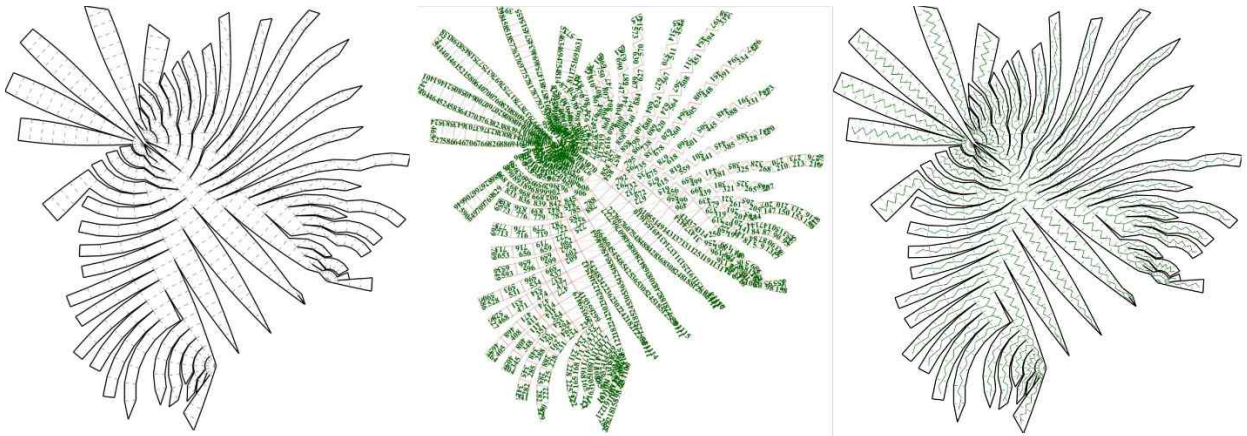# <Programming Assignment : Mesh Unfolding Heuristics>

160CPG02 Jiyang, Kim

I chose the greatest increase cut tree as a first splitter, and cutting the rightmost ascending edge as a second splitter. First method is very similar to steepest edge cut tree method, but the difference is the followings :
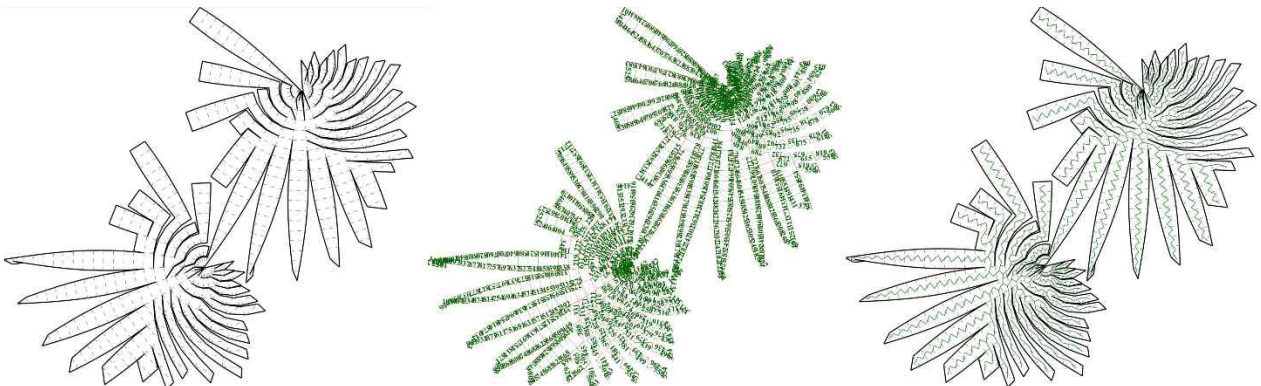
Greatest increase cut tree method consider <c, v-w> is maximal and positive while steepest edge cut tree method consider $\frac{<c,v-w>}{|v-w|}$ is maximal. And second method consider normal vector is positive and determinant is maximal.

