Blender Edit Mode Mirroring Improvements

Operators

Several operators do not support Blender's Edit Mode mirror.

Transform

These operators result in moving vertices around, but do not add or remove geometry or adjust their attributes. Most transform operators in Blender already support mirroring, but not the following:

- Warp
- Randomize
- Selection to Cursor
- Selection to Grid
- Selection to Active

Attributes

These operators work only on existing components and should be as safe to use mirroring on as the transform operators.

- Normals (all)
- Shading (all)
- Weights (all)
- Set Attribute
- Hide
- Reveal
- Vertex Crease
- Edge Crease
- Edge Bevel Weight
- Mark / Clear Seam
- Mark / Clear Sharp (all)
- Set Sharpness by Angle
- Mark / Clear Freestyle Edge
- Mark / Clear Freestyle Face
- Flip Quad Tessellation

- Rotate UVs
- Reverse UVs
- Rotate Colors
- Reverse Colors
- UV Unwrap (all)
- UV Reset

Partially Supported

- Bend
    - Uses the mirror but does not have it as an option in the redo panel
- Move Texture Space and Scale Texture Space
    - Does have it as an option in the redo panel but should not as there is just one texture space per mesh
- Smooth Vertices (all)
    - Only appears to work with mirroring the X axis, not Y or Z

Adding and Removing

Operators that create or destroy geometry have never supported mirroring, so there may be some deeper considerations or concerns that Campbell would know more about.

For example: If mirroring is based just on location, what happens when you delete a double? In what order are new vertices created, so that quad tessellation is mirrored? Some topology would have to be considered, and this may be more complex than it seems at first glance. For these reasons, these operators should be looked at last. It may be best to not add symmetry to each one of them individually, but make a variation of Symmetrize that can be optionally run after each operation.

Some of these operators already have a Mirror Editing property, but that only moves the original vertices to the location of the newly created vertices and is not a mirror of the full operation, which renders it fairly useless in practice.

- Duplicate
- Extrude (all)
- Merge (all)
- Split
- Separate
- Bisect
- Knife Project
- Knife Tool
- Convex Hull
- Symmetrize
- Clean Up (all)

- Delete (all)
- Bevel
- New Edge / Face from Vertices
- Connect (all)
- Rip Vertices (all)
- Bridge Edge Loops
- Screw
- Subdivide
- Subdivide Edge Ring
- Un-Subdivide
- Loop Cut and Slide
- Offset Edge Slide
- Inset Faces
- Poke Faces
- Triangulate Faces
- Tris to Quads
- Solidify Faces
- Wireframe
- Fill
- Grid Fill
- Beautify Faces
- Intersect Knife / Boolean
- Weld Edges Into Faces

Mirror Methods

There are two main methods for mirroring in Blender's Edit Mode: Location and Topology. Both work in certain circumstances but have fairly significant downsides.

Location

The default, location based mirroring, breaks as soon as there is overlapping geometry because it will grab all points that share the same mirrored location.

To fix this, the topology of the points should be considered if the number of selected points on the mirrored side does not match the number of points in those locations on the edited side. In this case, topology could just be the number of connected edges, the locations of the connected vertices on their ends, and the vertex normal. While this may be an expensive operation, it only needs to be done for the verts that share the same location.

Topology

Topology mirroring is a pretty incredible option that allows users to edit opposite vertices even when the locations of those vertices are not exactly symmetrical. It works well for detailed objects such as characters, but does not work for more simple objects. It also breaks when there is an asymmetrical detail, even if that detail is not near the edited area. While this method is quite limited, I don't see any obvious ways to improve it at this time.

Symmetrize

Blender's Symmetrize operator works well for copying one entire side of a mesh to another, but not so well for copying individual parts of one side to another. Options to automatically select mirror and remove doubles would help a lot, but also it should only delete geometry after copying the other side and removing doubles - otherwise you can easily get holes in the mesh.

If the symmetrize operator was improved so that it was more robust and could easily work with sections of a mesh, it could potentially be used internally in operators that add or remove geometry, rather than implementing mirroring for each one individually.