Final Exam – Presentation

INFR 3380U: Industrial Design for Game Hardware

Roderick “R.J.” Montague (100701758)

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Introduction – Question

- **Name**: Roderick "R.J." Montague
- **Student ID**: 100701758
  - 1 + 0 + 0 + 7 + 0 + 1 + 7 + 5 + 8 = 29
- **Prime Question**:
  - *"You have been hired by a company to prototype a virtual reality controller for using chopsticks. The purpose of said controller is to provide an immersive and engaging experience for users to learn the appropriate movements and directions. The target user is the young adult."*
- **Repo**: https://github.com/mecha-rm/DGH-EXM01

Introduction – Presentation Outline

- **Agenda**:
  - Design Process
  - 3D Modelling (Fusion 360)
  - Technical Drawings
  - Assembly and Bill of Materials
  - STL Analysis for Improvement of 3D Printing to Use Less Materials
  - TinkerCAD Simulation
  - Takeaways and Future Improvements

Design Process

Hardware Design Thinking Process

Need Finding/Empathising

- Is primarily a learning tool.
  - Needs to be comfortable, immersive, and engaging.
  - Needs to be realistic.
  - Must mimic real-world use of chopsticks.
- Needs input for starting, pausing, and quitting the game.
- Needs to understand controller orientation.
- Needs some form of feedback for action performance.
- Needs compatibility with HTC Vive Tracker for VR purposes.

Defining the Problem

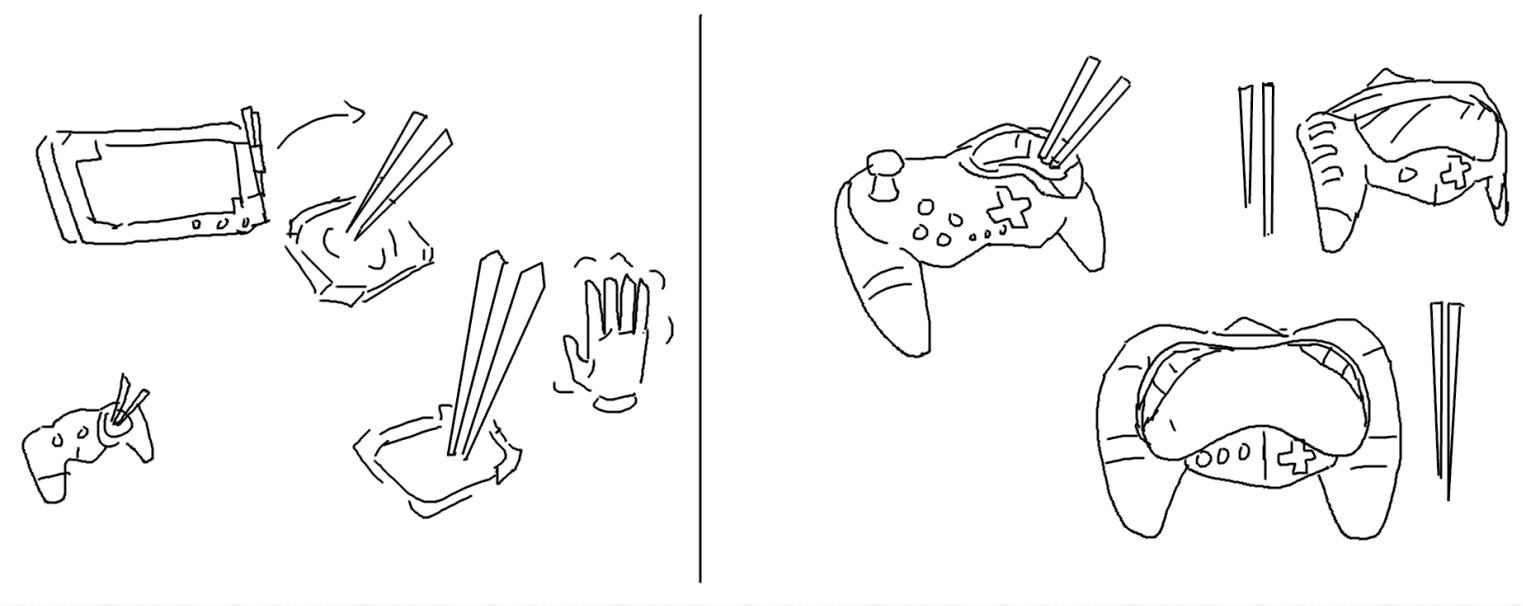
- Need to teach the user how to use chopsticks.
- Need to implement the controller into VR.
- Need to conisder the versatility of the hardware and software.
- User is a young adult, so need to consider what they can handle.

