WUMPUS Project (Part 1) Report

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Introduction

We implemented a Problem Transition System and a Search Algorithms for the WUMPUS project under full observability (complete information). The problem transition system was implemented using two classes, the States class which is an overview of the whole world ecosystem and Problem class which extends the Agent class and determines the action of the agent to navigate and achieve the goal.

Search Strategy

We used a greedy best-first search strategy. The search is performed on lines 523 to 552 with the help of the Node class function which is implemented on lines 372-427. To keep track of the state and actions of our agent and implementing the tree representation of our algorithm with the Node class . Where we have a frontier for exploring potential paths. We use the priority queue to give us the optimal path from potential options with the least path cost.

Data Structures

The best search algorithm to keep track of the best path is implemented using a priority queue. The node class representing the frontier of possible path uses the priority queue for the efficient selection of the current best candidate

Problem Transition System functions

The problem transition system consists of two classes which are on lines 8-370, the State class and the Problem class. The State class gives us an overview of where important items like pits, Wumbus and gold chest are located in our grid as well as the current location of our agent. The Problem class implements the directions and limits the available actions of our agent in the current location of the environment, depending on what is nearby his actions are a subset of all available actions throughout the environment since we have complete information. We call these functions whenever the agent moves to calculate the total cost for example in the search algorithm on lines 543- 553. We also use them repeatedly for the implementation of the node class for our search algorithm to determine the state and action of the agent. (Lines