



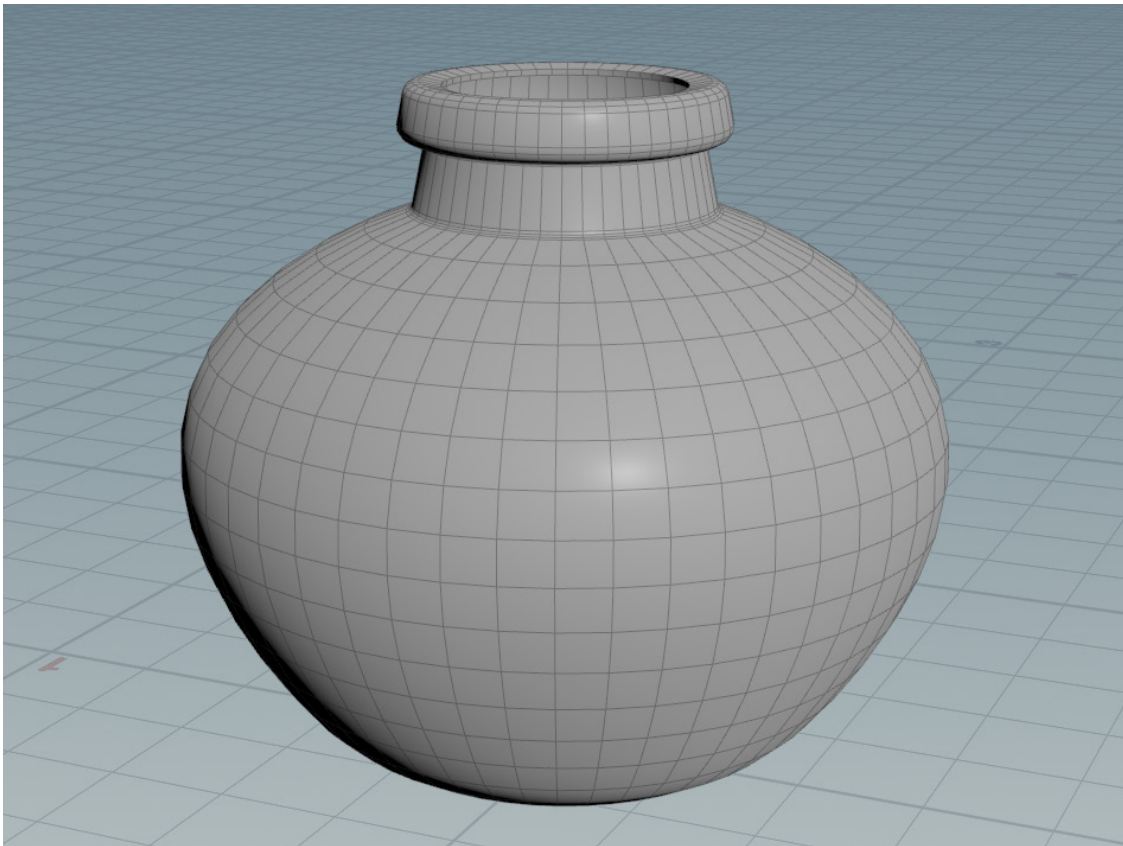
Curriculum-in-a-Box | Guided Work

MODELING A VASE

Students are now asked to follow-along with the teacher as they build something in Houdini. For this lesson, students will learn general modeling techniques. In this exercise we will build a model of a vase. To achieve this, you will learn how to use the "Poly" tools to create things like extrusions and bevels. There will also be several different types of selections that you will use in the Scene View. These are all fundamental concepts for working with geometry in Houdini. After this guided exercise, students will have a much deeper understanding of these concepts.

WHAT STUDENTS WILL LEARN

- How to work with the Houdini modeling tools
- How to use the PolyExtrude and PolyBevel SOPs
- How to make geometry selections in the Scene View
- How to make smooth edits to geometry using the Edit SOP
- How to add thickness to geometry with the PolyExtrude SOP



PART ONE

Rough Vase Shape

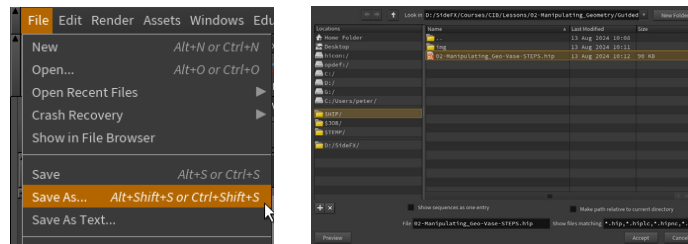
In this first section of the assignment, you will show your students how to set up their project, and begin to make the rough shape of the main part of the vase. Students will start with a sphere shape and use various geometry tools to shape their vase.

