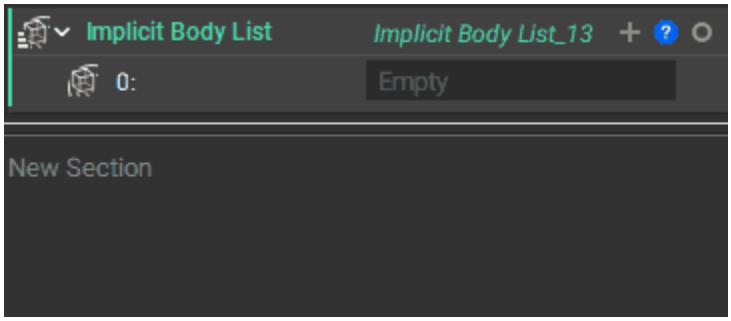
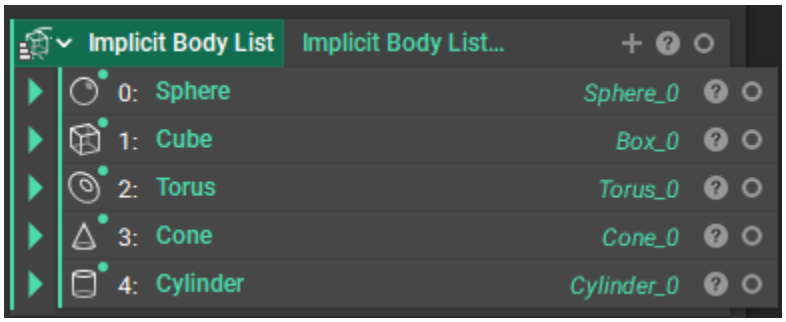
Follow Along: List Processing

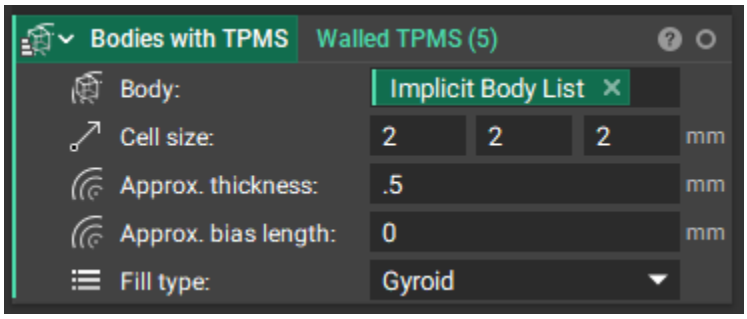
In this lesson, we will walk through the different list processing concepts and will demonstrate how to use the **Sequence, Filter, Sort**,**List Element** and **Sub List** blocks as well as an example custom block that uses these concepts. Please download the nTop file to follow along with the tutorial.

Step 1: First, add an **Implicit Body List** block to your notebook and add four more inputs by clicking on the plus button. Place in these implicit bodies from the create tab: **Sphere, Cube, Torus, Cone Cylinder.** Right click and make this block a variable labeled “Implicit Body List”.



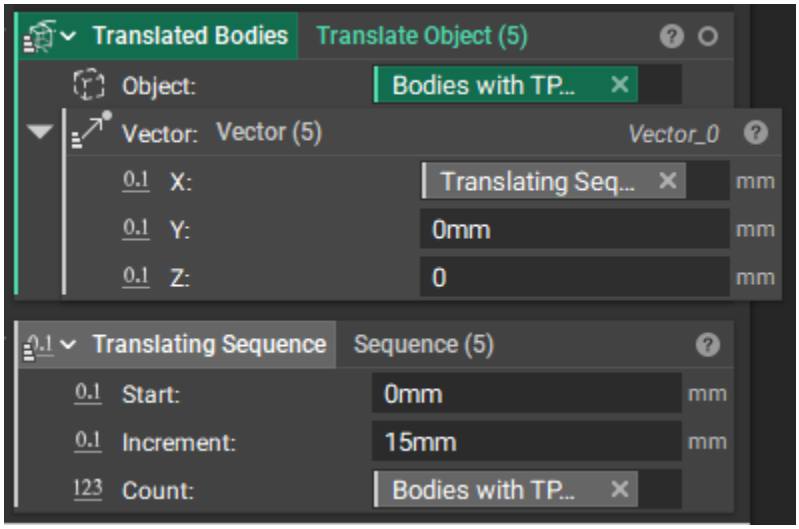


Step 2: Use this block as an input for the **Walled TPMS** block. Instead of using five **Walled TPMS** blocks, you can use list processing to add a TPMS structure to all of the bodies at once. Note, that the Walled TPMS type is now a list.

