CSC 384 Winter 2023 Test 2 Version B

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. 8-puzzle
B. Rubik's cube
C. Chess

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

A. Monopoly
B. Checkers
C. Tic Tac Toe

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

A. Checkers
B. Go
C. Poker

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 Right, player A gets a utility of 5, and player B gets a utility of 4.

		Player B	
		Left	Right
Player A	Up	6, 6	5, 4
	Down	4, 5	6, 6

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

Justify your answer in at most two sentences:

Game Tree 1 Below
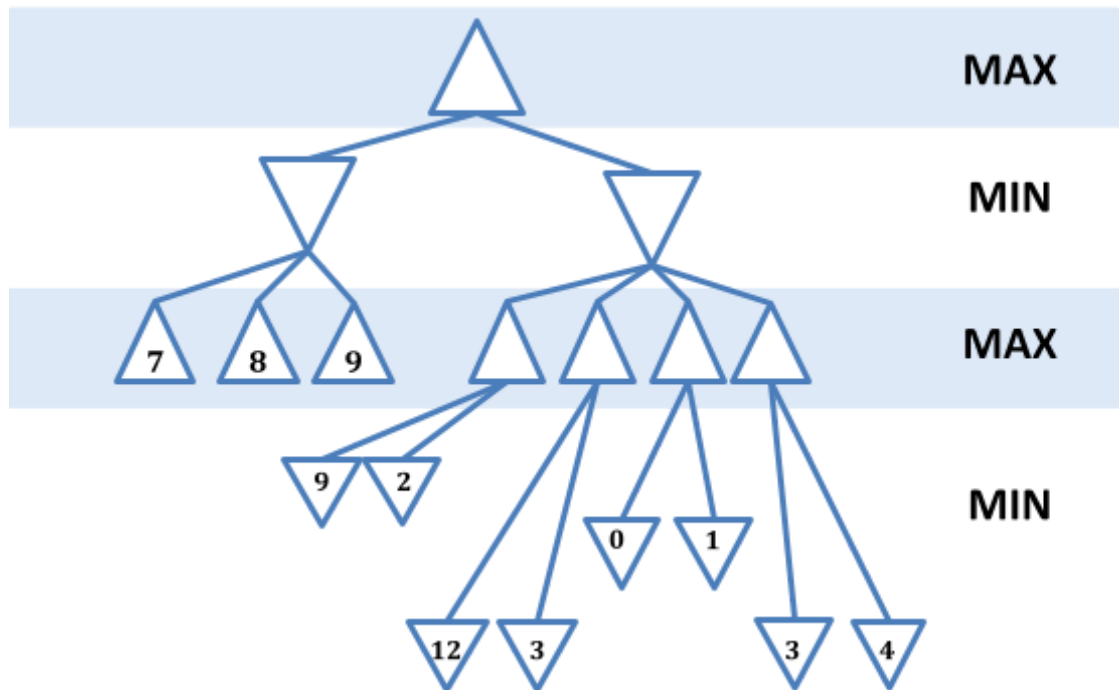
Q2 (4 marks)

