CSCI 3090U Computer Graphics and Visualization

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Assignment 2

"I, Jasdeep Nijjar, certify that this work is my own, submitted for CSCI 3090U in compliance with the UOIT Academic Integrity Policy."

The purpose of this assignment was to examine the difference in speed when rendering a model using a fragment shader vs. a vertex shader. The results show that the vertex shader is slightly faster than the fragment, but the models are still too small for it to be noticeable. Visually we'd expect that the vertex shader would have a worse looking render but since the dragon and Buddha both have so many vertices it's harder to see the difference. If we look at a smoother model like the vase however it is very easy to see the differences between the shaders.

```
Directional Light - Fragment Shader: 10 runs complete, avg runtime 0.007039
Directional Light - Vertex Shader: 10 runs complete, avg runtime 0.006141
World Coordinates - Fragment Shader: 10 runs complete, avg runtime 0.006016
World Coordinates - Vertex Shader: 10 runs complete, avg runtime 0.005961
Spotlight - Fragment Shader: 10 runs complete, avg runtime 0.006082
Spotlight - Vertex Shader: 10 runs complete, avg runtime 0.005998
Test complete
```

Figure 1 Buddha Run Times

```
Directional Light - Fragment Shader: 10 runs complete, avg runtime 0.005320
Directional Light - Vertex Shader: 10 runs complete, avg runtime 0.004559
World Coordinates - Fragment Shader: 10 runs complete, avg runtime 0.004666
World Coordinates - Vertex Shader: 10 runs complete, avg runtime 0.004660
Spotlight - Fragment Shader: 10 runs complete, avg runtime 0.004867
Spotlight - Vertex Shader: 10 runs complete, avg runtime 0.004764
Test complete
```

