawing that shows the overall dimension of the assembled product (Width, Length, and Height).

1 3D Printed, assembled prototype of the final design, along with a 2min video demonstrating the key features and product in use (MP4 format)

Submit all files compressed, (Drawings as PDFs, and Video as MP4) as INDS2018_Project2_Part2_First-Lastname.zip to Canvas. Email submission not accepted.

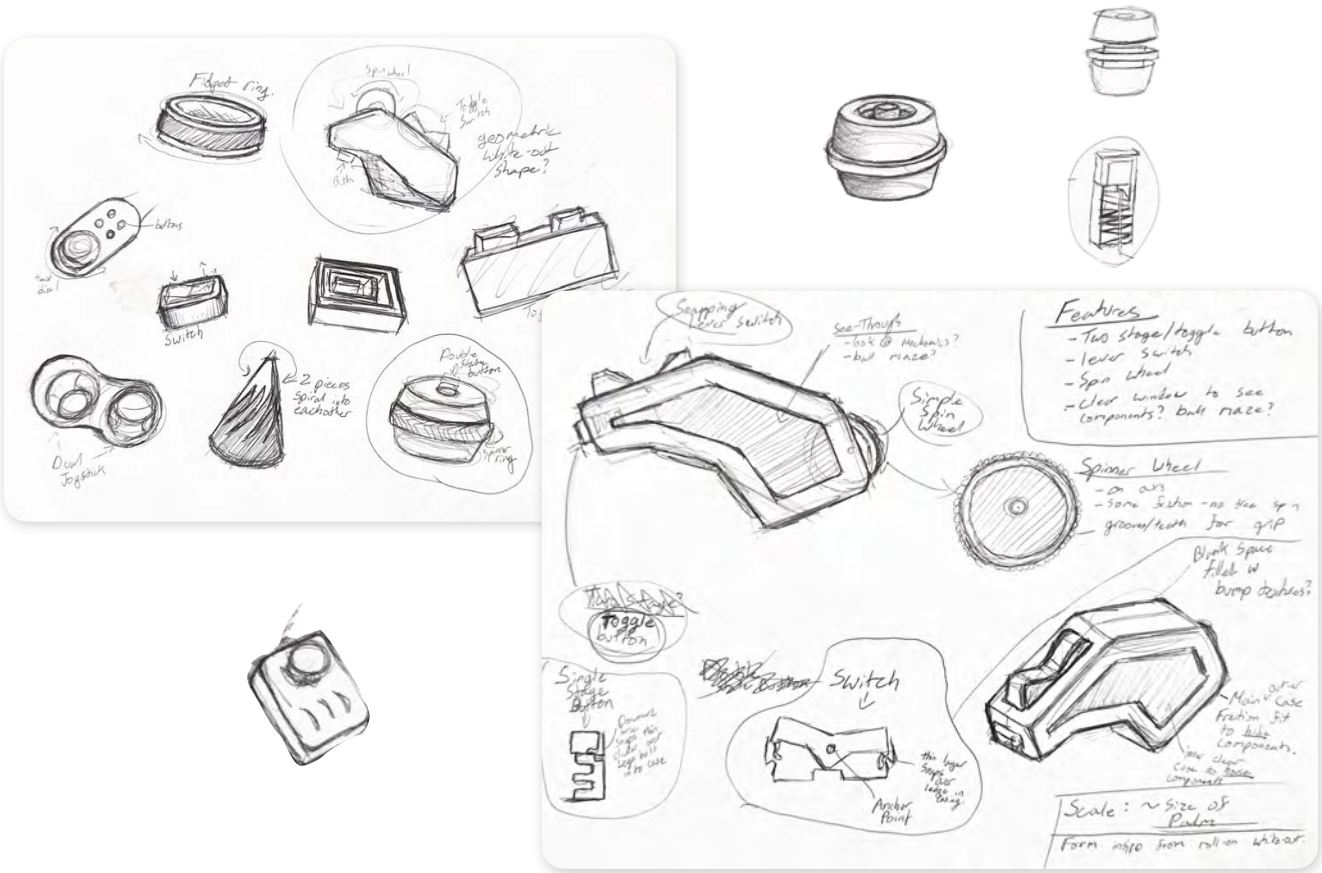
PROCESS

INSPIRATION



IDEATION

Initial Sketches



PROCESS & METHODS

3D Modeling

After settling on a direction from the ideation stage, I began to explore some more Ideas using shaper3D

After I had finalized my concept, I moved over to fusion and rebuilt it from scratch, now taking more time to define smaller details like the angle at which the sharpener rests in the casing.

Rendering

I created some initial renderings of form in Shapr3d. Once I had the functional model designed, I re-rendered it In greater detail

3D Print Tests

The next step was to begin printing out individual models to test tolerances and how they would function in the real world. These individual prints allowed me to focus on the parts with greater complexity, while other parts like the shell required less testing and could be printed as a final model.

