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CS 499 – Milestone 2

1. Briefly describe the artifact. What is it? When was it created?
   * The original artifact is a game like breakout. I created it during my time in the course CS330 Computer Graphics and Visualization. It is a project written in C++ that utilizes GLFW to make OpenGL calls. It is a very simple game without a framework that only utilizes a low level graphics library.
2. 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 software development? How was the artifact improved?
   * I specifically chose this project for the category of Software Engineering and Design because I wanted to showcase how I could redesign the software implementation of the game. Breakout is a very simple game that does not require heavy lifting in graphics. I felt that using C++ and OpenGL was too close to reinventing the wheel.
   * The project was enhanced by utilizing the stable and proven game framework, PyGame. PyGame has useful features such as handling input events and rendering shapes and text. This elimated the need for low-level OpenGL calls.
   * The game now utilizes a class that acts as a game state manager and uses three main states: Menu, Playing, and Game Over. This makes the game for modular and scalable.
   * Artifact 1 was improved with a user interface that features a main menu, indicators for remaining lives, the current score, and a game over screen to improve the user experience.
3. 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?
   * I met the course outcomes that I planned in module 1. I was able to show algorithmic principles by designing a solution for a game state manager and improving collision detection. I used innovative techniques and skills in computer practices by transitioning from C++ and OpenGL to PyGame. I showed my ability to choose a more modern and high-level tool to complete a job in less time and still meet the requirements.
4. 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?
   * As I was improving the original game, the most significant lesson I learned was the importance of choosing the right tool for the job. The initial implantation in C++ and OpenGL was a good exercise in understanding computer graphics programming, but it was an inefficient way to build a simple game like breakout. I learned how a higher-level framework could abstract away complex details like event handling and rendering, allowing me to focus on the game's core logic and design. This taught me that software engineering isn't just about building from scratch, but also leveraging existing solutions to create a more efficient and maintainable product.
   * The primary challenge I faced was redesigning the game’s architecture to be more modular. The original code was a single file with all the logic tightly coupled. Introducing the state manger class was a major step in separating the concerns for the different game states that would be added.