1. Set up your Project Directory

- Download the *CIB_Lesson02.zip* file and unzip it, then place it in the *documents>HoudiniProjects* directory.
- Open Houdini and from the **File** menu, choose **Set Project**.
- Navigate to the *CIB_Lesson02* directory and press **Accept**.

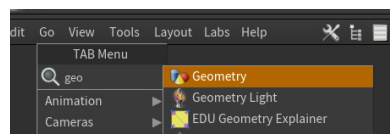
2. Save your Scene File

- From the File menu, choose **Save As**.
- Make sure you are in the *CIB_Lesson02* directory, give the **File** a name and press **Accept**.



3. Set up the Geometry Network

- Press Tab in the Network View, start typing *geo*, then select **Geometry**.



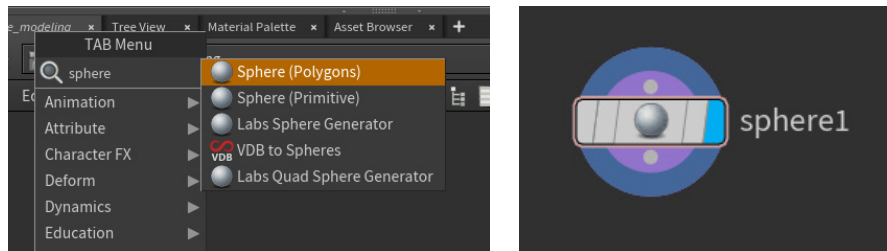
- Click in the Network View to place the node.
- Double-click the *geo1* name and change it to something like *vase_modeling*.
 - This will be a container for the geometry you create.



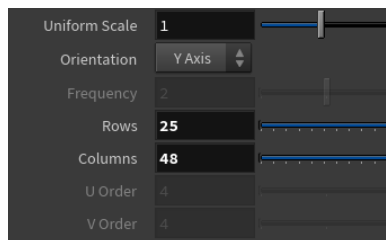
- Double-click the *vase_modeling* node to dive inside.

4. Add a sphere to the scene

- Press **Tab** in the Network View, type *sphere*, and select **Sphere (Polygons)**.
- **Click** to place the node.

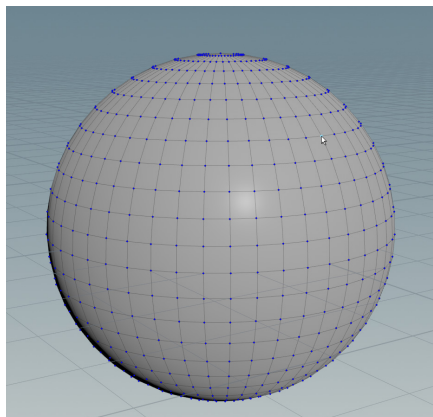


- In the Parameter Pane, change the **Rows** to **25**, and the **Columns** to **48**.

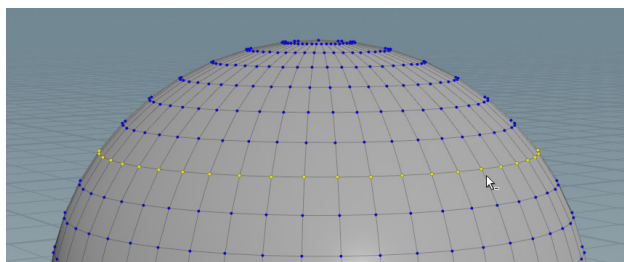


5. Bulge out the sphere

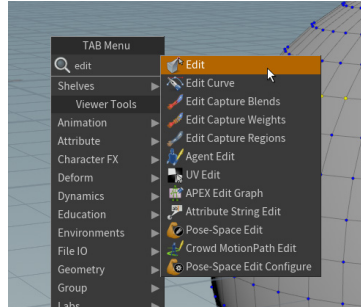
- Press **S** and **2** in the Scene View to enter the point selection mode.
- Go up five rows from the center of the sphere, and hover the mouse over a point in that row.



