



Introduction to the Final Project

Curriculum Guide

Week 4

07/24 - 07/28



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Announcements

This week, you will be making your own CAD model!

Watch the Week 4 video on sketching in Onshape [here](#).

All the videos can be found on this [playlist](#).

Closing ceremony is on **Saturday, July 29th, 2-3PM**. You should be receiving or have received an email reminder. Zoom link can be accessed here:

President EWB UBC is inviting you to a scheduled Zoom meeting.

Topic: Closing Ceremony | Youth Venture CAD Mentorship Program

Time: Jul 29, 2023 02:00 PM Pacific Time (US and Canada)

Join Zoom Meeting

<https://us02web.zoom.us/j/89436749004?pwd=eWFzbVZEL3RPUHJXa3F4ZjA0a05rUT09>

Meeting ID: 894 3674 9004

Passcode: 513885



Weekly Learning Goals

- Ideate and assess the feasibility of prototyping such ideas using the CAD platform
- Resolve an idea into constituent 2D sketches and 3D parts using appropriate dimensioning and modeling functions

Certification of Program Completion

As we near the end of the program, we would like to go over the 2 types of assessment you must pass in order to receive the **certificate of completion for Youth Venture's CAD Mentorship program**.

At the beginning of week 4, please text the OnShape link of your drawer assembly (completed by following week 1-3 videos) to your mentor on Discord. This assessment is a **yes-or-no** assessment. That is, if you have followed the tutorials from week 1 - 3 and done the assembly, you will most likely pass this assessment unless the quality of the model is extremely poor or incomplete.

During week 4, you will make your own model (i.e., final project). By **Friday 6:00 PM PST**, please email the OnShape link to this model to ubc.yv@chapter.ewb.ca. These models will be evaluated for their quality, completeness, and novelty. At the closing ceremony on Saturday, July 29th, we will announce the **top three best models**, which will be 3D-printed and mailed to the models' owners. Note that whether or not your model is in the top 3, if you have emailed a completed model to us by the deadline, you will satisfy this assessment.

To summarize, in order to receive the certificate of completion, you must satisfy the following:

Assessment	Format	Sent to Whom	Sent to Whom	Relevant Video Tutorials
Drawer Assembly	OnShape Link	Text to your mentor, on Discord	Tuesday July 25th, 6PM PST	Week 1 (1 video) Week 2 (3 videos) Week 3 (1 video)
Final Project	OnShape	Email to	Friday July 28th,	Week 4 (1 video)



Model	Link	YV UBC EWB Chapter	6PM PST	
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Please see [this section](#) for the complete evaluation criteria of your final project. For instructions on how to share an OnShape link, please refer to [this section](#).

Introduction to the Final Project

In this final project, you will be independently creating your own 3D model using the tricks and techniques learned in week 1-3.

There are two ways you can complete this project:

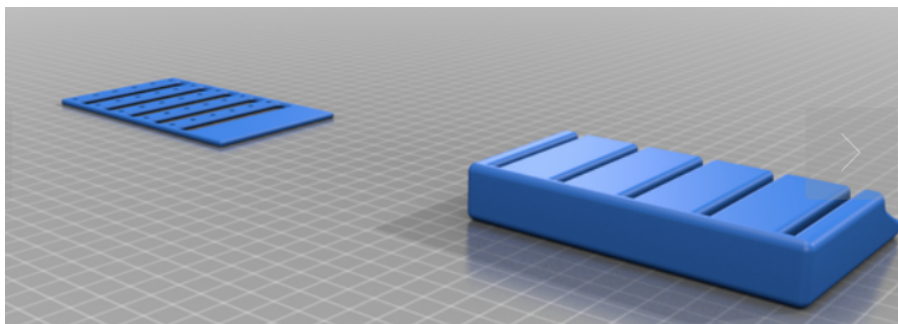
- 1) Model a part or assembly that solves a problem you experienced
- 2) Model a part or assembly of your personal interest

Understandably, you are given a short timeline to complete this, so we aren't expecting masterpieces! Just proof that you've given thought and effort into creating your own parts.

