CSC 384 Winter 2023 Test 2 Version A

February 13 and 14, 2023

Last Name: _____

First Name: _____

Email: _____

Q1 (4 marks)

Q1.1 (1 mark) Which is a **multiplayer** game? Circle the best answer.

A. Checkers
B. The Huarongdao sliding puzzle
C. Rubik's cube

Q1.2 (1 mark) Which is a **stochastic** game? Circle the best answer.

A. Tic Tac Toe
B. Monopoly
C. Chess

Q1.3 (1 mark) Which is an **imperfect-information** game? Circle the best answer.

A. Poker
B. Chess
C. Go

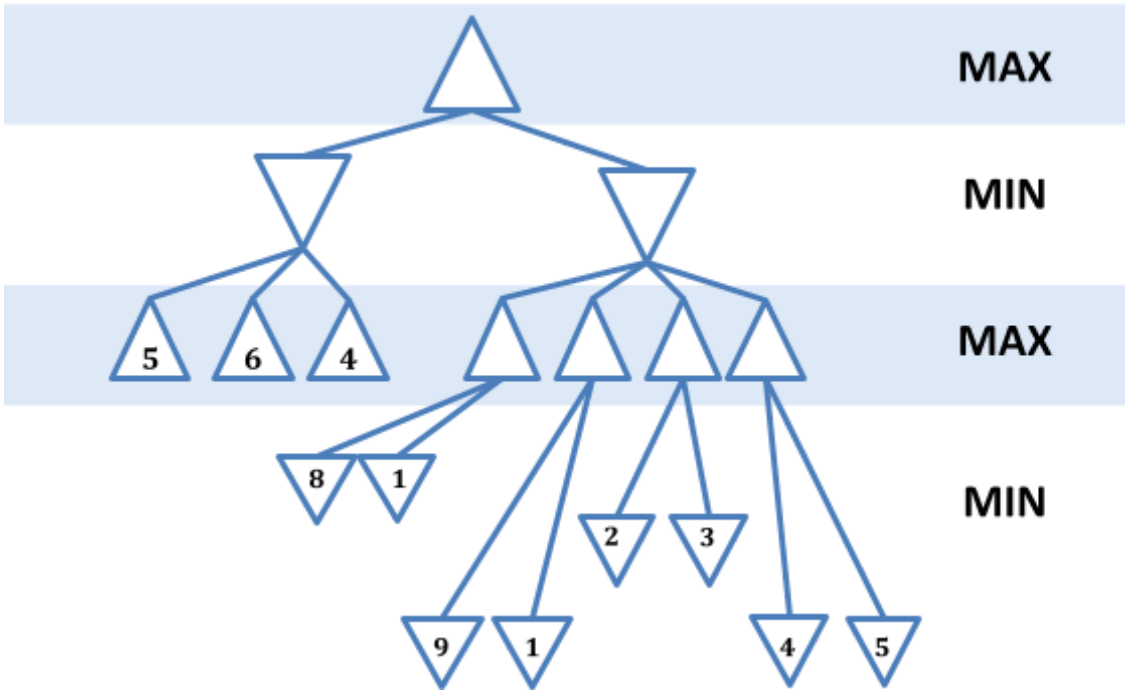
Q1.4 (1 mark) Consider the game below. Player A has two actions: Up and Down. Player B has two actions: Left and Right. In each cell, the two numbers specify player A's and B's utility, respectively. For example, if player A chooses Up and player B chooses Left, player A gets a utility of 2, and player B gets a utility of 3.

		Player B	
		Left	Right
Player A	Up	2, 3	1, 1
	Down	1, 1	3, 2

Is this a **constant-sum** game? YES OR NO

Justify your answer in at most two sentences:

Game Tree 1 Below



Q2 (4 marks)

Perform **Minimax search** with **NO Alpha-Beta Pruning** on **Game Tree 1** above.

Q2.1 (2 marks) Fill in the minimax value of every node.

Q2.2 (1 mark) How will the **results** differ if we used **Depth-First Minimax** instead of regular **Minimax** for Game Tree 1? Explain in one sentence.

