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Terms to Know:

1. *CAD* - Computer Aided Design
2. *Relief*- A general art term that means a design with raised and recessed areas (all connected to a shaped background) (Terms that mean similar things...Emboss, Deboss, Relief, and Sunken Relief)
3. *Extrude*- The tool used to make a flat shape three dimensional (you can "add" or "remove" with the extrude tool to create a *Relief Design*).
4. *Origin*- The starting point and the point where planes intersect
5. *Dimensions*- The measurements of a given section of the design

Workspace Orientation:

Annotations in the screenshot:

- Rename Your File
- Make Comments
- Share with kferrell@losal.org "Can Edit" permissions
- Graphic Area: Origin Point - Where all planes intersect
- View Cube
- Legend for View Cube:
 - Shift 1 - Front
 - Shift 2 - Back
 - Shift 3 - Left
 - Shift 4 - Right
 - Shift 5 - Top
 - Shift 6 - Bottom

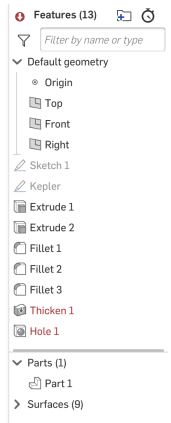
Dimension Tool - Shows the measurement of a given section of the design



Coincident- Indicates when you are connecting to a line (down arrow) offers more options - midpoint, perpendicular, concentric...

Keyboard shortcuts:

Versions & History



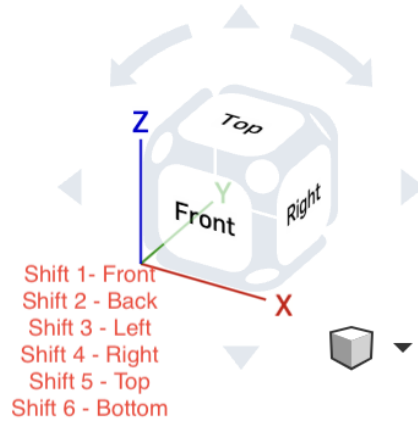
“P” = Hide or View the plane views

Shift “e” = *Extrude Tool* - Used to make a flat shape three dimensional (you can “add” or “remove” with the extrude tool to create a *Relief Design*).

Shift “s” = *Sketch Tool*

Two finger click and hold to easily rotate the view (OR) Shift and arrow keys

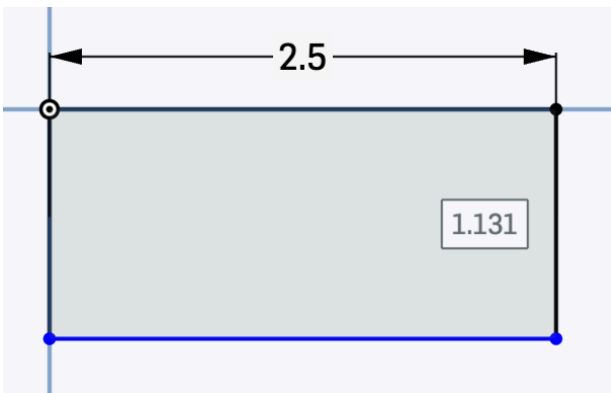
View Cube



Click and reorder the features tabs to apply different functions

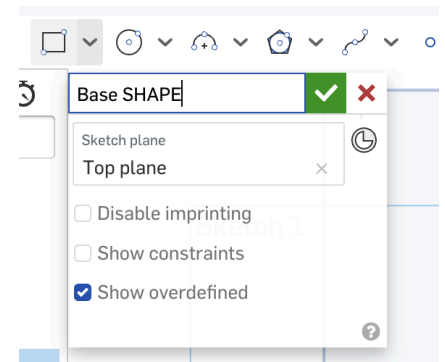
Use the rollback bar to move back in time, click on a feature and delete if needed.

Steps and Tools to use to design the keychain: THE ORDER OF OPERATIONS MATTERS (COMPLETE THESE STEPS IN ORDER) YOU WILL MAKE TWO KEYCHAINS (One *Embossed- raised letter*) and (One *Debossed- sunken relief letters*)

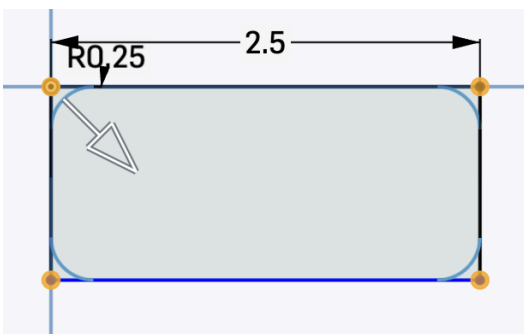


1. Click “Sketch”, Click on the Plane “Top” and draw a rectangle from the “Origin Point” into one quadrant. Name this “Sketch” - **BASE** THE DIMENSIONS WILL APPEAR GRAY- AND YOU CAN TYPE IN A SELECT DIMENSION FOR YOUR PROJECT. Scale should not exceed 2.75 inches in any direction.

