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Aquarium Term Project

**Project Proposal:**

My plan is to simulate a 3D aquarium using 3D fish and plants. I want the fish, water, and décor to have lifelike movements and build from there. I am at the stage where the fish are moving randomly up, down, left, and right. I need to work on having them hit corners and turn around and check for collisions with one another. Some more long-term goals include modelling schooling fish, which means that the fish will stay a certain distance from one another and follow each other or a leader. As time permits, I would also like to model chasing and aggression, such as big fish eating little fish. In that case, this project may include several different environments, such as the smaller aquarium versus the ocean floor.

To accomplish these tasks, I will use Blender and Panda3D to do the 3D modelling and animation. I am importing models from the internet and modifying them in Blender. In Blender, I am creating separate models of the same fish, but showing different states. For example, for a fish to seem like it’s “moving,” I need to show a fish bending left, bending right, and centered. Thus I have 3 models for each fish.

In Panda3D, I’m using the models from Blender and animating them. For fish moving tail, I loop through each of the different models (bending left, center, bending right, center) while making the fish go forward. I also included right/left and up/down motions calculating the changes in the x, y, and z positions as well as the heading, pitch, and roll positions for rotating.

For user interface, I want to make this as a sort of simulation that’s possibly game-like. I might be able to have the user create a virtual aquarium or ocean world where you build everything, from the fish to the décor. The users would be able to choose the type of fish, its sizing, and its behaviors. Then when they click “run,” everything will start moving and they’ll see what happens in their aquatic world.

**Competitive Analysis:**

I looked up various virtual aquariums, both designable on websites and videos through YouTube. I haven’t found anything exactly like what I want to do, but there are definitely combinations of things I want my term project to reflect.

I found a lot of 2D and 3D virtual aquariums online and through YouTube. The 3D ones were very pretty and normally were used as screensavers. These had very smooth and beautiful animations, and modelled fish behavior fairly well (one website said they included pecking, eating, pooping, chasing, swimming around plants and, schooling). None of the 3D ones were personalized. I want to utilize the 3D animations and behaviors while coupling it with an interactive user experience.

I found a 2D fish tank that was more personalized. The user could choose which fish they wanted in the tank, move the plants around, feed the fish, and clean the tank. There were also statuses for fish happiness, tank cleanliness, and oxygen level. The graphics and animation on this program were more subpar, but it has some of the functions I want to include. I want to have the user choose which fish they want to include, and possibly include a feeding option in mine.

Another very cool in between a 2 and 3 D tank I saw was for tank layout. It was for placing décor in the tank. After choosing which ones from a sidebar, you could adjust the size of the plant/rock/wood. Then, there was a separate screen with a 2D rectangle which determined where in the tank on the bottom (x/y plane) you wanted the objects to be placed. These were represented as dots. Then the website translated these x/y points and placed them in the 3D tank. I liked this program’s method of placing objects in the tank, especially objects that are going to be on the bottom of the tank anyways.