

# TDT4195: Visual Computing Fundamentals

## Computer Graphics - Assignment 1

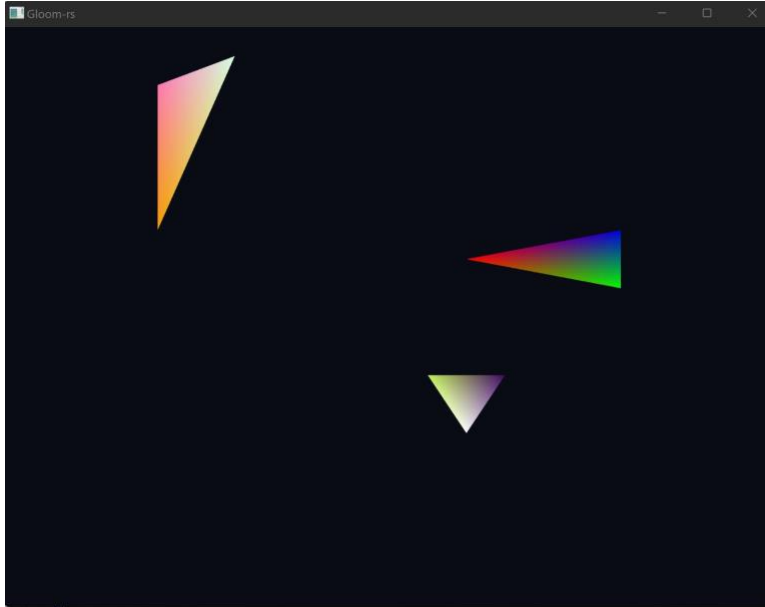
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### Task 1: Per-Vertex Colors [0.5 points]

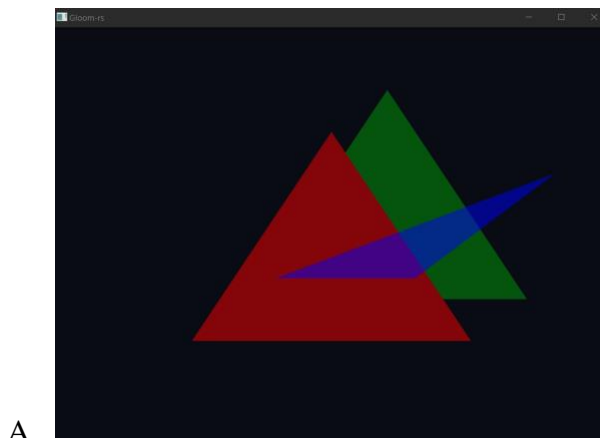
A. n/a

B. .



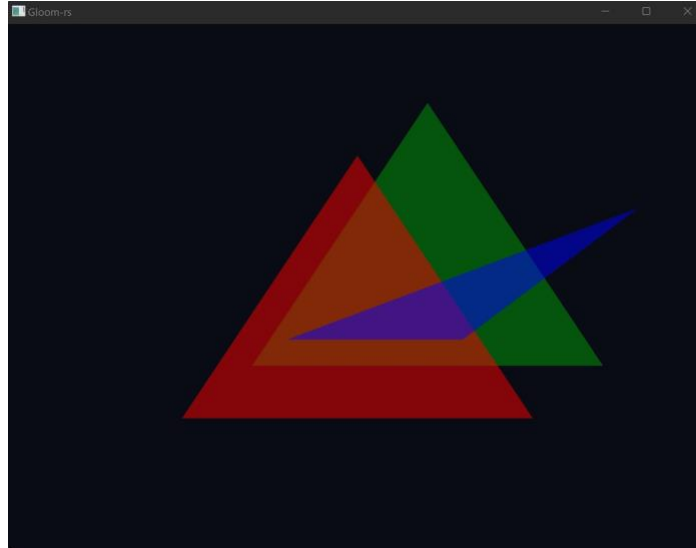
Here, we can see that each of the individual triangles have unique colors at every vertex. It is noticeable that OpenGL handles the transition between the vertices by creating a gradient between the colors. It gradually blends one color into the next.

