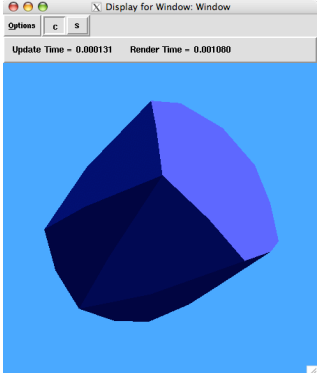
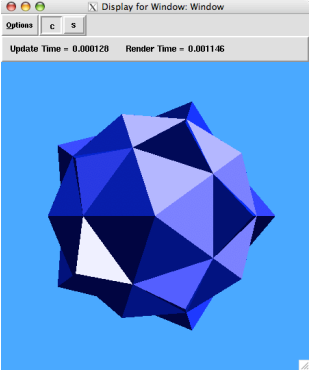
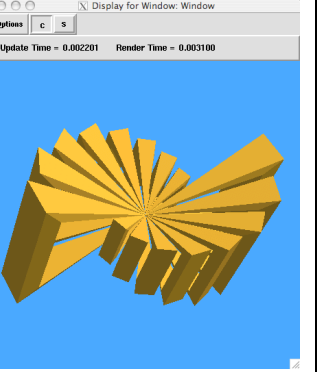


# Comparison of Subdivision Techniques

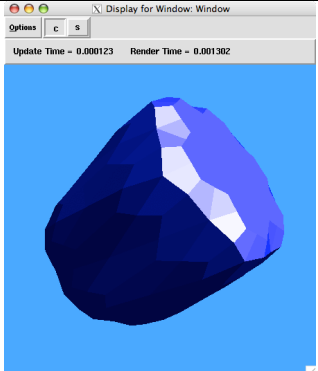
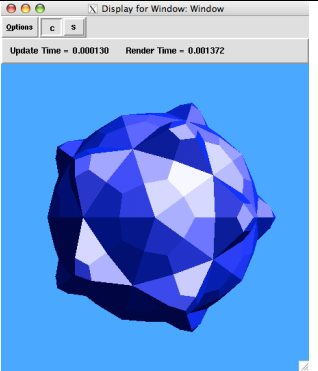
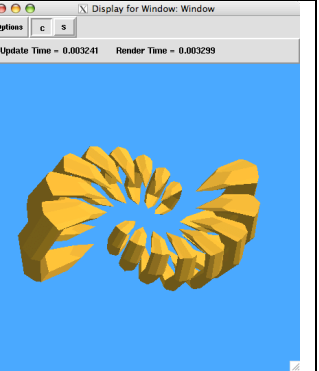
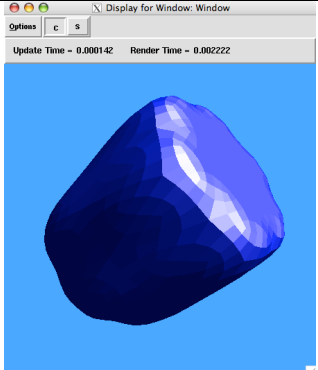
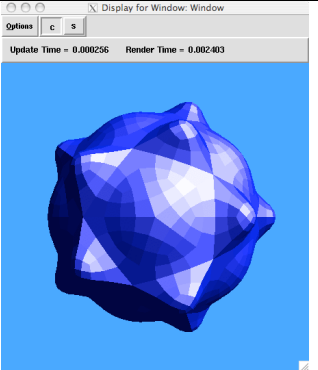
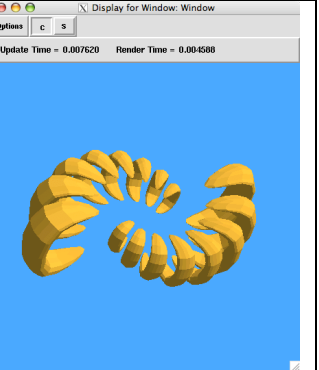
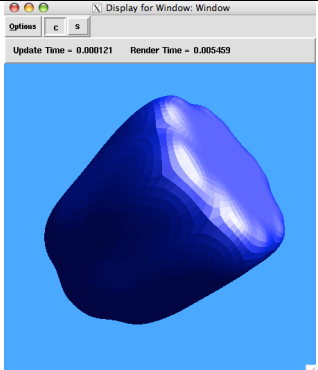
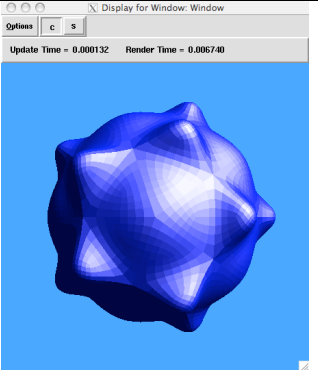
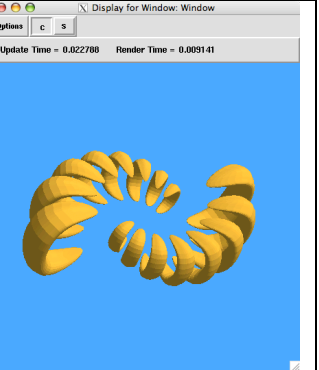
*Daniel Davis*  
*CS 284 – Fa06*  
*October 16, 2006*

