Real Time Rendering
Semester 2 2010
Assignment 2 Findings

Rendering Performance: Fixed vs. Binn-Phong vs. Phong
*Considers Per Vertex and Per Pixel Rendering.

 # Geometry Tessellation: 1024x1024

1: Shader Binn-Phong per pix - 212 fps
2: Shader Binn-Phong per ver - 212 fps
2: Shader Phong per ver - 212 fps
4: Shader Phong per pix - 210 fps
5: Fixed Pipeline - 112 fps

 # Geometry Tessellation: 8x8

1: Shader Binn-Phong per pix - 1458 fps
2: Shader Binn-Phong per ver - 1433 fps
2: Shader Phong per ver - 1389 fps
4: Shader Phong per pix - 1379 fps
5: Fixed Pipeline - 1372 fps

 # Conclusion

At the maximum tessellation (1024x1024), the shaders perform much better then the fixed pipeline.
There is not much difference between per pix and per vert as the number of verts is so high.

It is interesting however that at low tessellations the per pixel shaders perform slightly better then the per vert. Although the difference is probably negligible it is consistent. I would have expected per vert to be much better then per pix
This maybe due to optimisations in the 'fragment cores' for lighting calculations.
Maybe if the torus consumed more of the screen space the result would be different as there would be more pixels to be filled per vertex.

Rendering Appearance: Fixed vs. Binn-Phong vs. Phong

The fixed pipeline and Binn-Phong per vert appear the same.
This is expected as they are using the same lighting model.

Phong gives a much nicer shine/gloss when compared with Binn-Phong.
This was also expected, as the Phong calculations are more accurate.

In both shaders the per pixel lighting is much nicer then per vert.
This difference is very noticeable at low tessellations.

 # Conclusion

Given the very small performance difference between per pix and per vert, it seams that it is generally preferable to use per pix lighting.
This provides the most visually pleasing at only a small extra cost (if any).
Per pixel is a 'cost effective' way of increasing appearance of an object without increasing tessellation.

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