



a group of commands stored for later execution

or simply... a macro

- Sometimes called the *retained mode*
“normal” rendering is the *immediate mode*
- at least as fast as immediate mode
- once a display list is created it cannot be modified
- DLists can be hierarchical



What is faster?

- *matrix operations*

set of transforms is stored into one matrix
complex calculations are precomputed and
only `glMultMatrix()` is called

- *bitmaps and textures*

are stored in a hw suitable format

- *lights, material properties*

many things can be precomputed

- *polygon stippling*



- *Creating a display list*

```
void glNewList(GLuint list, GLenum mode)
```

where

`list` is an unique number specified by user

`mode` is either `GL_COMPILE` or `GL_COMPILE_AND_EXECUTE`

```
void glEndList()
```

- ends display list definition

- *Executing a display list*

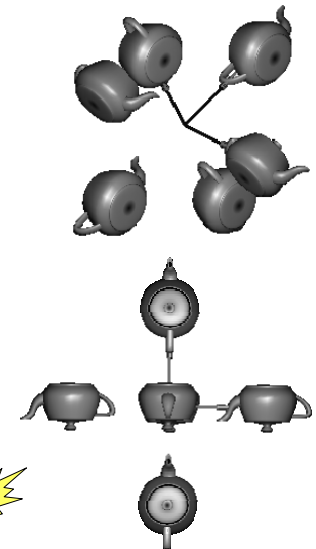
```
void glCallList(GLuint list)
```



Example:

```
void Teapots(){
    glTranslatef(-1,0,0);
    glutSolidTeapot(0.2);
    glTranslatef(2,0,0);
    glutSolidTeapot(0.2);
    glTranslatef(-1,0,0);
}
```

```
Teapots();
glRotatef(90, 0, 0, 1);
Teapots();
glRotatef(90, 0, 1, 0);
Teapots();
```

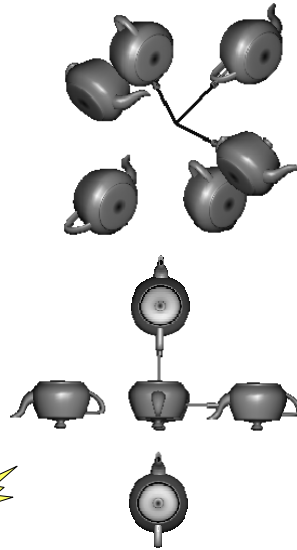




Example:

```
glNewList(1, GL_COMPILE);
glTranslatef(-1, 0, 0);
glutSolidTeapot(0.2);
glTranslatef(2, 0, 0);
glutSolidTeapot(0.2);
glTranslatef(-1, 0, 0);
glEndList();

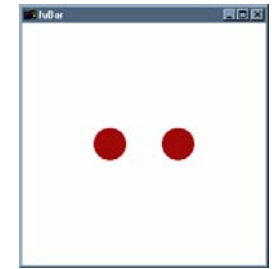
glCallList(1);
glRotatef(90, 0, 0, 1);
glCallList(1);
glRotatef(90, 0, 1, 0);
glCallList(1);
```



Example:

```
glNewList(1, GL_COMPILE);
glBegin(GL_TRIANGLE_FAN);
glVertex3f(0, 0, 0);
for (i=0; i<=MAX; i++) //very slow cycle !!
    glVertex3f(sin(i*pi/MAX)/3.0,
               cos(i*pi/MAX)/3.0, 0);

glEnd();
glEndList();
//execute
glTranslatef(-0.7, 0, 0);
glCallList(1);
glTranslatef(1.4, 0, 0);
glCallList(1);
glFlush();
```



Forbidden commands in display lists

- query commands

`glIs*()`, `glGet*()`, `glReadPixels()`, `glSelectBuffer()`

- display list manipulation

`glDeleteLists()`, `glIsList()`, `glGenLists()`,

- and some more

`glFlush()`, `glFinish()`, `glRenderMode()`,
`glPixelStore()`, `glFeedbackBuffer()`



GLboolean glIsList(GLuint list)

- returns `GL_TRUE` if the number is in use by another list

GLuint glGenLists(GLsizei range)

- allocates contiguous range of display-list indices or zero
- returns pointer to the first one

void glDeleteLists(GLuint list, GLsizei range)

- erases display lists and sets the indices as a free



display lists can be hierarchical

(we can call a display list in the display list definition)

e.g.,

```
glNewList(7, GL_COMPILE);  
    for (i=0; i<7; i++) glCallList(i);  
glEndList();
```

`glGetIntegerv(GL_MAX_LIST_NESTING, GLint *dta)`

- determines the nesting limit



- Jackie Neider, Tom Davis, Mason Woo
OpenGL Programming Guide,
Addison-Wesley Publication Company
ON LINE at <http://www.opengl.org.ru/docs/>