I compared the 6 subdivision schemes using 3 shapes: the hex prism, the dodecahedron, and my spiral from the last homework. All schemes produced unique results which varied much, but I don't think any one is better than any other. Each seems to have its own applications.

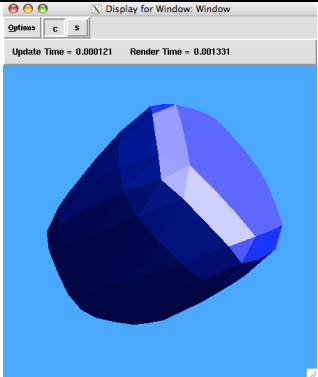
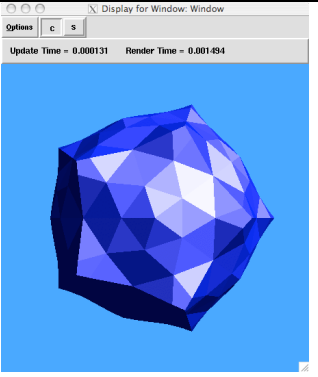
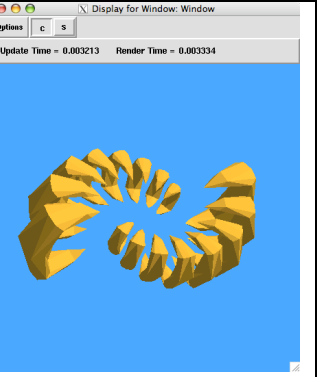
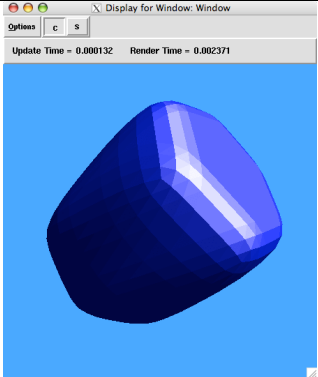
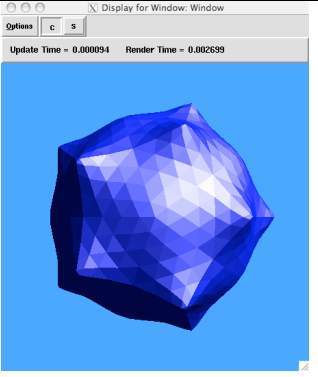
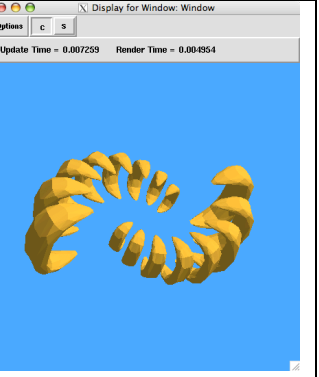
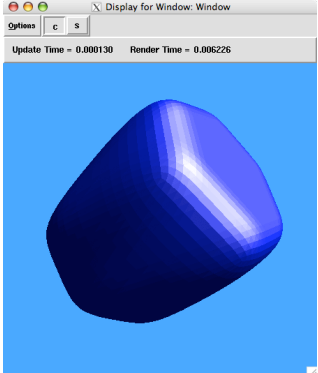
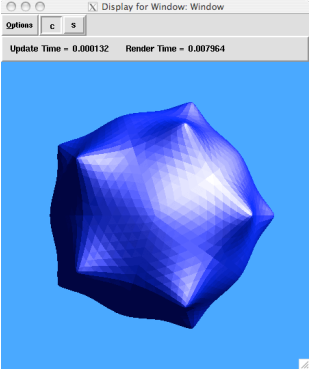
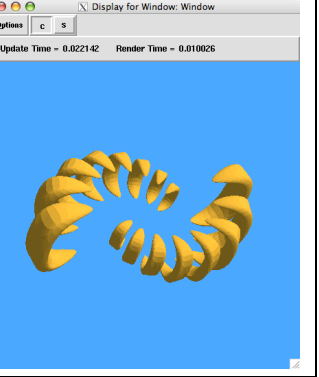
	divs	Hex Prism	Dodecahedron Icosahedron1	My Spiral
Original	0			

