Comparison of Subdivision Techniques

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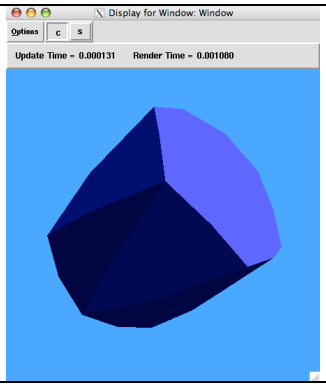
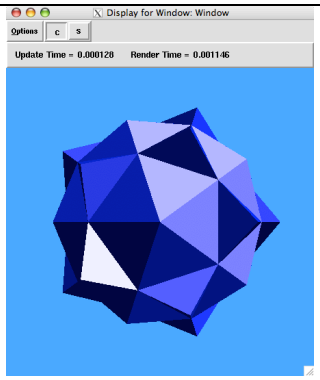
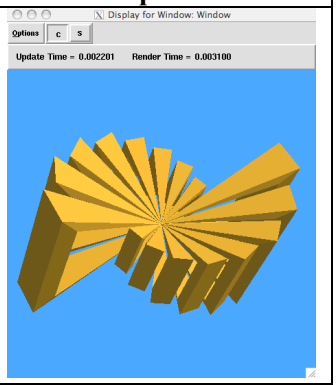
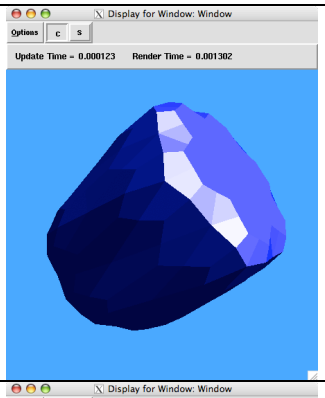
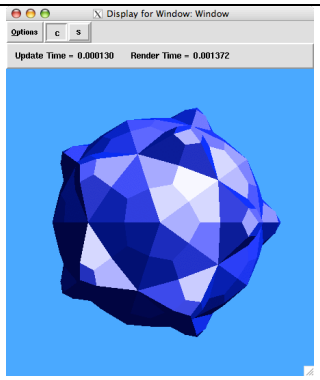
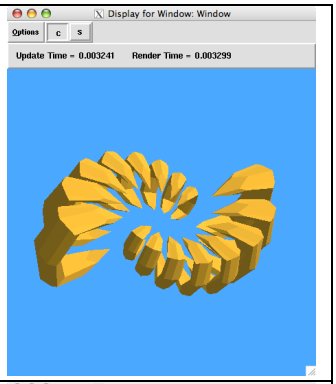
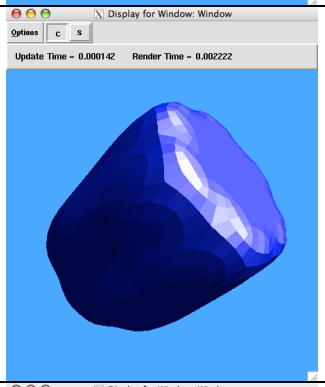
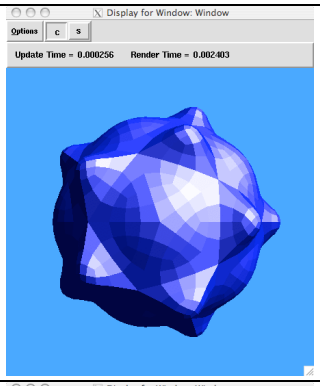
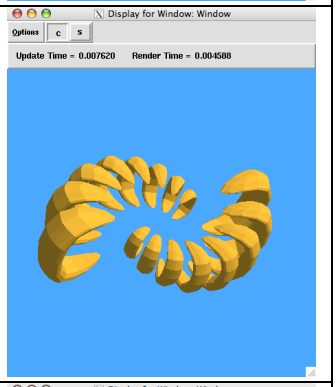
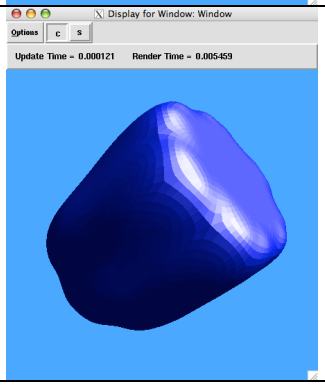
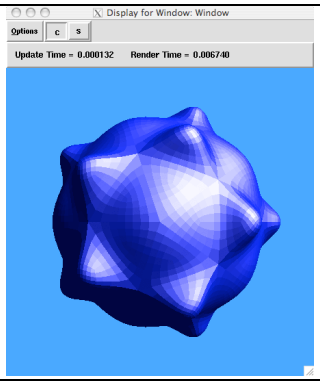
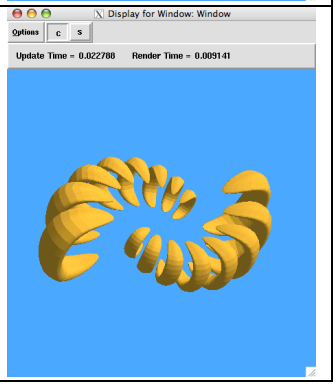
CS 284 – Fa06
October 16, 2006