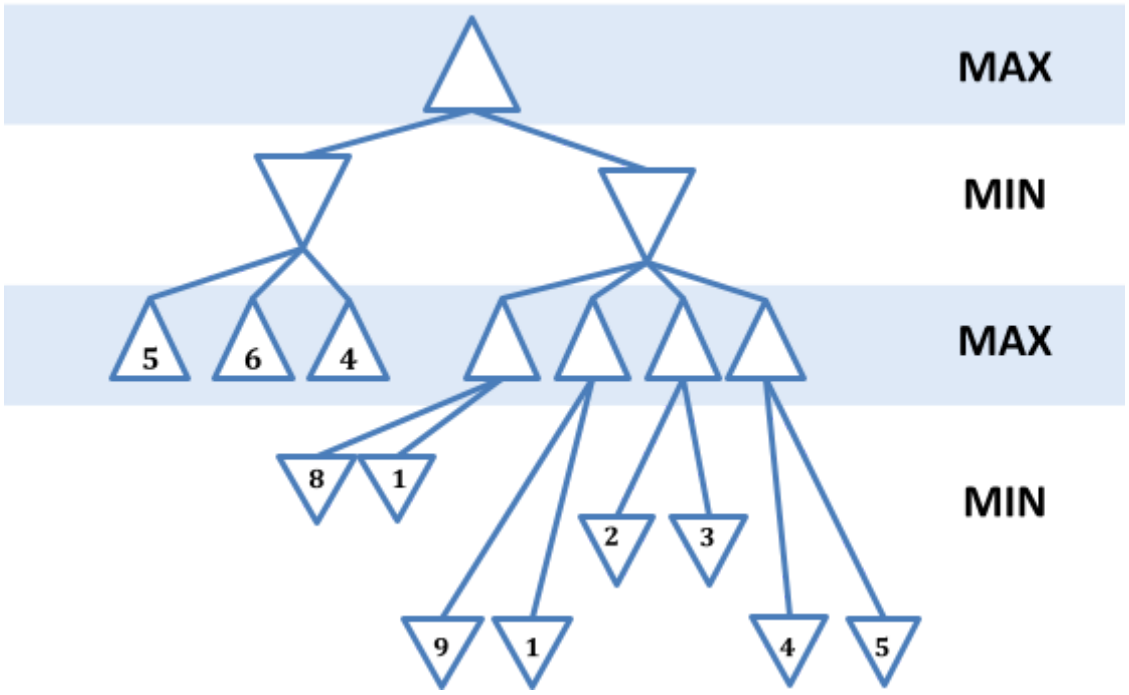
Q2.3 (1 mark) How will the **performance** differ if we used **Depth-First Minimax** instead of regular **Minimax** for Game Tree 1? Explain in one sentence.

Q3 (6 marks)

Consider Game Tree 1 below. Perform **Alpha-Beta Pruning from left to right**.

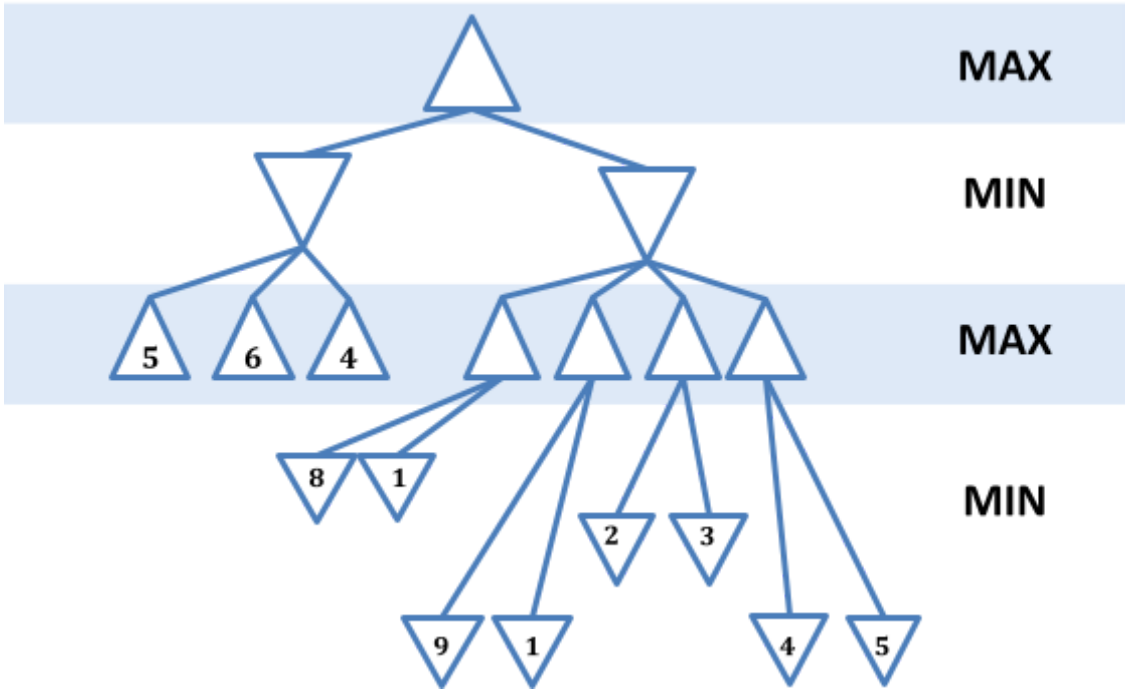
Circle all the **terminal** nodes that are **pruned** (**NOT visited**).

Copy of Game Tree 1 Below

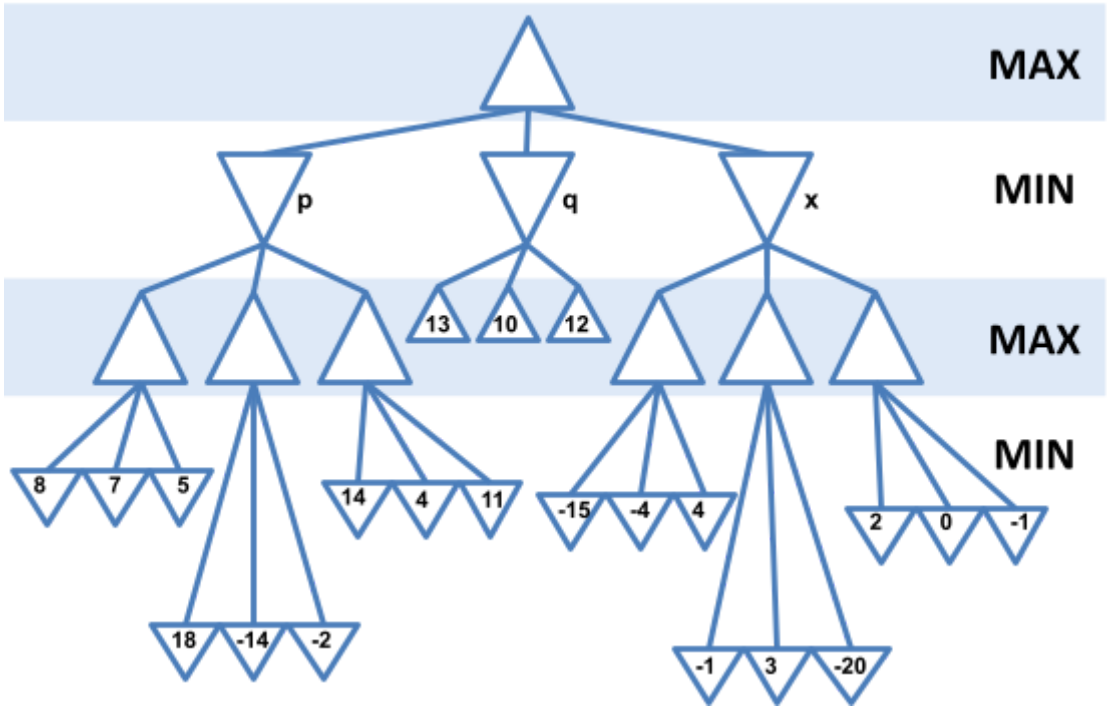


There is no question on this page. Feel free to use this page for your rough work.

Copy of Game Tree 1 Below



Game Tree 2 Below



Q4 (8 marks)

Consider **Game Tree 2** above.

Q4.1 (6 marks) Execute **Alpha-Beta Pruning** from **left** to **right**. Circle all the **terminal** nodes that are **pruned (not visited)**.

Q4.2 (2 marks)

How can we re-order **p, q, and x** to **maximize** the number of terminal nodes pruned by Alpha-Beta Pruning? Write down the new order below. When reordering p, q, and x, the order of their descendants remains the same.