### Task 2: Alpha Blending and Depth [0.5 points]

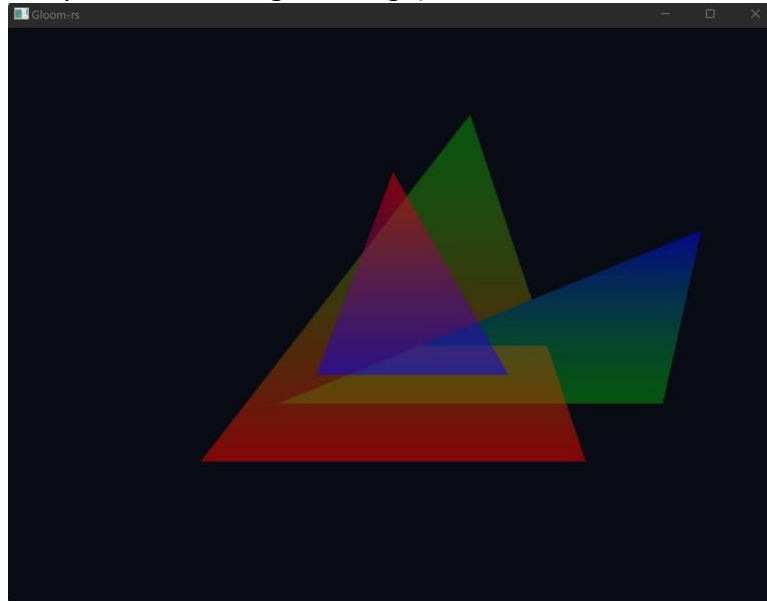


B.

- i. Here, we manipulated the VBO containing the Vertex attribute by swapping vertices of triangles. Therefore, we see that our triangles are rendered in a different order.

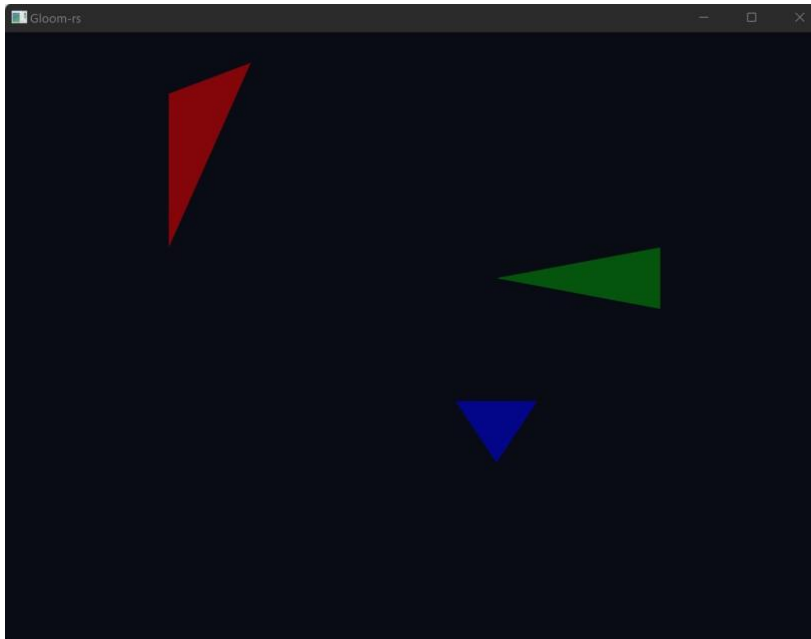


- ii. Here, we modified the z-coordinate. As a result, the depth of drawing for the triangles are all shifted. So, the colors here create a gradient blend. This shows how the actual triangle being drawn looks different from the change in z-coordinate. The colors help to see this change (when compared to our original image).