Figure 2 Dragon Run Times

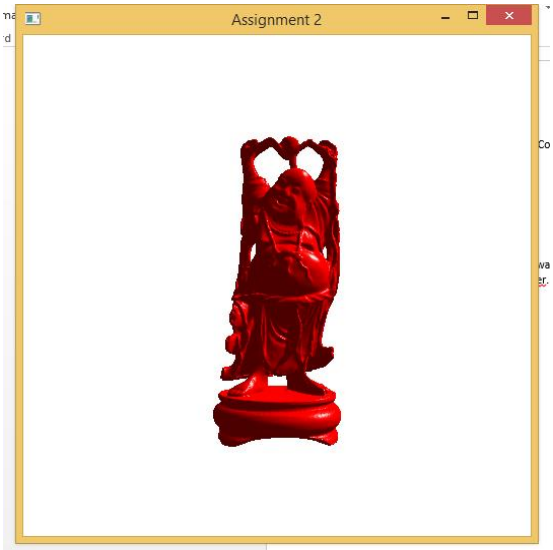


Figure 3 Buddha - Directional Light Fragment Shader

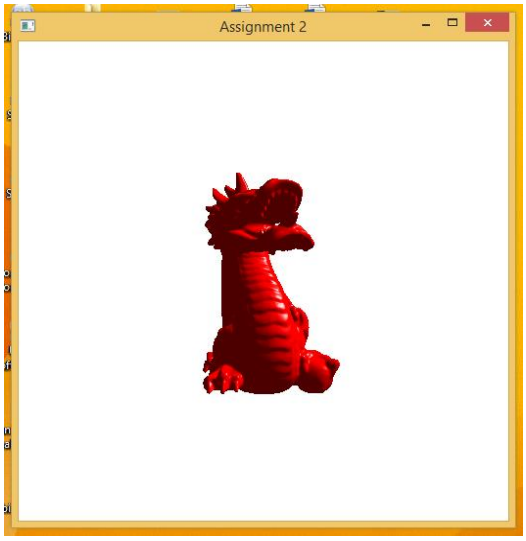
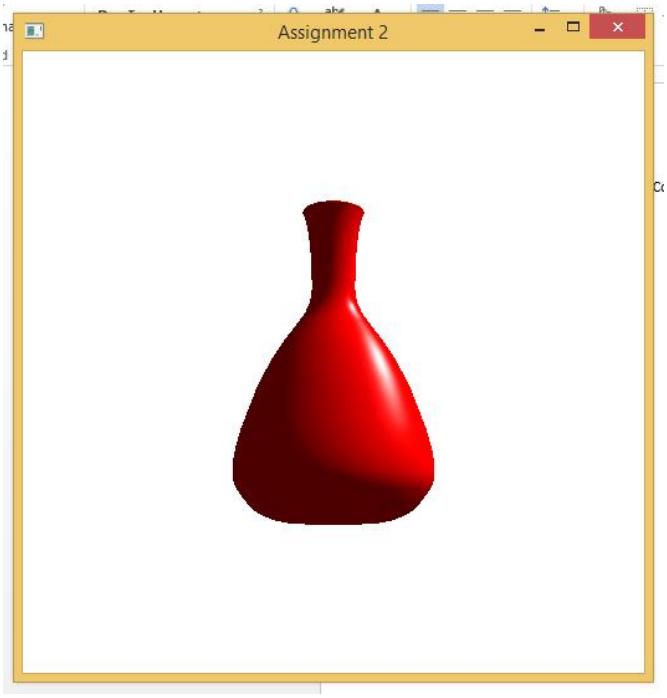
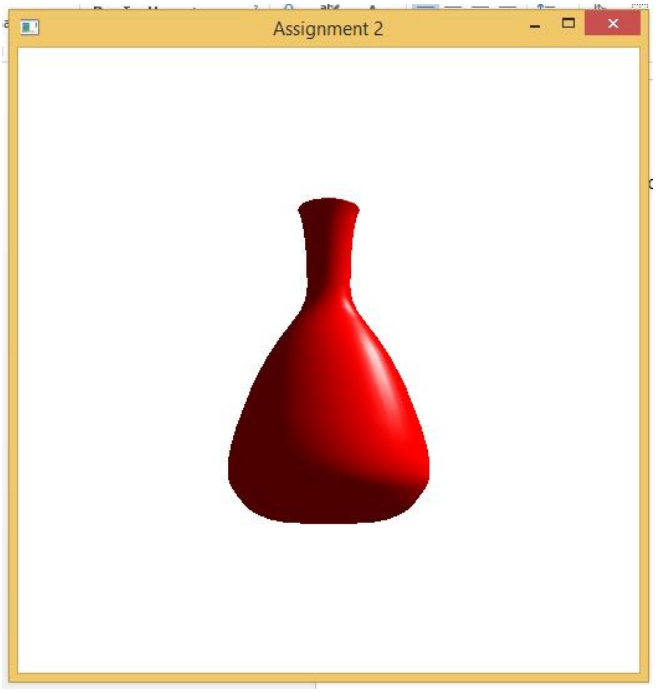


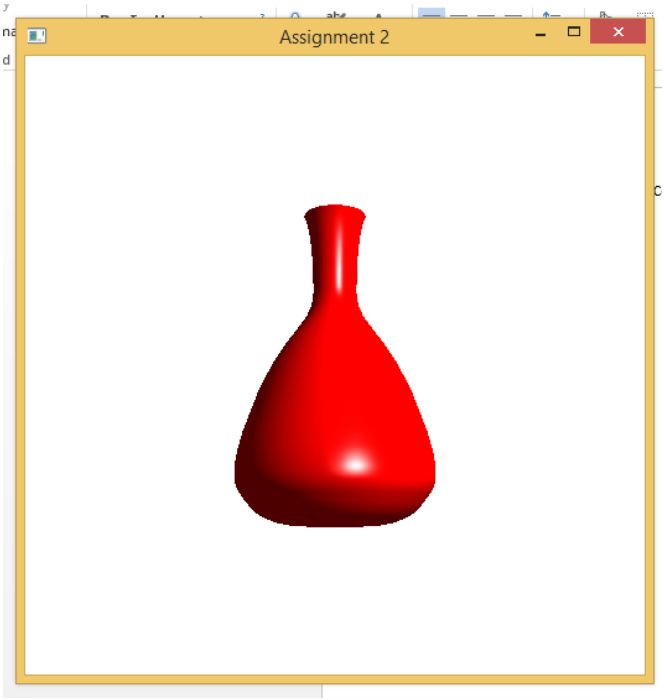
Figure 4 Dragon - Directional Light Vertex Shader