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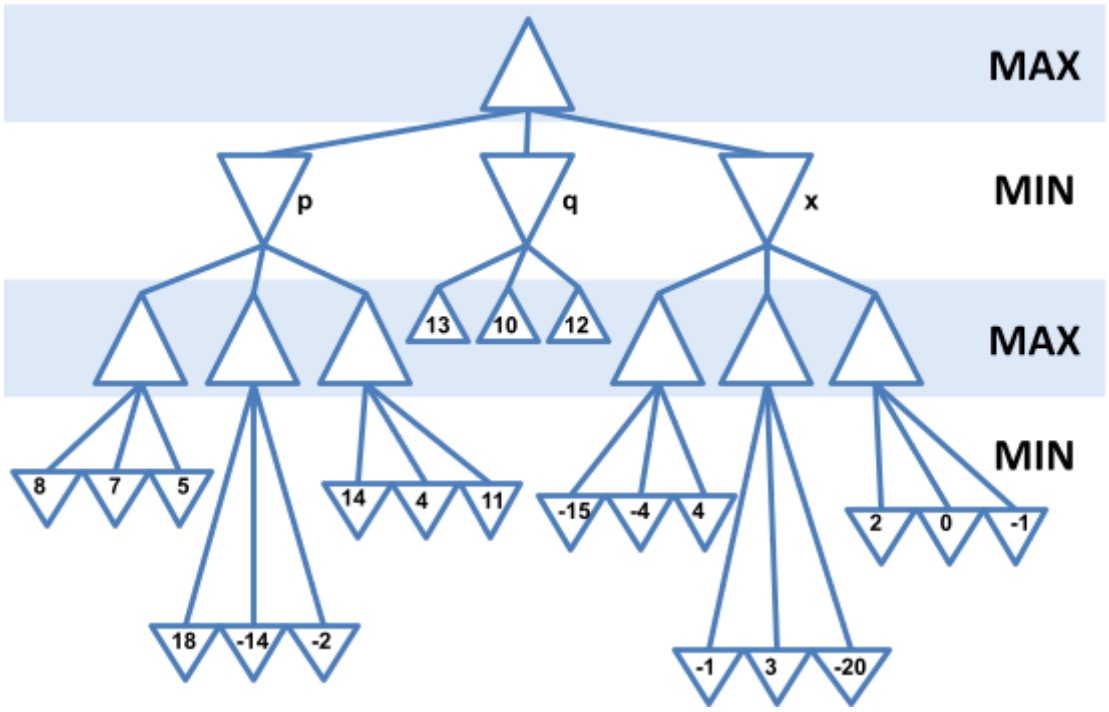
Copy of Game Tree 2 Below



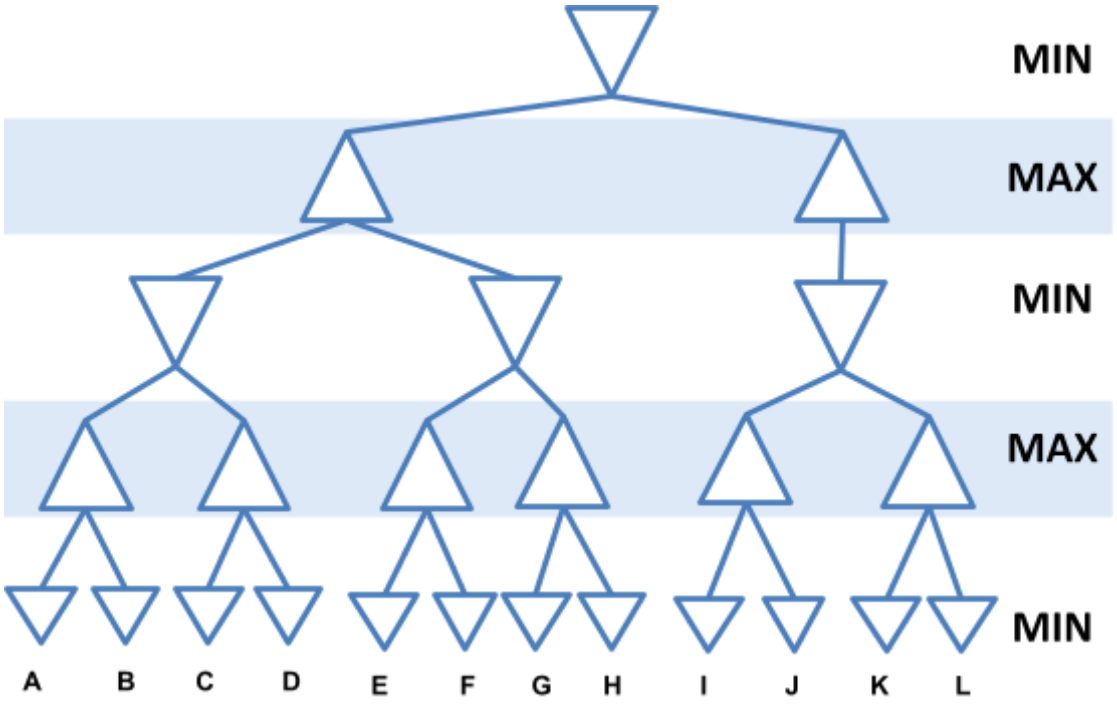
Q5 (4 marks)