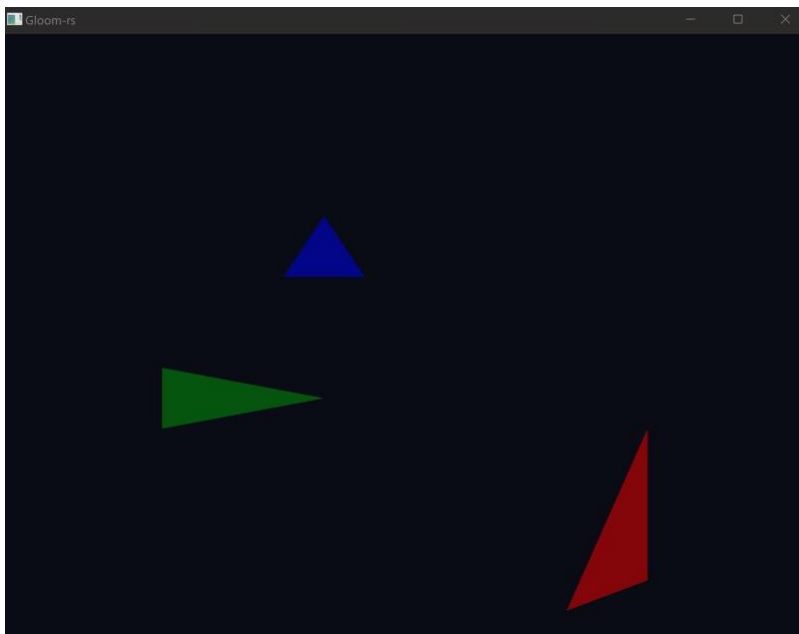


### Task 3: The Affine Transformation Matrix [0.7 points]

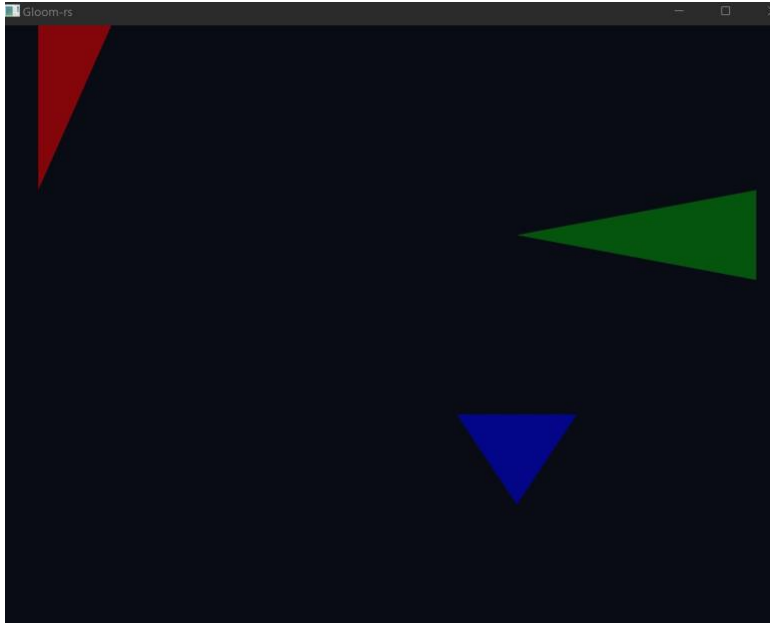
- A. n/a
- B.



Original image



Here, we change  $a$  and  $e$  values to be  $-1$ . Thus, the result is a mirroring effect, so this transformation is scaling.



Here, we change  $a$  and  $e$  to be 1.5. Scaling transformation is yet again noticeable.

In all of the examples of modifying the values marked with letters, we notice some kind of scaling effect. In the example above, we scaled both the  $x$  and  $y$  axis. In all of our testing, the scaling was noticeable on these axes.

- C. We are certain that the result is not a rotation because we are performing a scaling effect, not a rotation. Therefore, we do not turn the triangles about the origin and in many cases the distance from the origin does change (depending on the size of the scaling factor). Therefore, it is not rotation.

**Task 4: Combinations of Transformations [3.3 points]**

- A. n/a
- B. n/a
- C. n/a
- D. n/a