CSC 384 Test 2 on Game AI

Friday, October 7, 2022

Last Name: _____

First Name: _____

Email: _____

1. **(6 marks total)** For each scenario below, what extension to A* would be the best approach to address that scenario?
   Circle all the correct answers.

   1.1. (2 marks) There are too many places in this level where the AI agent could be standing, making the A* state space too big to manage.

   a) Iterative A*
   b) Navigation mesh
   c) Subgoals
   d) Influence maps
   e) Common sense

   1.2. (2 marks) The AI agent is trying to navigate toward a moving goal.

   a) Iterative A*
   b) Navigation mesh
   c) Subgoals
   d) Influence maps
   e) Common sense

1.3. (2 marks) While navigating toward a goal, the AI agent needs to steer away from the edges of a cliff.

a) Iterative A*

b) Navigation mesh

c) Subgoals

d) Influence maps

e) Common sense

2. **(6 marks total)** Consider the following lines from the Assignment 2 handout. For each line, fill in the blank with one of the 5 properties below.

   Two-Player, Finite, Zero-Sum, Deterministic, Perfect-Information

   If there are multiple correct answers, give any one of them.

   2.1. (2 marks) "Checkers is a game where one player's pieces are black, and the other player's pieces are red."

   _____

   2.2. (2 marks) "One player has 12 red pieces, and the other player has 12 black pieces. The pieces are placed on the dark squares of the board across the first three rows on each side."

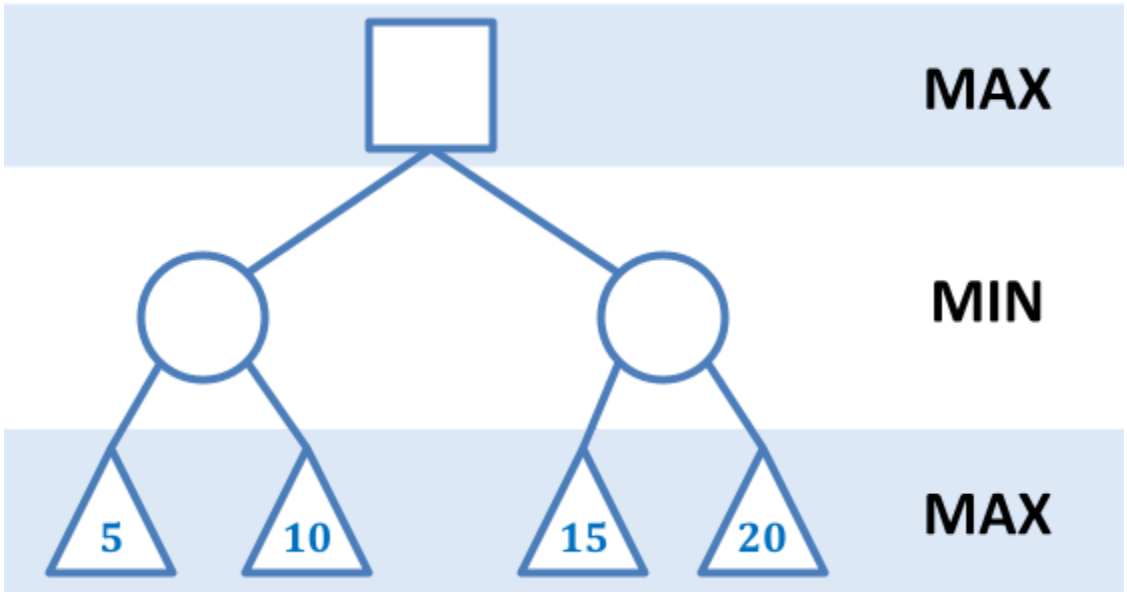
   _____

   2.3. "Each piece can only move forward diagonally in two ways: one space, if the adjacent space is empty, or two spaces if the adjacent space is occupied by the opponent, and space beyond that is empty." (2 marks)