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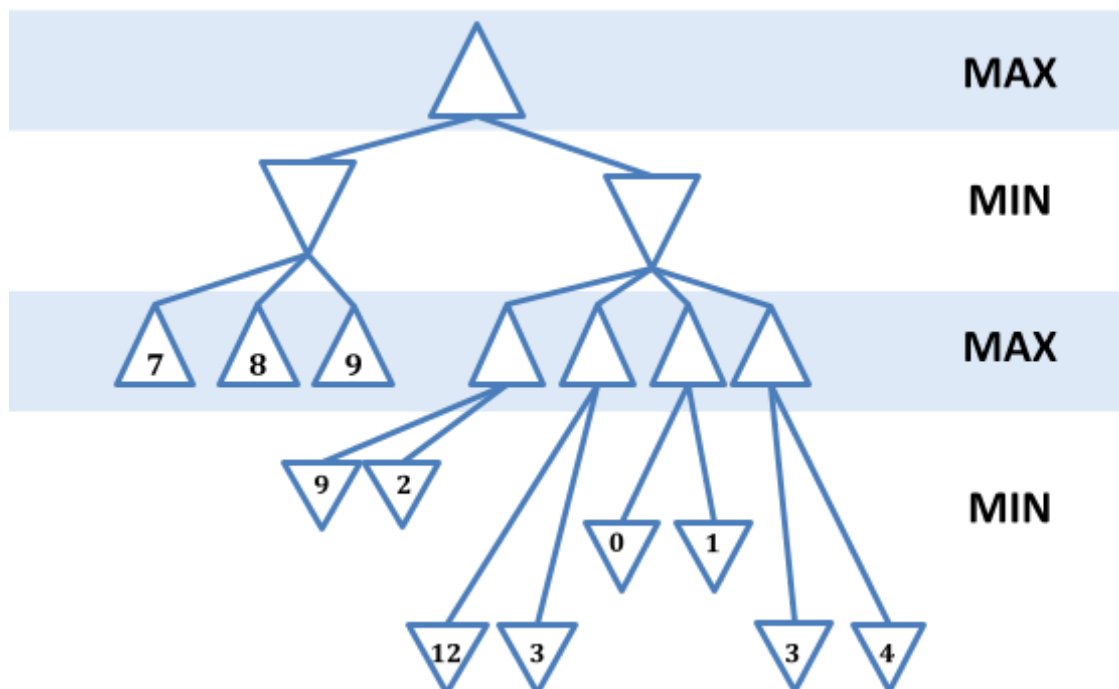
Q2.3 (1 mark) How will the **performance** differ if we used **Depth-First Minimax** instead of regular **Minimax** for Game Tree 1? Explain in one sentence.

Q3 (6 marks)

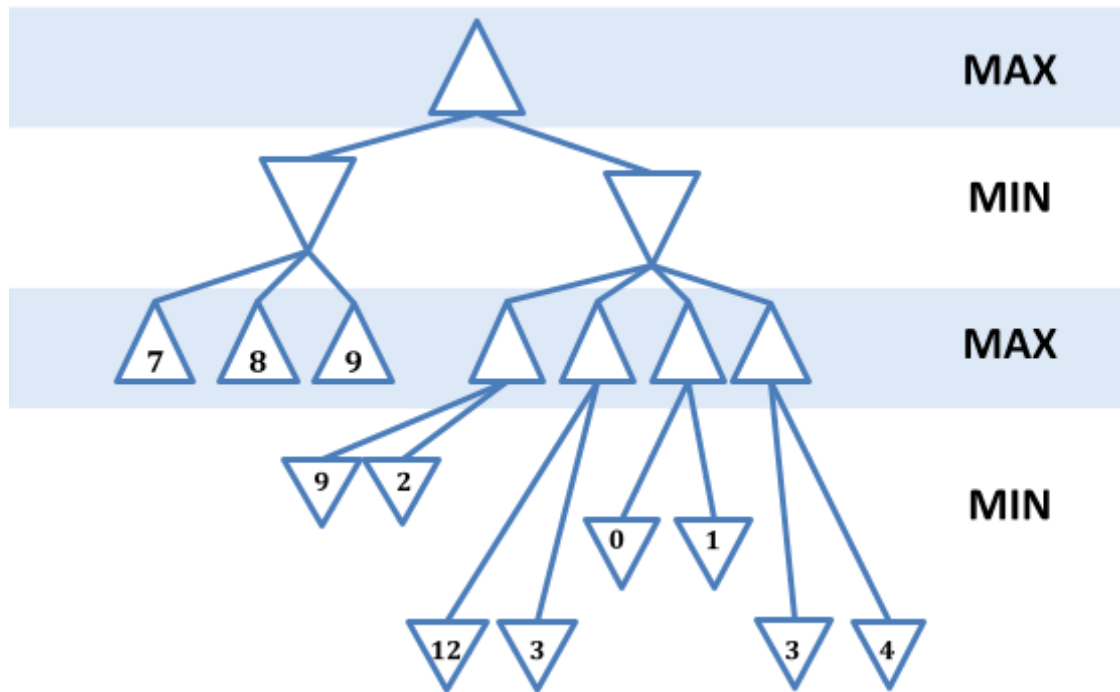Consider Game Tree 1 below. Perform **Alpha-Beta Pruning from left to right**.