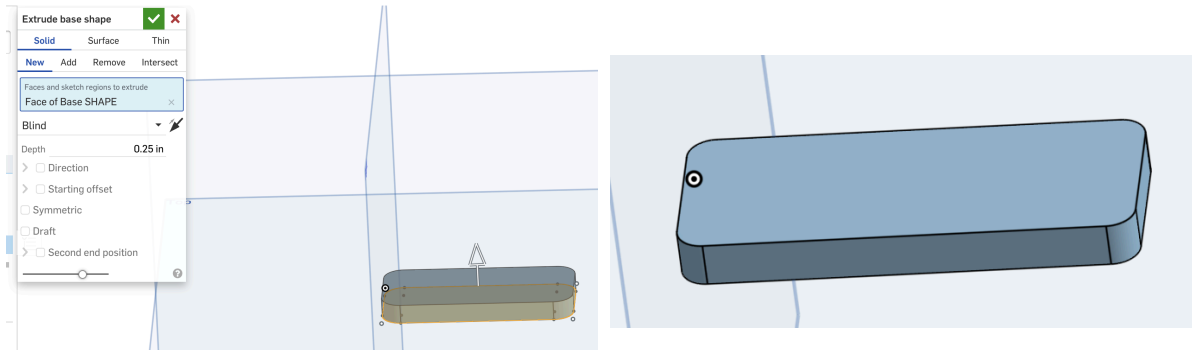
Rename this sketch layer “Base” to help you modify it later



2. Double click on the ‘Base’ layer and select the corners of the rectangle. Click on the rounded corner tool and type in a radius for how much you want to round the corners (.05 is a good starting point)

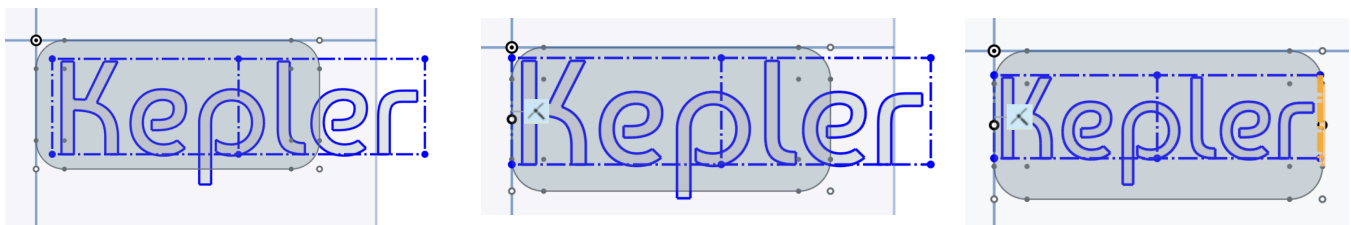


3. Extrude the “base shape” Double Click on the base shape until the sketch box pops up and the “top plane” of the base shape is highlighted yellow. Select the extrude button (or use the keyboard shortcut “Shift E”). Name this layer “Extrude Base” and make it 0.25 inches thick (arrow pointing up along the Z axis). Rotate the view to confirm the base is now a rectangular FORM.



4. Adding your name: Click on the “Top Plane” of the extruded base form and select the top plane (it should turn yellow) Then create a new sketch (“Shift s”). Name this sketch “Name” or type in your name as the label for this layer. Select the **Text icon** and draw a rectangle within the base.

