

CS440/ECE448 Worksheet 1

Name and NetID: _____

Week of 2/1/2021

Question 1

In the tree search formulation, why do we restrict step costs to be non-negative?

Question 2

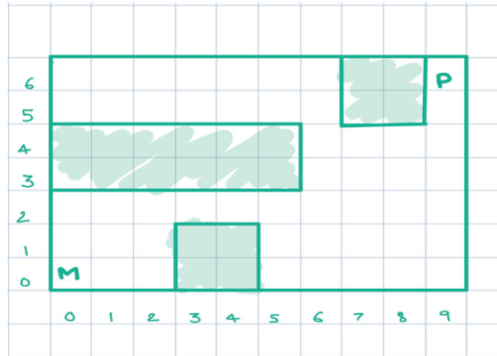
What is the distinction between a world state and a search tree node?

Question 3

How do we avoid repeated states during tree search?

Question 4

Refer to the maze shown below. Here, M represents Mario, P represents Peach, and the goal of the game is to get Mario and Peach to find each other. In each move, both Mario and Peach take turns. For example, one move would consist of Peach moving a block to the bottom from her current position, and Mario moving one block to the left from his current position. Standing still is also an option.



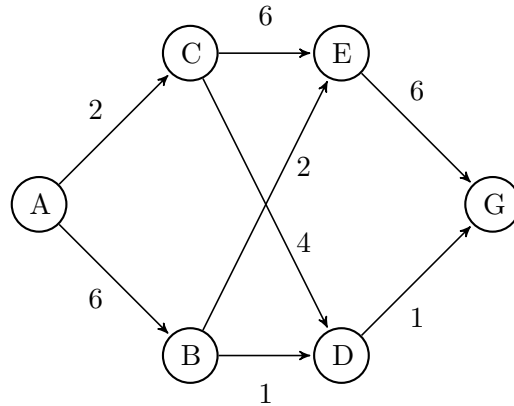
(a) Describe state and action representations for this problem.

(b) What is the size of the state space?

(c) Describe an admissible heuristic for this problem.

Question 5

Consider the following search graph.



Ties are resolved in alphabetical order, e.g., if node B and node C both have an equal score, then node B is evaluated first. Node G is the goal state.

(a) What nodes are evaluated during BFS? What is the chosen path?

(b) What nodes are evaluated during UCS? What is the chosen path?

(c) Suppose that the heuristic is $h(G) = 0$, $h(D) = h(E) = 1$, $h(B) = h(C) = 2$, $h(A) = 3$. What nodes are evaluated during **A*** search? What is the chosen path?