Part Refinement

Based on the outcomes of the print tests, the product underwent several refinement stages to improve function and reliability. While there is space for improvement, the final model is entirely functional.

For the most part, no major changes were needed, just simple improvements to tolerances and the order of printed parts.

Assembly

Finally, once all of the pieces were refined and printed, it was time to assemble them. For this assignment, all components were sufficiently secure with just the friction fits, however if I were selling or producing them I would likely add glue as additional security.

This also involved sanding and treating the final product.

FINAL PRODUCT

PRODUCT DETAILS

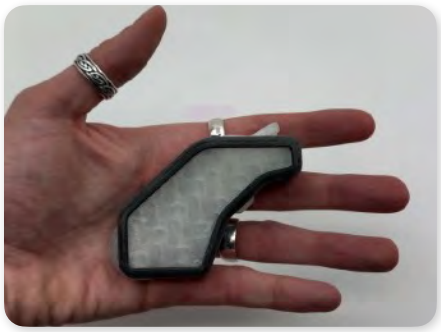
Basic Dimensions (W x L x H)
Full Product: 2.5 x 10 x 5.6 cm

Number of Pieces
8 Pieces - 4 Case & 4 Fidget Components,

Materials / Elements
PLA Plastic Filament, Glue, Beads

Description
FidgiGrip is a fidget toy design that incorporates three different fidgets into one ergonomic grip.

FEATURES



Ergonomic Grip
FidgiGrip is modeled to fit perfectly in the user's hand.

Friction Fit Components
Simple assembly with friction fit components; no glue needed.

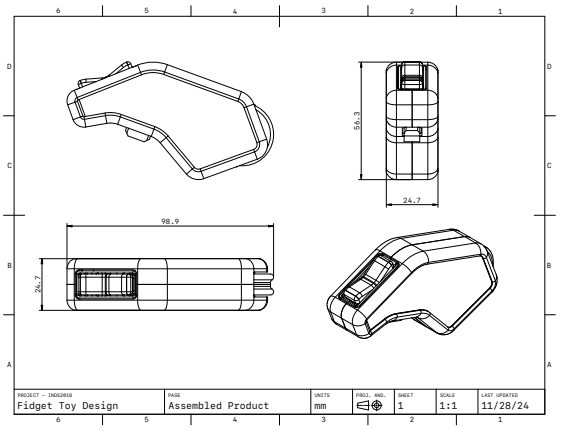
Tactile & Audible
All Components provide both tactile and audible feedback.

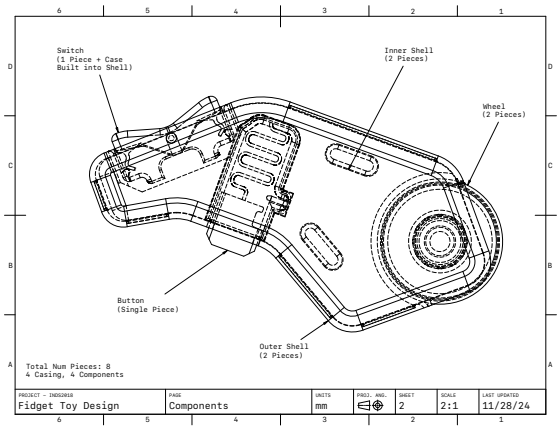
2 State Switch
Two state switch can be snapped back and forth.

Clickable Button
Printed as-is, inserted into cutout in the inner shell.

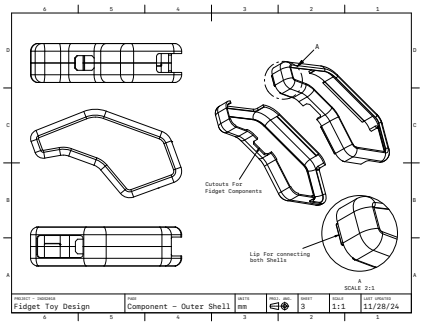
Spin Wheel
Printed in two parts, with beads inserted inside.

