Software Rasterizer Implementation Report

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1 Introduction

This report presents the implementation of a software rasterizer as part of the computer graphics assignment. The rasterizer was developed to handle various rendering tasks, from basic 2D shapes to 3D scenes with lighting models.

2 Implementation Results

2.1 Example 1: Basic 2D Rendering

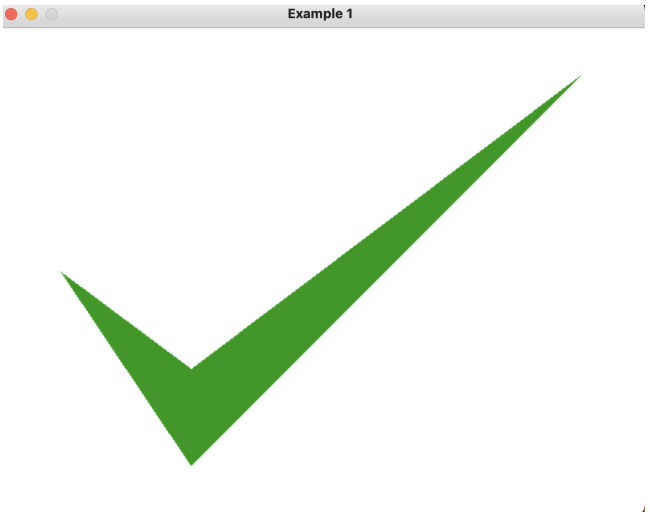

Figure 1: Example 1: Basic 2D rendering

2.2 Example 2: 2D Object Drawing

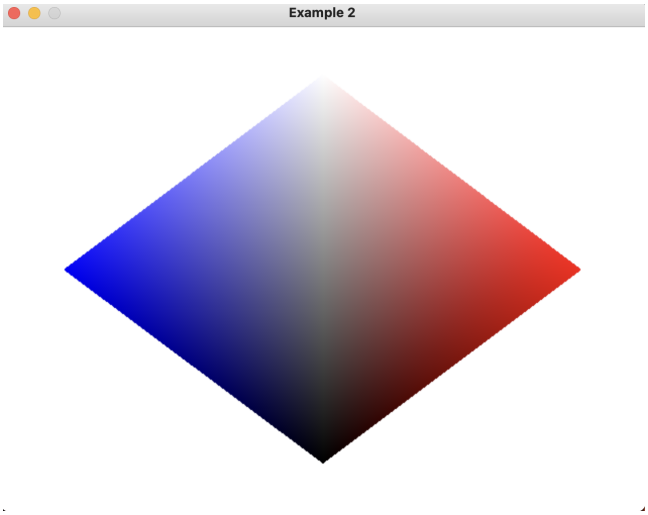

Figure 2: Example 2: 2D object drawing

2.3 Example 3: 3D Rendering with Depth Testing

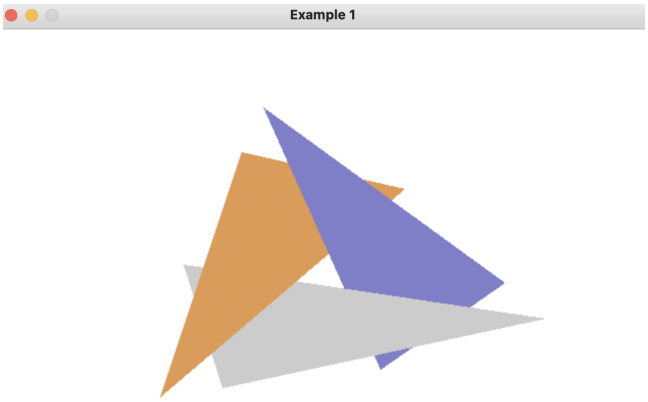

Figure 3: Example 3: 3D rendering with depth testing

2.4 Example 4: 3D Scene with Depth Testing

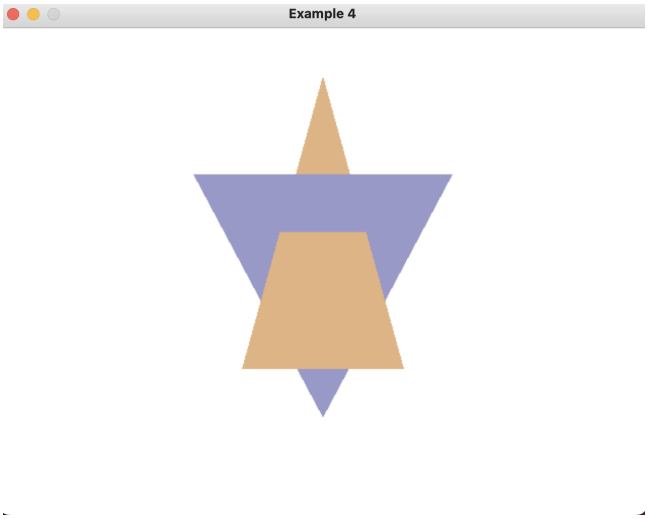

Figure 4: Example 4: 3D scene with multiple objects

2.5 Example 5: Perspective-Correct Interpolation

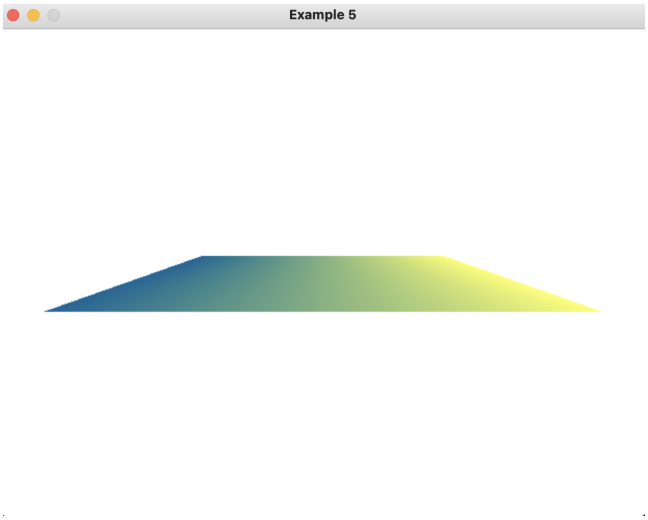

Figure 5: Example 5: Perspective-correct interpolation (View 1)

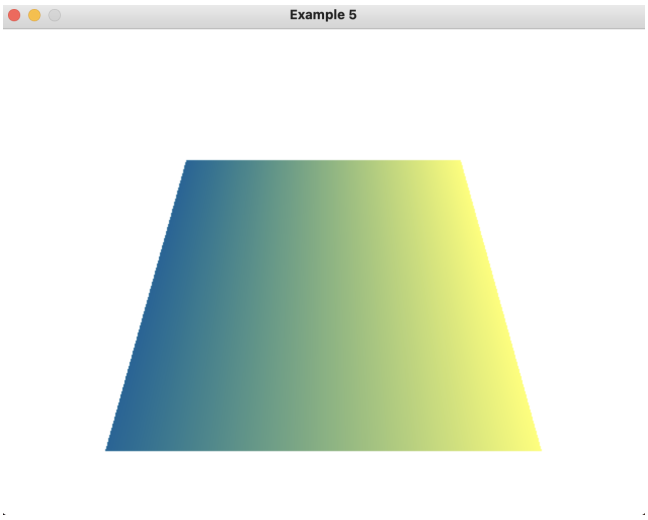

Figure 6: Example 5: Perspective-correct interpolation (View 2)

2.6 Example 6: Lighting Models

2.6.1 Lambertian Lighting

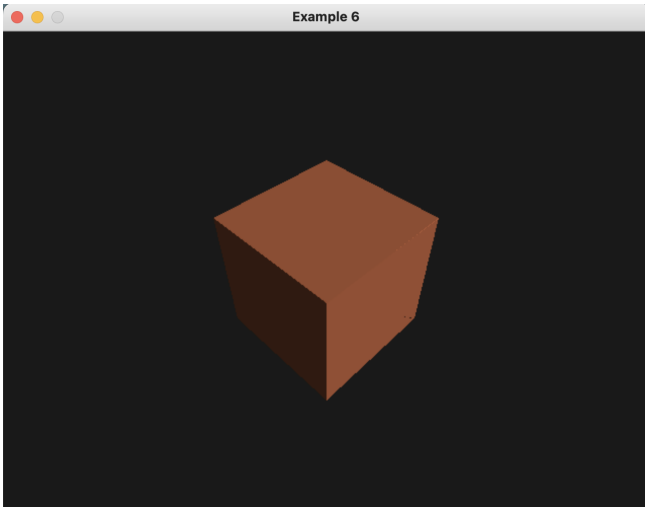

Figure 7: Example 6: Lambertian lighting model (View 1)

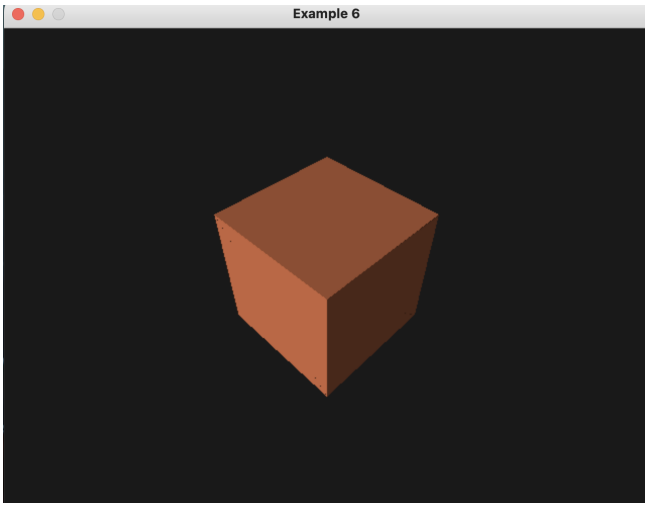

Figure 8: Example 6: Lambertian lighting model (View 2)

2.6.2 Blinn-Phong Lighting

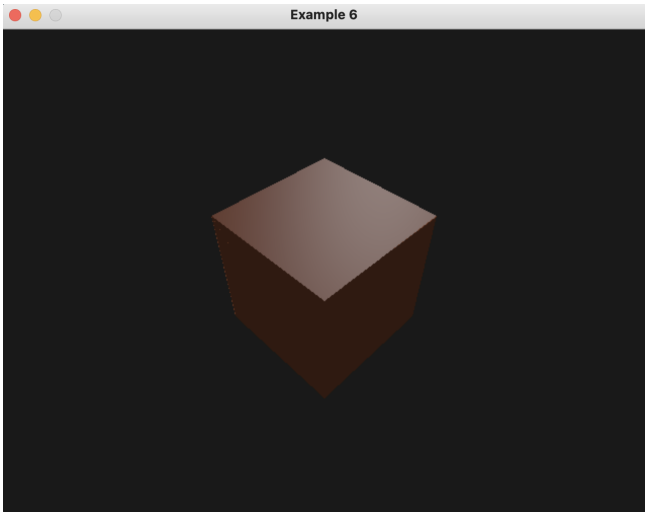

Figure 9: Example 6: Blinn-Phong lighting model (View 1)

