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Project 5 Documentation

Assets:

I used only unity default assets, and made the materials myself, as well as the models and animations for the plane, oil cans, pillars, horses, and chariots.

Known Errors:

When the path follower reaches sharp corners where it's projection onto the path leads away from the next node, it would fly away from the node so in these cases I have it seek the point on the path to keep it from flying away. This is why it sometimes quickly turns around to move to the path. It's not really an error but in these instances it is not truly path following so I listed it here.

Controls:

Press 'D' to toggle showing debug lines along the path

Press 'R' to reset the simulation / Generate new terrain, paths, and obstacles.

Press numbers 1-5 to switch cameras.

1: Overview of the whole scene

2: Flock average position

3: Flock leading camera

4: Path Follower camera

5: Race-view camera (not smoothed to simulate a bumpy chariot ride)

Code:

Agent:

Base class used by both Path Follower and Flocker, handles Seek, Flee, and Obstacle avoidance, as well as velocity and acceleration.

Camera Controller:

Controls cameras and makes sure they move smoothly, it works by giving cameras a velocity and max move speed to smooth motion and a turn time to smooth rotations. The camera is given a target to look at and a target position relative to an object and tries to stay at the proper position and orientation, limited by its move and rotation speed.

Camera Manager:

Handles camera switching

Flock:

Keeps track of stats relevant to the flock such as average position and alignment, also gives the position that the flock seeks which is just ahead of the flock's average position on the path to ensure that they keep moving in a circle.

Flocker:

Controls the logic and steering of a member of the flock uses Alignment Cohesion, and Separation to keep the shape of the flock. Inherits from Agent.

Flocker Editor:

Inspector script that makes sure all of the steering weights add up to one.

Obstacle:

Keeps track of the position and radius of an obstacle. Used by the agent for obstacle avoidance.

Obstacle Manager:

Keeps track of all of the obstacles and also places them when the scene is reset.

Path Follower:

Utilizes path following to stay on the track going from node to node. It projects it's future position onto the path and seeks that point to stay on track. When the projection is past the next point on the path it moves on to the next section.

Path Generator:

Generates the path by drawing a circle of nodes and then randomly moving them in relation to the center of the map. It also places the floating fuel cans and particle systems that show where the path is.

Terrain Generator:

Generates the terrain with perlin noise and then alters it to create a circular path for the chariot race. Then it generates an alpha map to texture the terrain as grass, dirt, or rock, depending on the steepness at each point on the heightmap.