Fire of Eidolon Final Project Proposal

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Introduction

The goal of our project is to design an autonomous version of the board game “Fire of Eidolon”. The project will simulate “players” exploring a dungeon, unlocking the titular Fire of Eidolon, and escaping to the exit. The game has many levels of complexity ranging from simple to intricate, allowing for a unique and interesting application of motion planning. A key feature of the game is the dungeon exploration aspect. By implementing an ever changing maze as our simulation graph, we can explore a large number of motion planning techniques.

Original Game Description

Fire of Eidolon is played with 1-6 players in a grid-like dungeon. Players must recover the Fire of Eidolon by cooperatively exploring the dungeon and challenging the dangers in each Chamber to collect Tokens of Power. These Tokens are used to destroy the three Dark Relics sealing the Fire of Eidolon and escape the dungeon with the fire before the cultists of the Dark God Vorax complete their ritual to plunge the Fire of Eidolon into the Void forever.

Proposed Adapted Simulation

Simulation will consist of 1-6 robots collecting tokens, searching for chambers, and then collecting and escaping with the Fire of Eidolon. Simulation design will include maze/dungeon generation, ranging rules of game complexity, changing goal states, multi robot simulation, and of course, lots of motion planning.

The first simulation would be to be able to complete a known maze without any barriers, specializations, or cultists who delete tiles. The second simulation will complete a known maze with specialization and barriers. The third simulation will complete an unknown maze with specialization and barriers. Our first stretch goal will be to complete a known maze with specialization, barriers, and cultists who delete tiles. Our second stretch goal will complete an unknown maze with specialization, barriers, and cultists who delete tiles.

Formal Motion Planning Definition

Goal set: G(G0, G1, … Gn) Goals will vary in time during the game, ie multiple goals within a game. Goals will change according to which simulation is running
Simulation Variables:

- Known vs Unknown State
- Specializations vs General Abilities
- Barriers vs Free Movement
- Number of Players (1 to 6)
- Cultists who delete tiles vs No Tile Removal

Action set: A(Right, Left, Up, Down, Grab, Break, Trade, Attack)
State set: S(s0, s1,..., sn) ‘n’ = to number of available tiles “explored”
Transition functions: move from one tile to another according to action
Costs:

- Grab Token (1, 2, or 3 cost depending on specialization)
- Grab Fire of Eidolon, Movement, Trade, Break, or Attack (1 cost)