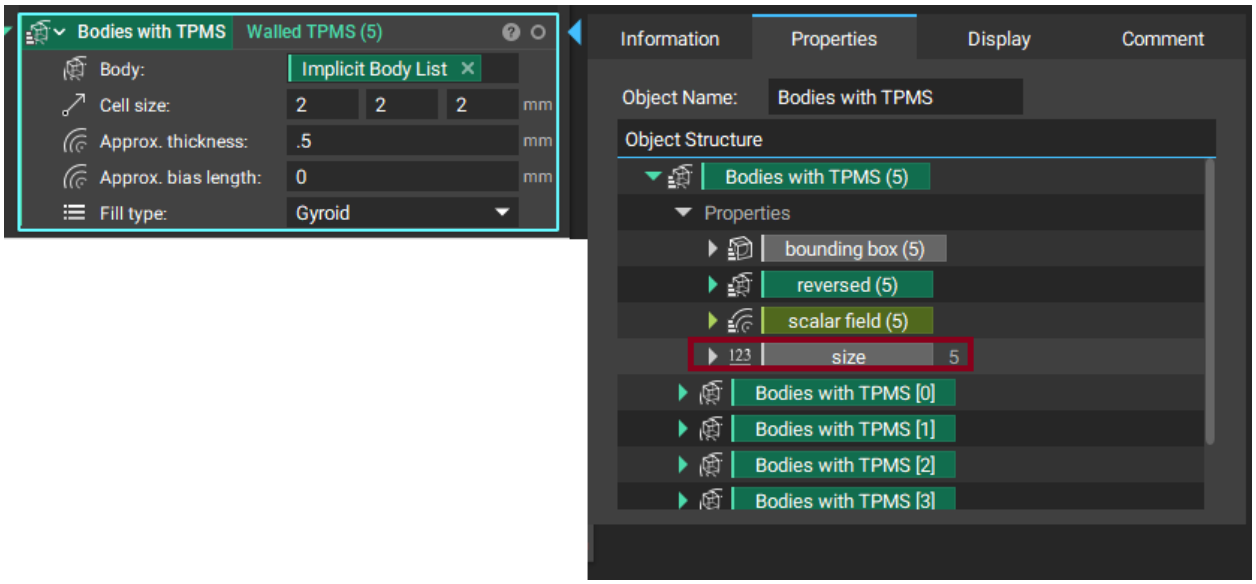


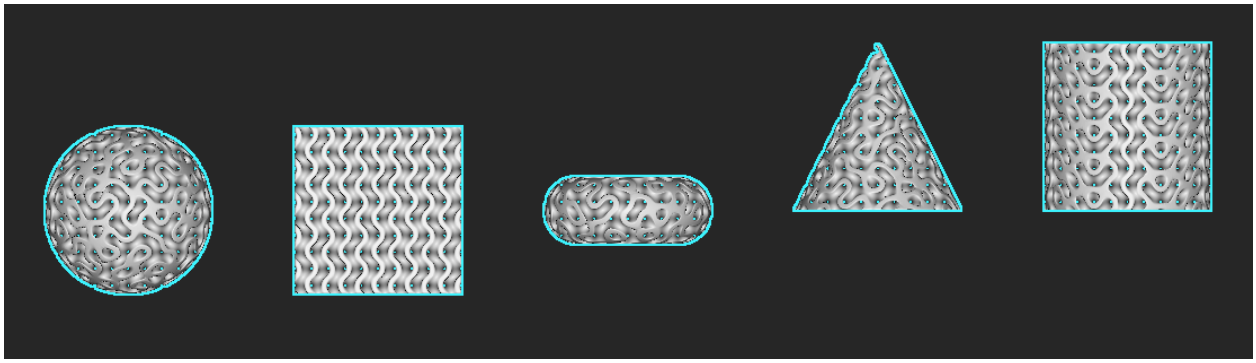
Step 3: To visualize all five of these implicit bodies, we will use the **Translate Object** block. For the vector, type in the **Vector** block so we can control the X values using a **Sequence** block. In

the Sequence Block, start at 0mm with an increment of 15mm.