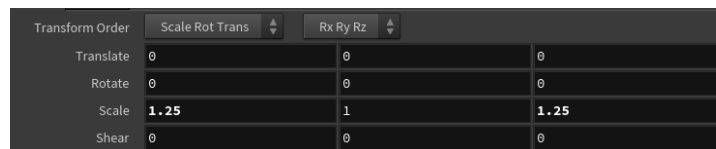
- Hold **A**, **Middle-click**, and drag to the side to select a loop around the sphere.



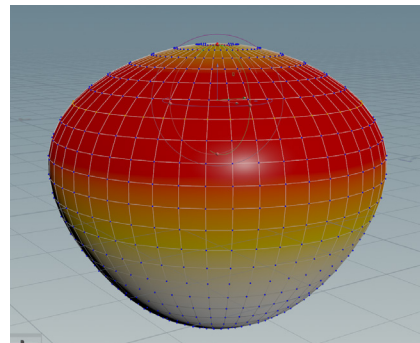
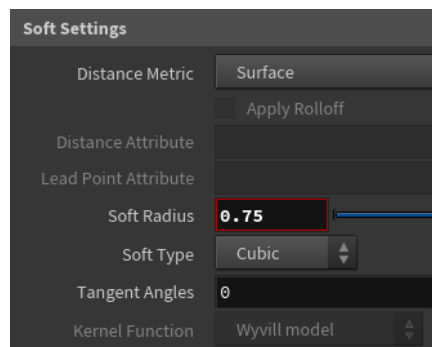
- Press **Tab** in the Scene View, type *edit*, and press **Enter**.



- In the Parameter Pane, change the **Scale** to **1.25**, **1**, and **1.25**.

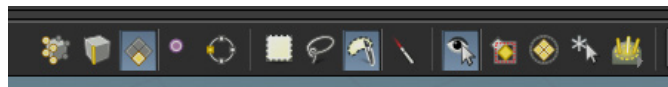


- Scroll down in the Parameter Pane to the **Soft Settings** section, and change the **Soft Radius** to **0.75**.

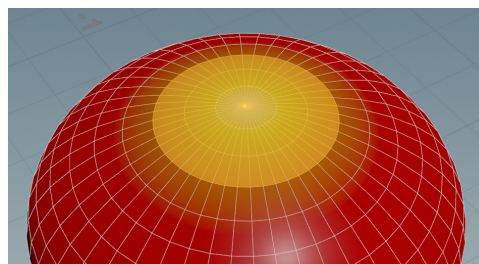


6. Make an opening in the top of the vase

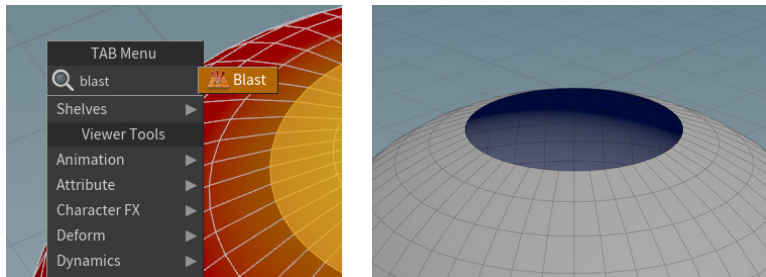
- Press **S** and **4** in the Scene View to enter the polygon selection mode.
- In the controls above the Scene View, press the **Brush Select** button and the **Select Visible Geometry Only** button.



- Use the Brush Selection in the Scene View to select the top three rows of polygons

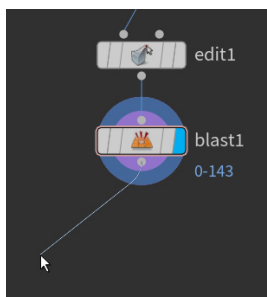


- Press **Tab** in the Scene View, type *blast*, and press **Enter**.