Circle all the **terminal** nodes that are **pruned** (**NOT visited**).
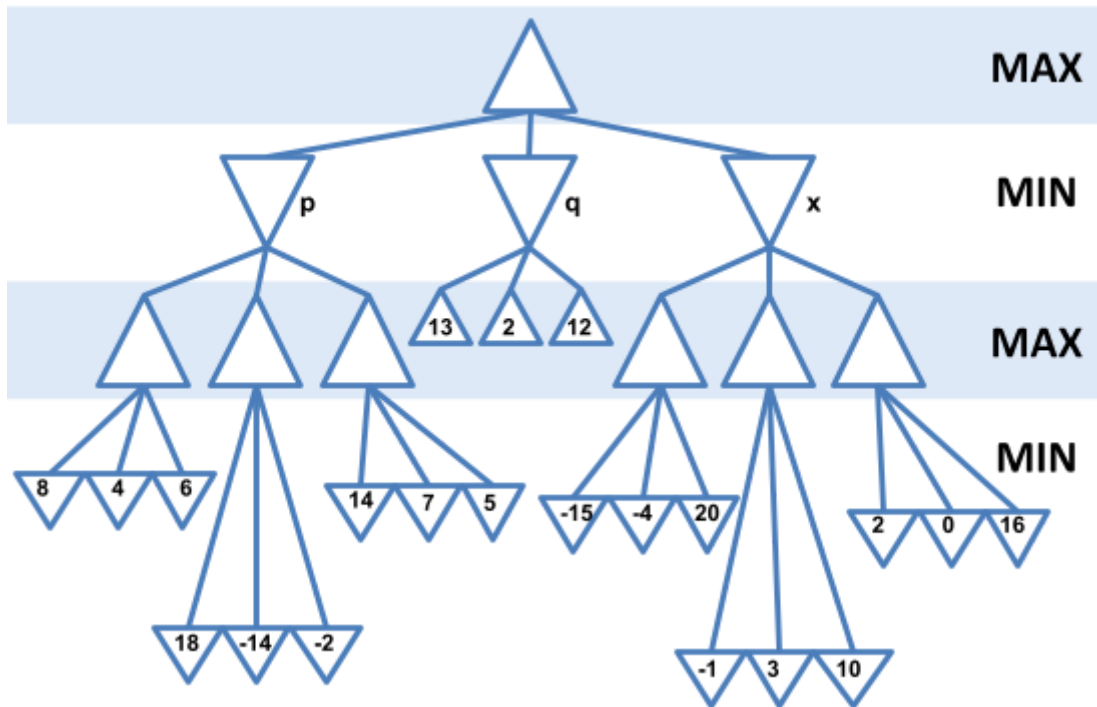
Copy of Game Tree 1 Below

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

Copy of Game Tree 1 Below

Q4 (8 marks)