To create a sphere, I would use the Triangle Butterfly technique because it produced extremely smooth curvature in very few steps, as seen below.

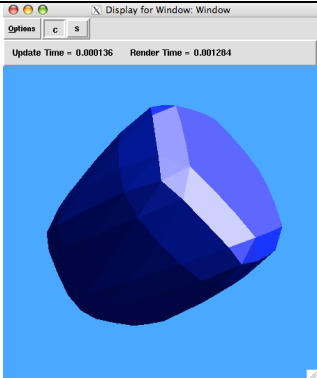
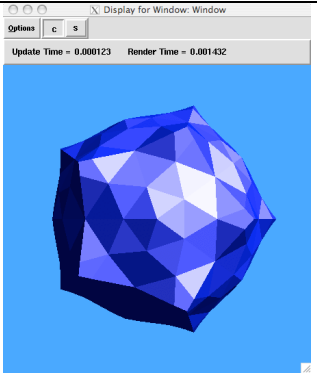
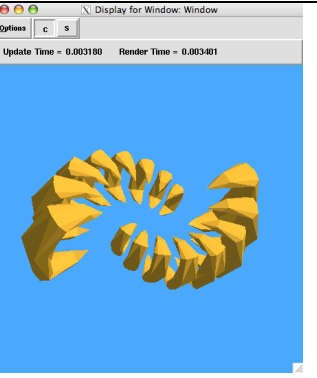
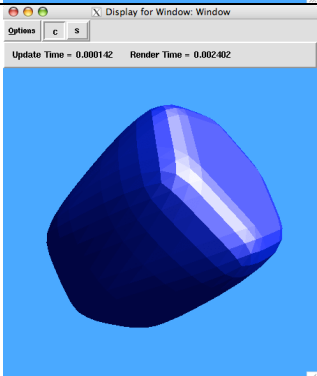
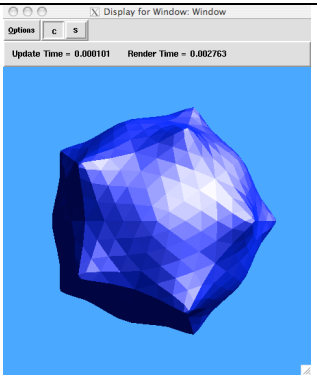
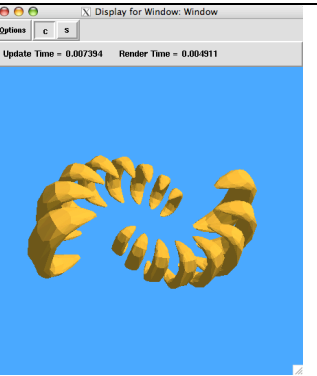
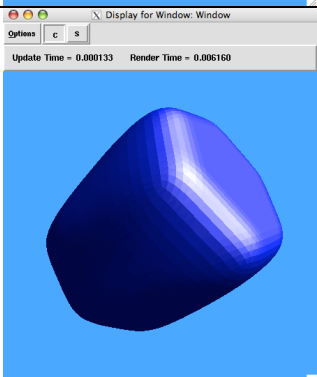
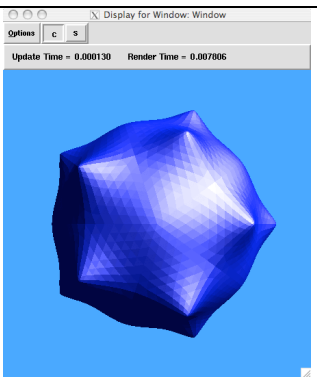
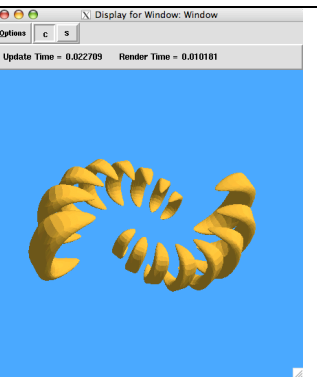
**Sharp Catmull Clark** produced a very smooth object which maintained the original form well. Edges came out a bit curved and vertices a bit bulbous. In other words, it was obvious from the final object where the original control points were. So this scheme would not work well for the sphere. It is also not an interpolating scheme, visible in the spiral whose pieces are shortened.

