1. Briefly describe the artifact. What is it? When was it created?

The artifact to be enhanced is a CS 330: Computational Graphics and Visualization program. The program focuses on applying 3D transformations and rendering techniques using OpenGL. The program was initially intended to display the basic rendering of 3D objects, transformation matrices, and camera translation.

1. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in algorithms and data structure? How was the artifact improved?

​ The artifact was chosen as it most accurately represents my knowledge and application of data structures and algorithms within real-world computational graphics environments. It depicts efficient data structures in handling 3D object transformations, matrix manipulation, and rendering optimization algorithm implementation, hierarchical modeling for object transformations, and memory management and performance optimization within OpenGL. The enhancements include more efficient matrix operations, more advanced data structures for the storage of object transformation, and an improved rendering pipeline.

1. Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

The enhancements align with learning objectives outlined in Module One. The improvements have optimized algorithmic efficiency in transformation calculation, enhanced data handling for storage and retrieval of objects, and optimized code structuring for improved performance and maintainability. With the implementation of these enhancements, I have enhanced my skills through algorithmic concepts and data structures to develop computationally efficient and scalable graphics applications.

1. Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?

I gained greater insight ​into​ performance trade-offs in 3D rendering during the optimization process. Optimizing matrix multiplications to minimize computational overhead was one of the major learning experiences. Improving hierarchical transformations so that object relationships were preserved while correct transformations were guaranteed at runtime was another challenge. By debugging and profiling, I enhanced my skills in analyzing and optimizing complex algorithmic implementations.