Daniel Barychev - Term Project Proposal

In my term project, I hope to create a three-dimensional game in which the user controls a character roaming through a custom-modeled structure. The goal will be to complete a final task, but there will be enemies in the structure along with the user trying to prevent them from doing so. This may be thought of in the sense of 3D Pacman where the user must intelligently avoid enemies in order to achieve an objective. My game will most likely not focus on collecting dots like Pacman, but will certainly have enemies working together to stop the user from reaching their final destination or goal.

The biggest complexities of this project will be programming the enemies to work collaboratively to stop the player. Since the game will most likely consist of multiple levels, this will involve upgrading the complexity of their AI with each successive round. This does not mean that they will become faster, but that they will analyze the paths around the building more intelligently. I also hope to slightly different models for each level so the game will need to be able to robustly analyze any kind of map. Another aspiration is to be able to have the user be able to insert elements into the game. For example, if there is a gap in the floor, a user should be able to fill it by inserting a plane.

I hope to solve these algorithmic problems by primarily employing backtracking to solve my buildings (or mazes) in intelligent ways. I will think of these solutions as possible paths to my player. I will have to map every floor of the building to a maze in list form and then solve it in this fashion. Although this will give my enemies possible paths to the player, the first paths that they find will not necessarily be the best. I will require that their paths to the player employ the resources of enemies in numbers by updating the isLegal() part of the backtracking. In this way, the fashion in which the enemies solve the maze will be more and more resourceful with each successive level. Furthermore, I will track the paths that the user takes to the end of each level and then incorporate these into the paths the enemies can take. This will probably be done by “solving into” a common path if it seems like the player will take it again. Finally, all of this mus occur on multiple stories of the building so there will be plenty of 3D list usage. I will also use backtracking to try and solve any gaps in my building to see what size elements should be inserted.

In order to accomplish these tasks, I will use Panda3D to render and animate my player, enemies, and models. I will be building the models in Blender.