Sharp Catmull Clark	1	 Update Time = 0.000123 Render Time = 0.001302	 Update Time = 0.000130 Render Time = 0.001372	 Update Time = 0.003241 Render Time = 0.003299
	2	 Update Time = 0.000142 Render Time = 0.002222	 Update Time = 0.000256 Render Time = 0.002403	 Update Time = 0.007620 Render Time = 0.004508
	3	 Update Time = 0.000121 Render Time = 0.005459	 Update Time = 0.000132 Render Time = 0.006740	 Update Time = 0.022788 Render Time = 0.009141

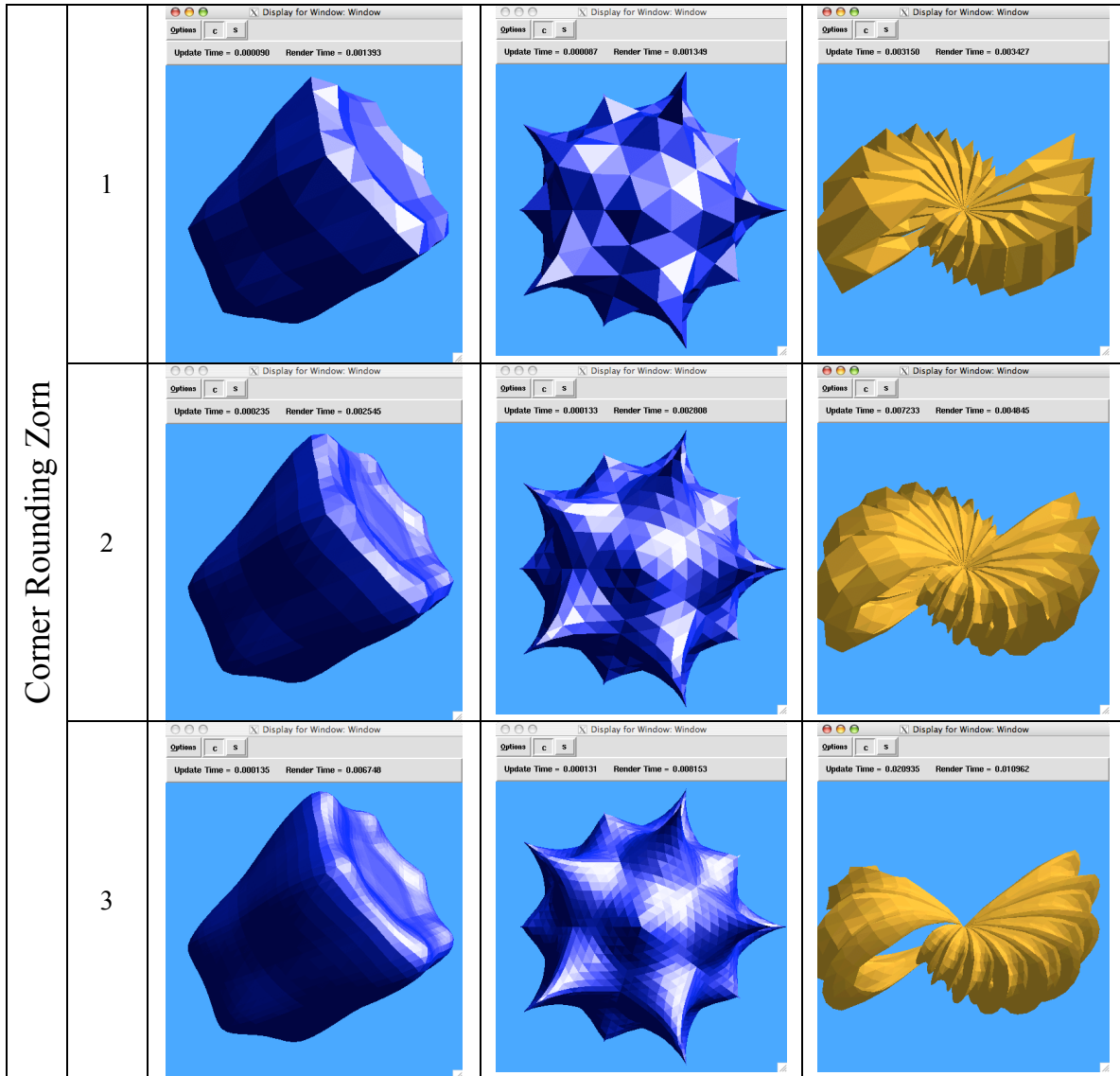
**Corner Rounding Loop** looks a little different. It makes tight turns so edges are pretty straight now. The original vertices are less bulbous and more pointy. Overall it looks like a rubber sheet which was stretched around the original mesh very tightly. It does not interpolate either.

Corner Rounding Sharp Loop	1	 Update Time = 0.000121 Render Time = 0.001331	 Update Time = 0.000131 Render Time = 0.001494	 Update Time = 0.003213 Render Time = 0.003334
	2	 Update Time = 0.000132 Render Time = 0.002371	 Update Time = 0.000094 Render Time = 0.002699	 Update Time = 0.007259 Render Time = 0.004954
	3	 Update Time = 0.000130 Render Time = 0.006226	 Update Time = 0.000132 Render Time = 0.007964	 Update Time = 0.022142 Render Time = 0.010626

