HW1

This is a preview of the published version of the quiz

Started: Jul 22 at 4:25pm

Quiz Instructions

Question 1 — 0 pts

Honor Pledge: Please type your name as a signature in the form.

I avow that I will not give or receive any unauthorized help on this exam, and that all work will be my own.

Question 2 — 1 pts

Consider the following task environments, show their corresponding i) PEAS} and ii) properties of task environments as shown in the Introduction slides:

1. Plowing snow on driveway

2. Translating French to English

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Question 3 2 pts

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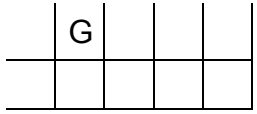

We consider the maze under windy situation as shown in the above. We assume that the wind comes from the **north**. The cost of one step for the agent is defined as follows: 1 for moving along the wind direction; 3 for moving against the wind direction; 2 for moving with the side wind cases. We assume that the square labeled with 0 is the starting square and G is the goal square and all shaded squares are obstacles. We use a label we did in class to indicates the order of choosing the corresponding unlabeled square and adding it to the frontier. To break tier for unlabeled squares (expanding children nodes), use this order: first westward; then northward; then eastward; then southward. To break tier for labeled squares (picking one child node to expand), the smallest label is picked first. Follow the same way as done in the class to show the search steps with labels (plus subscript numbers if needed) for the following search algorithms:

1. Uniform-Cost-Search (UCS)
2. Greedy Best-First Search (GBFS): We use a modified Manhattan distance used in class as the heuristic function h(n) by considering the windy situation.

Copy the above maze and paste it for each algorithm in the following form. If you can't copy the black square, you can put "#" inside instead. Fill the correct labels for each algorithm.

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Question 4 2 pts

We consider a windy 8-puzzle with the following initial state and goal state:

7	-	8
4	6	2

1	2	3
8	-	4

3	1	5

7	6	5

We assume that the windy comes from the **north**. The step cost regarding the agent's moving a non-blank tile to the neighboring blank tile is defined as follows: 1 for moving along the wind direction; 3 for moving against the wind direction; 2 for moving with the side wind cases. When adding children to an expansion node, use such order of moving the non-blank tile to the neighboring blank tiles: first the west neighboring non-blank tile; then north one; then the east one; then the south one. To break tie in picking an expansion node, use FIFO order.

Please show the partial search tree with the expansion number up to #4 (including the children of all 4 expansion nodes) for each of the following search algorithms (please follow **https://tristanpenman.com/demos/n-puzzle (https://tristanpenman.com/demos/n-puzzle/)** to draw the search tree):

1. Depth-First-Search (DFS)
2. A* Search: we follow the same way in P1 to define g(n) and h(n) but with a north wind condition

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Question 5 2 pts

We consider a Sudoku puzzle as shown in this webpage: https://www.websudoku.com/?level=2&set_id=234455 (https://www.websudoku.com/?level=2&set_id=234455) . Make sure the ID number is 234455. It has 49 open squares. Solve the puzzle with the constraint propagation through inference. Show two screenshots in your report:

1. One is an intermediate result with the number of unfilled open squares between 15 and 30;

2. The other is the final result with no open squares remaining.

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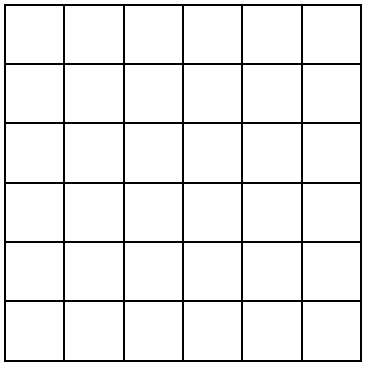
Question 6 2 pts

We consider a modified 6-Queens problem. The chessboard is with 6x6 squares with two black ones. Each black one can block any attach if it is between two queen either horizontally, vertically, or diagonally. Please use

backtracking approach to place the 6 queens so that no any pair attach each other. You only need to provide two solutions for the 6 queen placement (use Q for a queen in the chessboard).



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Question 7

2 pts

We play a Tic-Tac-Toe game. We assume you start with X and the root of the following figure. shows its current state of your game play, where next turn is you as X. Finish the game tree starting from the current state with X as MAX and O as MIN together with the minimax value at each node.

