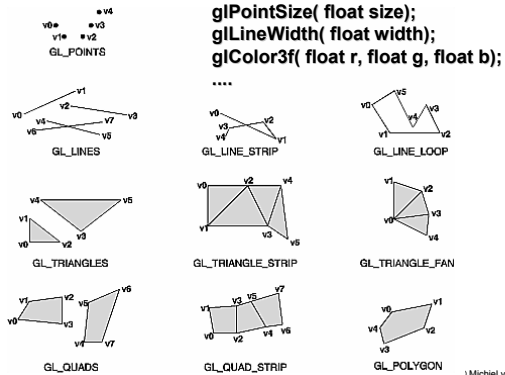


## GL Primitives



## GLUT: OpenGL Utility Toolkit



### The basics...

```
int main(int argc, char **argv)
{
    glutInit( &argc, argv );
    glutInitDisplayMode( GLUT_RGB |
                        GLUT_DOUBLE | GLUT_DEPTH );
    glutInitWindowSize( 640, 480 );
    glutCreateWindow( "openGLDemo" );
    glutDisplayFunc( DrawWorld );
    glutIdleFunc( Idle );
    glClearColor( 1,1,1 );
    glutMainLoop();

    return 0;        // never reached
}
```

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## GLUT Example



```
void DrawWorld() {
    glMatrixMode( GL_PROJECTION );
    glLoadIdentity();
    glMatrixMode( GL_MODELVIEW );
    glLoadIdentity();
    glClear( GL_COLOR_BUFFER_BIT );
    angle += 0.05;
    glRotatef( angle, 0, 0, 1 );
    ... // draw triangle
    glutSwapBuffers();
}
```

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## GLUT Example



### the triangle...

```
glColor3f( 0, 1, 0 );
glBegin( GL_TRIANGLES );
    glVertex3f( 0.0f, 0.5f, 0.0f );
    glVertex3f( -0.5f, -0.5f, 0.0f );
    glVertex3f( 0.5f, -0.5f, 0.0f );
glEnd();
```

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## GLUT Example



```
void Idle() {
    angle += 0.05;
    glutPostRedisplay();
}
```

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## GLUT Input Events



```
// you supply these kind of functions
void reshape( int w, int h );
void keyboard( unsigned char key, int x, int y );
void mouse( int but, int state, int x, int y );

// register them with glut
glutReshapeFunc( reshape );
glutKeyboardFunc( keyboard );
glutMouseFunc( mouse );
```

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## GLUT and GLU primitives



```
gluSphere(...)  
gluCylinder(...)  
  
glutSolidSphere(...)  
glutWireSphere(...)  
  
glutSolidCube(...)  
glutWireCube(...)  
  
glutSolidTorus(...)  
glutWireTorus(...)  
  
glutSolidTeapot(...)  
glutWireTeapot(...)
```

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## Depth buffer



### for visibility

- stores a z-value for every pixel
- smaller z means “closer”

```
// allocate depth buffer  
glutInitDisplayMode( GLUT_RGB | GLUT_DOUBLE | GLUT_DEPTH );
```

```
// enabling the depth test  
glEnable( GL_DEPTH_TEST );
```

```
// clearing the depth buffer for each frame  
glClear( GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT );
```

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## GLUT menus



```
glutCreateMenu(...)  
glutSetMenu(...)  
glutGetMenu(...)  
glutDestroyMenu(...)  
glutAddMenuEntry(...)  
glutAddSubMenu(...)  
glutAttachMenu(...)
```

```
// Example usage  
glutCreateMenu(demo_menu);  
glutAddMenuEntry("quit", 1);  
glutAddMenuEntry("Increase Square Size", 2);  
glutAttachMenu(GLUT_RIGHT_BUTTON);
```

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