

## 5.2.6.3 Modeling - Meshes - Editing - Basics

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### Basics

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## Basic Mesh Editing

In this section we explain how to do basic editing on a mesh.

- *Translation, Rotation, Scale*
- *Adding Elements*
- *Deleting Elements*
- *Creating Faces and Edges*
- *Mirror editing*

## Translation, Rotation, Scale

### Reference

Mode: *Edit mode*

Panel: *Mesh Tools (Editing context)*

Menu: Mesh ▸ Transform ▸ Grab/Move, Rotate, Scale, ...

Hotkey: G / R / S

Once you have a selection of one or more elements, you can grab/move (G), rotate (R) or scale (S) them, like many other things in Blender, as described in the *Manipulation in 3D Space* section.

To move, rotate and scale selected components, either use the *Translate*, *Rotate*, and *Scale* buttons, the *transform manipulators*, or the shortcuts:

G, R, and S respectively. After moving a selection, the options in the Tool Shelf allow you to fine-tune your changes, limit the effect to certain axes, turn proportional editing on and off, etc.

Of course, when you move an element of a given type (e.g. an edge), you also modify the implicitly related elements of other kinds (e.g. vertices and faces).

You also have in *Edit* mode an extra option when using these basic manipulations: the *proportional editing*.

## Adding

This page is being developed right now, follow this link to see the page while it's being constructed.

Object mode Adding object - menu, manual selection - is under last added object... or shortcut Shift-A.

Edit mode: adding object → addin mesh, e.g. final merging into one object.

center for adding: X 3D curson. If you need to center cursor. just press Shift-C, or edit in the N tools menu cursor coordinates x,y,z.

## Deleting and Merging

These tools can be used to remove components.

### Delete

#### Delete (X or Delete)

Deletes selected vertices, edges, or faces. This operation can also be limited to:

##### Vertices

Delete all vertices in current selection, removing any faces or edges they are connected to.

##### Edges

Deletes any edges in the current selection. Removes any faces that the edge shares with it.

##### Faces

Removes any faces in current selection.

##### Only Edges & Faces

Limits the operation to only selected edges and adjacent faces.

##### Only faces

Removes faces, but edges within face selection are retained.

##### Edge Collapse

Collapses edges into single vertices. This can be used to remove a loop of faces.

##### Edge Loop

Deletes an edge loop. If the current selection is not an edge loop, this operation does nothing.

### Dissolve

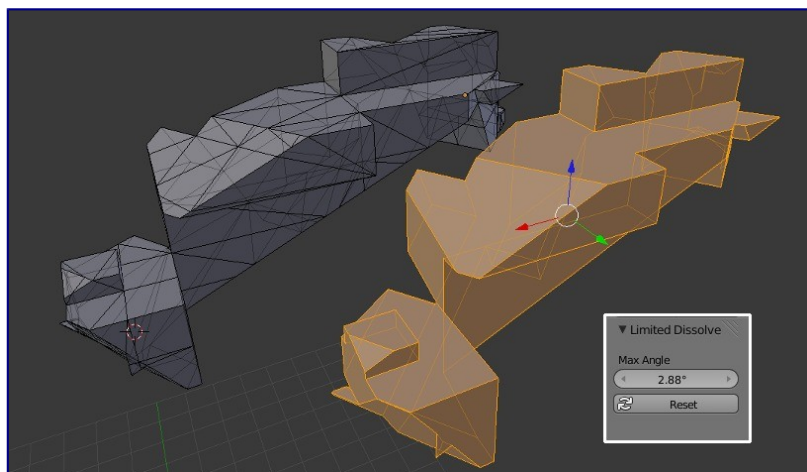
Dissolve operations are also accessed from the delete menu. Instead of removing the geometry, which may leave holes that you have to fill in again, dissolve will remove the geometry and fill in the surrounding geometry.

#### Dissolve

Removes selected geometry, but keeps surface closed, effectively turning the selection into a single n-gon. Dissolve works slightly different based on if you have edges, faces or vertices selected. You can add detail where you need it, or quickly remove it where you don't.

