# Engineering Models, Drawing & CAD

**Lab Deliverable**

You will need to turn in your INDIVIDUAL lab report worksheet (this document) with all tables and questions completed by the due date listed on Canvas. Some of the tasks will be done as you go through the process, while some questions must be answered at the end of an activity. While your procedures will look identical to your team members, make sure that your answers are your own and you are able to explain every detail in this lab worksheet. DO NOT COPY your team members' reports. If you are absent during the lab, you will be responsible for completing all of the work in this report yourself.

**Activity Description**

This lab is a practical application of the CAD tool known as TinkerCAD. You will be practicing your orthographic drawing skills as well as your 3D modeling skills in preparation for the development of your project conceptual model. This lab will start by each team member creating a 3-view orthographic drawing based on a predetermined CAD object. From there, the drawing will be provided to another team member to recreate in TinkerCAD; a game of "TinkerCAD Telephone" to see how well we depict 3-D objects into 2-D drawings. Please refer to the table below when providing drawings to your team members:

| If you are… | You will draw… | You will pass your drawing to… | You will be passed a drawing from… |
|---|---|---|---|
| Team Member 1 | Object 1 | Team Member 2 | Team Member 4 |
| Team Member 2 | Object 2 | Team Member 3 | Team Member 1 |
| Team Member 3 | Object 3 | Team Member 4 | Team Member 2 |
| Team Member 4 | Object 4 | Team Member 1 | Team Member 3 |

