

# Project Proposal for COMP 477 Fall 2019

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## Pac-Man Game (Path Finding)

*Simulate a classic (or other) arcade game such as PacMan, Space Invaders, Donkey Kong, Asteroids, Pinball, Defender, . . . using modern hardware.*

This project would be a recreation of the classic arcade game. Ghosts will follow pathfinding rules that they will adhere to during the game. We will need to research these algorithms and implement them accordingly. A collision system that is true to the original game will also need to be implemented. Pac-Man and the ghosts can collide with the walls of the arena. Pac-Man can collide with pellets and eat them. Finally, Pac-Man can collide with ghosts and eat them if he has the super pellet, or die otherwise. Ghosts can move through each other.

## Hide-and-Seek (Path Finding)

*Given a landscape with obstacles (trees, buildings, water, etc.), and two points, A and B, find a path from A to B that avoids obstacles. Additional criteria can be added: e.g., the path must be smooth, without abrupt corners. Finding a path is more difficult if the “obstacles” are NPCs who move.*

We could use this concept to make a virtual game of hide-and-seek between some number of primitive, pathfinding AIs—perhaps with a score tracker. The user-interaction component may consist of being able to modify characteristics such as speed or initial placement of the AIs. This idea is loosely based on [OpenAI’s Multi-Agent Hide and Seek](#). Another variation of this idea would be to have the user move a character around and hide behind objects while an AI attempts to seek out the player. When the player is within the AI’s field-of-view, it will begin chasing the player.

## Flying (Path Finding)

*Allow a PC or NPC to fly an aircraft, helicopter, or spaceship. This is a form of path-finding in 3D, but it is also necessary to consider “attitude” (where is “up”?), etc. For realistic aircraft flight, turns must be “banked” so the resultant of gravity and “centrifugal force” is always normal to the body of the aircraft. The ground should be apparently endless, so that pilots cannot fly off the edge of the world.*

Our project would be very closely to the description above, but we also propose including endless cloud generation to go along with the terrain, as well as collision detection with the terrain to simulate a crash and explosion—perhaps in-air collisions with birds or other planes.