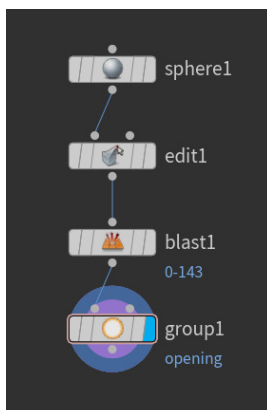


7. Group opening edges for easier selection

- **Left-Click** on the *Blast* node's output dot.
 - You will now have a wire that follows your cursor and is connected to the output dot

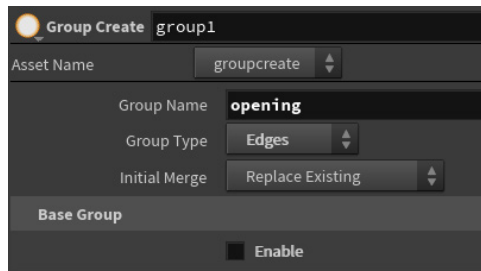


- Press **Tab** in the Network View, type *group*, and press **Enter**.

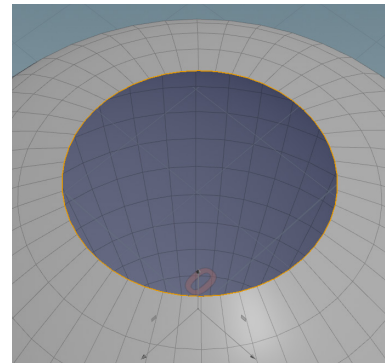
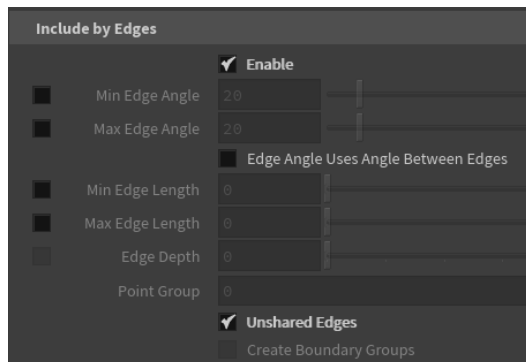


- A new *Group* node will be placed in your network pane and will be connected to the *Blast* node.
- You can move the new node in order to keep your network organized. You should see the node snap into alignment with the positions of the other nodes that are already in the network.
- **Click** the right-most section of the *Group* node to move the blue Display Flag.
 - This allows us to visualize what the *Group* node is doing. The Display Flag is a cornerstone of using Houdini because it lets you visualize the result of all nodes that were placed before the one with the Display Flag.
 - If your *Group* node isn't highlighted in yellow, click on the center of it in the Network View.

- In the Parameter Pane, change the **Group Name** to *opening*.
- Change the **Group Type** drop-down to **Edges**.
- In the **Base Group** section, uncheck the **Enable** check box.



- You've made an edge group that has no edges. You will now select the edges that you want included in the group.
- Scroll down in the Parameter Pane to the **Include by Edges** section, and check the box next to **Enable**.
- In the same section, check **Unshared Edges**.



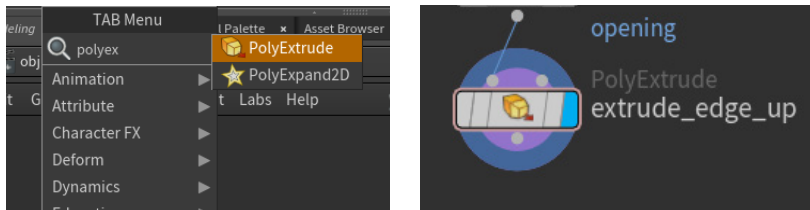
PART TWO

Make the Neck of the Vase

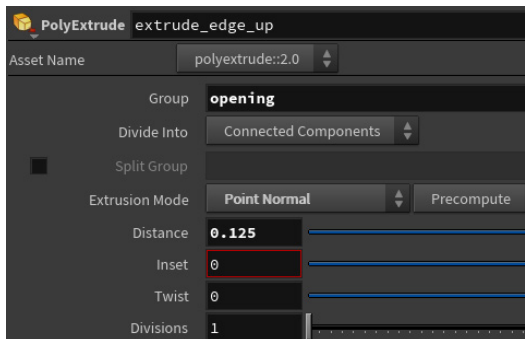
In the next steps, students will add a neck to the vase to make it a more realistic model. Students will use a series of PolyExtrude nodes to create this decorative part of the model.