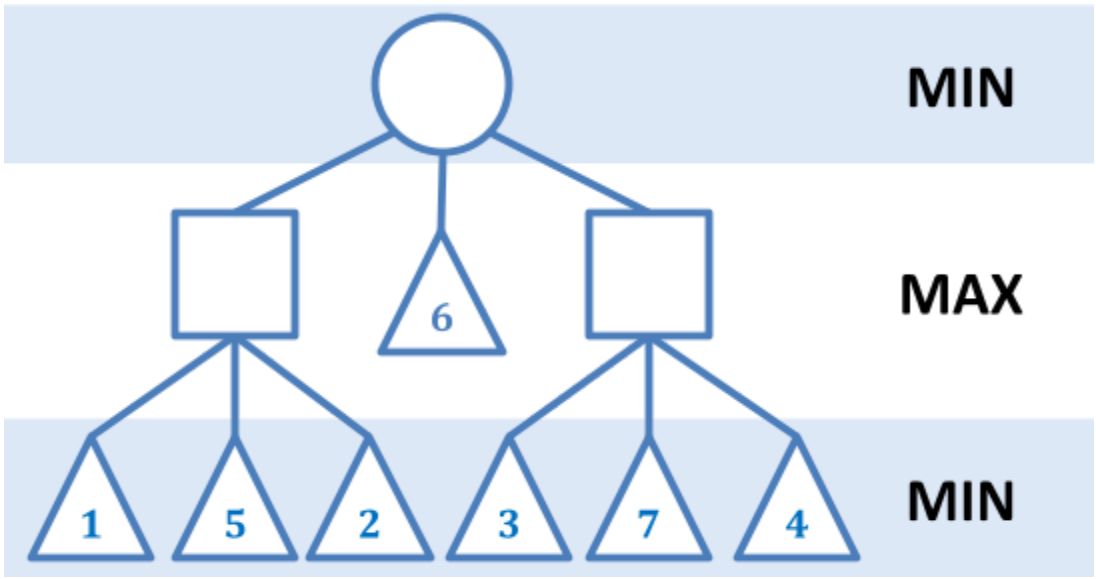
   _____

3. **(12 marks total)** The diagrams below represent game search trees with utility values in the terminal nodes. Using the **minimax** strategy, fill in the utility values for the empty nodes.

3.1. (6 marks)



3.2. (6 marks)



4. **(12 marks)** The following diagrams represent game search trees with utility values in the terminal nodes.

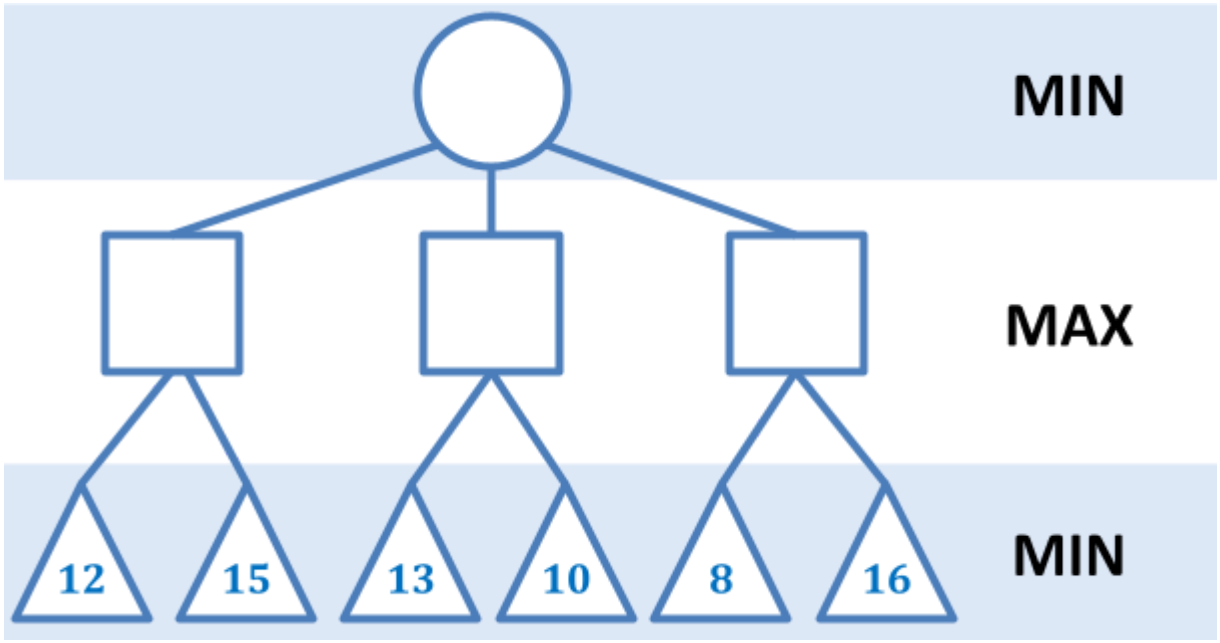
   We will apply **Depth-First Search from left to right**,