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.

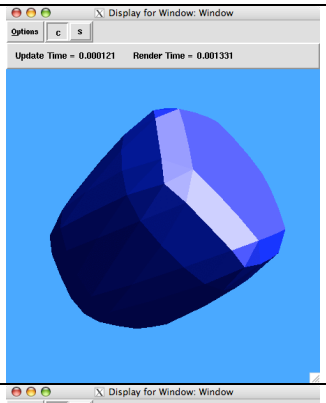
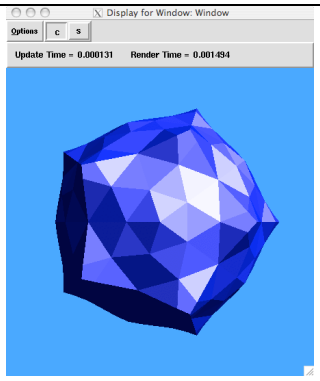
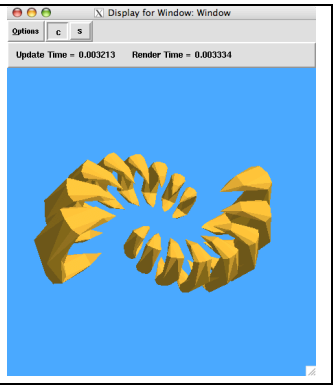
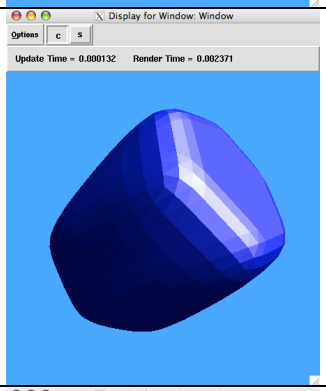
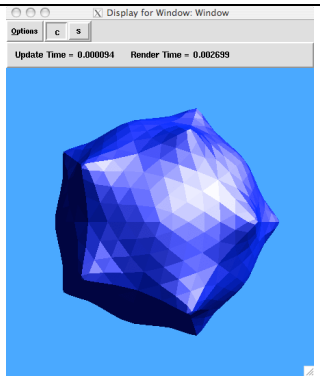
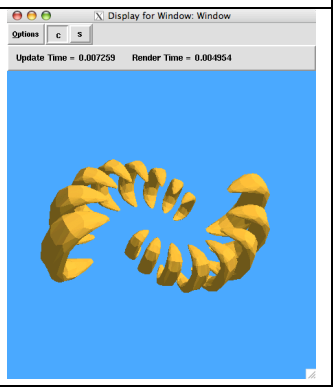
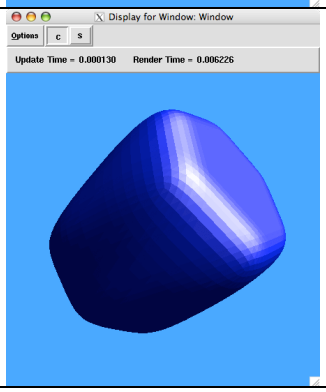
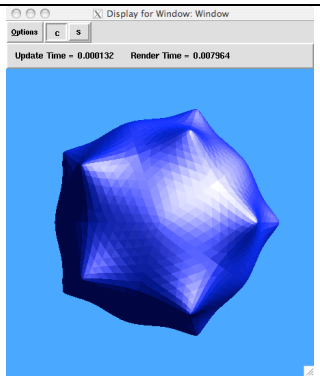
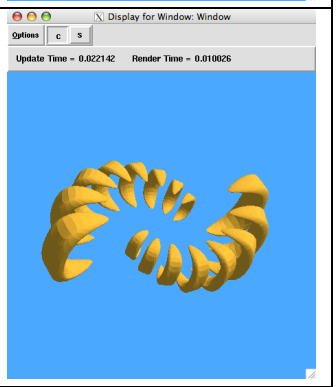
	divs	**Hex Prism**	**Dodecahedron Icosahedron1**	**My Spiral**
Original	0			

