Introduction

Frequently one is left with an N-gon as the end of an edge extrusion modeling procedure. N-gons are best avoided in modeling props for animation, and completely unacceptable for game assets. They can be predictably subdivided with triangular faces (tris) but this leads to a pole vertex - one that is connected to more than four edges - at the center. The Grid Fill option in Blender offers a way to fill an N-gon with quads that are topologically acceptable.

Procedure

Here we have an edge extruded object with twelve sides (note: there must be an even number of sides in the extrusion for Grid Fill to work). We’ve reached the top and want to close it off with a sharp edge. Because this object is being used as the control cage for a subdivision surface we’ll need to add a couple more edgeloops close to this top edge - first, one on the existing geometry and then second on the top by selecting that edgeloop with Alt-RMB, then E for extrude and S for scale. The result should look something like this:

With the inner edgeloop still selected, use Control-F to bring up the Face specials menu (note: not the Edge specials).
This will create a series of quads across the open area that continue the existing edgeloops.

At the foot of the left hand fly-in, you’ll notice a few controls.

The top one, Span, controls how square the quads are, ranging from the default option above to long rectangles. Generally, you’ll want to accept the default fill. Offset simply rotates the connecting loops around the available vertices. This may make a difference to your model’s topology; experiment with a few options.

Finally, checking Simple Blending will change the way the edges cross the open area to reduce the difference in area and shape between them. This is generally a good idea.

Now we have a well filled, well topologized top to our model.