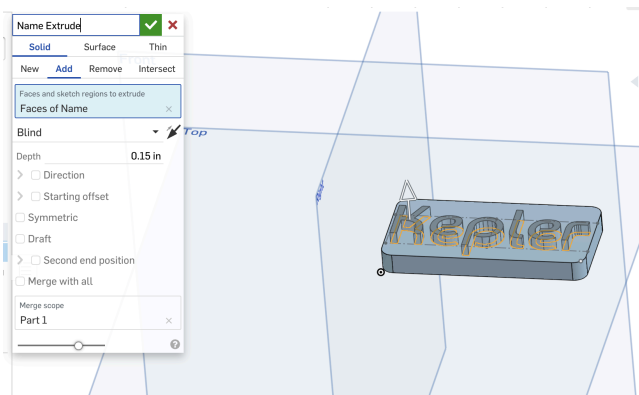
A script box will appear, type your name, and choose a font style you like. Then Click the green arrow. Your text will likely extend beyond the base like the example below. To fix this, click on the leading edge of the box and the leading edge of the text box (they will both be yellow). Then click the coincident tool (on the main toolbar). This will lock the two edges together. Then select the ending line of the text (it will turn yellow) then you should be able to slide it until it fits within the base shape. This will resize your text. Make sure you are not too close to any of the outer edges and leave room for a hole in one area of the base shape.



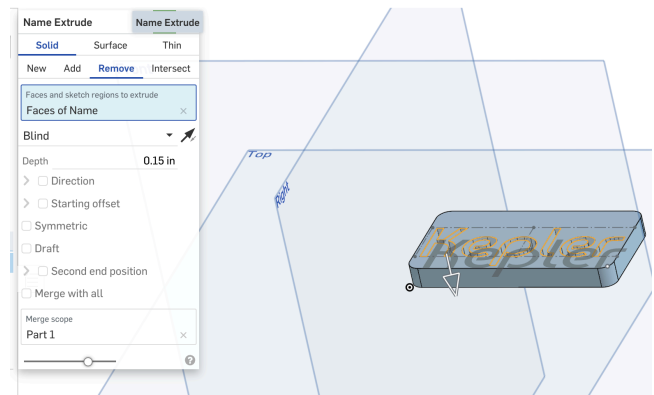
5. Extrude (Add = raised/embossed) **AND** (Remove = recessed/sunken relief/debossed): Repeat the above steps to make one of each.



Double Click on the letters of the name and bring up the Sketch Tool by clicking on the “name” step in your history on the left. When the word is yellow, click on the extrude button and type in .15 so it raises the letters 0.15 inches. For the Deboss option, make sure your letters are on the top plane of the base form. Then hit the remove tab and type in .15 or less. If the letters are red, it is because the two surfaces are not connected and the step cannot be solved.

