The Use of Algorithms to Analyze 3D Vectors and Component Transformations in a ROV Simulator

Machado, Zahydee (School: CROEM HS)

This project aimed to build a computer program that contains an interactive underwater ROV (Remotely Operated Underwater Vehicle) build and test simulator. Its purpose was to engage people with the use of game mechanics in order to teach students and to assist engineers with the basics of building simple ROVs. It consists of a building system that uses algorithms for analyzing 3D vectors and calculating component transformations. The user can use virtual PVC tubes to assemble their own ROV frame design. It takes the players through the process of learning how to build a ROV and allowing them to build upon that to create their own innovative designs. The building system uses a variety of different pieces that are modeled after their real-life counterparts in aspects such as their dimensions and functionality. Once the ROV prototype has been constructed, the player uses keyboard inputs to control the impulse and force that act upon the model (which is set to simulate physics) in order to test the design in the virtual environment. Vectors within the programming are used and controlled to run the test simulation. The primary software used was the Unreal Game Engine, within which Blueprint scripting was used for programming. Additional assets were made in Blender and Photoshop and then exported to the game engine.

Awards Won: