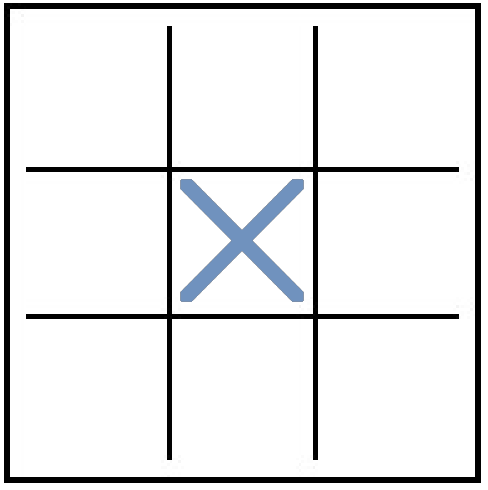
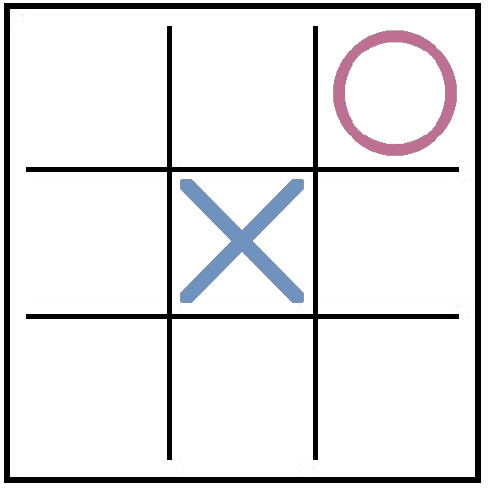
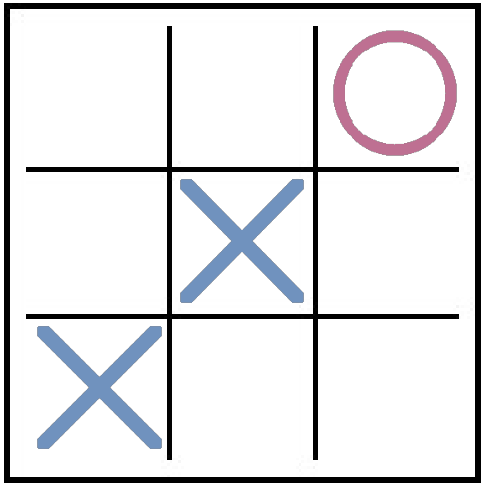
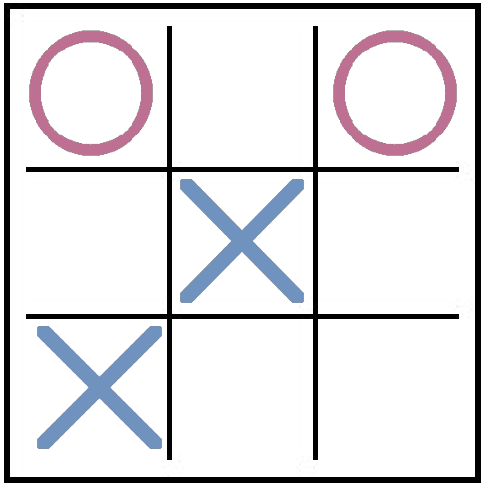
Super Noughts & Crosses AI