Ideating

- Controller Area:
  - Need to conisder controller size.
  - Need to consider area for using chopsticks.
  - Need to consider button spaces and sizes.
- Need to consider storage of the controller and chopsticks.
- Consider controller-specific chopsticks versus regular chopsticks.

Ideating – Chopsticks

Ideating – Sketches



Prototyping/Testing

- Fusion 360
- TinkerCAD
- 3D Printing Simulation

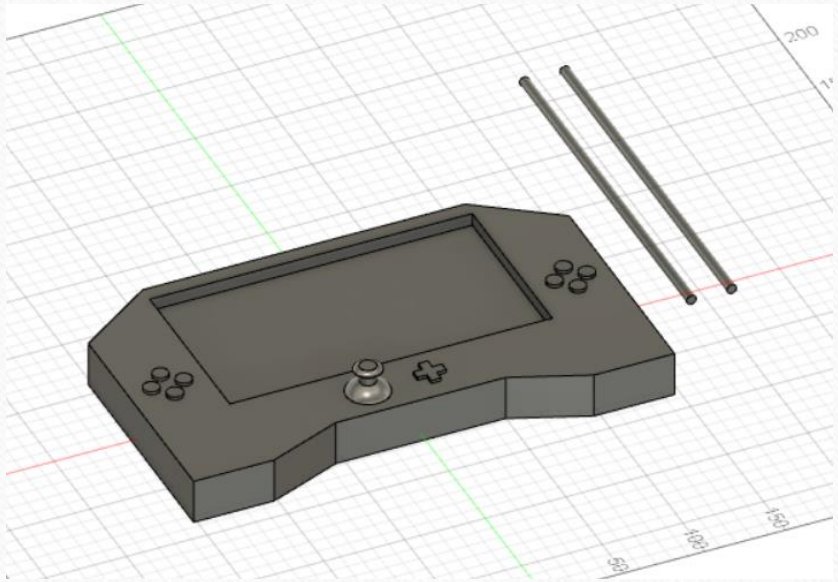
Problem Statement

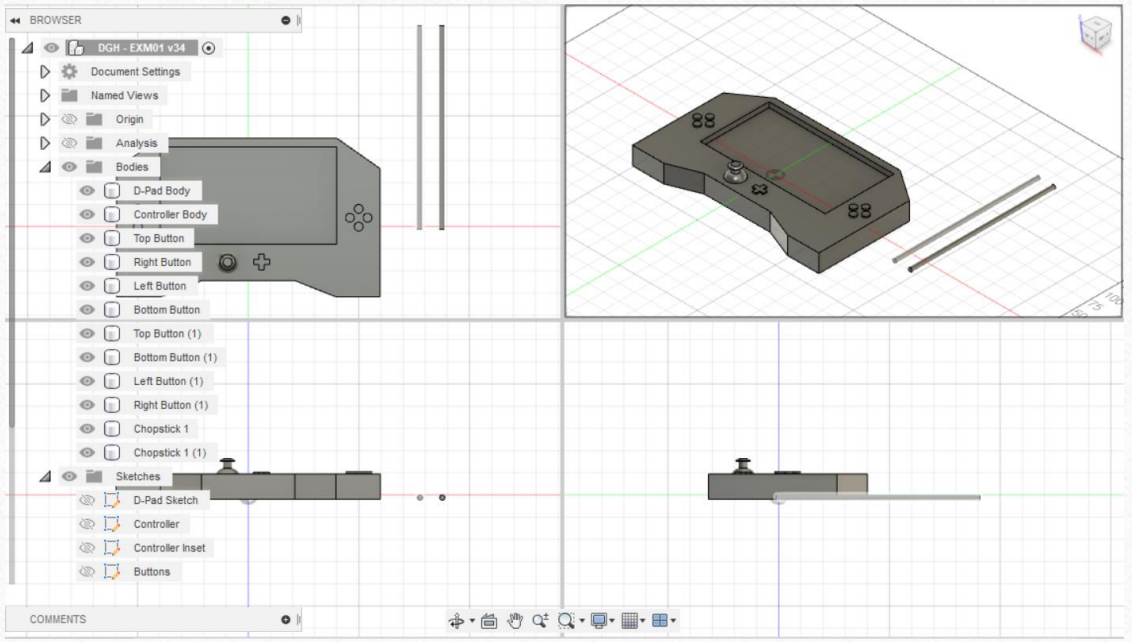
The user needs a way to realistically use chopsticks in virtual reality using a controller. The controller needs to be modified in terms of its layout and features to allow for the user to use chopsticks in virtual reality akin to how they would in real life.