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

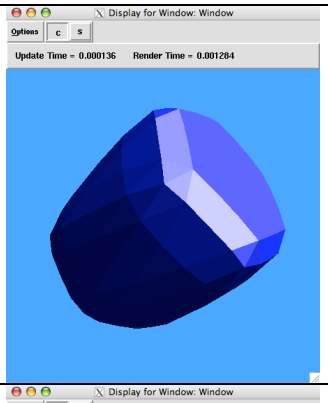
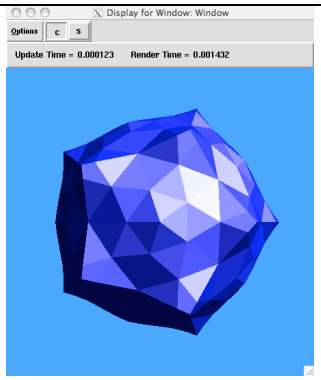
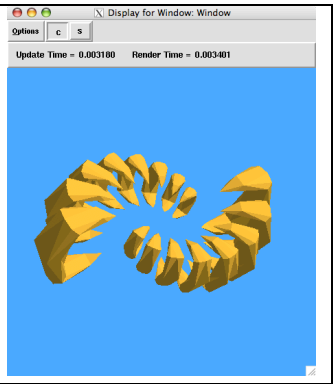
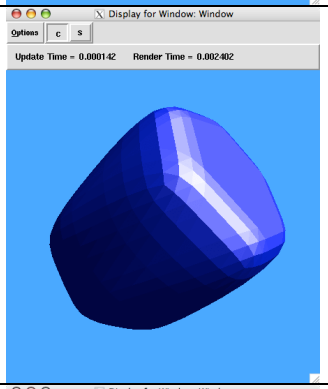
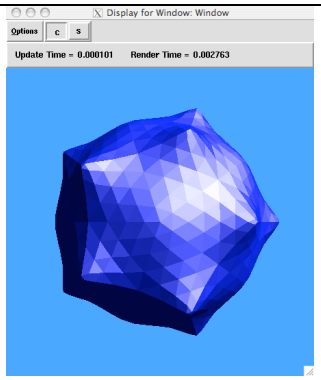
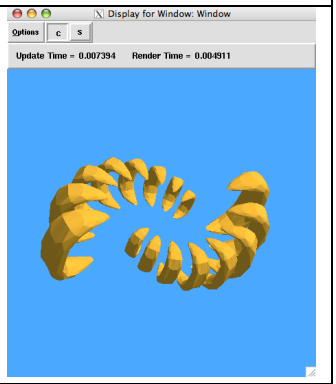
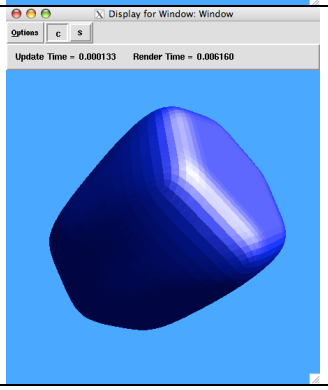
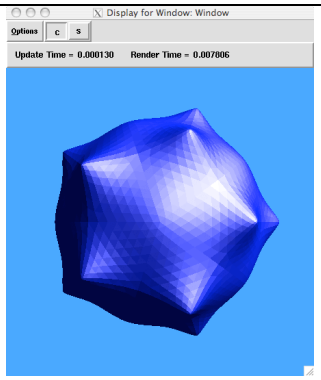
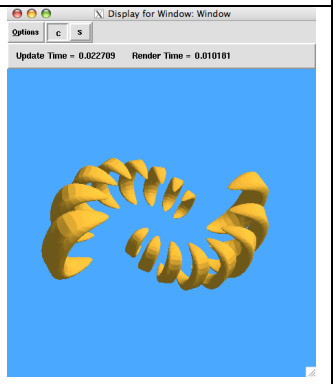
Sharp Catmull Clark produced a very smooth object which maintained the original form well. Edges came out a bit curved and vertices a bit bulbous. In other words, it was obvious from the final object where the original control points were. So this scheme would not work well for the sphere. It is also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