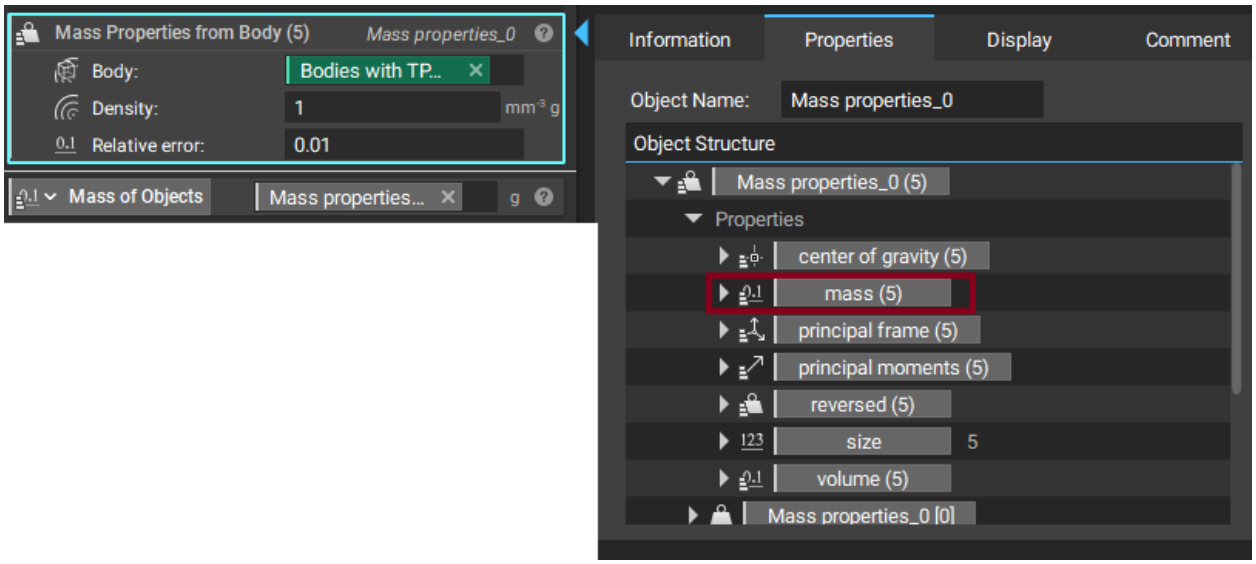


Step 4: For the count, use the Size property in the Bodies with TPMS block, so that the size of the sequence will automatically adjust to be the same size as the Bodies with TPMS list.

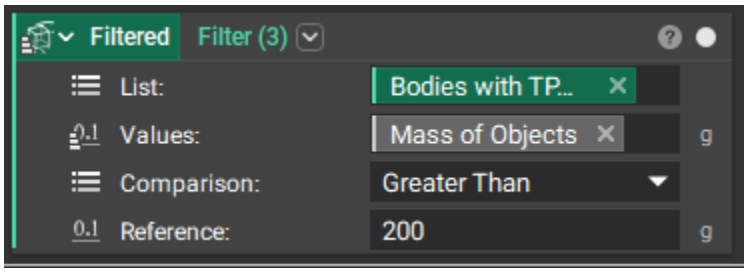




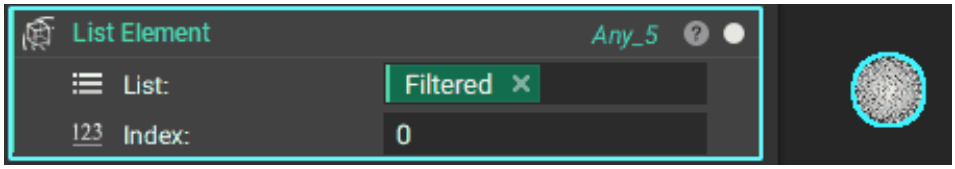
Step 5: Double click on Section 1 and rename this “Creating Lists and Sequencing”. Next, add a new section and label this “Sort and Filter”. In this section we will filter the created bodies by their mass. Add a **Mass Properties from Body** block into the notebook and place the Bodies with TPMS variable in the input for body with a density of 1 mm^-3g. In the properties tab of this block, drag and drop the mass into the notebook and rename this “Mass of Objects”.