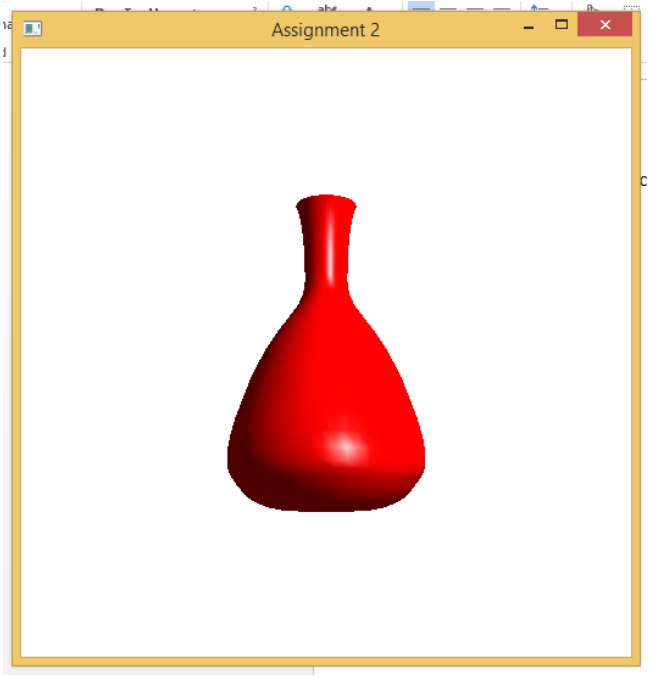
Directional Fragment Shader



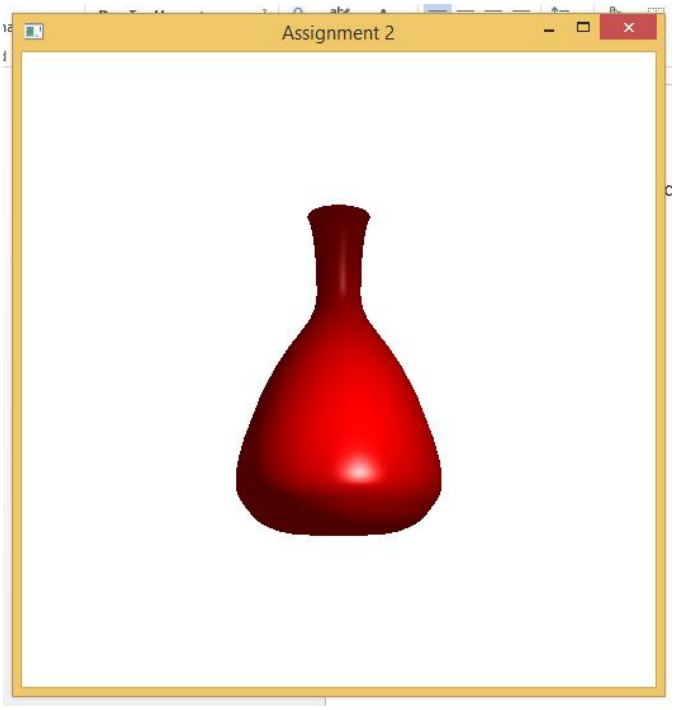
Directional Vertex Shader



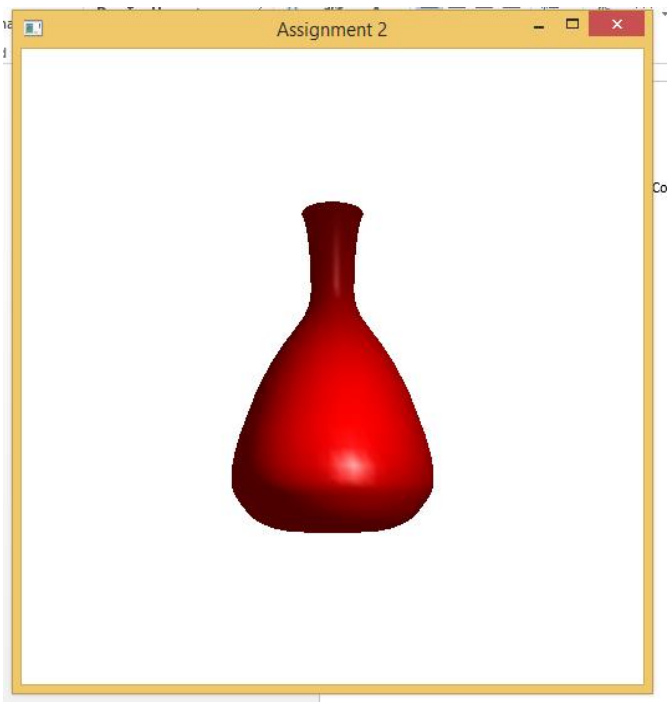
World Coordinates Fragment Shader



World Coordinates Vertex Shader



Spotlight Fragment Shader



Spotlight Vertex Shader

When running the program it will automatically test each of the 6 shaders 10 times and print the average, at this point (after the model is loaded), you can cycles between the shaders using ‘z’ and ‘x’. Pressing ‘p’ prints the last tests that were run, and pressing ‘r’ re-runs the tests on the shaders.