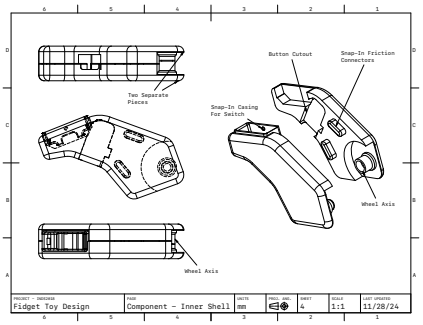
3D MODEL / DRAWINGS / AXONOMETRIC

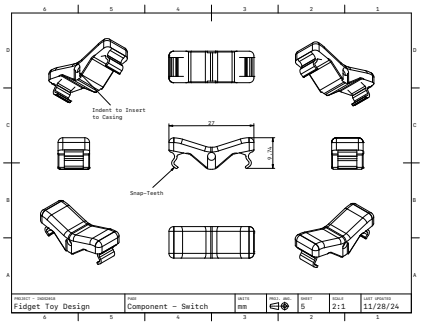


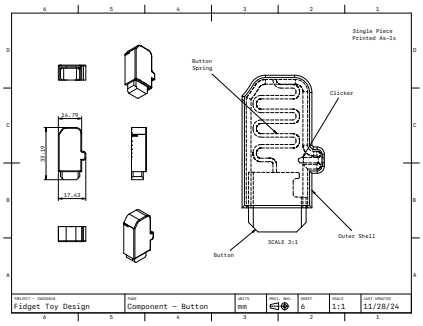


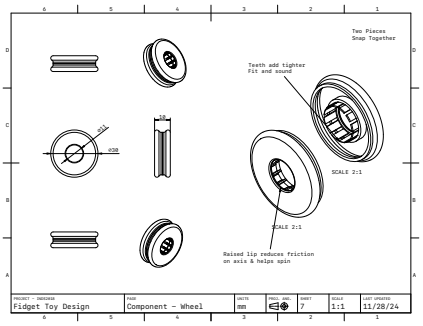
Individual Component Breakdown





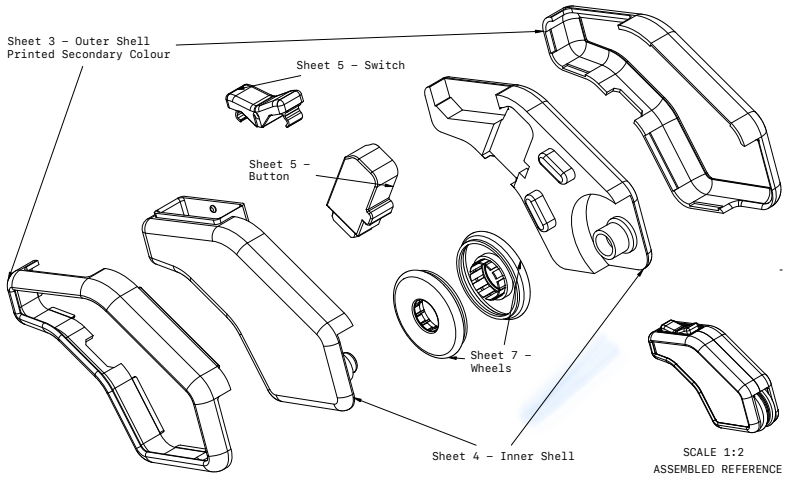






BILL OF PARTS *(8 TOTAL)*

1 & 2 - Outer Shell *(Sheet 3)* Black
3 & 4 - Inner Shell *(Sheet 4)* Clear
5 - Switch *(Sheet 5)* Clear PLA
6 - Button *(Sheet 6)* Clear PLA
7 & 8 - Wheels *(Sheet 7)* Clear



Quick View
Shaper3D
Quick look at model, mockups, & drawings;
Click here.

Complete Files
Fusion360
To access the complete 3d file,
Click here.

REVIEW

Future Improvements

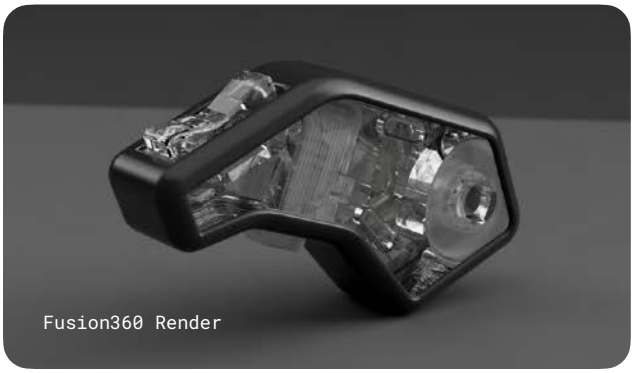
- Minor improvements could be made to each of the components (mainly the button) to ensure smoother movement and better-sounding clicks.
- It would be interesting to explore better connectors for the shell, like snap-fit joints, rather than the current friction fit system.
- Hollow out the inner shell (rather than infill) for better clarity through the clear plastic

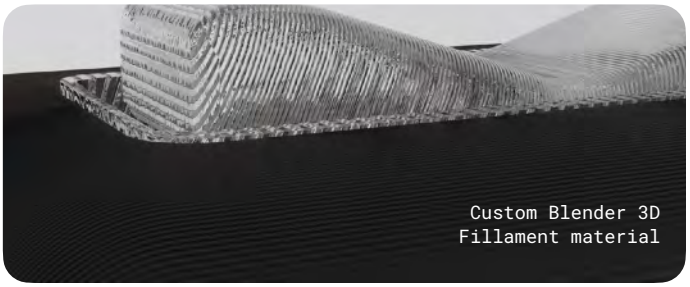
Learnings

This project allowed me to get comfortable with fusion. I was able to take my time with more advanced commands, and my file structure has significantly improved thanks to components and linking more complex pieces to separate files. ***This is also by far my most complex print, both in terms of function and assembled pieces.***


Pre-Assembly


Blender Exploded Render


Fusion360 Render


Custom Blender 3D Fillament material