I tried 5 convex models(: ball, cone, cylinder, ellip, hexagonal pyramid) and 5 non-convex models(: bunny, pooh, snail, star, tiger).
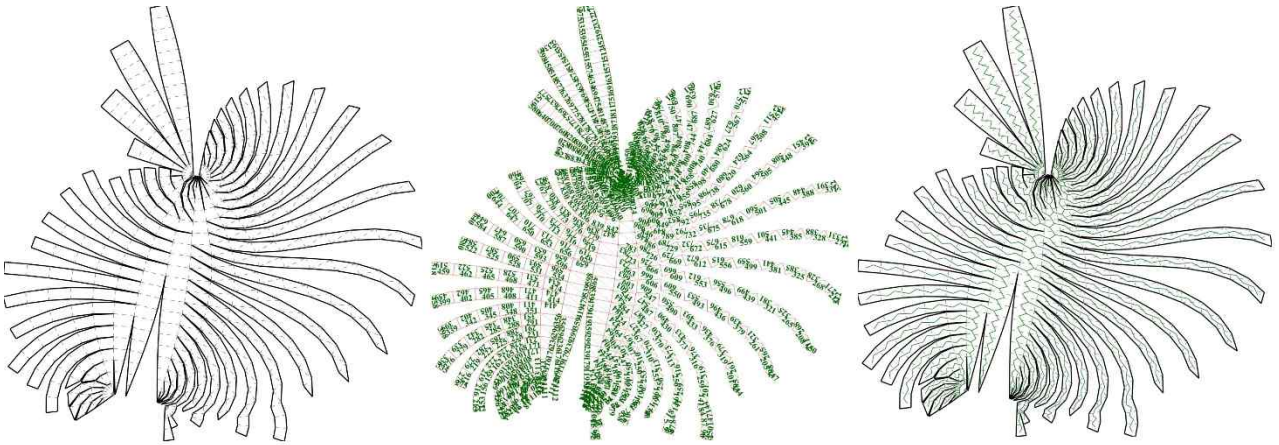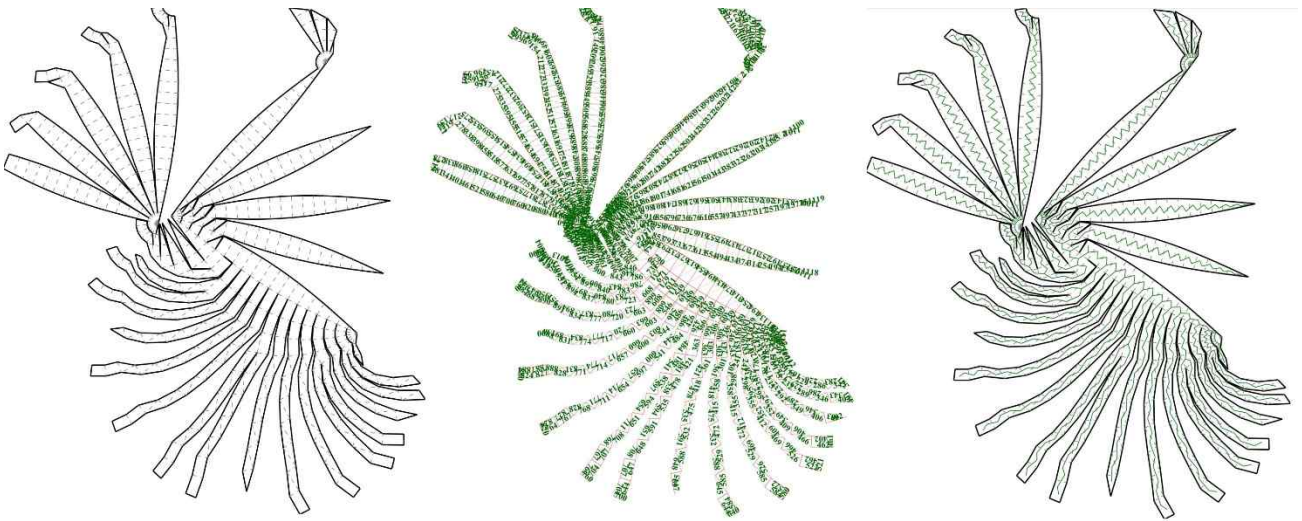
These are my test results below.

▲ This is the result of the steepest edge unfold method.

