

Graphics Final Report - Underwater Pizza Party Tournament

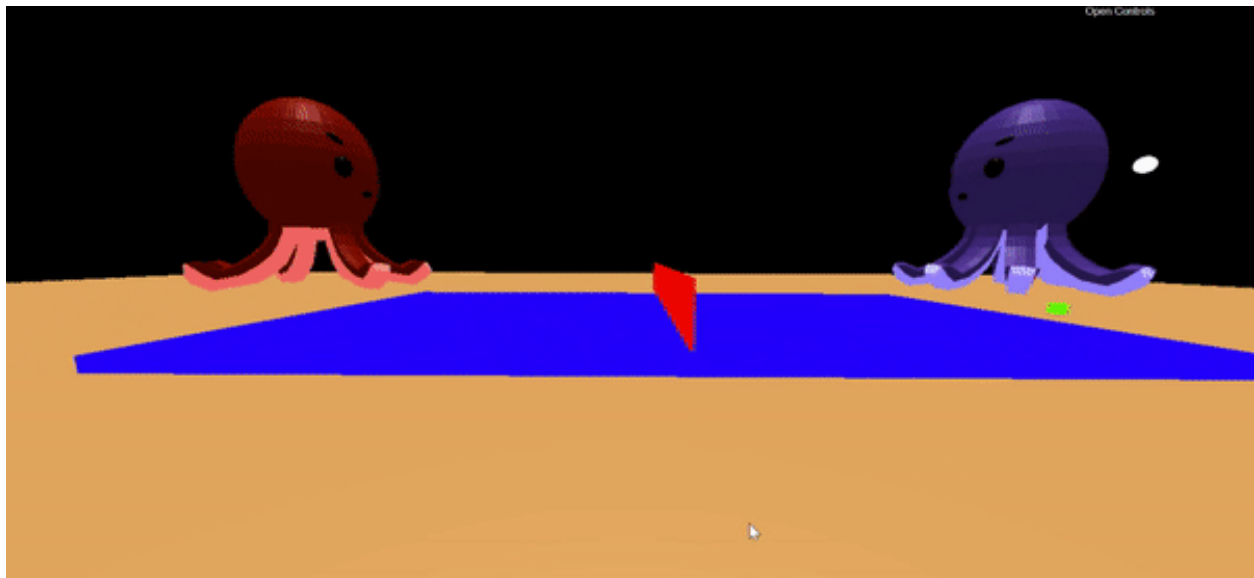
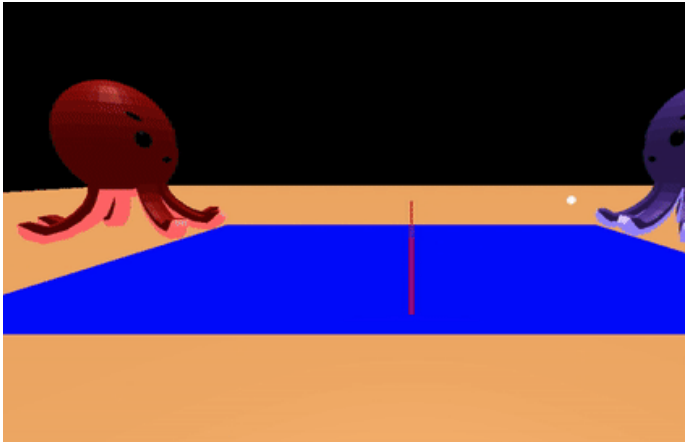
Background

- For the Ping Pong simulation, we sought to design a physical simulator that could predictively figure out the motion of a ball in play using specific physical forces: gravity, drag, spin, aerodynamic movement, and variable collisions. We also wanted to simulate game rules, such as continuing the game based on the number of times the ball bounces on one side. At first, our project used Forward Euler to determine position. We eventually switched to Verlet for numerical stability. Figuring out collisions (with the table and players) and making the physics look accurate took most of our programming time. A large part of our design focused on how a user would interact with the simulation; we have a GUI that takes in how the ball starts and collides.

Accomplished

- Not all are in the same commit, due to some conflicts, however given enough time since the code is already there, we just need to update to our newer Verlet system for old code
- Verlet Integration
- Acceleration from Gravity and Drag
- Non-physically based spin
- A posteriori collision with the table
- User-interface for ball collisions
- Net Collision
- Floor Collision (dampens ball)

Artifacts



Sources

https://www.gafferongames.com/post/physics_in_3d/
https://en.wikipedia.org/wiki/Magnus_effect#In_sport
https://en.wikipedia.org/wiki/Verlet_integration