Fusion 360 Model

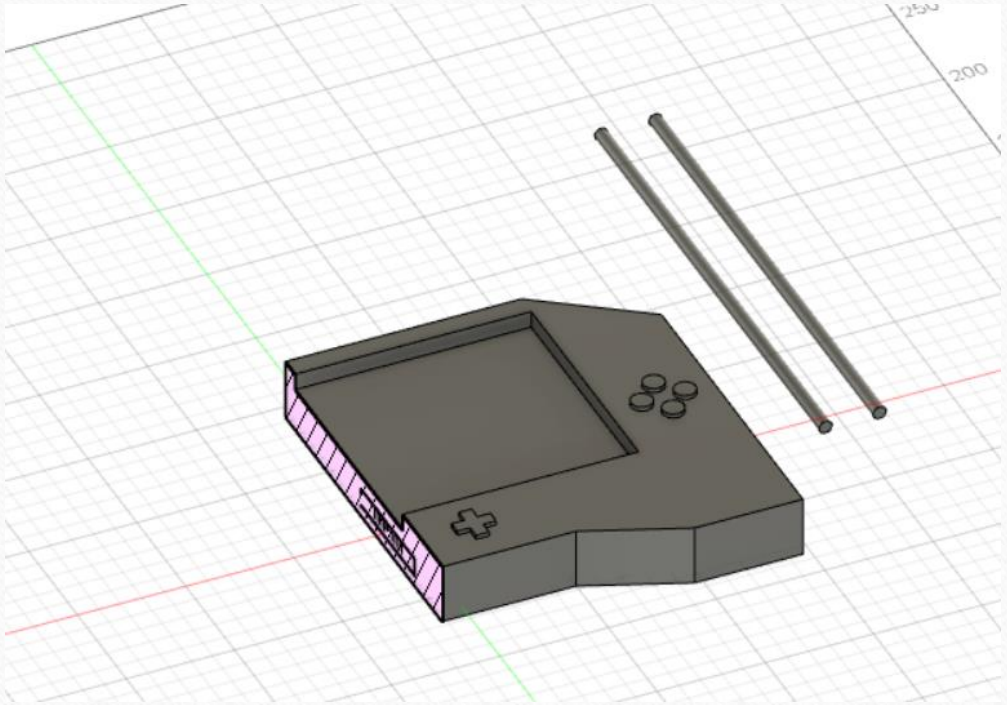
Modelling in Fusion 360

Fusion 360 Model





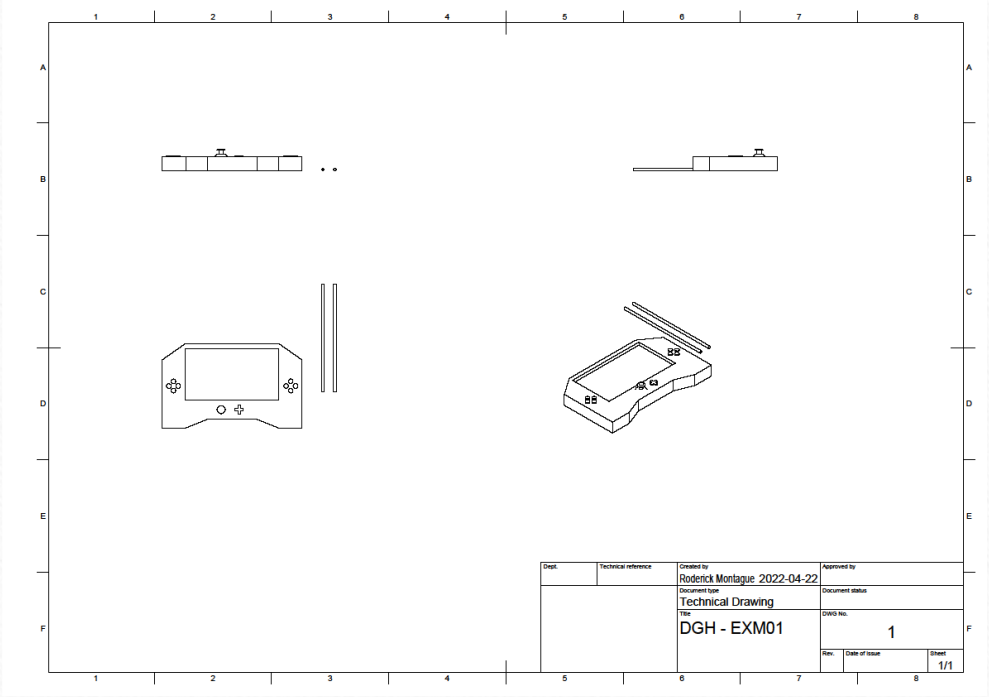
Fusion 360 Model – Cross-section Analysis



