1 Back Face Culling

It is an optimization technique allowing to (conservatively) reject some of the back-facing trianglers. In order to make it work, all the triangles have to be oriented so that their vertices appear counterclockwise when looked at from outside (just a convention.... clockwise would work too with obvious changes). Now, after the triangle's vertices are projected, and they turn out to come in the clockwise order, the triangle is not scan-converted. In particular, do not even have to compute the pixels of the screen its projection covers, their depths or colors. Thus, some work is spared in the fragment processing stage (less fragments are generated) and on the rasterization stage (back facing triangles are not rasterized).

2 Triangle Strips

This is a way to reduce the number of vertices that are processed. All in all, it is a compromise between this goal and the fact that we need to be able to code the procedure in hardware, using a small fixed number of 'registers' (here: three). The triangle strip definition is shown in Figure 1. The right way to use strips is to cover the object to be rendered with them; the strips should be made as long as possible: the longer they are, the more savings in the rendering time (Why?). Computing the optimal layout of triangle strips is a hard problem, but it often can be solved nicely for special cases.

Triangle fans work like triangle strips. See Figure 1.

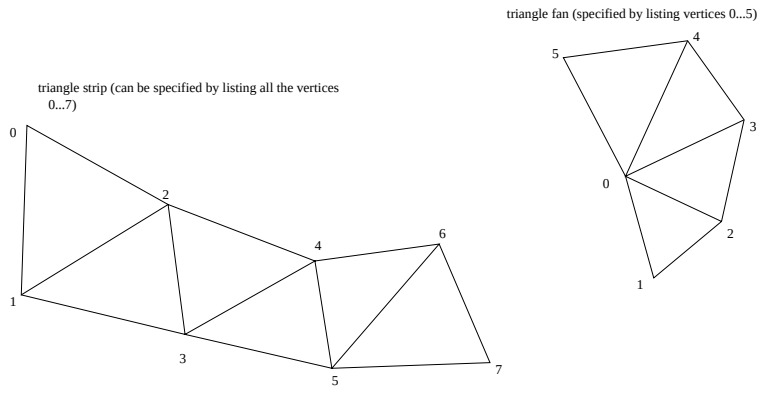

Figure 1: Triangle strips, fans and polygons

How does it work? If the triangles on the strip on the Figure were to be processed separately, we would have to project a vertex as many as 18 times (3 times per triangle). If we draw the triangles as a triangle strip, we need to project each vertex only once, which means we need to do 8 projections. Much less than 18. Triangle fans work in a similar way. To draw a triangle strip,

you first tell OpenGL to interpret the forthcomming sequence of vertices as a specification of a triangle strip. Then you specify the strip's defining vertices in order. OpenGL will know that it has to interpret each consecutive triple as bounding a different triangle.