

CS 440: Introduction to Artificial Intelligence

Homework #1 Fast Trajectory Replanning

February 17, 2023

Professor Abdelsam Boularias

Jay Patwardhan RUID

Alan Wu 208000574

Neel Shejwalkar RUID

Problem 0

Setting Up Our Environments

Problem 1

Understanding the Methods

Part A

Explain in your report why the first move of the agent for the example search problem is to the east rather than to the north given that the agent does not know initially which cells are blocked.

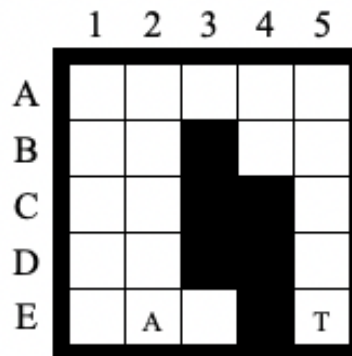


Figure 1: Second Example Search Problem

Solution.

Part B

This project argues that the agent is guaranteed to reach the target if it is not separated from it by blocked cells. Give a convincing argument that the agent in finite gridworlds indeed either reaches the target or discovers that this is impossible in finite time. Prove that the number of moves of the agent until it reaches the target or discovers that this is impossible is bounded from above by the number of unblocked cells square

Solution.

Problem 2

The Effects of Ties

Problem 3

Forward vs. Backward

Problem 4

Heuristics in the Adaptive A^*

Problem 5

Heuristics in the Adaptive A^*

Problem 6

Statistical Significance