Consider **Game Tree 3** below. The values of the terminal states are unknown. You can make the following assumptions:

- All the nodes have been ordered such that **Alpha-Beta Pruning from left to right** will prune the **maximum** number of terminal nodes.
- The utility values of all the terminal nodes are all different.

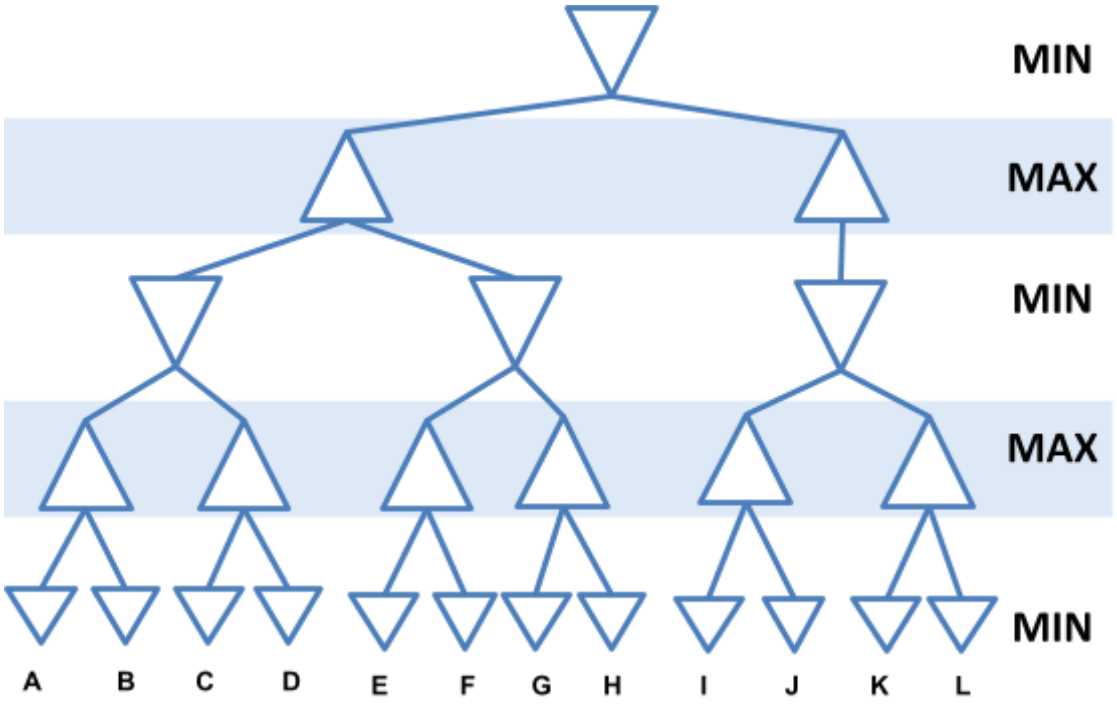
Circle all the **terminal** nodes that will be **pruned** (**NOT visited**).

Game Tree 3 Below



There is no question on this page. Feel free to use this page for your rough work.

Copy of Game Tree 3 Below



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