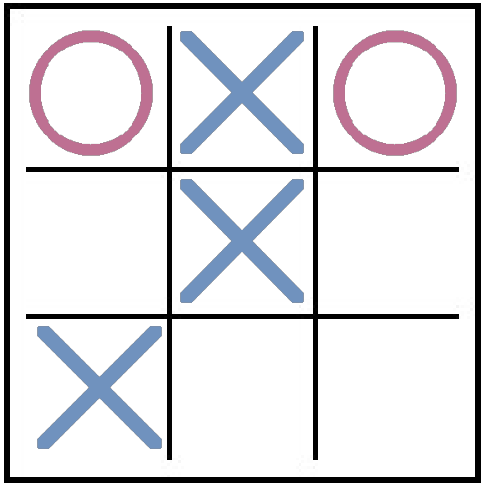
Thomas Richards

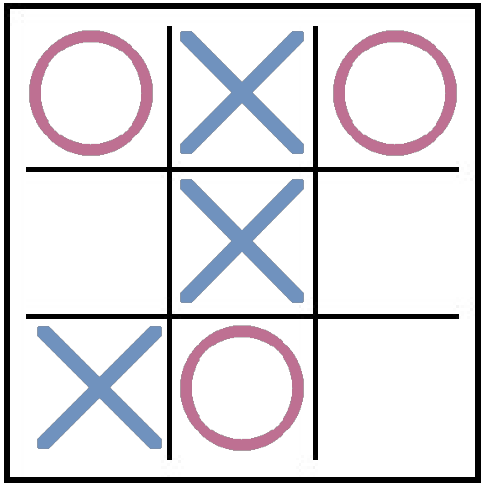


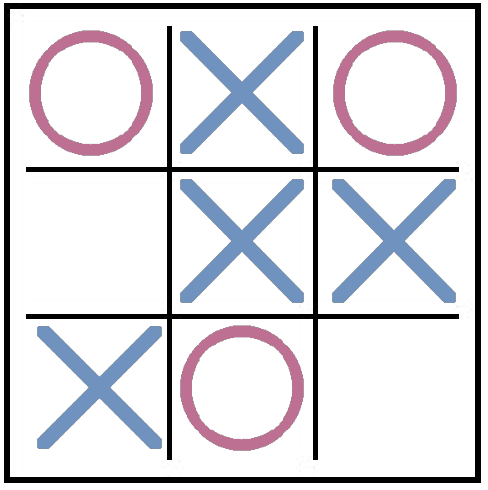