## Part 1: Multi-View Drawing of Object

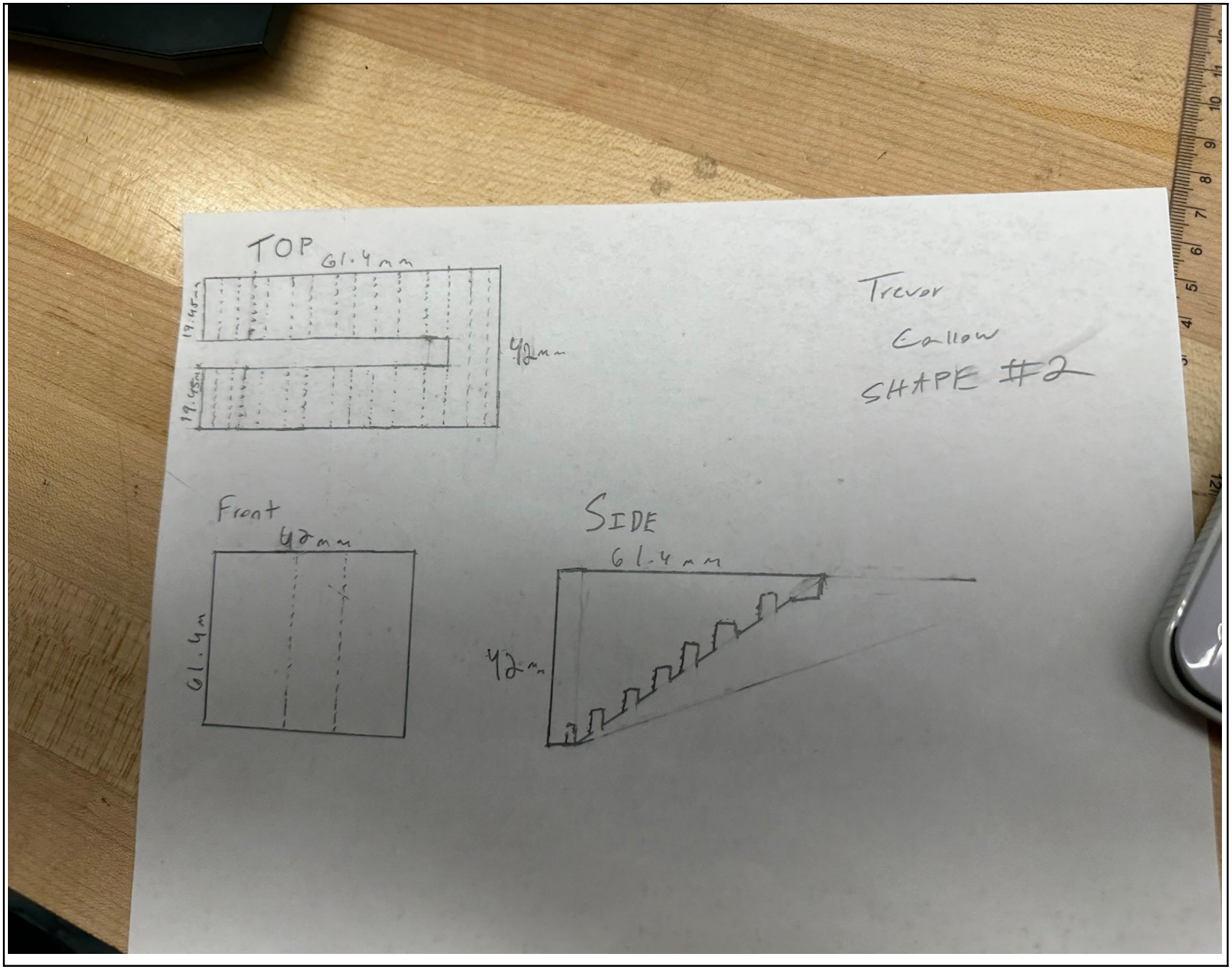
**Lab Procedure**

Assign a number to each team member (1-4, or 1-3 if only 3 members are present). Navigate to this week's module on Canvas and download the numbered object file (.stl file) that matches your individual number. Log into our Class TinkerCAD site and open a new design workspace. Import the file into TinkerCAD to reveal the object that you will be modeling. Add the "ruler" to the workplane near your object to reveal the dimensions of the shape.

Now that the entire shape and dimensions are visible, create a 3-view complete orthographic drawing of the shape on your own paper or electronic drawing software. Make sure to include dimensions and

properly align the views. Include a picture/scan/screenshot of your completed drawing in the worksheet space below. Please complete this drawing within **30 minutes**.

| **Orthographic Drawing of Imported Object** |
| --- |
| Insert YOUR drawing here: |


TOP
61.4mm
19.45mm
19.45mm
42mm
Trevor
Callow
SHAPE #2
Front
42mm
61.4mm
SIDE
61.4mm
42mm