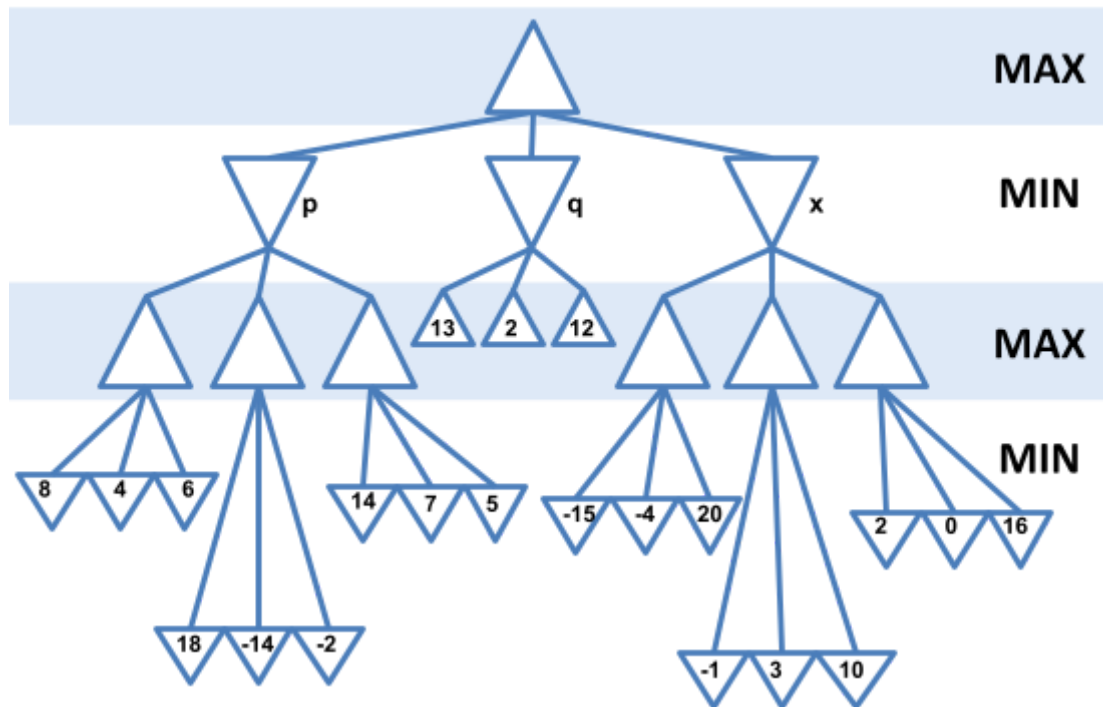Consider **Game Tree 2** above.

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.

There is no question on this page. Feel free to use this page for your rough work.
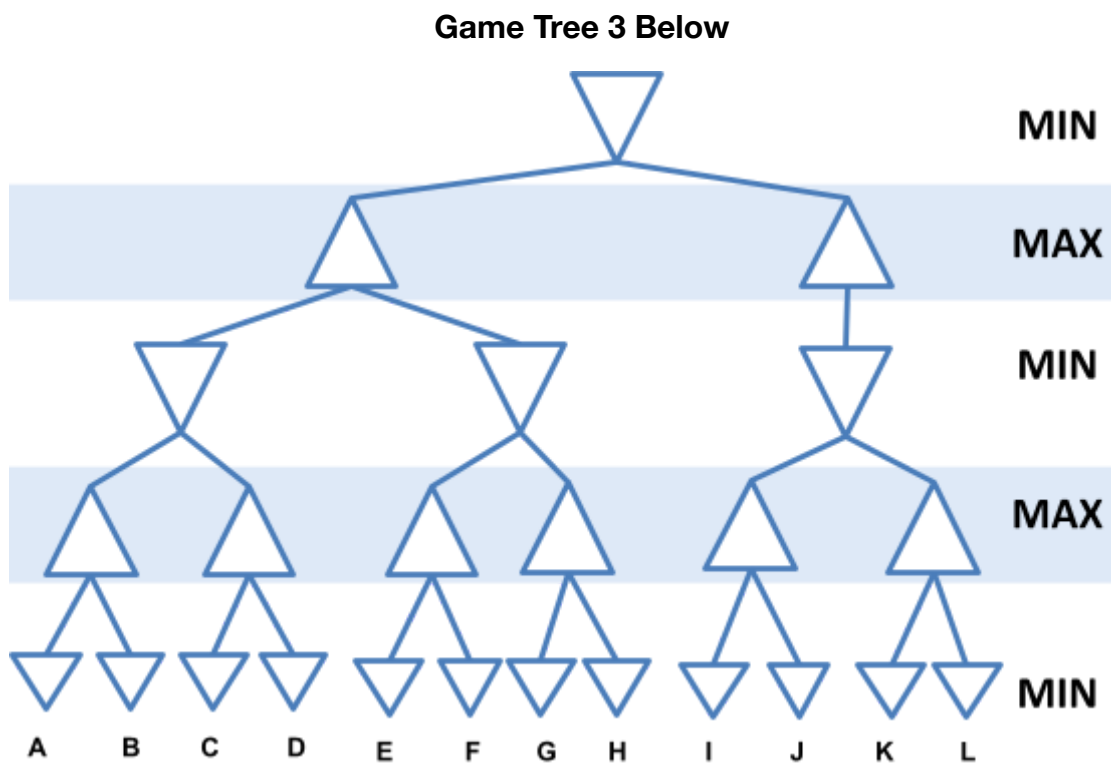
Copy of Game Tree 2 Below

