Display Lists

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void Sphere( float radius, int slices, int stacks )
{
    struct point top, bot;          // top, bottom points
    struct point *p;
    NumLngs = slices;
    NumLats = stacks;
    Pts = new struct point[ NumLngs * NumLats ];
    for( int ilat = 0; ilat < NumLats; ilat++ )
    {
        float lat = -M_PI/2.  +  M_PI * (float)ilat / (float)(NumLats-1);
        float xz = cos( lat );
        float y = sin( lat );
        for( int ilng = 0; ilng < NumLngs; ilng++ )
        {
            float lng = -M_PI  +  2. * M_PI * (float)ilng / (float)(NumLngs-1);
            float x =  xz * cos( lng );
            float z = -xz * sin( lng );
            p = PtsPointer( ilat, ilng );
            p->x  = radius * x;
            p->y  = radius * y;
            p->z  = radius * z;
            p->nx = x;
            p->ny = y;
            p->nz = z;
            p->s = ( lng + M_PI    ) / ( 2.*M_PI );
            p->t = ( lat + M_PI/2. ) / M_PI;
        }
    }
}

You don't want to execute all that code every time you want to redraw the scene, so draw it once, store the numbers in GPU memory, and call them back up later

1. How many unique, unused, consecutive DL identifiers to give back to
2. The ID of the first DL in the unique unused list
3. Open up a display list in (GPU) memory
4. The coordinates, etc. end up in memory instead of being sent to the display
5. Pull all the coordinates, etc. from memory, just as if the code to generate them had been executed here
6. Stop storing the numbers in the DL

Drawing a Sphere – Notice a lot of time-consuming Trig Function Calls!

valid:
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            float lng = -M_PI  +  2. * M_PI * (float)ilng / (float)(NumLngs-1);
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            p = PtsPointer( ilat, ilng );
            p->x  = radius * x;
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            p->nx = x;
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            p->s = ( lng + M_PI    ) / ( 2.*M_PI );
            p->t = ( lat + M_PI/2. ) / M_PI;
        }
    }
}

// a global GLuint variable:
SphereList = glGenLists( 1 );
glNewList( SphereList, GL_COMPILE );
Sphere( 5., 30, 30 );
glEndList( );
glCallList( SphereList );