## Part 2: Create CAD from Drawing

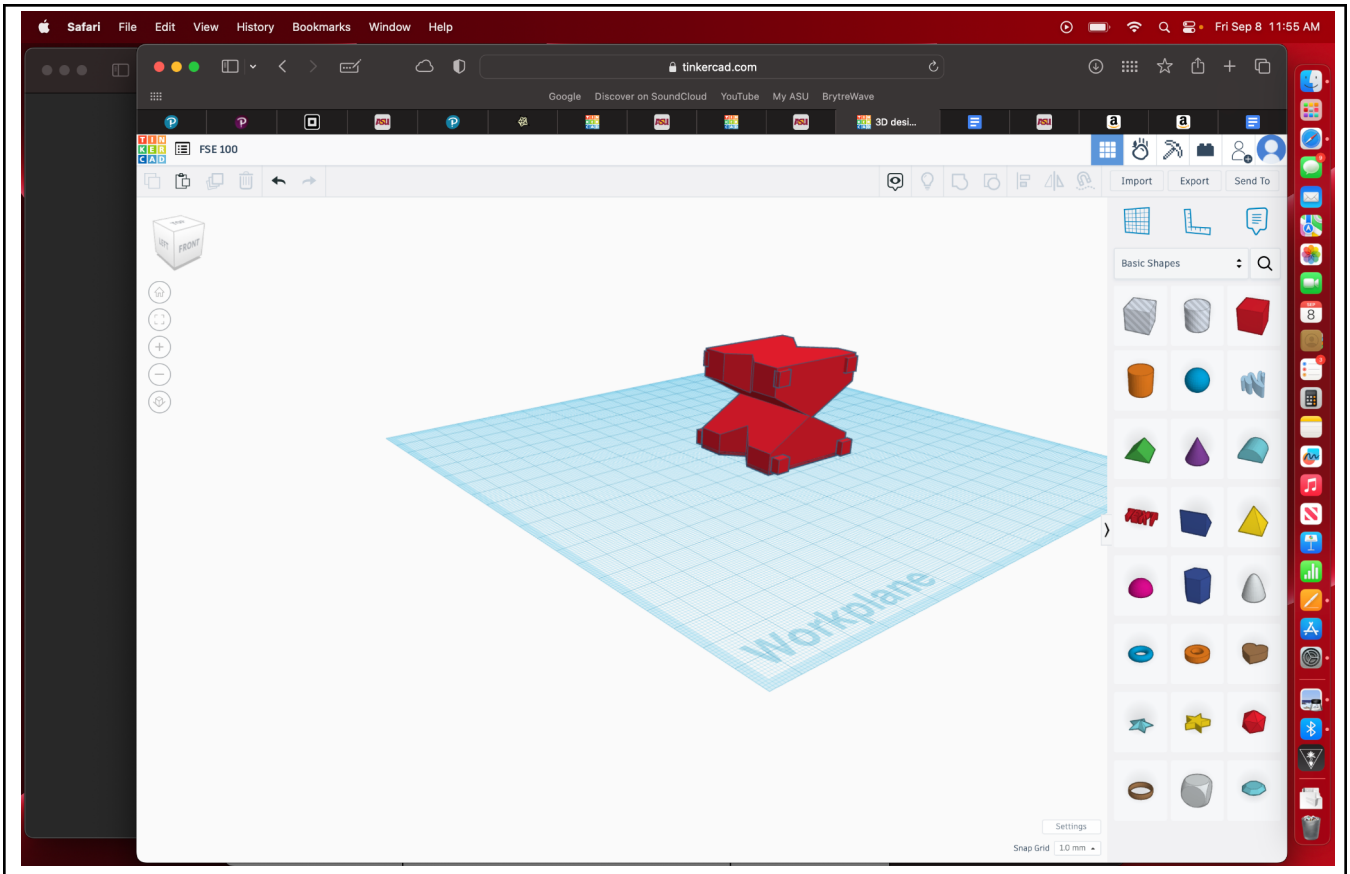
**Lab Procedure**

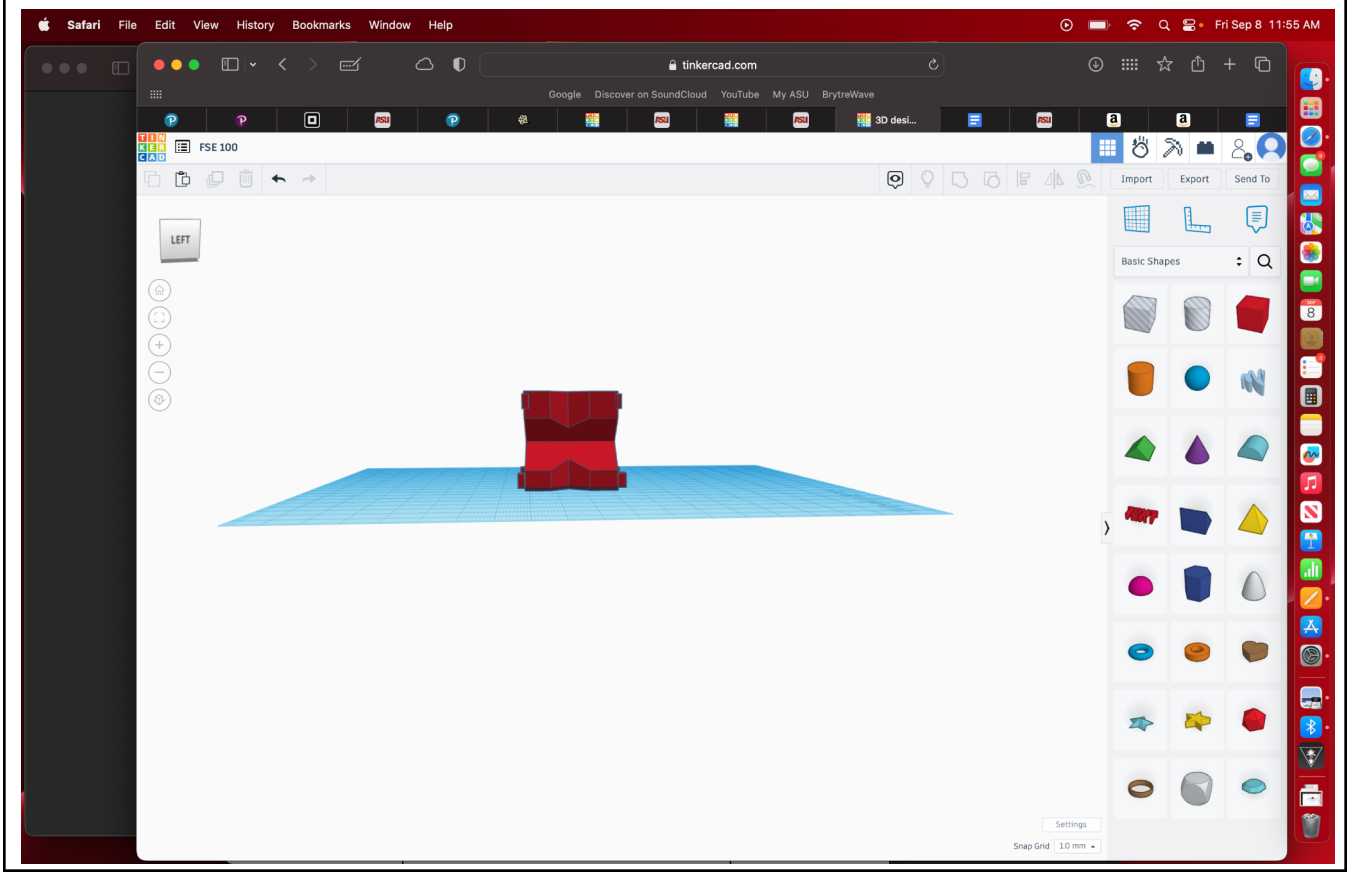
Once your drawing is complete (or 30 minutes has passed), provide your drawing to one of your team members. In turn, you will be provided a drawing from one of your team members that you will now need to recreate in TinkerCAD (or other CAD software of choosing). Reference the table below to identify which team member to send your drawing to.

