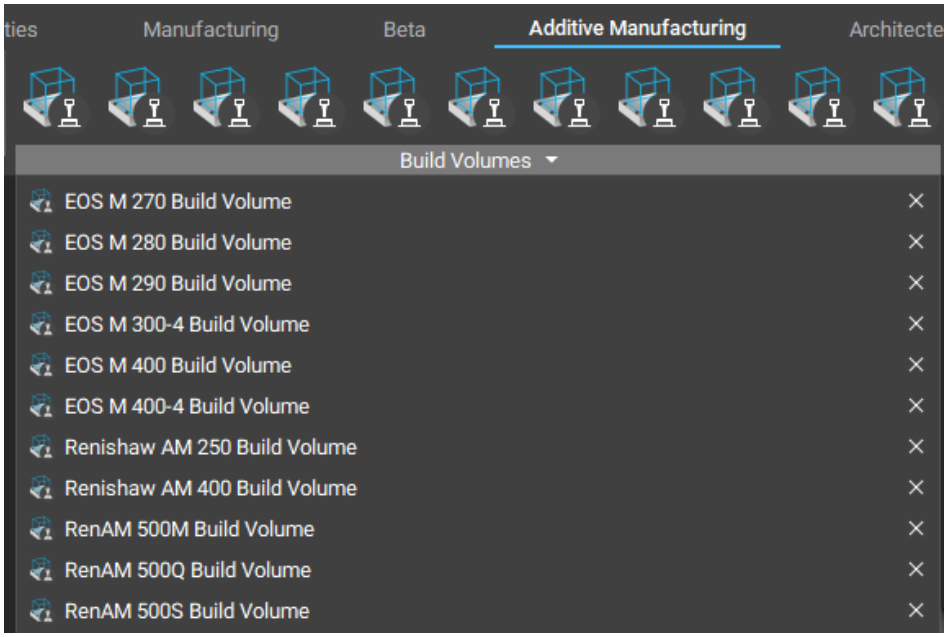
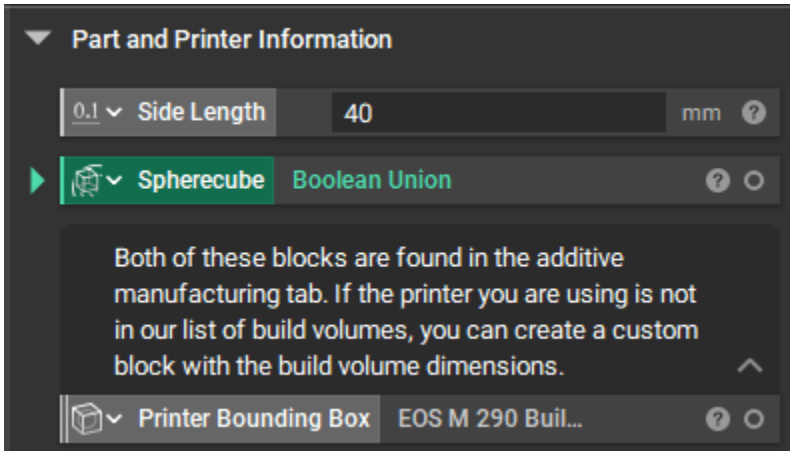
Follow Along: Print Preparation

In this lesson, we will walk through different options for orienting a part for printing and placing multiple bodies on a build plate. This lesson uses the List Element block discussed in our Intro to Automation Course. If you are unfamiliar, I recommend returning to these lessons.

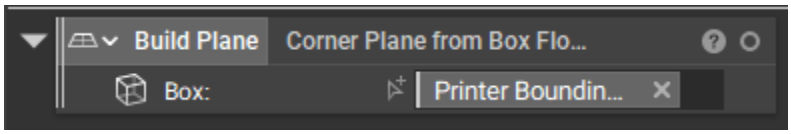
Please download the nTop file below to follow along with the tutorial.

Step 1: Add the **EOS 290 Build Volume** Block from the Additive Manufacturing Tab as we will use this printer as our example. Make this a variable and label this Printer Bounding Box. You could also create your own build volume with your printer's dimensions using a **Bounding Box** block.