O	O	X
	X	
O	X	

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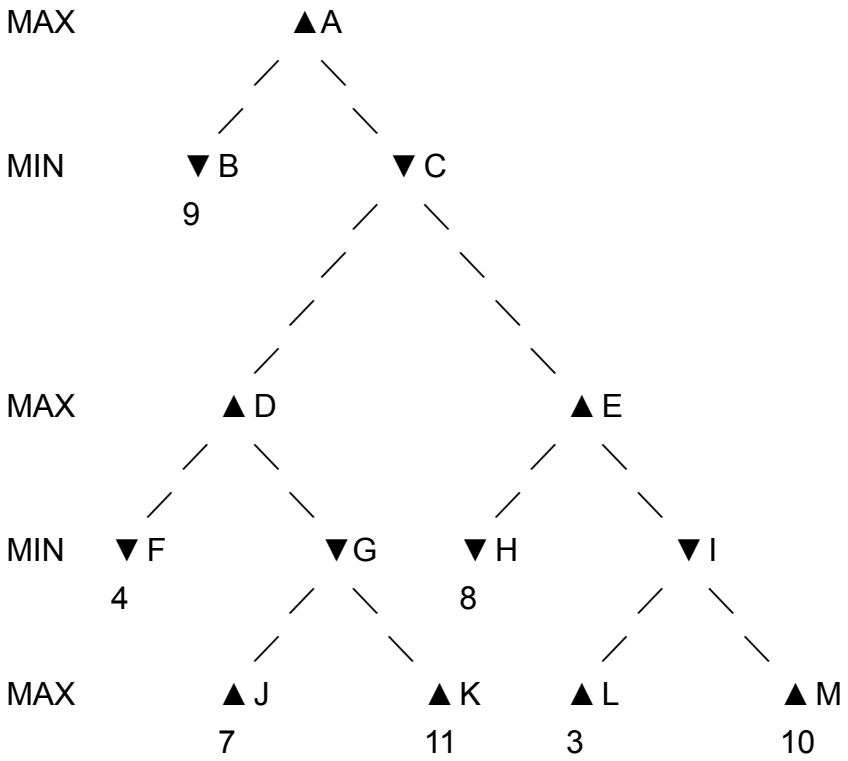
Question 8 2 pts

Consider the following game tree, where the letter next to the node is the name and the number below the node is the minmax value if any.

1. What are the values of the MAX and MIN nodes? No pruning is used here.
2. Cross out the node(s) whose exact value(s) the alpha-beta pruning method never determines, assuming that the

right child is added to the frontier first and the left child is expanded or returns utility (if terminal node) first.



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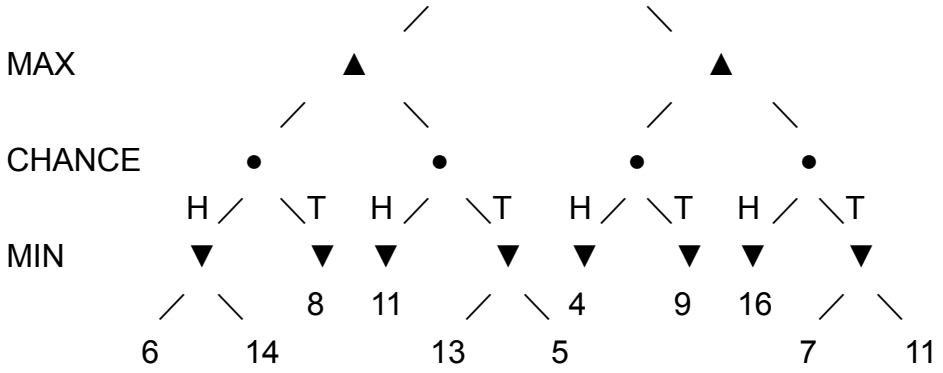
Question 9 1 pts

Consider the following game tree for a stochastic coin-flipping game. This is an uneven coin-flipping: for each coin flipping, head (H) will show up with 75% while tail (T) showing up with 25%. Obtain the value at each node.

CHANCE •

H ／ ＼T



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Question 10 — 0 pts

If you prefer to submit all your image solutions as one file, you can submit it here. Please use word or pdf file format.

Upload Choose a File

Quiz saved at 4:26pm Submit Quiz