Technical Drawings

Fusion 360 Model Technical Drawings

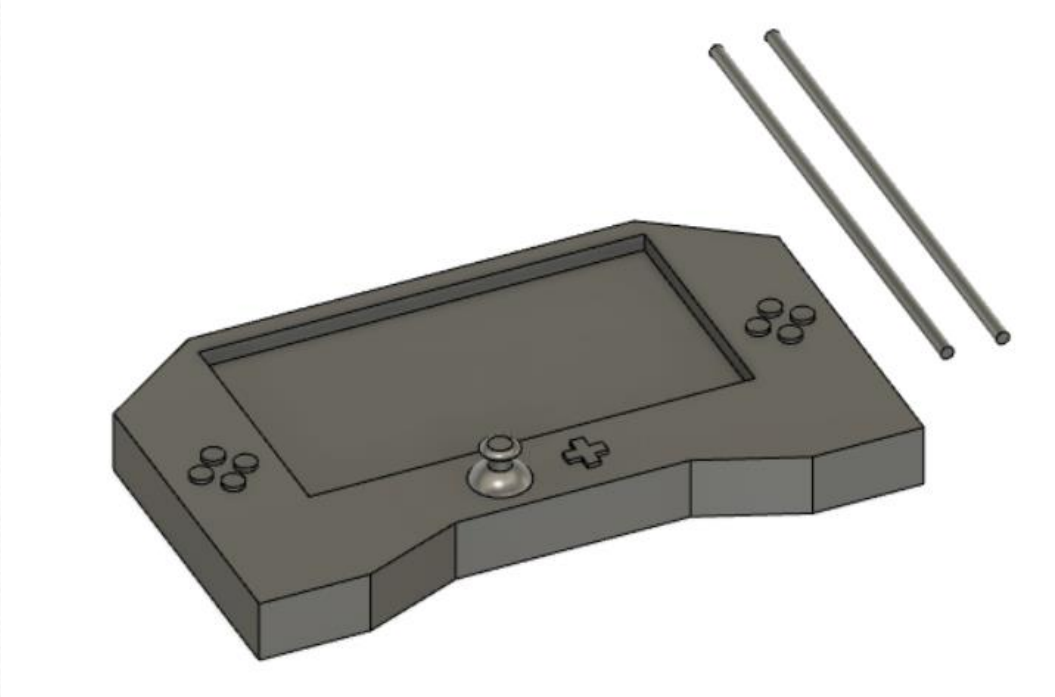
Technical Drawings



Assembly and Bill of Materials

Fusion 360 Model Technical Drawings

Assembly



Bill of Materials