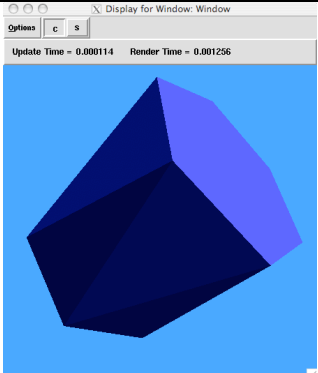
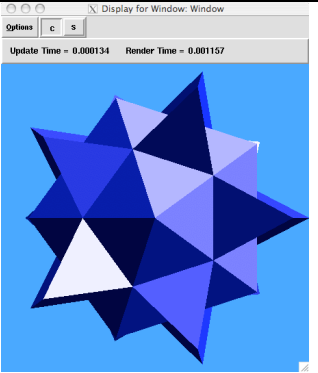
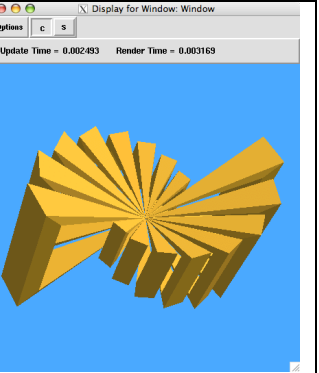
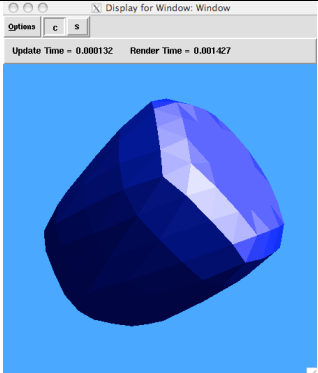
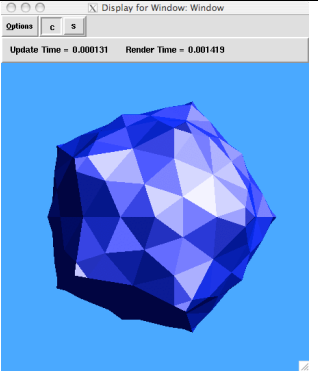
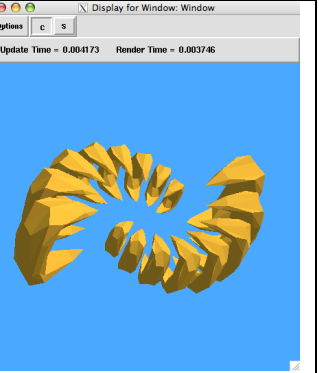
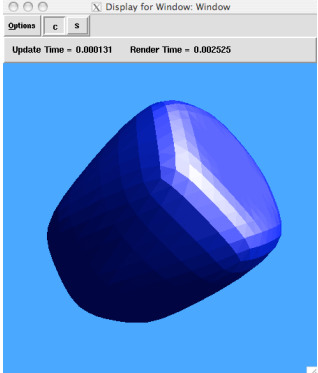
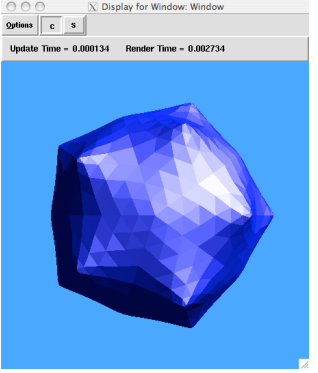