1. Extrude the opening edge upward

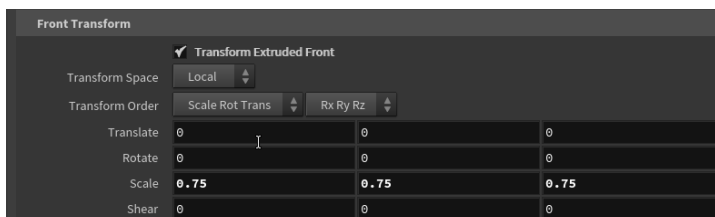
- Click the output dot of the *group1* node.
- Press **Tab** in the Network View, type *polyex*, and press **Enter**.
- Rename the node to *extrude_edge_up*.



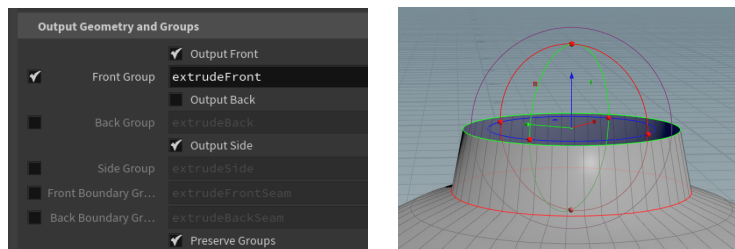
- In the Parameter Pane under the **Group** drop-down, select *opening*.
- Change the **Extrusion Mode** to **Point Normal**, and change the **Distance** to **0.125**.



- Scroll down in the Parameter Pane to the **Front Transform** section, turn on **Transform Extruded Front**, and set the **Scale** to **0.75, 0.75, and 0.75**.



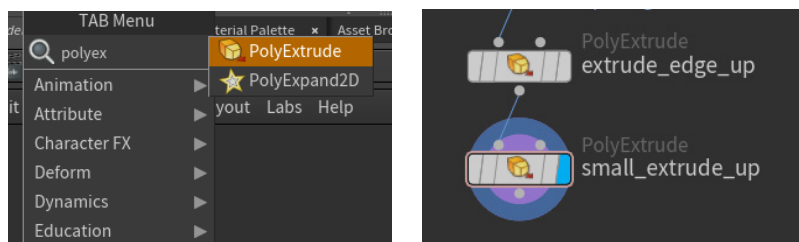
- In the **Output Geometry and Groups** section, turn on **Front Group**.



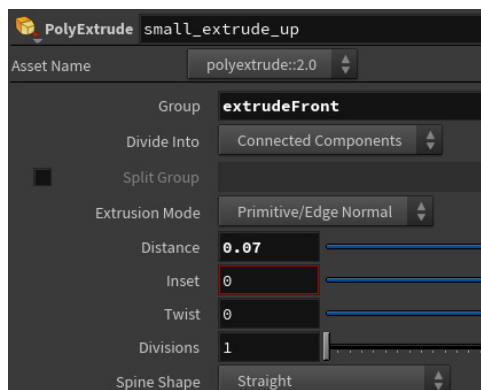
- Turning on this toggle will give us an edge group for easier selection in the next step.

2. Extrude the edge once more

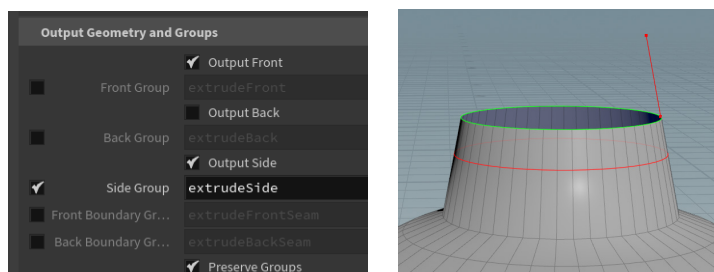
- Click the output dot of the *extrude_edge_up* node.
- Press **Tab** in the Network View, type *polyex*, and press **Enter**.
- Rename the node to *small_extrude_up*.



- In the Parameter Pane under the **Group** drop-down, select *extrudeFront*.
- Change the **Distance** parameter to **0.07**.