| If you are… | You will draw… | You will pass your drawing to… | You will be passed a drawing from… |
|---|---|---|---|
| Team Member 1 | Object 1 | Team Member 2 | Team Member 4 |
| Team Member 2 | Object 2 | Team Member 3 | Team Member 1 |
| Team Member 3 | Object 3 | Team Member 4 | Team Member 2 |
| Team Member 4 | Object 4 | Team Member 1 | Team Member 3 |

Open a new design workspace in TinkerCAD and create the object based on the orthographic drawing you received. All objects can be created by starting with a cube and cutting shapes into the cube. Do your best to interpret the drawing without any assistance, make any educated guesses as needed. When completed, save a screenshot of your object to the worksheet. Please complete this task within **45 minutes**.

| **TinkerCAD Object Creation** |
|---|
| Insert YOUR TinkerCAD attempt here: |


Safari File Edit View History Bookmarks Window Help
Fri Sep 8 11:55 AM
tinkercad.com
FSE 100
Import
Export
Send To
Basic Shapes
Workplane
Settings
Snap Grid 1.0 mm


Safari File Edit View History Bookmarks Window Help
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tinkercad.com
FSE 100
Import
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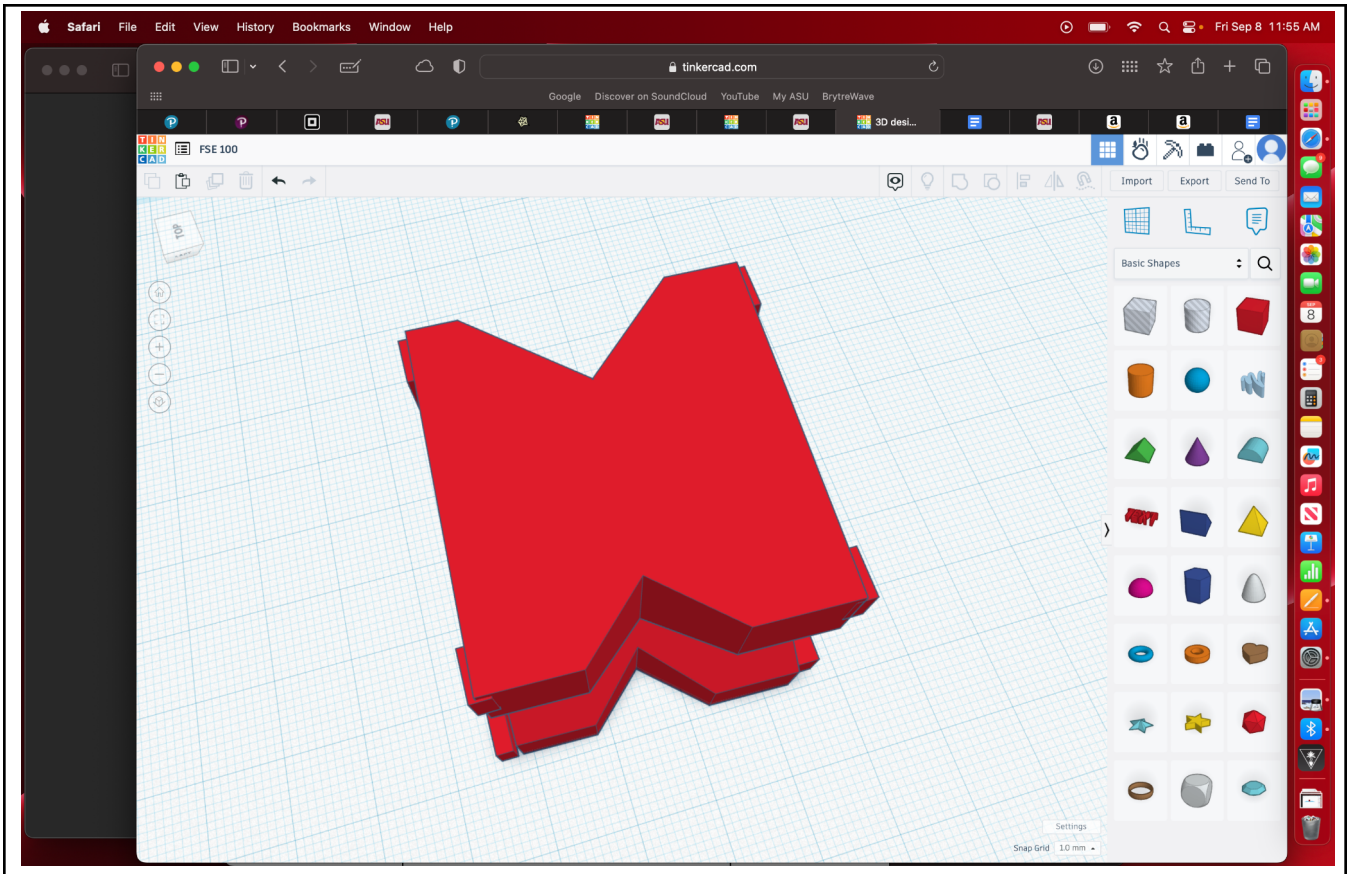
Basic Shapes
Settings
Snap Grid 1.0 mm


Safari File Edit View History Bookmarks Window Help
Fri Sep 8 11:55 AM
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Google Discover on SoundCloud YouTube My ASU BrytreWave
FSE 100
Import Export Send To
Basic Shapes
Settings
Snap Grid 1.0 mm

## Part 3: Team Reflection

### Lab Procedure

**As a team**, show your final created object in TinkerCAD and the drawing that prompted the design to your team members. Your team members will be able to show the original artifact and you need to discuss how the drawings could have been improved to better reflect the object. If your team members have questions regarding how they should have created the object in TinkerCAD, discuss the cuts and holes that could have been made to a starting cube to recreate the original object. Compile the feedback from your team to help you answer the questions below.

Generative AI is **not** allowed to be used during this portion of the worksheet.

| **Individual Reflection** |
| --- |
| 1. Based on the feedback from your team, how did your orthographic 3-view drawing need to change to perfectly reflect the original design artifact?<br>My sizing in my drawing needed to be more accurate in the 3-view drawing. I also needed to add some dotted lines in the side view drawing for the measurement with the splitting of the design down the middle of the two stairs.<br><br>2. Explain the amount of cuts and holes you had to make in your starting cube to create your final CAD design? What shapes did you use to create the “holes”?<br>I had to make cuts to split open a cube to make it triangular or more pyramid-like to follow the 3-view drawing I was given. I started with a trapezoid and then I started to cut with triangles and then added small squares on the ends to finish my given design. I then repeated the process on the opposite side to create a mirror.<br><br>3. What did your team struggle with during this exercise? What do you feel like you would do differently to properly convey your project design solution?<br>Our team struggled most with the time constraints and also struggled with creating the diagrams accurate enough to allow for recreation. I would change my sizing and add a more detailed diagram to create a better visual for the group member that got my picture. Overall, our team did very well with this project but some suggestions could be helpful. |