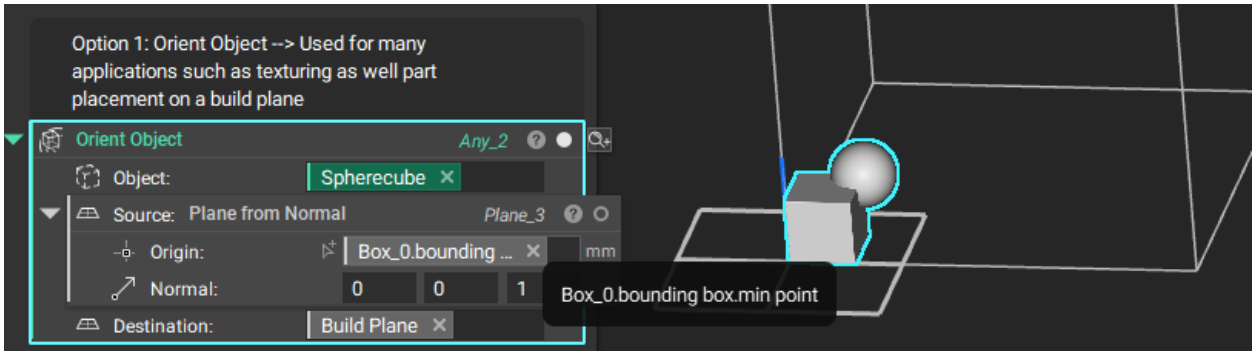




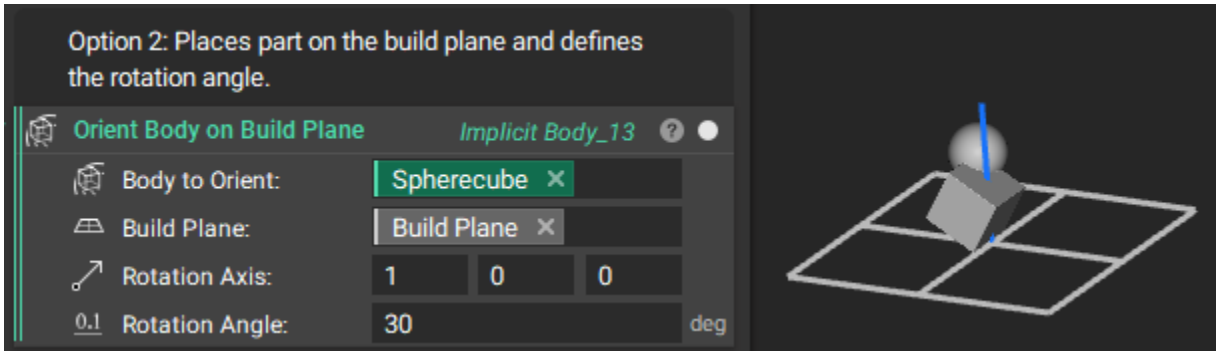
Step 2: Add a **Corner Plane from Box Floor** (or **Center Plane from Box Floor**) and place the printer bounding box in the input. Then make this a variable and label it Build Plane.