#### Limited Dissolve

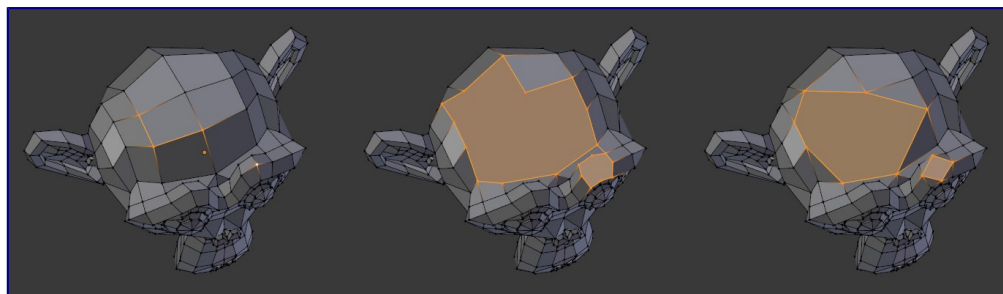
Limited Dissolve reduces detail on planar faces and linear edges with an adjustable angle threshold.



Example showing the how Limited Dissolve can be used.

### Face Split - dissolve option.

When dissolving vertices into surrounding faces, you can often end up with very large, uneven ngons. The face split option limits dissolve to only use the corners of the faces connected to the vertex.



Dissolve Face Split option. Left - the input, middle - regular dissolve, right - Face Split enabled

## Convert Triangles to Quads

**Tris to Quads Alt - J** This takes adjacent tris and removes the shared edge to create a quad. This tool can be performed on a selection of multiple triangles.

This same action can be done on a selection of just 2 tris, by selecting them and using the shortcut **F**, to create a face.

## Unsubdivide

### Reference

Mode: *Edit* mode

Menu: Mesh ▸ Edges ▸ Unsubdivide

Unsubdivide functions as the reverse of subdivide by attempting to remove edges that were the result of a subdivide operation. If additional editing has been done after the subdivide operation, unexpected results may occur.

### Iterations

How many subdivisions to remove.

## Merging

### Merging Vertices

### Reference

Mode: *Edit* mode

Menu: Mesh ▸ Vertices ▸ Merge..., Specials ▸ Merge or Vertex Specials ▸ Merge

Hotkey: **Alt - M**

This tool allows you to merge all selected vertices into an unique one, deleting all others. You can choose the

location of the surviving vertex in the menu this tool pops up before executing:

### At First

Only available in *Vertex* select mode, it will place the remaining vertex at the location of the first one selected.

### At Last

Only available in *Vertex* select mode, it will place the remaining vertex at the location of the last one selected (the active one).

### At Center

Available in all select modes, it will place the remaining vertex at the center of the selection.

### At Cursor

Available in all select modes, it will place the remaining vertex at the 3D Cursor.

### Collapse

This is a special option, as it might let “live” more than one vertex. In fact, you will have as many remaining vertices as you had “islands” of selection (i.e. groups of linked selected vertices). The remaining vertices will be positioned at the center of their respective “islands”. It is also available *via* the Mesh ▸ Edges ▸ Collapse menu option...

Merging vertices of course also deletes some edges and faces. But Blender will do everything it can to preserve edges and faces only partly involved in the reunion.

## AutoMerge Editing

Reference
Mode: <i>Edit</i> mode Menu: Mesh ▸ AutoMerge Editing

The *Mesh* menu as a related toggle option: *AutoMerge Editing*. When enabled, as soon as a vertex moves closer to another one than the *Limit* setting (*Mesh Tools* panel, see below), they are automatically merged.

## Remove Doubles

Reference
Mode: <i>Edit</i> mode Panel: <i>Editing</i> context → <i>Mesh Tools</i> Menu: Mesh ▸ Vertices ▸ Remove Doubles, Specials ▸ Remove Doubles or Vertex Specials ▸ Remove Doubles Hotkey: W, Remove Doubles

Remove Doubles is a useful tool to simplify a mesh by merging vertices that are closer than a specified distance to each other. An alternate way to simplify a mesh is to use the *Decimate modifier*.

### Merge Distance

Sets the distance threshold for merging vertices, in Blender units.

### Unselected

Allows vertices in a selection to be merged with unselected vertices. When disabled, selected vertices will only be merged with other selected ones.