Sharp Catmull Clark				
	1			
	2			
	3			

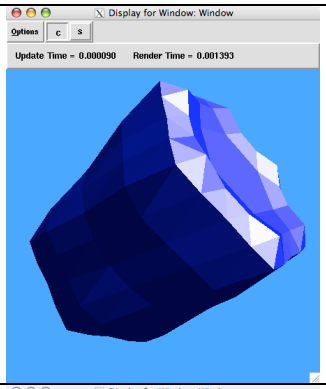
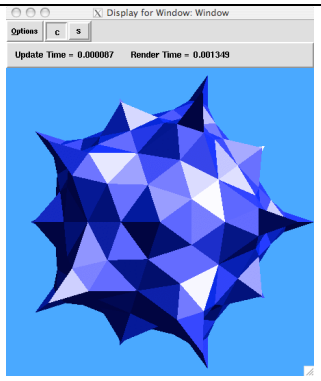
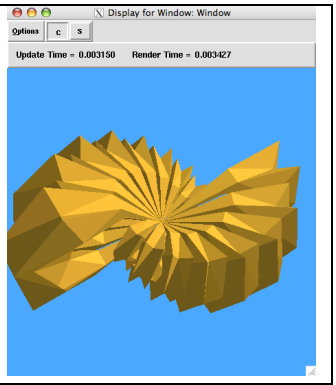
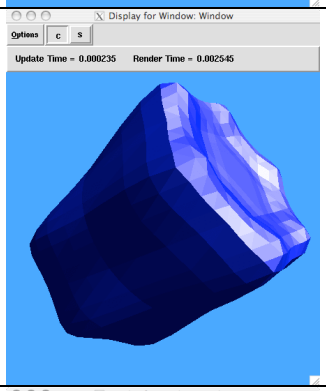
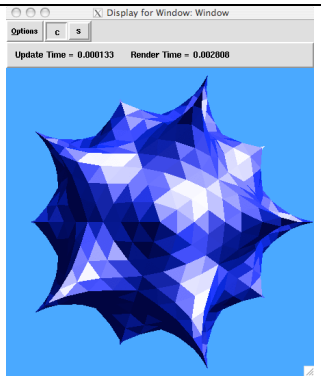
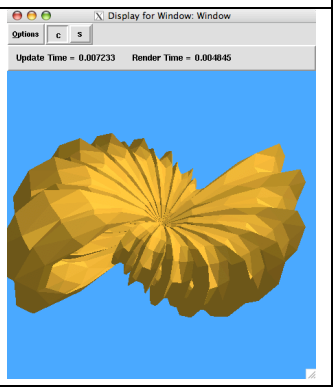
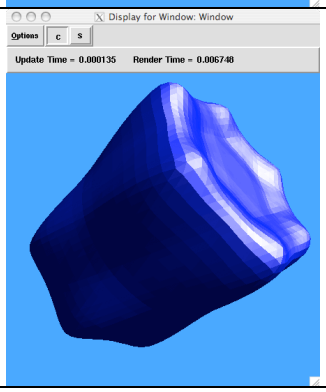
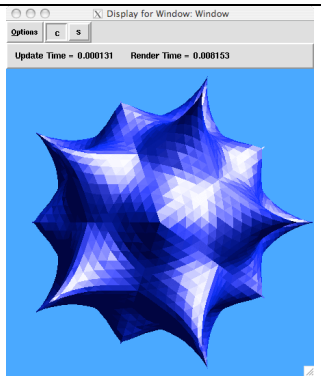
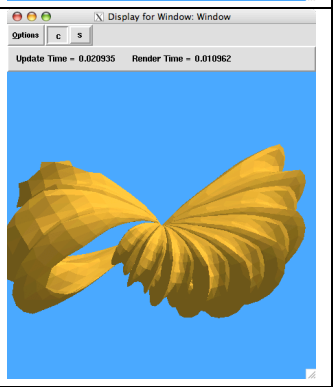
Corner Rounding Loop looks a little different. It makes tight turns so edges are pretty straight now. The original vertices are less bulbous and more pointy. Overall it looks like a rubber sheet which was stretched around the original mesh very tightly. It does not interpolate either.