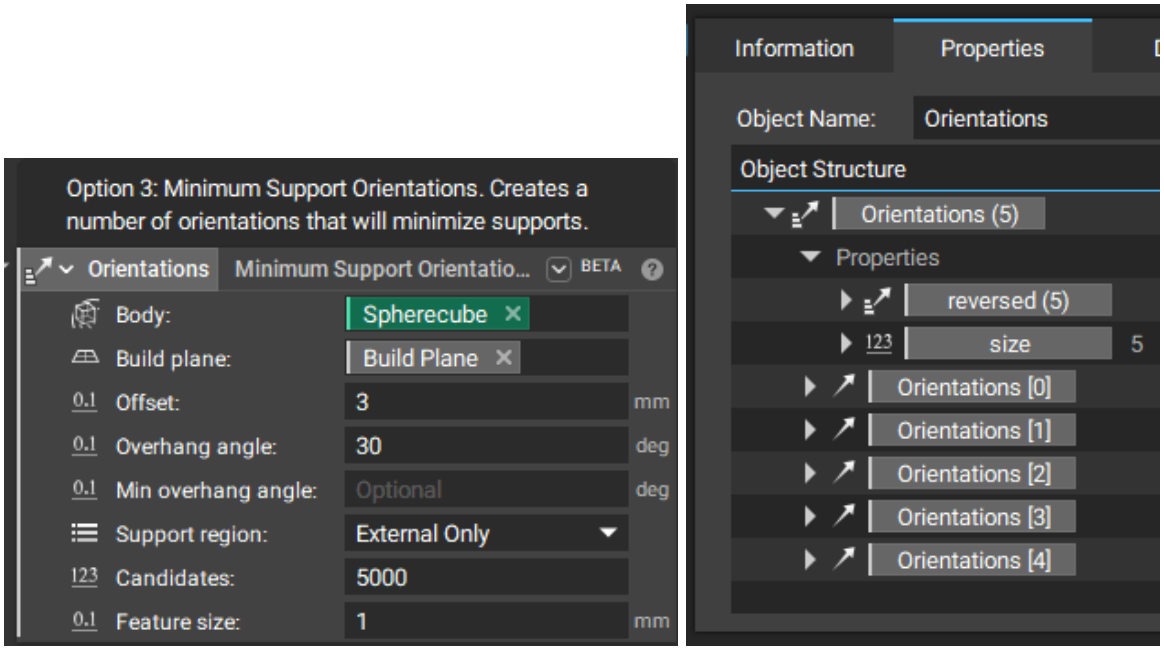
Step 3: Click underneath the Part Orientations section and add an **Orient Object** block (in the Additive Manufacturing Tab). Drag and drop the Spherecube in the object input, use a **Plane from Normal** block as the source. For the origin input, choose the bounding box min point in the block details of the cube used to create the Spherecube. For the destination plane, use the build plane. Now, you should have the minimum point of the Spherecube placed in the corner of the build volume.



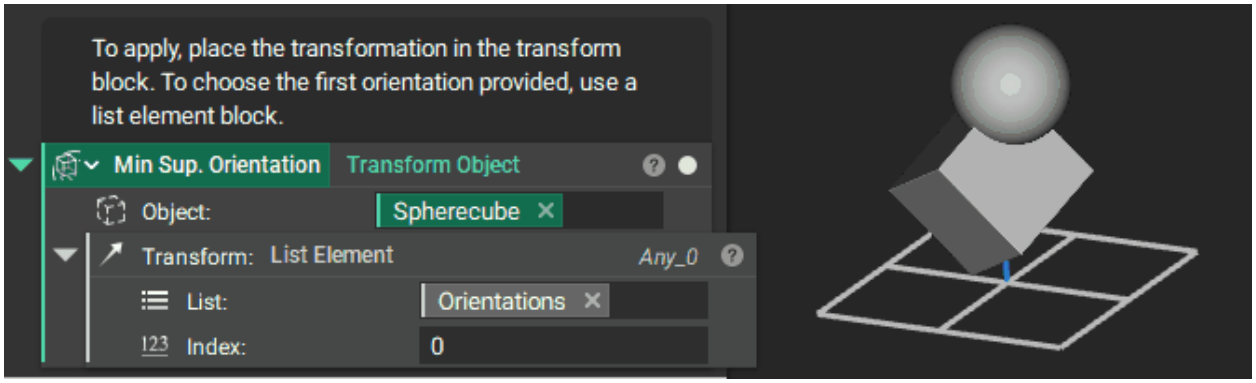
Step 4: Add an **Orient Body on Build Plane** block into the notebook. Add the Spherecube into the body to orient input and the Build Plane variable for the build plane input. You can also change the rotation axis and rotation angle.