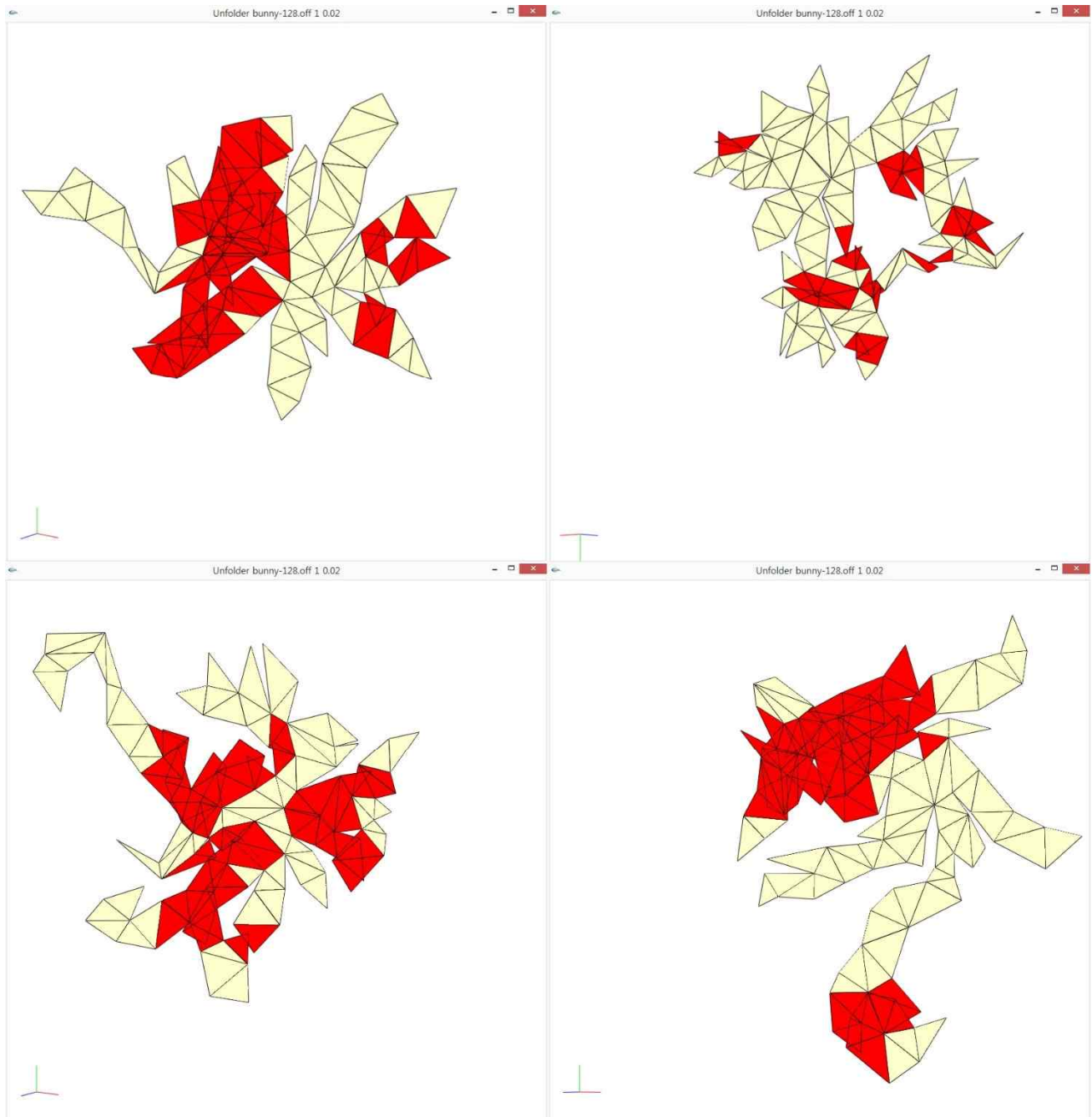▲ This is the result of flat edge unfolding method.

▲ This is the result of the greatest increase cut tree(my first splitter).

▲ This is the result of the cutting the rightmost ascending edge method(my second splitter).

The steepest edge unfold method choose the steepest ascending edge at the vertex as a cut edge. This makes straight paths from top to bottom. Flat edge unfolding method cut corresponding edges together, so the result looks like symmetry graph. The greatest increase cut tree method which that I chose as a first splitter choose the edge with greatest increase with respect to a given objective function in general position. This method makes more straight cutting lines than the steepest edge unfold method. The rightmost ascending edge method which I chose as a second splitter makes a spanning tree with the collection of the rightmost ascending edges. These four methods show similar results for the other convex models. The other result files are in the convex-models folder as svg files.

The first picture is the result of non-convex model bunny using the steepest edge cut tree method, and the right one is the result of flat edge unfolding method. The first picture under is the result of the greatest increase cut tree method, and the last one is rightmost ascending edge method's result. Flat edge unfolding method which took two corresponding edges together has the least overlapping faces. I think other methods have many overlapping faces than flat edge unfolding method because they start with one vertex. And I think the method coding will be repaired to get rid of these overlapping faces in non-convex models. Other result pictures of non-convex models are in /unfolder/imgs/results_noncv.