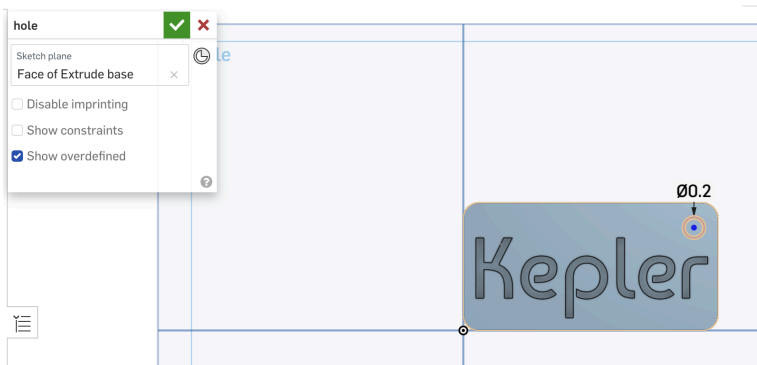


EMBOSSSED

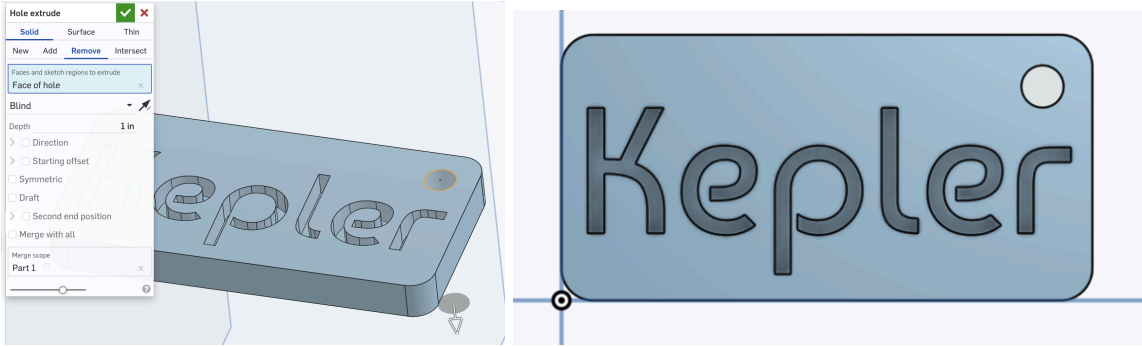


DEBOSSSED

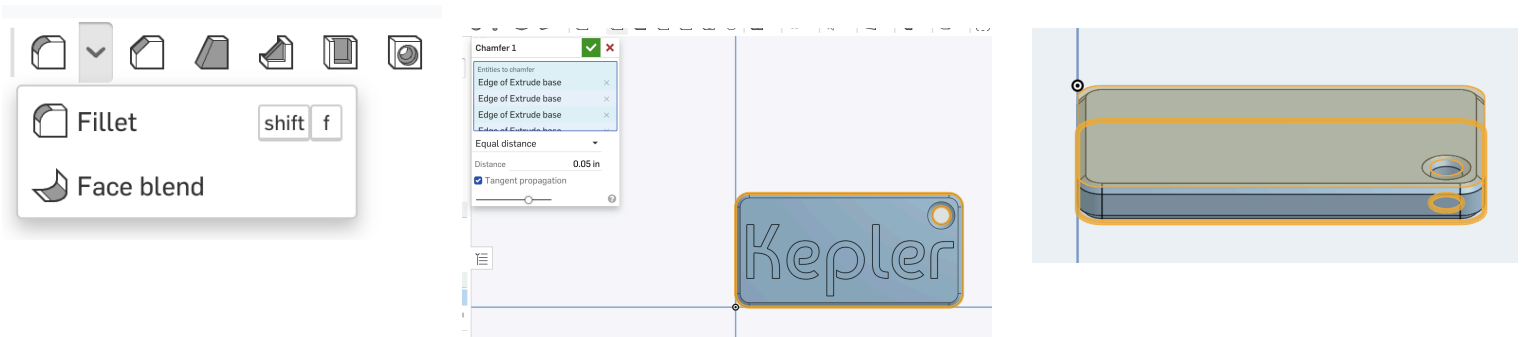
6. Making the Keychain Hole: Double click on the surface of the base shape, bring up the sketch tool and select the circle (center point circle is easiest to use). Draw a circle near (but not too close to the edges or text). Label the sketch “Hole” and adjust the dimension between .15 and .2 in.



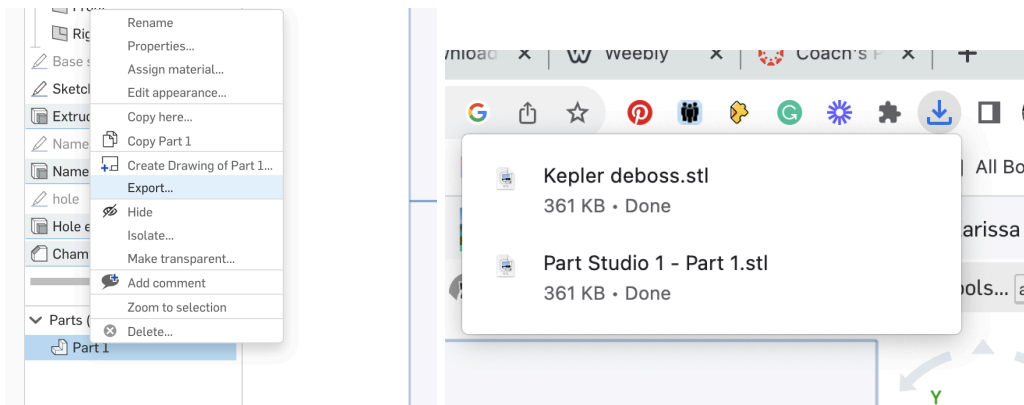
7. Zoom in and click on the inside plane of the hole (not the outer edge) and turn it to the yellow circle. Then “Shift e” to extrude REMOVE to create a hole through the keychain.



8. Add the Chamfer or Fillet Edges to the keychain edges and the hole: (*Fillet*- Rounded edges or *Chamfer* - Beveled (Angled) edges). Click on all the edges from the “top view), then click the Chamfer or Fillet Button on the main toolbar (.05 is a good measurement for this step). Turn your object upside down and repeat this step on the bottom edges and hole edge.



9. Share and Export your file: Click the blue “Share” button on the top right of the screen. Give kferrell@losal.org Editing permission. Click on Part 1 on the Features and Parts section of your screen. Double click on “Part 1” and select EXPORT. Name your file (with your name and either deboss or emboss) then click Export. The file will download to the upper right hand corner, then copy the file to an external flash drive, for the slicing and printing process.



YAY!!!! YOU DID IT!