DGH - EXM01 [Public Version]

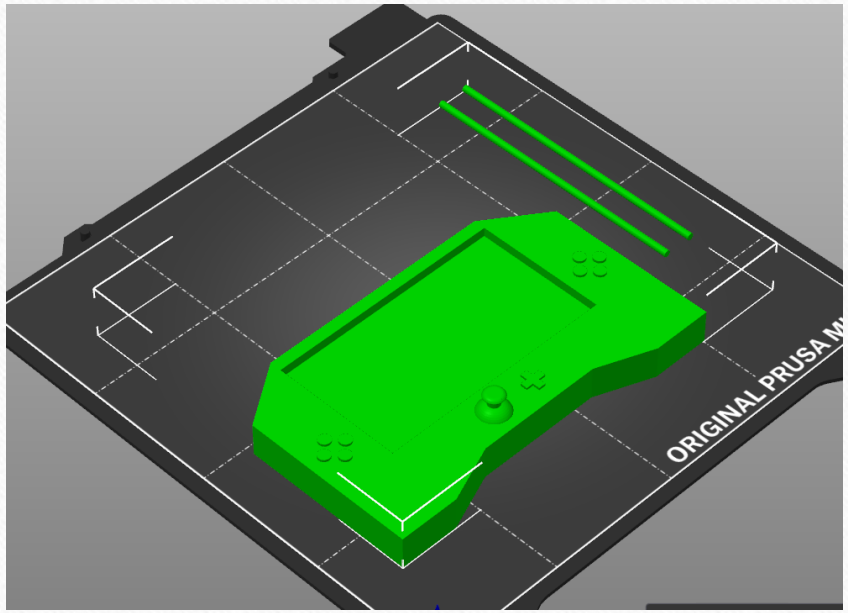
Component List

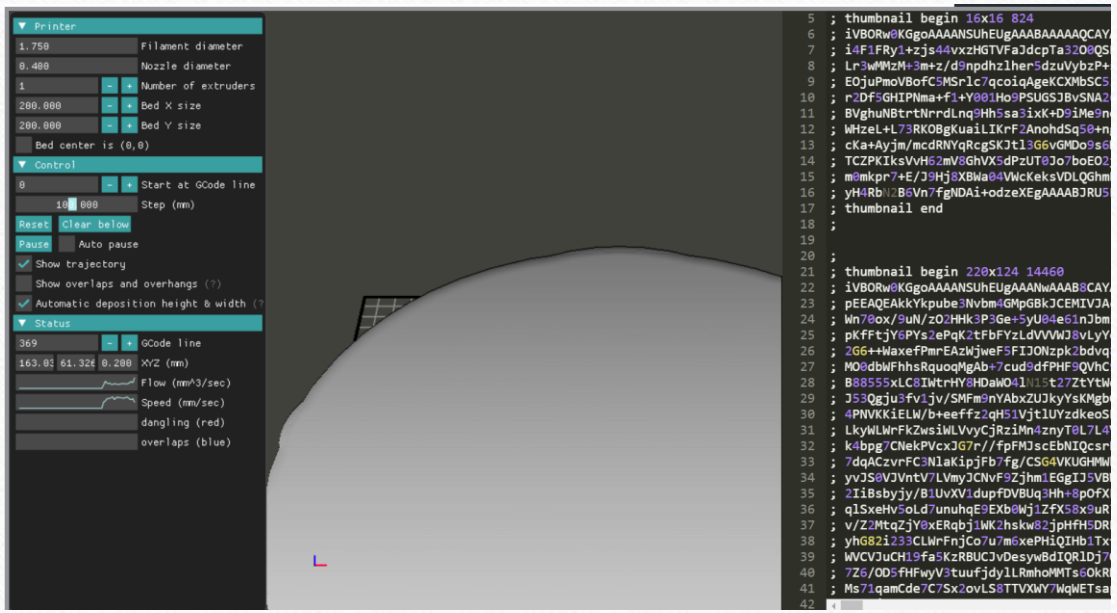
Name	Quantity	Component
U3	1	Arduino Uno R3
S1	1	Pushbutton
R2	1	1 kΩ Resistor

