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CS/Math 371

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**Space Chase**

Project Description

Space Chase is a game where the player controls a space ship, and tries to avoid enemy space ships for as long as he/she can. The space ships will move around with complex motion (velocity/acceleration), and the screen will wrap around on all sides, creating an “infinite space”. The enemies will use an AI to predict the player’s motion and adjust their trajectories to try to collide with the player. As the game progresses, more enemies will be added to the field. When an enemy hits the player, the game is over.

Final Product

The game will begin with a menu screen with a logo for the game and a Play button. When the user clicks Play, they will begin at Level 1.

On the first level, the player begins at the center of the screen, and the first enemy slides in from a random direction on the edge of the screen. Every 30 seconds, the next level begins (without interrupting the game), and a new enemy slides onto the screen.

The player controls their ship by using the arrow keys. Similar to the controls in Asteroids, the player may rotate their ship and fire their thrusters in order to accelerate forward. The player’s ship (along with enemy ships) follows Newtonian motion; traveling at the same speed in the same direction until they accelerate or decelerate.

Increments

1. With the first increment, we hope to be implement a ship that the player can control completely with their keyboard, as well as the wrapped-around “infinite space” environment.
2. The second increment will be mainly focused on designing the enemy AI. Each enemy will use the current trajectory of the player (given its current velocity and acceleration), and use this to calculate the optimal acceleration vector to minimize the distance between itself and the player. We plan to partially solve this problem using differential equations, though there will be some obvious quirks to it due to the wrapped-around nature of our game environment.
3. The third increment will cover the visual/auditory aspect of the game. We want to use some decent sprites and sound effects to make the final product a more attractive game. We will also spend plenty of time fine-tuning the underlying structure of the game, including the enemy AI.