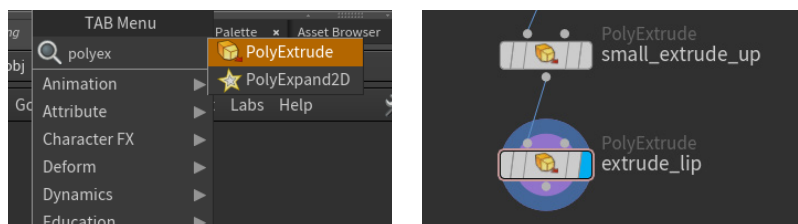


- In the **Output Geometry and Groups** section, turn on **Side Group**

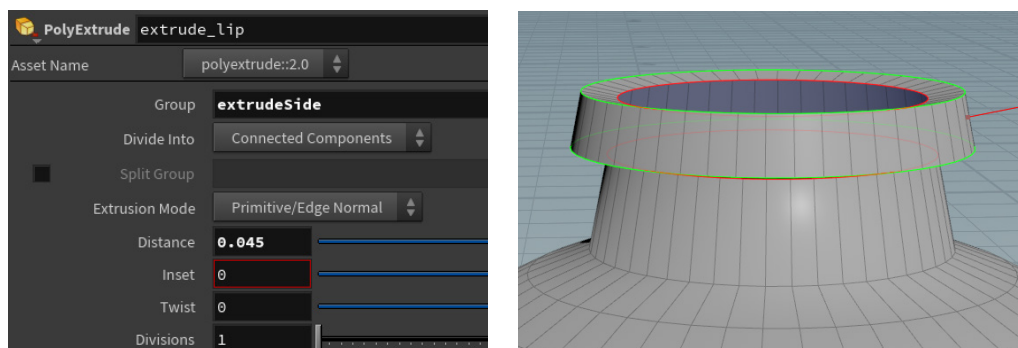


3. Extrude the top lip of the vase

- Click the output dot of the *small_extrude_up* node.
- Press **Tab** in the Network View, type *polyex*, and press **Enter**.
- Rename the node to *extrude_lip*.



- In the Parameter Pane under the **Group** drop-down, select *extrudeSide*.
- Change the **Distance** parameter to **0.045**.



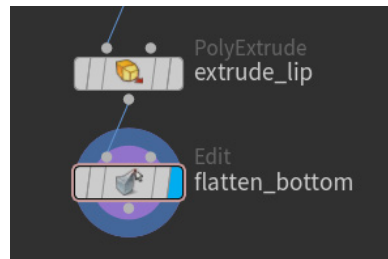
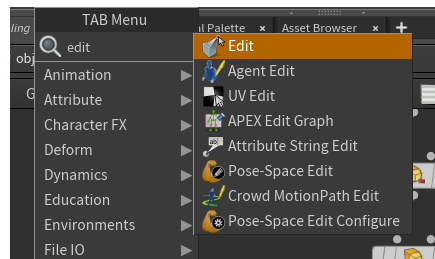
PART THREE

Finishing Touches

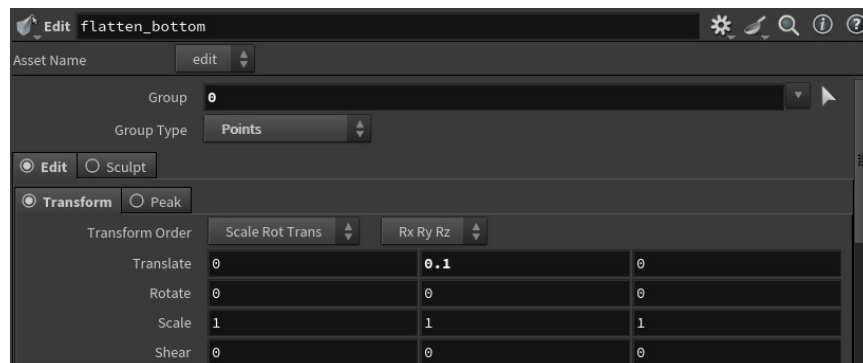
The final step in this exercise will be for your students to add a few small touches to their vase model. In this section, students will flatten the bottom of the vase, bevel the hard edge, and add some thickness to the model.