STL Analysis

Improvements for 3D Printing

STL Analysis



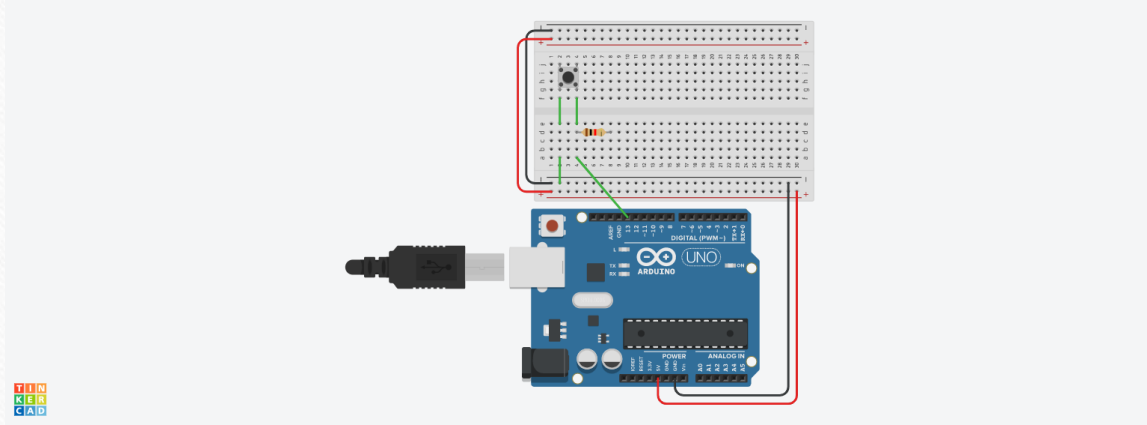


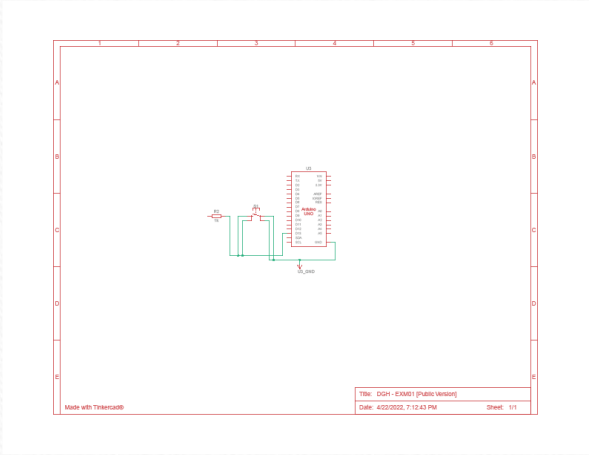
TinkerCAD Simulation

Virtual Simulation of Electronics

TinkerCAD Simulation

https://www.tinkercad.com/things/8rEMIP8d2r8





Takeaways and Future Improvements

Conclusions and Future Changes

Takeaways and Future Improvements

- Smoother Controller
- Holster for Chopsticks
- Materials for the Touch Area and Controller Grip
- Button Size and Placement

END

Thank You for Listening