## Make Edge/Face

### Reference

Mode: *Edit* mode

Menu: Mesh -> Faces -> Make Face/Edge

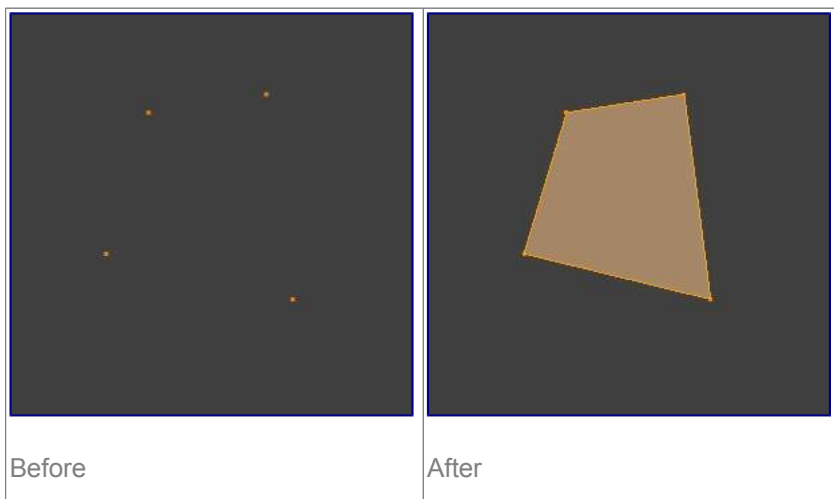
Hotkey: F

This is a context sensitive tool which creates geometry by filling in the selection. When only 2 vertices are selected it will create an edge, otherwise it will create faces.

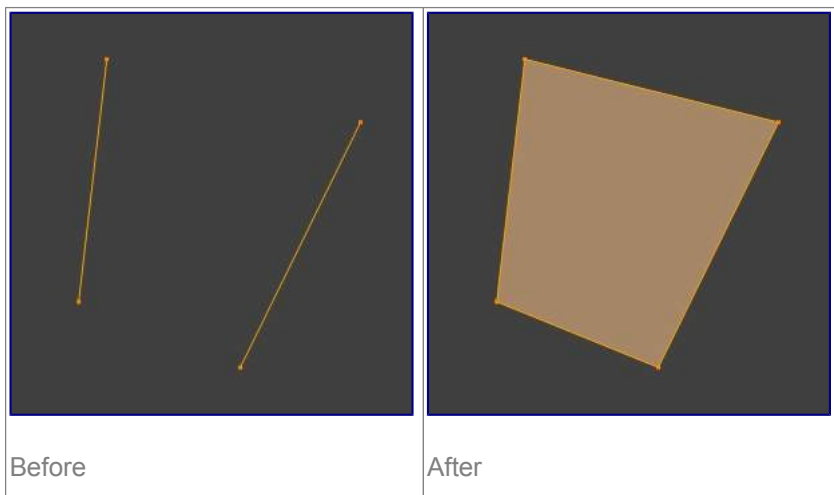
The typical use case is to select vertices and press F, however Blender also supports creating faces from different selections to help quickly build up geometry.

The following methods are used automatically depending on the context.

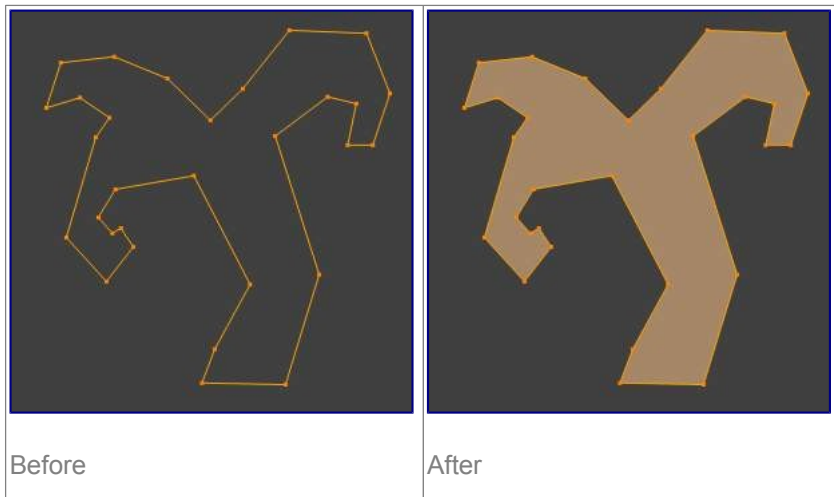
Isolated vertices.