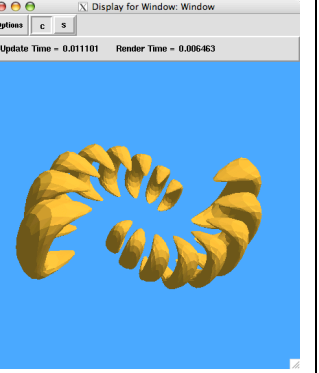
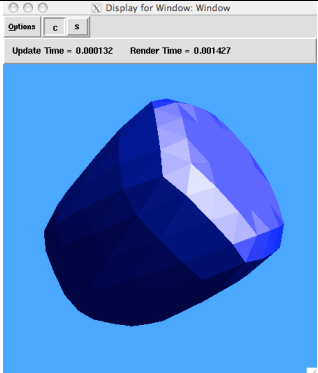
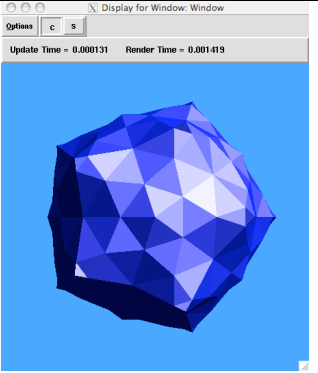
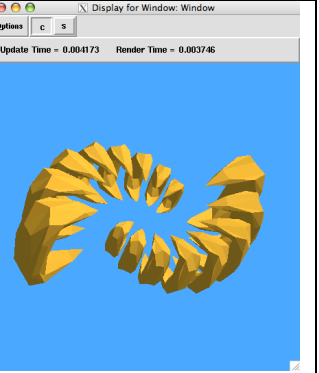
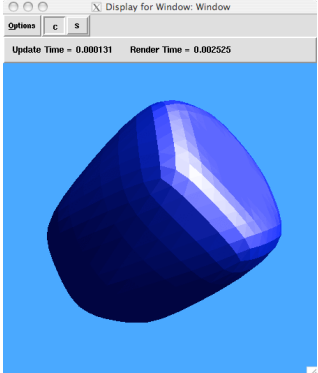
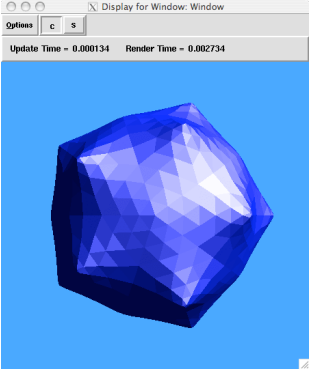
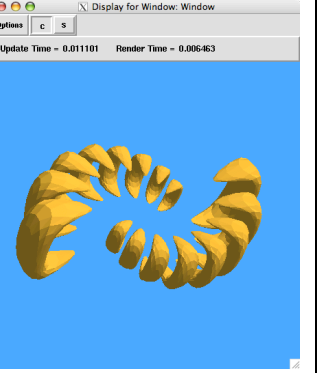