Examples

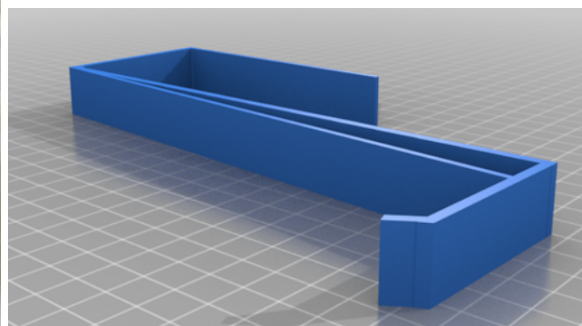
Here are 4 examples of possible projects to take on. For exhibit A-C, the models are designed to solve a specific daily-challenge and thus have a functional purpose. For exhibit D, the model is purely for fun and artistic purposes. All of these are wonderful ideas for this project! When submitting your Onshape file, **please provide a short description along with your part / assembly to let us know more about what you designed.**

Exhibit A: Earring holder storage



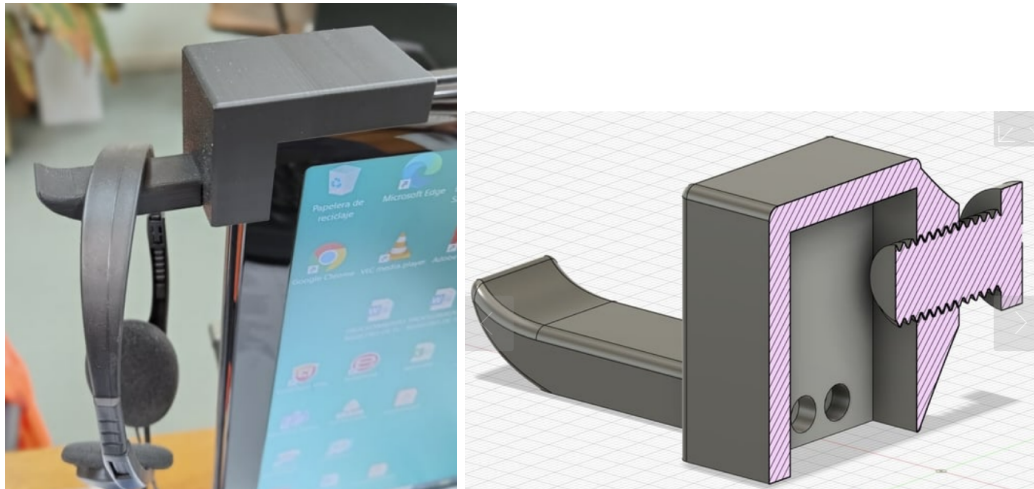
Source: <https://www.thingiverse.com/thing:6116623>