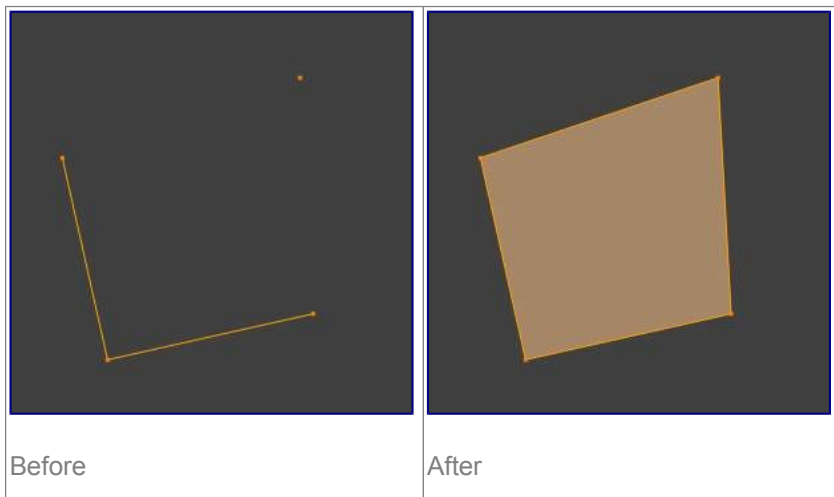
Isolated edges



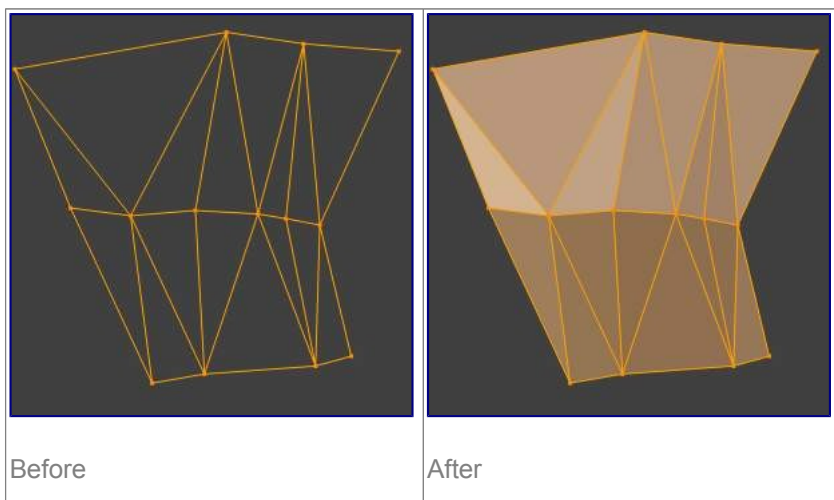
**N-gon from edges:** *When there are many edges Blender will make an ngon, note that this doesn't support holes, to support holes you need to use the Fill Faces tool.*



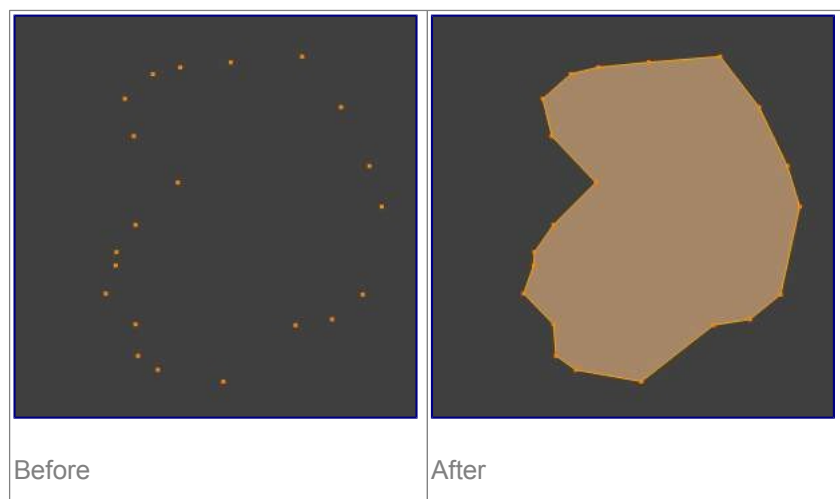
**Mixed vertices/edges:** *existing edges are used to make the face as well as an extra vertex.*



