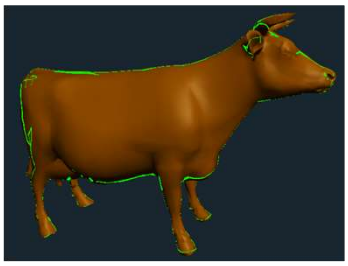
Fragment Shader Silhouettes



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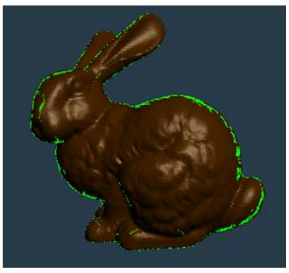

Fragment Shader Silhouettes

fsilh.glib

```
##OpenGL GLIB
Perspective 70
LookAt 0 0 10   0 0 0   0 1 0

Vertex      fsilh.vert
Fragment fsilh.frag
Program  FragSilhouette                                    \
                        uColor {0.50 0.25 0. 1.}           \
                        uSilh <false>                      \
                        uDeltaZ <0. 0.001 0.002>           \
                        uOpaque <true>                     \
                        uTol <0. 0.04 0.5>                 \
                        uKa <0. 0.1 1.>                    \
                        uKd <0. 0.8 1.>                    \
                        uKs <0. 0.1 1.>                    \
                        uShininess <2. 10. 50.>

Obj cow.obj
```

Fragment Shader Silhouettes

fsilh.vert

```
#version 330 compatibility

out  vec2   vST;                    // texture coords
out  vec3   vN;                     // normal vector
out  vec3   vL;                     // vector from point to light
out  vec3   vE;                     // vector from point to eye
out float   vNz;                    // z-component of normal

const vec3 LIGHTPOS = vec3( 5.,10.,10.);

void
main()
{
        vST = gl_MultiTexCoord0.st;
        vN =  normalize( gl_NormalMatrix * gl_Normal );          // normal vector
        vNz = normalize( gl_NormalMatrix * gl_Normal ).z;
        vec4 ECposition = gl_ModelViewMatrix * gl_Vertex;
        vL = LIGHTPOS - ECposition.xyz;             // vector from the point
                                                    // to the light position
        vE = vec3( 0., 0., 0. ) - ECposition.xyz;   // vector from the point
                                                    // to the eye position
        gl_Position = gl_ModelViewProjectionMatrix * gl_Vertex;
}
```


Fragment Shader Silhouettes

fsilh.frag, I

```
#version 330 compatibility

uniform vec4  uColor;
uniform bool  uSilh;
uniform float uDeltaZ;
uniform bool  uOpaque;
uniform float uTol;
uniform float uKa, uKd, uKs;        // coefficients of each type of lighting
uniform float uShininess;           // specular exponent

in  vec2  vST;                      // texture coords
in  vec3  vN;                       // normal vector
in  vec3  vL;                       // vector from point to light
in  vec3  vE;                       // vector from point to eye
in float  vNz;

const vec3 SPECULARCOLOR        = vec3( 1., 1., 1. );
const vec3 SILHCOLOR            = vec3( 0., 1., 0. );

void
main()
{
        vec3 myColor = uColor.rgb;

// per-fragment lighting:
        vec3 Normal   = normalize(vN);
        vec3 Light    = normalize(vL);
        vec3 Eye      = normalize(vE);

        vec3 ambient = uKa * myColor;
```

Fragment Shader Silhouettes

fsilh.frag, II

```
float d = max( dot(Normal,Light), 0. );       // only do diffuse if the light can see the point
vec3 diffuse = uKd * d * myColor;

float s = 0.;
if( d > 0. )            // only do specular if the light can see the point
{
        vec3 ref = normalize(  reflect( -Light, Normal )  );
        float cosphi = dot( Eye, ref );
        if( cosphi > 0. )
                s = pow( max( cosphi, 0. ), uShininess );
}
vec3 specular = uKs * s * SPECULARCOLOR.rgb;

float deltaz = 0.;
if( uSilh  &&  ( abs(vNz) <= uTol ) )
{
        gl_FragColor = vec4( SILHCOLOR, 1. );
        deltaz = -uDeltaZ;
}
else
{
        if( ! uOpaque )
                discard;

        gl_FragColor = vec4( ambient + diffuse + specular,  1. );
}
gl_FragDepth = gl_FragCoord.z + deltaz;
}
```

gl_FragCoord gives the x and y pixel coordinates and the z-buffer value of this fragment.

gl_FragDepth is used to change the z-buffer value of this fragment.

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Something Fun – Only Draw the Silhouette Fragments

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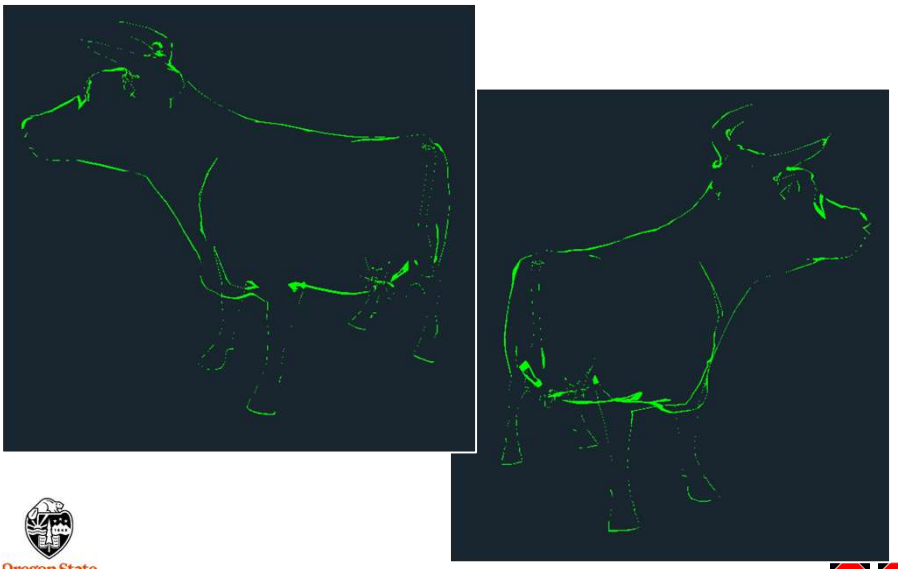

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