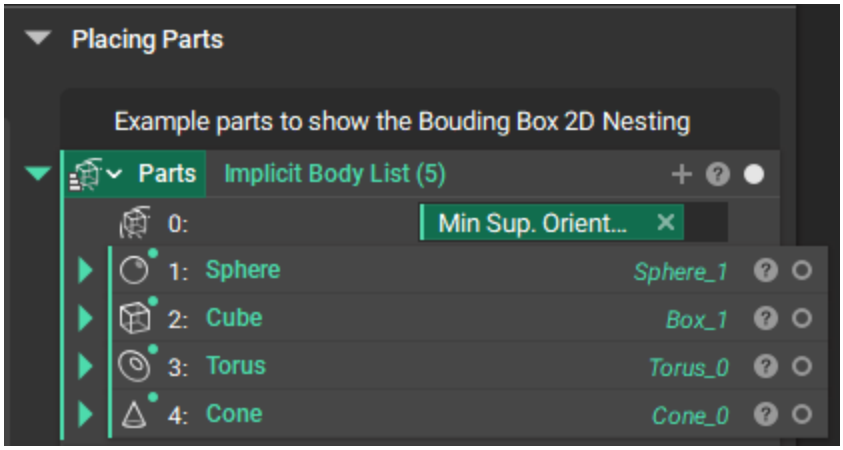
Step 5: Add a **Minimum Support Orientations** block found in our Beta Blocks. If you do not see the Beta Tab, you can go to Settings → General → Check Show Beta Blocks. For the body, use the Spherecube variable and the Build Plane variable for the build plane input. We will use a 3mm offset, overhang angle of 30 degrees, and External Only for supports. This block outputs a transformation list with five different orientations produced.



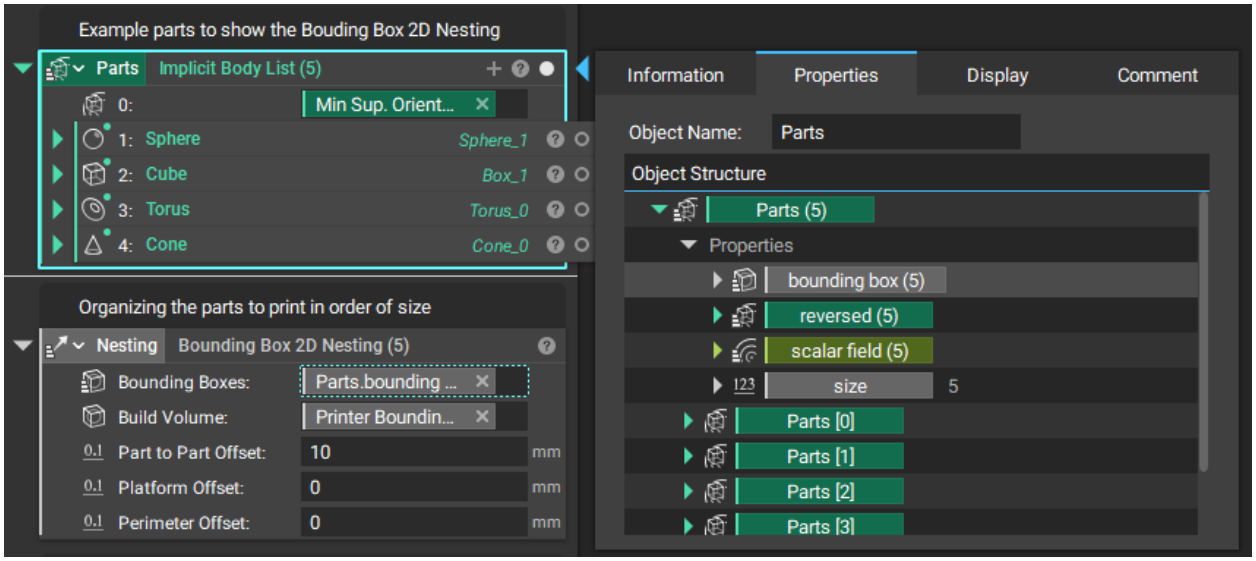
Step 6: Add a **Transform Object** block to your notebook to apply the transformation from the **Minimum Support Orientations** block. Since the minimum support orientation result is a list, add a **List Element** block into the transform input (For more information on this block and for working with lists, please visit our Intro to Automation Course). Place in the **Minimum Support Orientation**s block for the list input and type 0 for the index (this will select the first orientation in the list). Make the **Transform Object** block a variable labeled Min. Sup. Orientation. You would follow a similar process for the **Minimum Height Orientation** block.