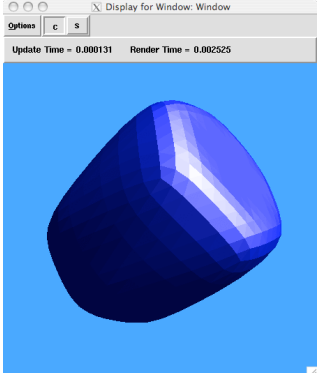
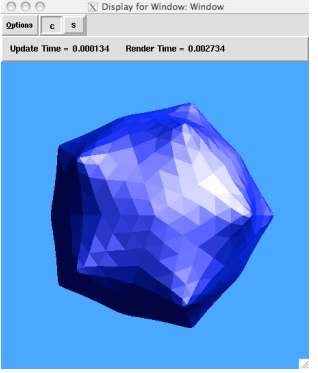
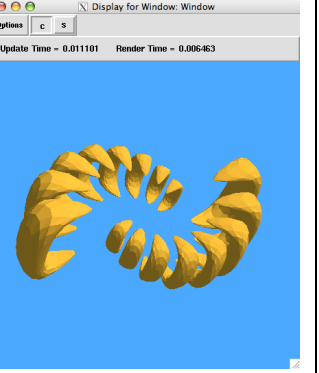






**Corner Rounding Butterfly** seems to have the same effect as Corner Rounding Sharp Loop using the shapes I chose.

Corner Rounding Butterfly	1			
	2			
	3			

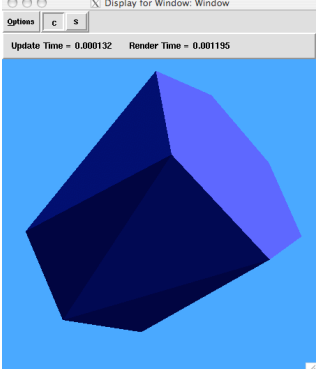
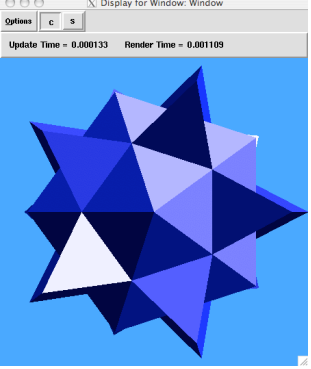
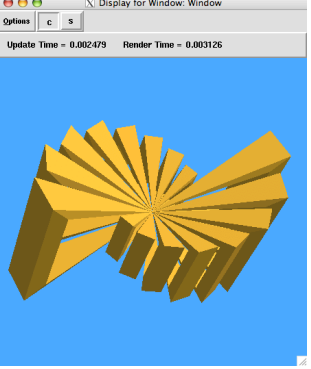
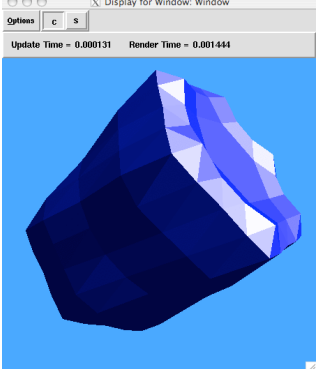
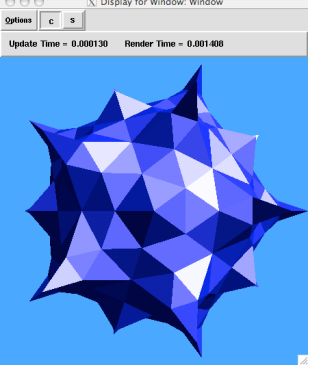
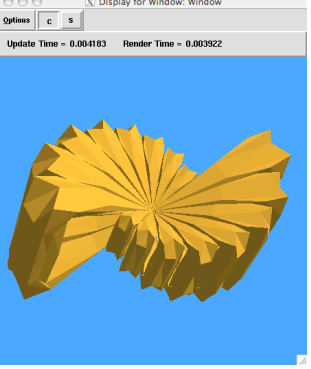
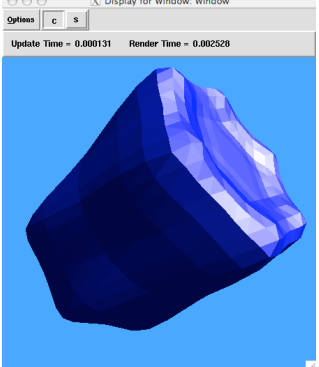
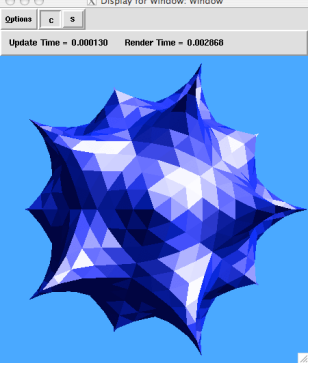
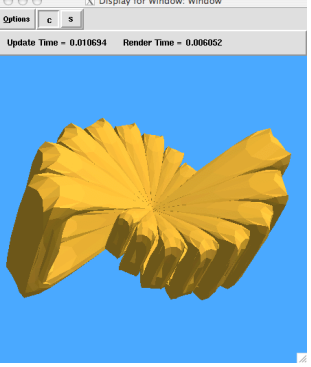
**Corner Rounding Zorn** interpolates the original vertices so the objects seem to grow a lot. The results are pointy and the curves are much more pronounced; in fact, they are exaggerated. It looks like wrapping the mesh in a rubber sheet and then pushing out every vertex it still touches.