1. Flatten the bottom of the vase

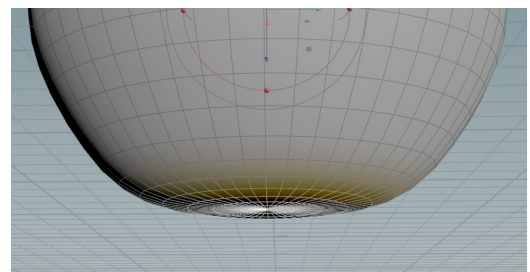
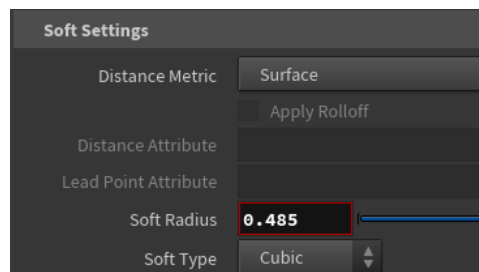
- Click the output dot of the extrude_lip node.
- Press **Tab** in the Network View, type *edit*, and press **Enter**.
- Rename the node to *flatten_bottom*.



- In the Parameter Pane, type **0** in the **Group** parameter.
- Change the **Group Type** drop-down to **Points**.
- Set **Translate** to **0, 0.1, and 0**.

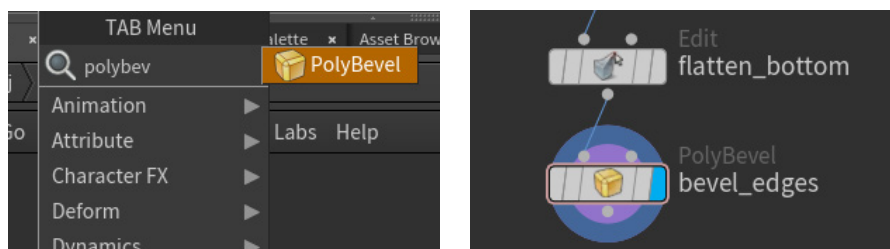


- Scroll down to the **Soft Settings** section, and change the **Soft Radius** to **0.485**.

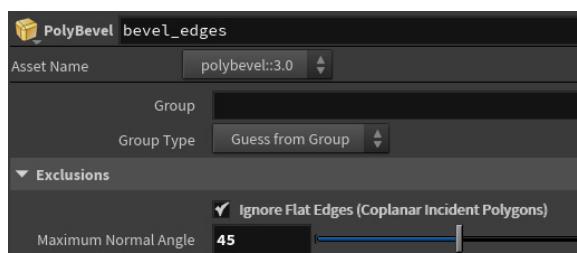


2. Bevel all sharp edges of the vase

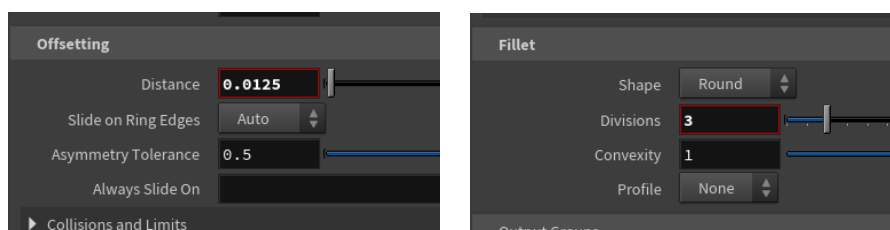
- Click the output dot of the *flatten_bottom* node.
- Press **Tab** in the Network View, type *polybev*, and press **Enter**.
- Rename the node to *bevel_edges*.



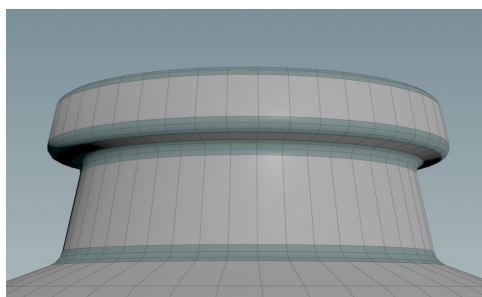
- In the Parameter Pane, open the **Exclusions** section, and check **Ignore Flat Edges**.
- Change the **Maximum Normal Angle** to 45.
 - This will make sure you are only beveling between polygons with a relative angle over 45 degrees.



- In the **Offsetting** section, change the **Distance** to 0.0125.
- In the **Fillet** section, change the **Divisions** to 3.

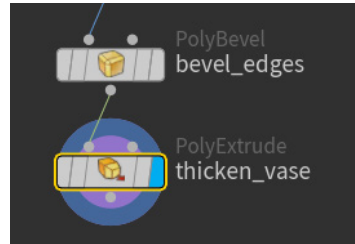
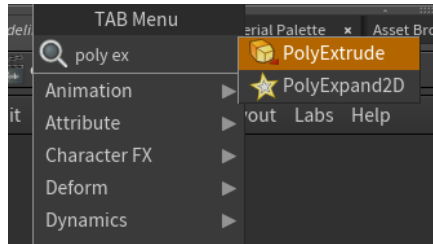


- You should now have rounded edges around the lip of the vase.