Corner Rounding Sharp Loop				
	1			
	2			
	3			

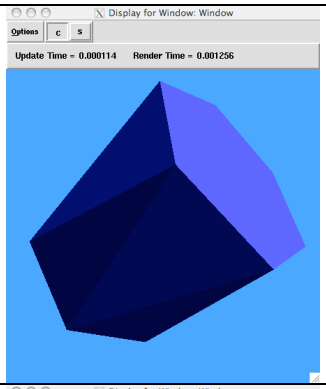
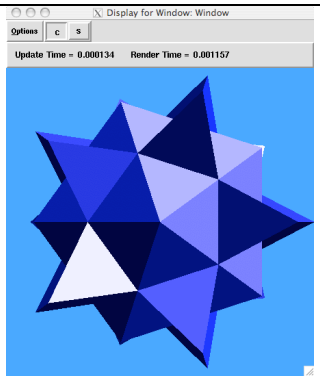
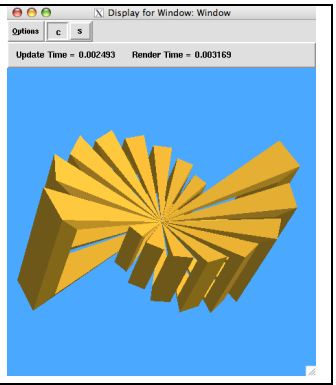
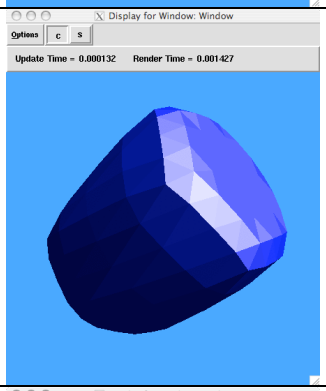
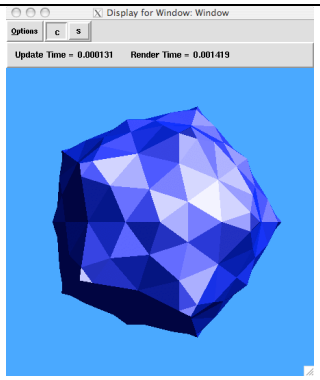
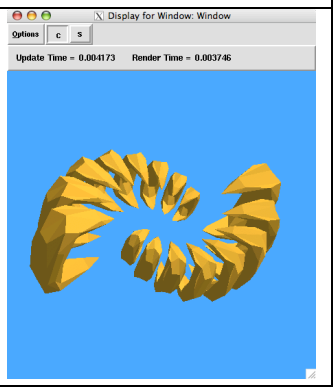
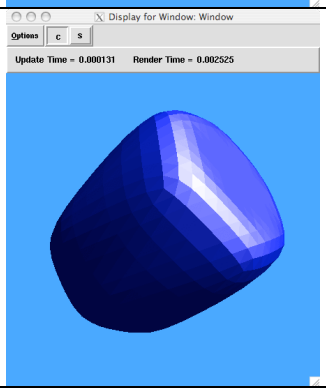
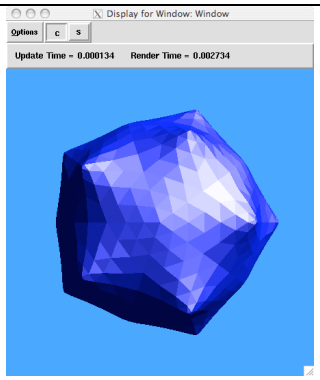
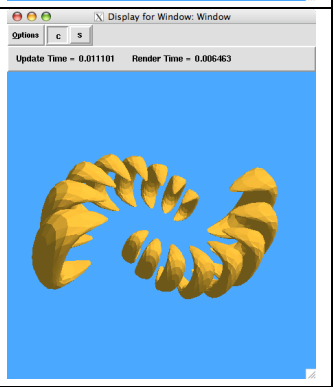
Corner Rounding Butterfly seems to have the same effect as Corner Rounding Sharp Loop using the shapes I chose.