**Edge-Net:** *sometimes you may have many connected edges without interior faces.*



**Point Cloud:** *when there are many isolated vertices, Blender will calculate the edges for an n-gon.*



Single Vertex Selection: *with a single vertex selected on a boundary, the face will be created along the boundary, this saves manually selecting the other 2 vertices. Notice this tool can run multiple times to continue creating faces.*’‘



## Further Reading

For other ways to create faces see:

- Fill
- Grid Fill
- Bridge Edge Loops

## Mirror Editing

### X-Mirror

#### Reference

Mode: *Edit mode*

Panel: Mesh Options ▶ X-mirror

The *X-mirror* option of the *Mesh Options* panel allows you edit both “sides” of your mesh in a single action. When you transform an element (vertex, edge or face), if there is its *exact X-mirrored counterpart* (in local space), it will be transformed accordingly, *through a symmetry along the local X axis*.

### Topology Mirror

The *Topology Mirror* option is available in the 3D View Editor ▶ Toolshelf Region ▶ Mesh Options Panel whilst in *Edit Mode*

For *Topology Mirror* to work the *X Mirror* option must be enabled.



When using the *X Mirror* option to work on mirrored Mesh Geometry the vertices that are mirrored must be perfectly placed. If they are not exactly positioned in their mirror locations then *X Mirror* will not treat those vertices as mirrored. This can be annoying because often the out of position vertices are only very slightly out of position.

*Topology Mirror* tries to solve this problem by determining which vertices are mirrored vertices not only by using their positions but also by looking at how those vertices are related to others in the Mesh Geometry. It looks at the overall Mesh Geometry topology to determine if particular vertices will be treated as mirrored. The effect of this is that mirrored vertices can be non-symmetrical and yet still be treated as mirrored when *X Mirror* and *Topology Mirror* are both active.

Note that *Topology Mirror* functionality will work more reliably on Mesh Geometry which is more detailed. If you use very simple Mesh Geometry such as a Cube or UV Sphere for example the *Topology Mirror* option will often not work.

For an example of how to use *Topology Mirror* open up a new Blender scene, then delete Blender's default cube and add a Monkey Object to the 3D Viewport.

Press the TAB Key to put the Monkey Object into *Edit Mode*.

With the *X Mirror* option disabled move one of the Monkey Object's vertices slightly.

Then Turn *X Mirror* option on again but leave *Topology Mirror* disabled

If you now move that vertice again *X Mirror* will not work and the mirrored vertices will not be altered.

If you then enable *Topology Mirror* and move the same vertices again, then *X Mirror* should still mirror the other vertice, even though they are not perfectly positioned.

## Mirror Modifier

The conditions for X-mirror to work are quite strict, which can make it difficult to use. To have an exact mirrored version of a (half) mesh, its easier and simpler to use the *Mirror modifier*

## Snap to Symmetry

Reference
Mode: <i>Edit mode</i>
Menu: Mesh ▸ Snap to Symmetry

The *Snap to Symmetry* tool works on meshes which are mostly symmetrical but have vertices which have been moved enough that Blender does not detect them as mirrored (when x-mirror option is enable for example).

This can be caused by accident when editing without x-mirror enabled. Sometimes models imported from other applications are asymmetrical enough that mirror fails too.

### Direction

Specify the axis and direction to snap. Can be any of the 3 axes, and either positive to negative, or negative to positive.

### Threshold

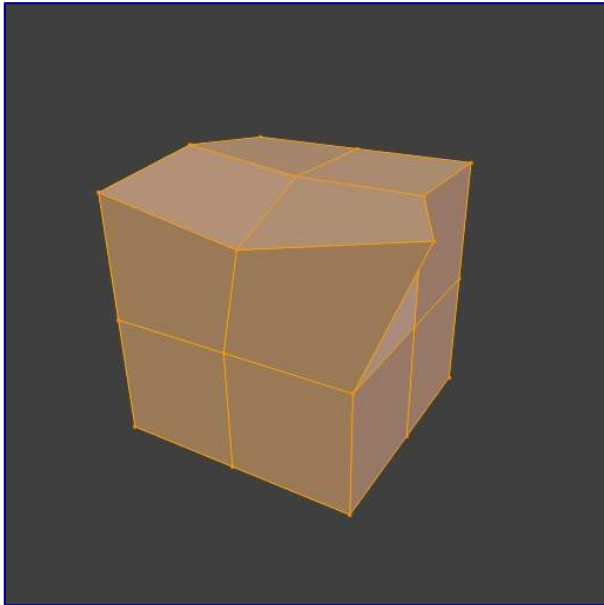
Specify the search radius to use when finding matching vertices.