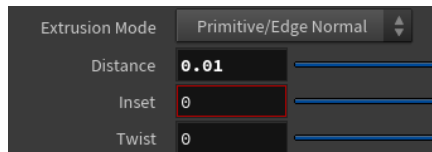


3. Thicken the walls of the vase

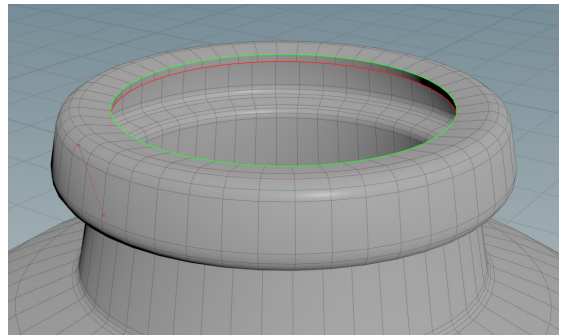
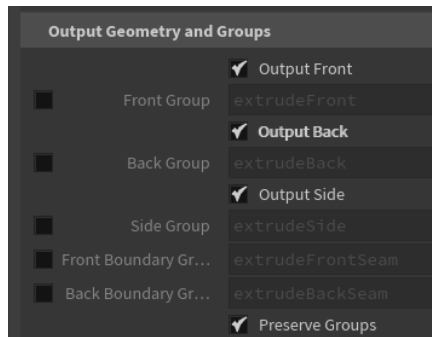
- Click the output dot of the *bevel_edges* node.
- Press **Tab** in the Network View, type *polyex*, and press **Enter**.
- Rename the node to *thicken_vase*.



- In the Parameter Pane, change **Distance** to 0.01

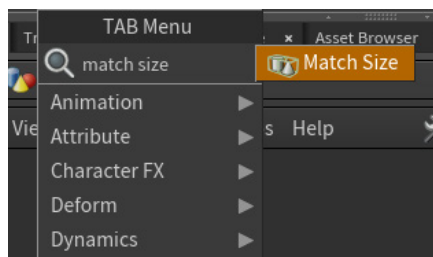


- In the **Output Geometry and Groups** section, turn on **Output Back**.

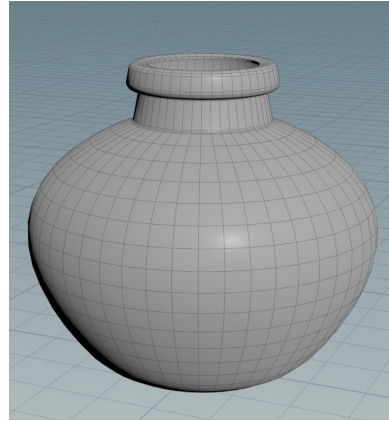
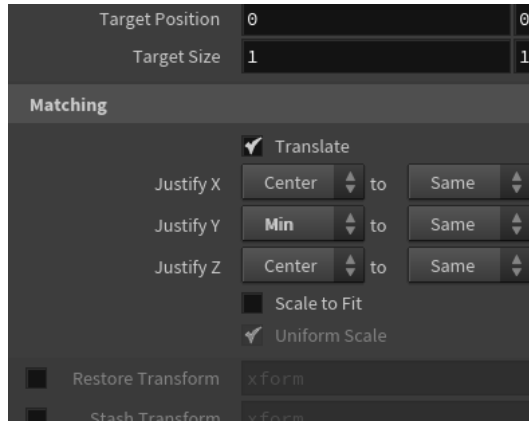


4. Move your geometry to the XZ plane

- Click the output dot of our *thicken_vase* node.
- Press **Tab** in the Network View, type *match size*, and press **Enter**.



- In the parameter pane, change the **Justify Y** drop-down to **Min**.



CONGRATULATIONS

You have now completed your Vase Modeling exercise. This exercise took you through a project that began with a simple polygon sphere and you created a vase using the PolyExtrude and PolyBevel tools. You also used the Edit node to smoothly shape points and polygons.