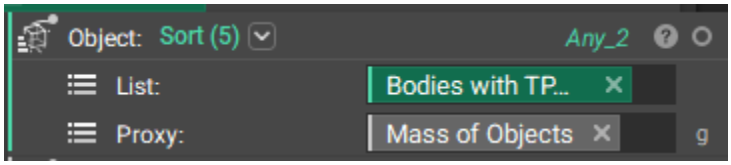
Step 6: Add a **Filter** Block and click on the overload button to see four inputs. For the list, place in the Bodies with TPMS, use the Mass of Objects for the values, choose greater than for the comparison and 200g for the reference. This will leave the three bodies that are greater than 200g.



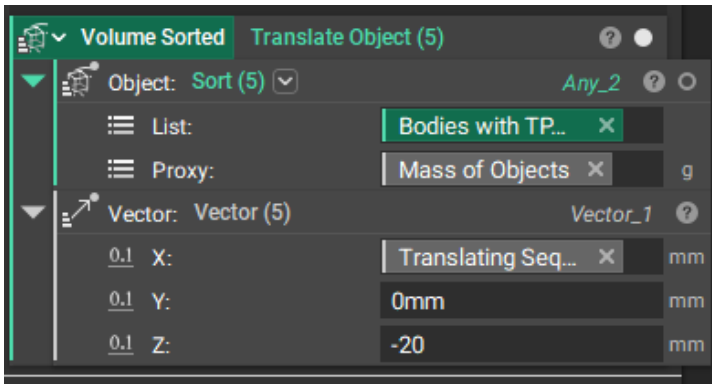
Step 7: To see one element of the list and rotate between the different elements, use the **List Element** block. Place the Filtered block (created above into this block and switch between an index of 0,1, or 2.

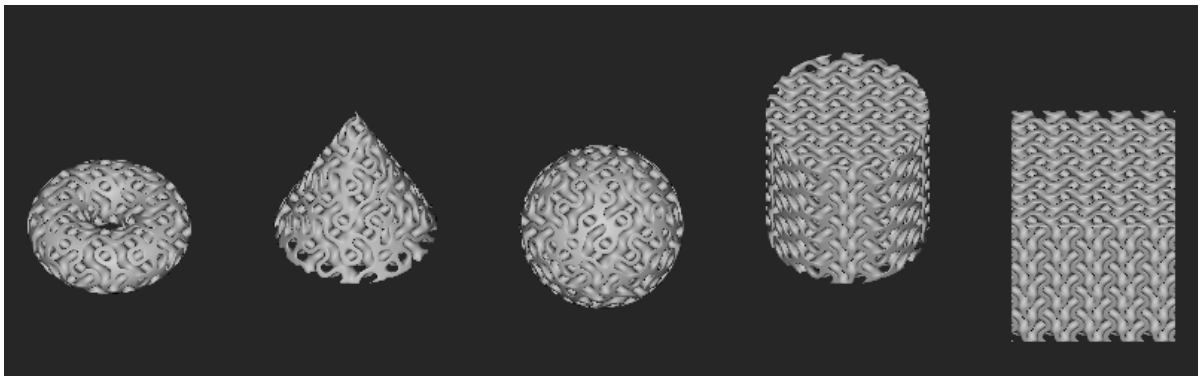


Step 8: Along with filtering, we can also sort our implicit body list by mass. Add the **Sort** block to your notebook and place in the Bodies with TPMS block for the list and the Mass of Objects as the properties. If you do not see these two input options, click on the block overload button.

