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[NumLats * 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 < NumLats; ilng++)
        {
            float lng = -M_PI + 2. * M_PI * (float)ilng / (float)(NumLats-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;
        }
    }
}

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

Even worse, the trig calls are inside single or nested for-loops!
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.

Without Display List:
The CPU re-computes and transmits the sphere coordinates every time they need to be drawn.

With Display List:
The GPU computes and transmits the sphere coordinates once and then they are grabbed from GPU memory every time they need to be drawn.

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The solution is to incur the sphere-creation overhead once, and whenever the sphere needs to be re-drawn, just draw the saved numbers, not the equations. This is a Display List.

Creating the Display List in `InitLists()`:

1. How many unique, unused, consecutive DL identifiers to give back to you
2. The ID of the first DL in the unique, unused list
   
   ```
   if a global GLuint variable:
   SphereList = glGenLists( 1 );
   glGenLists( SphereList, GL_COMPILE );
   
   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. All done with storing the numbers in the DL
   
   6. Pull all the coordinates, etc. from memory, just as if the code to generate them had been executed here
   ```

Calling up the Display List in `Display()`:

```glCallList( SphereList );```