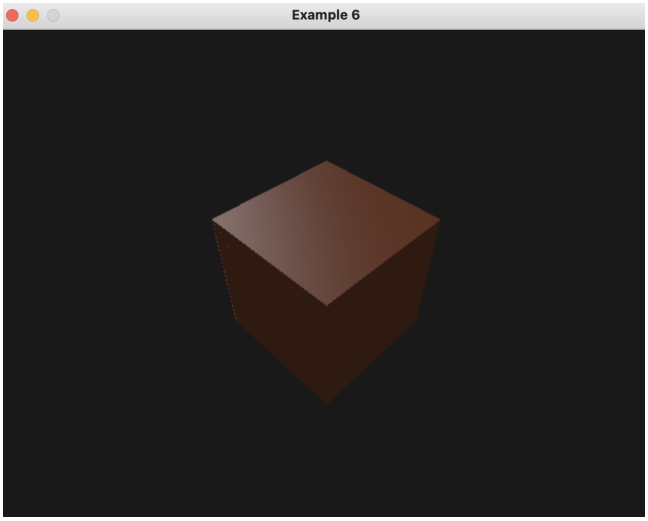

Figure 10: Example 6: Blinn-Phong lighting model (View 2)

3 Additional Implementations

3.1 Analogue Clock

Figure 11: Analogue clock implementation

3.2 Creative 3D Scene

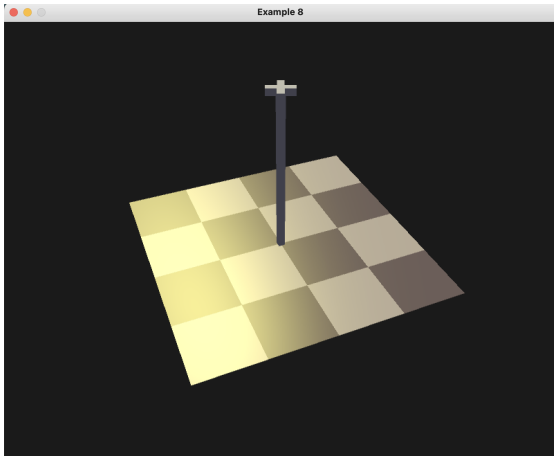

Figure 12: Creative 3D scene - Overview

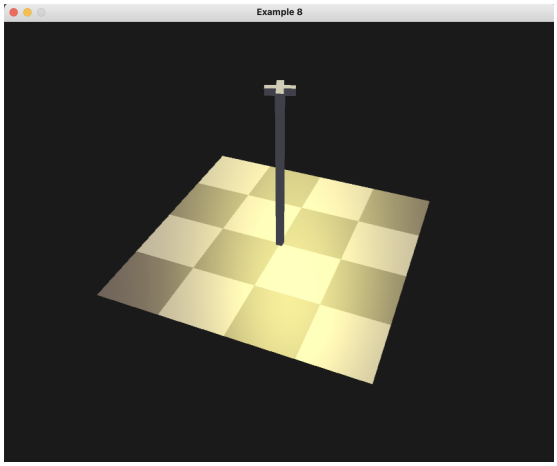

Figure 13: Creative 3D scene - Detail

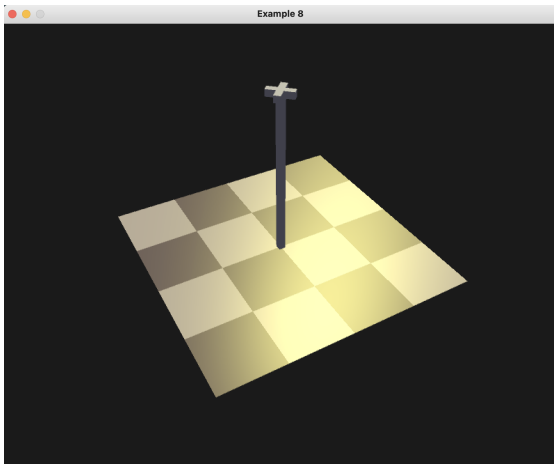

Figure 14: Creative 3D scene - Close-up

4 Challenges and Solutions

5 Conclusion

This report has presented the successful implementation of a software rasterizer capable of rendering 2D and 3D scenes with various lighting models. The rasterizer demonstrates functionality in perspective-correct interpolation, depth testing, and shader implementations for Lambertian and Blinn-Phong lighting models. The additional implementations of an analogue clock and the creative 3D scene, depicting a nail on a sandstone field with specular sunlight, showcase the versatility of the developed rasterizer.