Corner Rounding Butterfly				
	1			
	2			
	3			

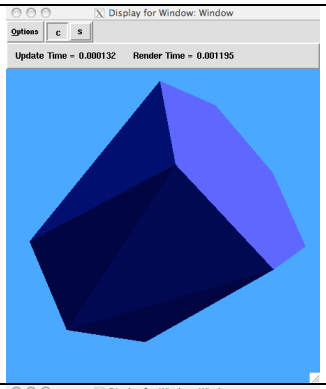
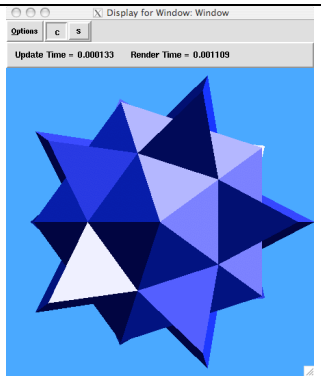
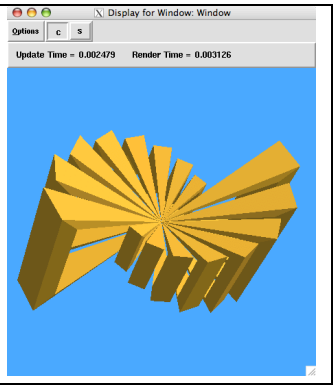
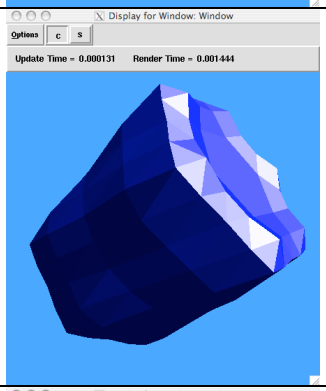
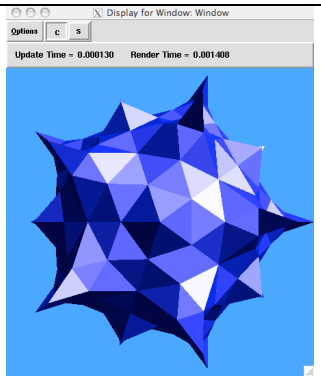
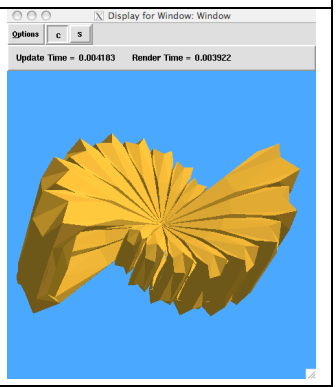
Corner Rounding Zorin interpolates the original vertices so the objects seem to grow a lot. The results are pointy and the curves are much more pronounced; in fact, they are exaggerated. It looks like wrapping the mesh in a rubber sheet and then pushing out every vertex it still touches.

Corner Rounding Zorn	1			
	2			
	3			

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			
	2			
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