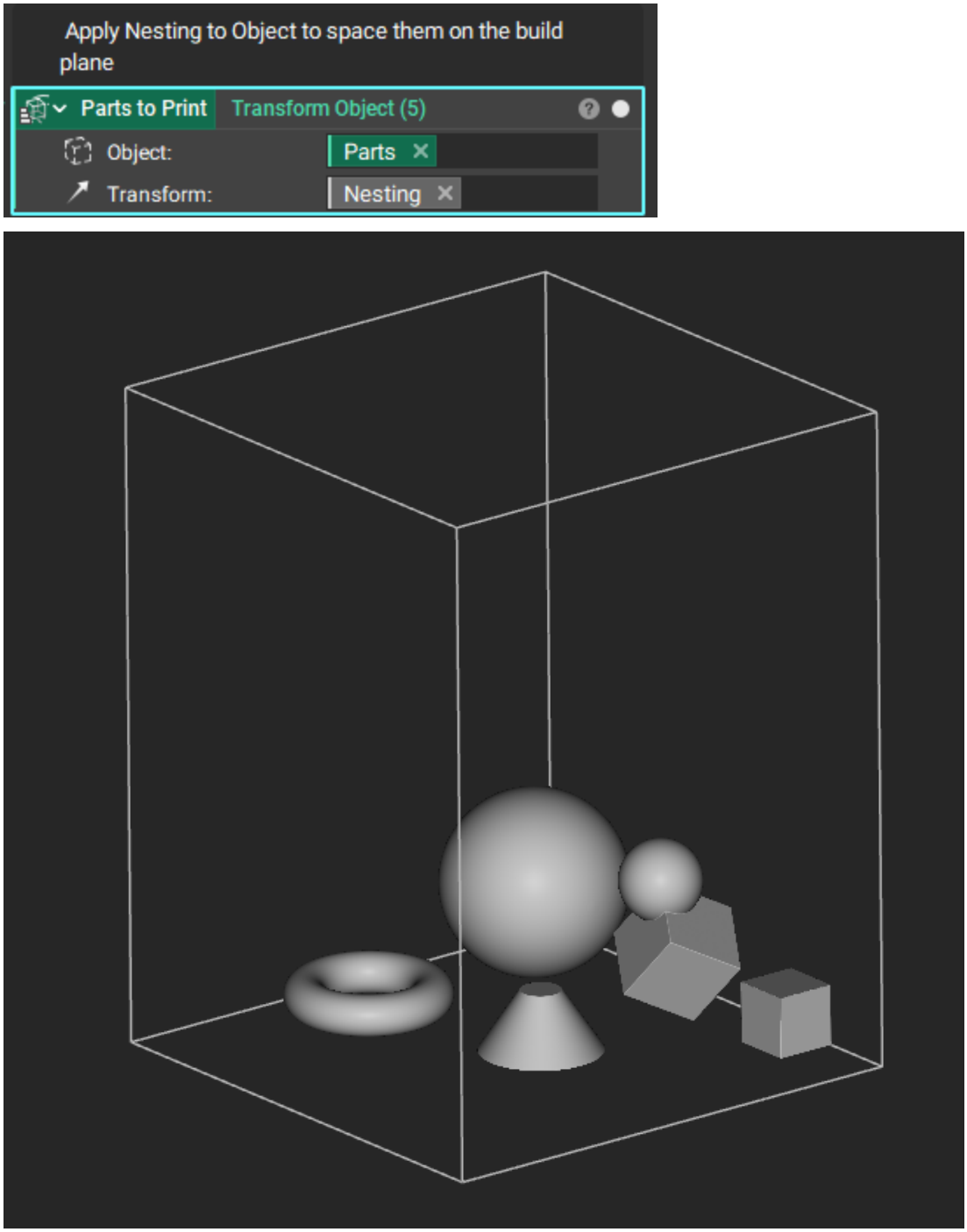
Step 7: Open the Placing Parts Section of your notebook, which already has an **Implicit Body List** block with the **Sphere**, **Cube**, **Torus**, and **Cone** blocks for the inputs. For the last input, place in the Min. Sup. Orientation variable. We will use this block for the **Bounding Box 2D Nesting** block (in the Manufacturing tab).



Step 8: Remove the bounding box list block in the bounding boxes input for the **Bounding Box 2D Nesting** block. Open the block details for the implicit body list and place this into the input. For the build volume, use the Printer Volume. Input 10mm for the part to part offset.



Step 9: The last step is to add the **Transform Object** block to the notebook and place the **Bounding Box 2D Nesting** block in the transform input and the parts into the object. They are now placed on the build volume, organized in order of size.


Apply Nesting to Object to space them on the build plane
Parts to Print
Transform Object (5)
Object:
Parts
Transform:
Nesting