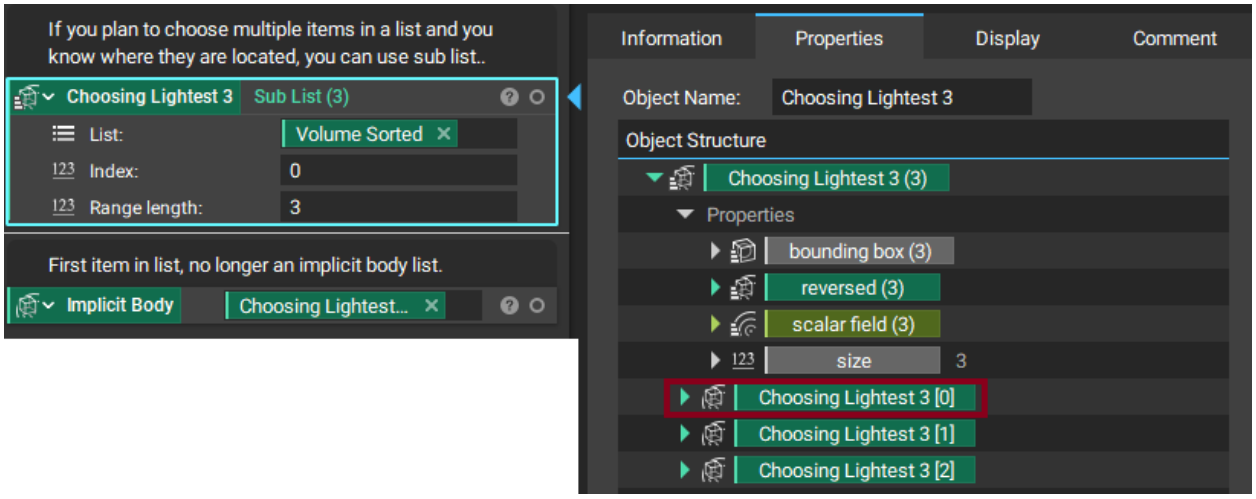


Step 9: To visualize these items, use another translate object block and the same sequence created in the previous section. The bodies are now sorted from lightest to heaviest.

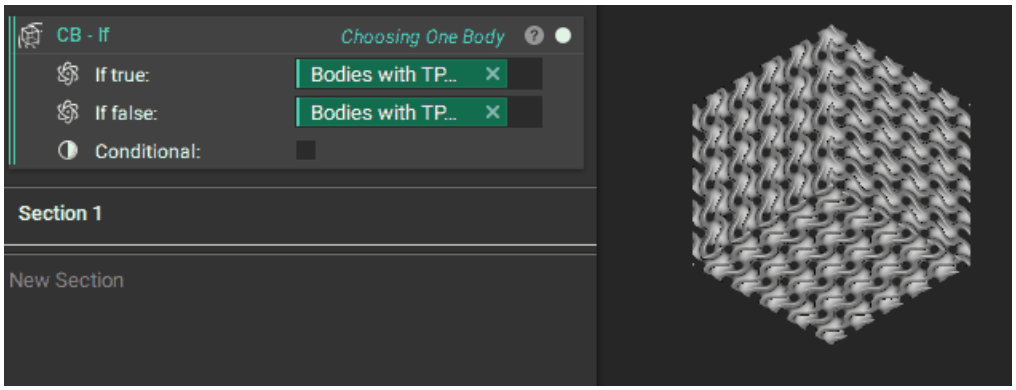




Step 10: To select the three lightest items, we can use a **Sub List** block and place in the Volume Sorted Block (shown above) into the list input with an index starting at 0 and a range of 3. Note that even if you only wanted to select one item, the sublist will always be a list, so in order to have an implicit body type instead of an implicit body list type, either use a **List Element** block or drag and drop the block you plan to use into the notebook from the block properties.



Step 11: We can also create custom blocks using these blocks, such as the Custom block If. Import the **CB-If** block that you can download in this lesson using the process shown in the previous Follow Along video. Place in the first body from the Bodies with TPMS variable list found in the properties tab into the “If true” input. For the input “If false” place the second implicit body in the list. You can then check the condition to switch between choosing the sphere or cube.



Step 12: To further automate this block, you can use the logic blocks such as the **Greater Than** block. Place the **Greater Than** block into the input for the conditional and use the first item in the Mass of Objects properties list for the first input and the second Mass of Objects into the second option. Now, it will only display the block with the greater mass.