### Factor

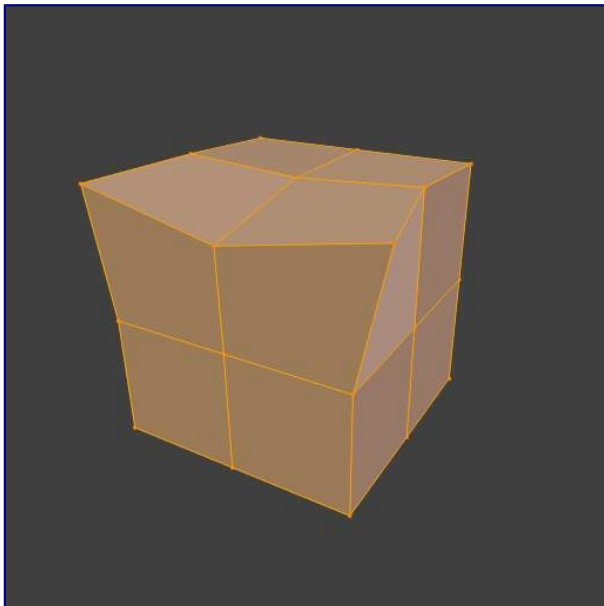
Support for blending mirrored locations from one side to the other (0.5 is an equal mix of both).

### Center

Snap vertices in the center axis to zero.



Before Snap to Symmetry



After Snap to Symmetry

## Symmetrize Mesh

### Reference

Mode: *Edit* mode

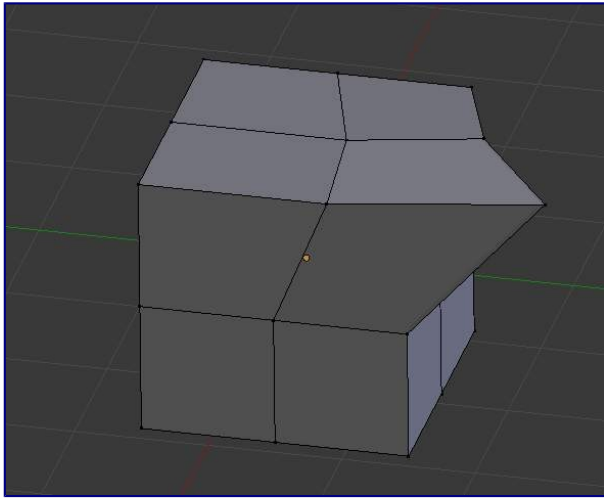
Menu: Mesh ▸ Symmetrize

The *Symmetrize* tool is a quick way to make a mesh symmetrical. *Symmetrize* works by cutting the mesh at the pivot point of the object, and mirroring over the geometry in the specified axis, and merges the two halves

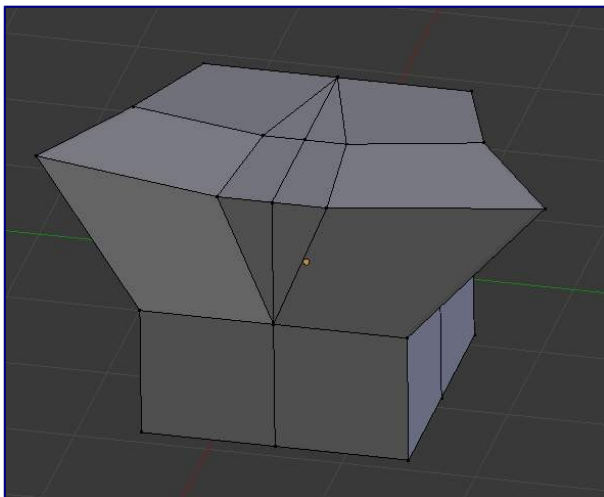
together (if they are connected)

### Direction

Specify the axis and direction of the effect. Can be any of the 3 axes, and either positive to negative, or negative to positive.



Mesh before Symmetrize



Mesh after Symmetrize

## Mirroring Geometry

See *Mirror* for information on mirroring, which allows you to flip geometry across an axis