Exhibit B: Tablet Holder



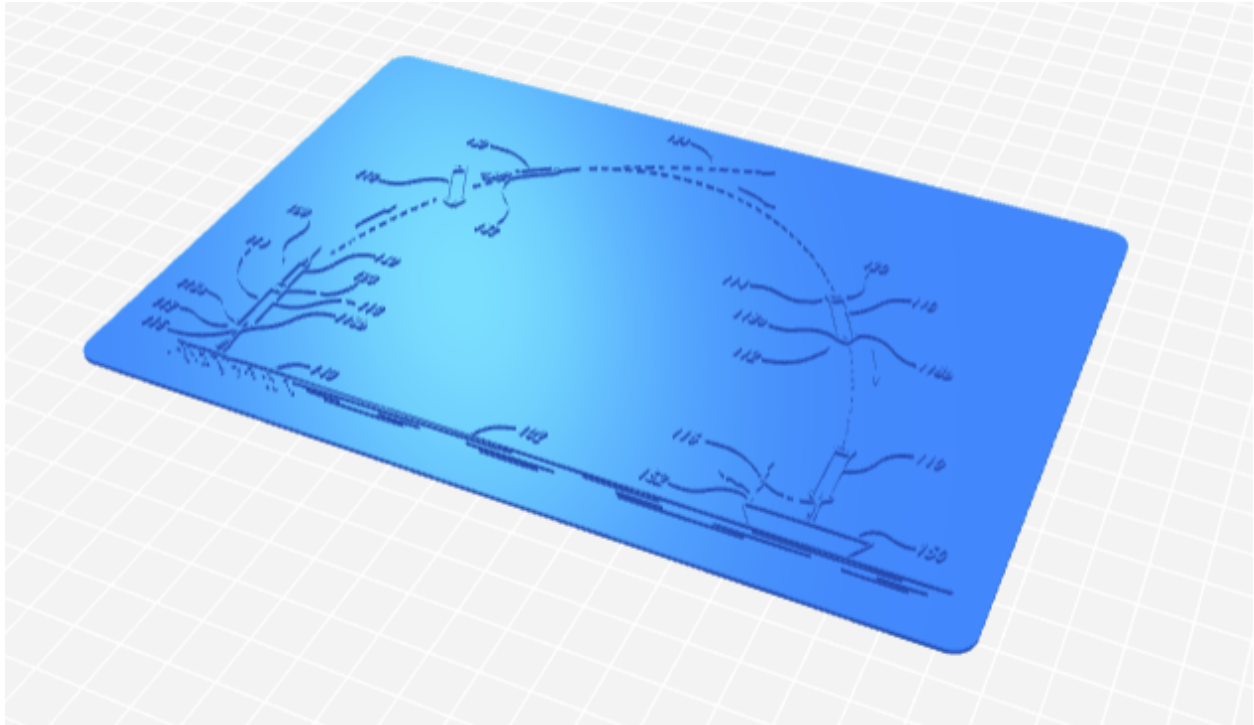
Source: <https://www.thingiverse.com/thing:6093951>

Exhibit C: Headphone Mount on Monitor



Source: <https://www.thingiverse.com/thing:6094804>

Exhibit D: SpaceX Landing Rocket Patent Art



Source: <https://www.thingiverse.com/thing:6124229>



And yes! You are welcome to browse this website with open-source 3D printing files: <https://www.thingiverse.com/> for more interesting project ideas.

CAD Design and Rapid Prototyping

One of applications of CAD design is the ability to rapidly prototype your product. This allows for assessment of the product and quick iterations to optimize the design before sending it off for manufacturing. As with the various flavors of CAD design platforms, there're also various methods of rapid prototyping, including but not limited to:

1. *Fused deposition modeling (FDM) 3D printing*: layering plastic on top of each other to create a 3D construct.
2. *Selective Laser Sintering (SLS)*: a laser to sinter patterns in a layer of polymer powder, layer-by-layer to build a 3D part.
3. *Stereolithography (SLA)*: Uses laser to cure UV-curable resin (from a vat of liquid resin) layer by layer.

For more information on rapid prototyping, check out the links in [this section](#).

While the last two methods are somewhat expensive and difficult to access, the first is definitely not!

As an incentive, the programming team will select top 3 designs from this cohort which will be 3D printed and mailed to the creators! We will announce this during our closing ceremony, so be sure to attend and see if your model has been selected.

Final Project Criteria

For the final project criteria, we want to emphasize creativity, quality, functionality, and presentation. In other words we want you to create a model of something that is new, modeled using proper technique, able to fulfill its design goals, and looks good! Models will be assessed by mentors using a scoring rubric and the short descriptions you include in the submission. For the final project, the creation of an assembly is not necessary. However, the mentors encourage students to push their limits and may assign a bonus for final projects that demonstrate a strong grasp of assembly design and mating principles.