   (1) fill in the utility values for the empty nodes, and

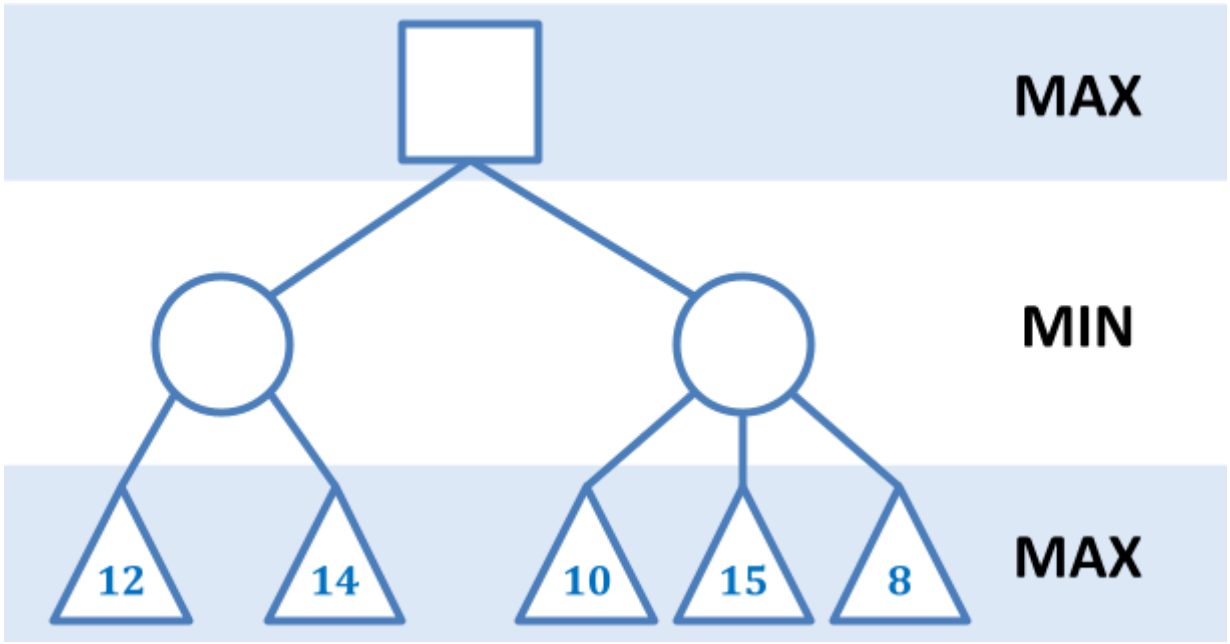
   (2) cross out the branches pruned with alpha-beta pruning.

   Most of the marks will be for the correct pruning.

4.1.



4.2.



4.3.