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

MIN

MAX

MIN

MAX

MIN

A   B   C   D   E   F   G   H   I   J   K   L

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

Copy of Game Tree 3 Below
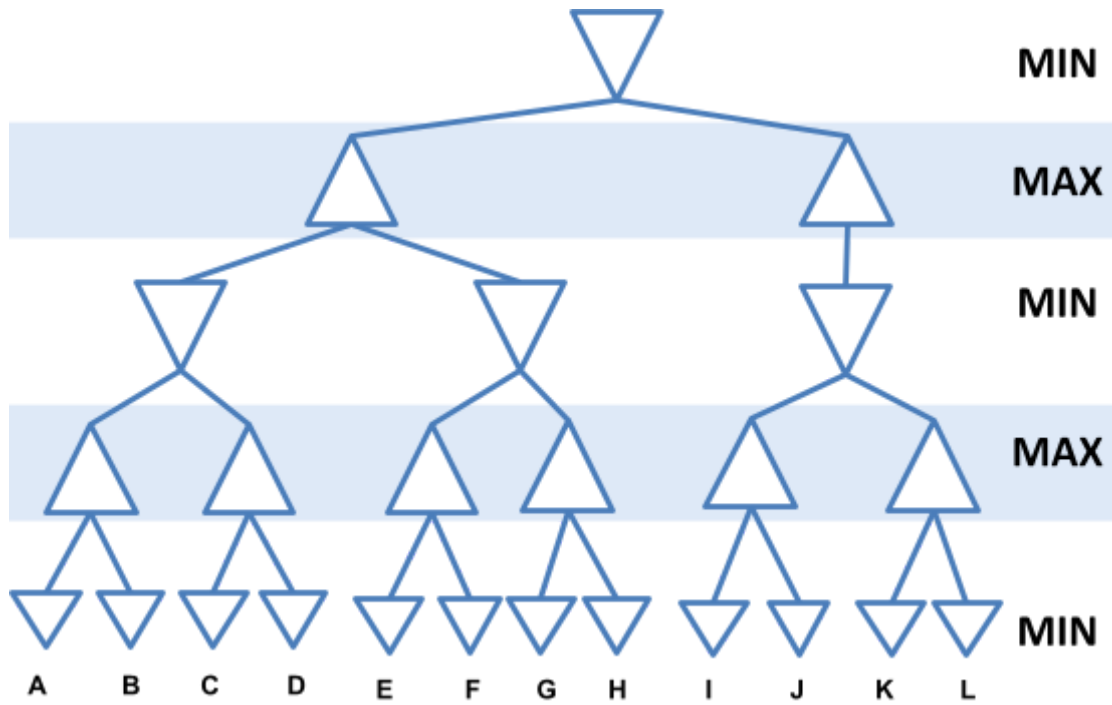
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