Below is a the rubric that will be used by mentors to assess each final project:



Criteria and Weight	1	2	3	4
CAD Skills (40%)	Poor use of CAD skills demonstrated. No or poor use of dimensions, sketch relations, and features.	Evident use of CAD skills demonstrated but with variable results. Some use of dimensions, sketch relations, and features.	Good use of CAD skills demonstrated with good quality results. Proper use of dimensions, sketch relations, and features.	Excellent use of CAD skills demonstrated with a wide variety of skills demonstrated. Excellent use of dimensions, sketch relations, and features.
Design and Functionality (30%)	The model design does not obviously meet the intended functionality stated by the student.	Elements of the model meet the intended functionality but the effectiveness of the design is limited.	Most elements of the model were designed to meet the intended functionality.	All elements of the model are designed well to effectively meet the intended functionality stated by the student.
Originality (20%)	Model is a direct copy of an existing model.	Model is similar to existing online models/concepts, but differs in several aspects.	Model borrows elements from existing online models/concepts, but does not obviously copy one.	Model is completely original, and no parts of existing online models/concepts can be identified.
Appearance (10%)	Model lacks form and is indistinguishable.	Model resembles the stated object, but the model does not take aesthetics into account.	Model looks like a real-life object, and obvious care has been put into its appearance.	Model has an appealing appearance, and a high level of attention to detail is evident.

Sharing OnShape Files as a Link

To share your file with the Youth Venture team, navigate to the share button on the top right corner of your screen and select **'Share'**. Next navigate to link sharing and copy the link to your clipboard. Make sure that the permission ensures that anyone with a link can view and **export** the document. Send the link to **your mentor's email**.

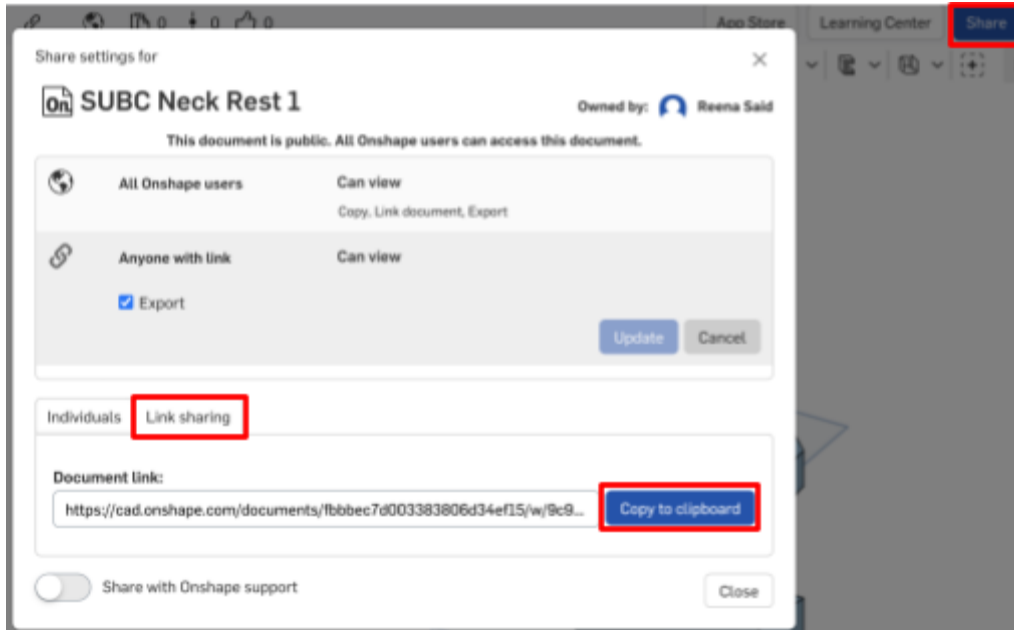


Figure 1. How to share an Onshape file as a link

Summary

This week, you learned Thank you so much for participating in our pilot program, and we hope you took away some skills and lessons about CAD and engineering! See you all on Saturday, July 29th for the closing ceremony!

Additional Resources

- ▶ Lisa Harouni: A primer on 3D printing
- ▶ Fused Deposition Modelling (FDM) Process at Loughborough University