**Triangle Butterfly** takes an extra iteration to start showing any results but then smoothes very quickly. It produced very nice results which showed no pointiness. There also seem to be more degrees of curvature here than in the other.s. To my eye it appears to be one degree higher continuity.

Triangle Butterfly	1			
				
				
	2			
				
				
	3			
				
				

**Triangle Zorin**, like the other triangle algorithm, requires an extra step before showing results but then acts very quickly. Because Zorin interpolates, this mesh grows a great deal but it maintains the original form well. The pointiness seems exaggerated again but cleaner. Again, this mesh seems more continuous and more symmetrical.

Triangle Zorin	1	 <p>Update Time = 0.000132 Render Time = 0.001195</p>	 <p>Update Time = 0.000133 Render Time = 0.001109</p>	 <p>Update Time = 0.002479 Render Time = 0.003126</p>
	2	 <p>Update Time = 0.000131 Render Time = 0.001444</p>	 <p>Update Time = 0.000130 Render Time = 0.001408</p>	 <p>Update Time = 0.004183 Render Time = 0.003922</p>
	3	 <p>Update Time = 0.000131 Render Time = 0.002520</p>	 <p>Update Time = 0.000130 Render Time = 0.002968</p>	 <p>Update Time = 0.010634 Render Time = 0.006052</p>