CS 450 Quizzes Before the Midterm

Quiz #1:

1) The difference between Model Coordinates and World Coordinates is:

MC are the original object coordinates, WC have been transformed into the scene

2) The topology to use when drawing a list of vertices in OpenGL is specified:

In the glBegin call

3) In OpenGL color, which of these is true?

Red + Green = Yellow

4) If Joe Graphics programs these lines of code:

```
glRotatef( 45., 1., 0., 0. );
glTranslatef( 1., 2., 3. );
```

followed by drawing something, he is trying to:

Translate, then rotate that object

5) An advantage of using perspective projection instead of orthographic is:

It gives a more realistic view

6) An advantage of using orthographic projection instead of perspective is:

It helps in lining things up

7) A "viewport" is:

A sub-region of the overall graphics window

8) A "Display List" is:

Writing display instructions into memory to be played back later

9) Joe Graphics wrote the following code:

```
glBegin( GL_LINE_STRIP );
for( float angle = 0.; angle <= 360.; angle += 10. )
{
	float x = Radius * cos( TO_RADIANS( angle ) );
	float y = Radius * sin( TO_RADIANS( angle ) );
	glVertex2f( x, y );
}
glEnd( );
```

What is he doing?

Drawing a 2D circle outline

10) A "callback" function, used in the graphics programming sense, is:

A function that gets called when a particular event or situation occurs

Quiz #2

1) What is the general idea behind Texture Mapping?

   To stretch an image over a piece of geometry

2) A texture image has MxN pixels (texels). OpenGL treats its dimensions as:

   1. x 1.

3) In Texture Mapping, the OpenGL program specifies s and t coordinate values at:

   Each vertex

4) The GL_TEXTURE_WRAP_S and GL_TEXTURE_WRAP_T texture parameters tell OpenGL what to do when:

   s and t are < 0. or > 1.

5) The Texture Map parameter value GL_LINEAR tells OpenGL to:

   If a pixel doesn't fall on an exact texel, interpolate from the 4 surrounding texels

6) The Texture Map parameter value GL_NEAREST tells OpenGL to:

   If a pixel doesn't fall on an exact texel, grab the nearest texel

7) The texture environment setting of GL_MODULATE differs from GL_REPLACE by:

   GL_MODULATE allows the underlying color of the surface to shine up through the texture

8) The purpose of texture objects and texture binding is:

   To allow textures to stay resident in GPU memory and not need to be downloaded each time they are used

9) If you setup the Texture Transformation to scale by 2.0, the appearance of the texture image on the object will differ by:

   Being scaled by 0.5

10) In HSV color, the letters H-S-V stand for:

   Hue-Saturation-Value

Quiz #3

1) A *surface normal* is

A vector perpendicular to the surface

2) Surface normals can be defined

Per-triangle or per-vertex

3) Flat Shading is

Where there is only one color/intensity for the entire triangle

4) What can give away the fact that you are using smooth shading to try to hide that you are using a low-triangle-resolution object?

The coarse edges on the silhouette

5) The three components of OpenGL lighting are

Ambient, Diffuse, Specular

6) The white lines you see, but aren't actually there, in some smoothly-shaded images are called:

Mach Banding

7) The reason that Diffuse intensity decreases as the angle between the normal and light direction increases is:

The photons are spread across a larger area

8) The "s" exponent in the $\cos^s \Phi$ expression represents:

Shininess

9) You can perform per-fragment (per-pixel) lighting

Using shader-extended OpenGL

10) Surfaces whose light reflecting behavior depends on their orientation (such as hair, brushed metal, etc.) are called

Anisotropic

Quiz #4

1) In OpenGL lighting, the GL_BACK and GL_FRONT of a triangle are determined by

The orientation of the vertices

2) When OpenGL lighting computations are performed, the actual position of the light that is used is

Whatever was given in the "glLightfv(GL_LIGHT0, GL_POSITION,..." call times the ModelView matrix

3) What is it called when we specify an XYZ position with 4 elements?

Homogeneous coordinates

4) A use for specifying an XYZ using 4 elements is

To specify a point at infinity

5) The purpose of double-buffering is

To be sure the viewer doesn't see an incomplete scene

6) The double buffers' roles are switched by calling

glutSwapBuffers

7) The purpose of a Depth-Buffer is to

Correctly display near objects so they appear to be in front of far objects

8) The Video Driver

Draws the front buffer to the screen

9) The Video Driver runs

At a constant refresh rate

10) An Alpha value specifies

Transparency

Quiz #5

1) What order do these appear in the shader-enabled graphics pipeline?

   * Fragment shader

   * Rasterizer

   * Vertex shader

   Vertex, Rasterizer, Fragment

2) The input to the Vertex shader is:

   gl_Vertex

3) The output from the Vertex shader is:

   gl_Position

4) The output from the Fragment shader is:

   gl_FragColor

5) The input and output variables in the Vertex shader are of type:

   vec4

6) The output from the Fragment shader is of type:

   vec4

7) If, in a framebuffer, the green component is stored using 6 bits, the number of shades of green that are possible is:

   64

8) The framebuffer's Alpha value is used to specify:

   Transparency

9) The framebuffer's Z-buffer is used to hold:

   Depth

10) The Specular lighting depends on the location of the point you are lighting, plus:

   Light location, Surface normal, Eye position