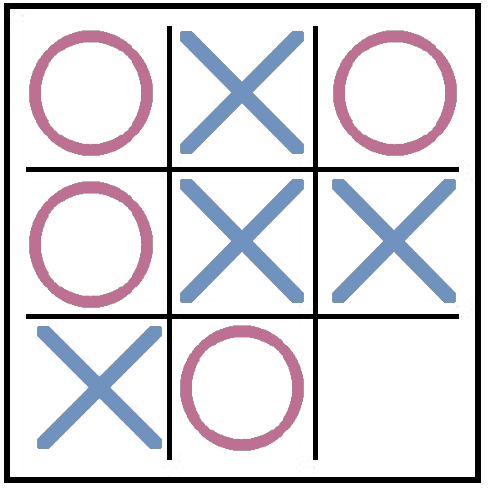


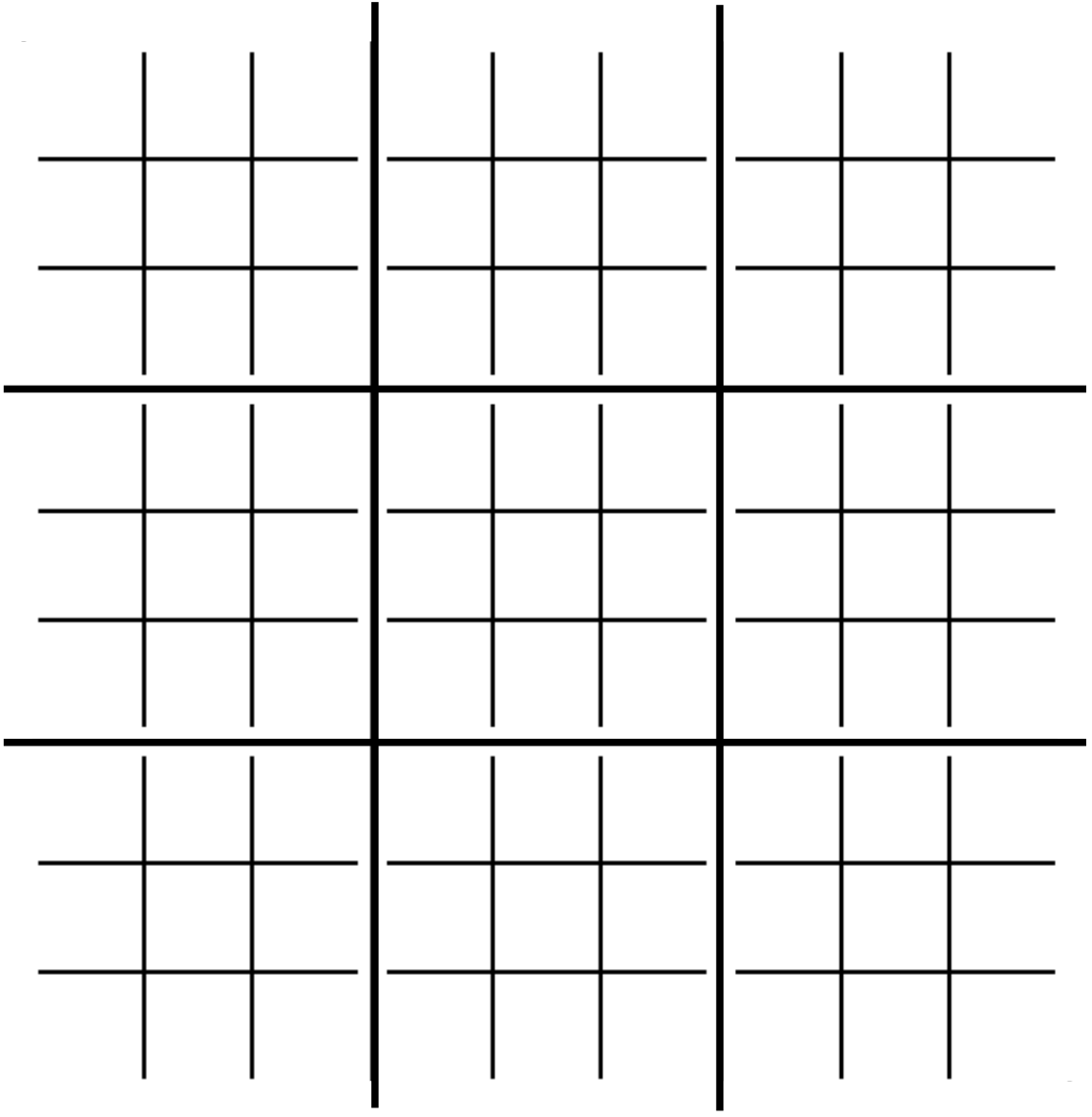


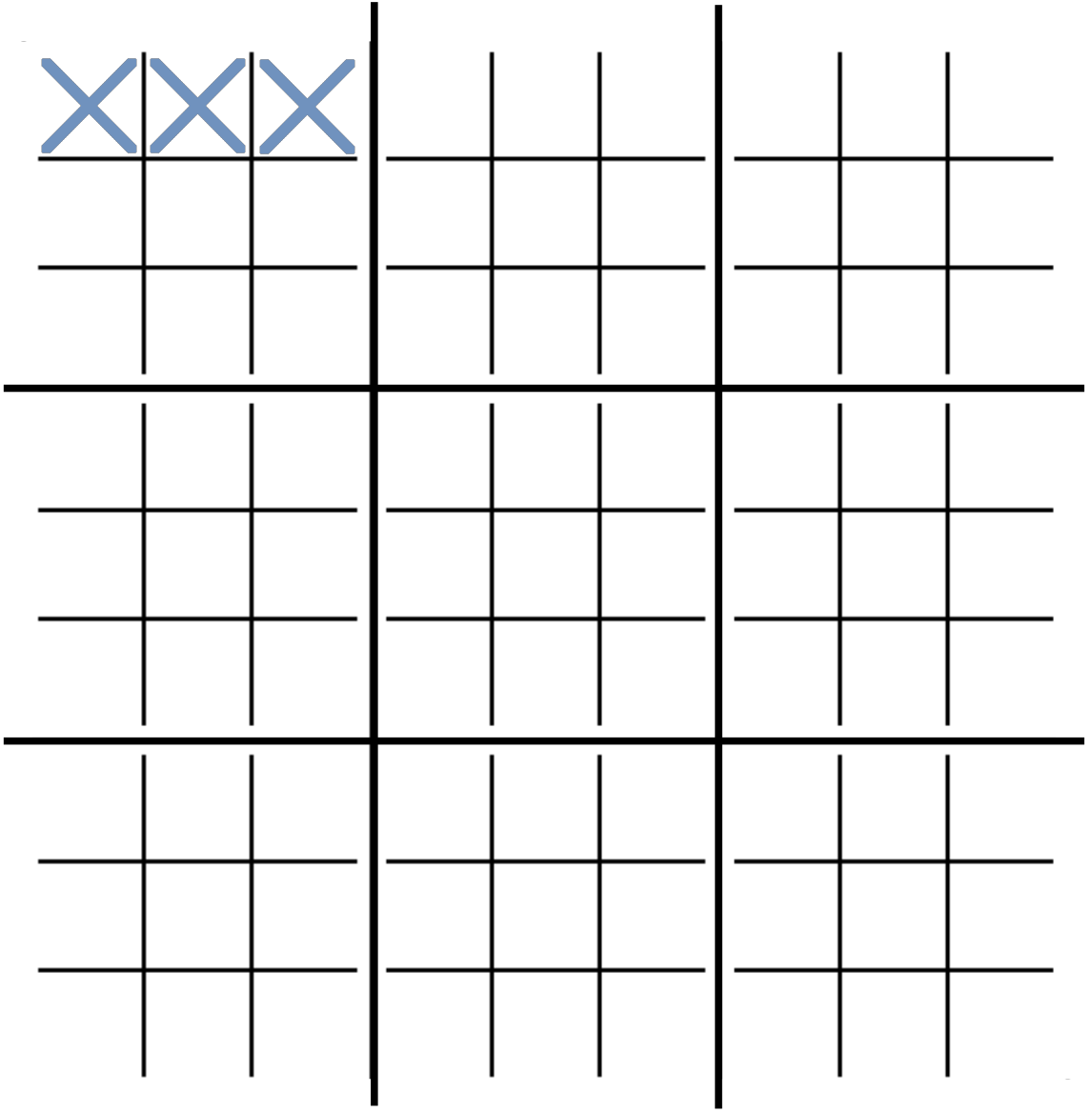


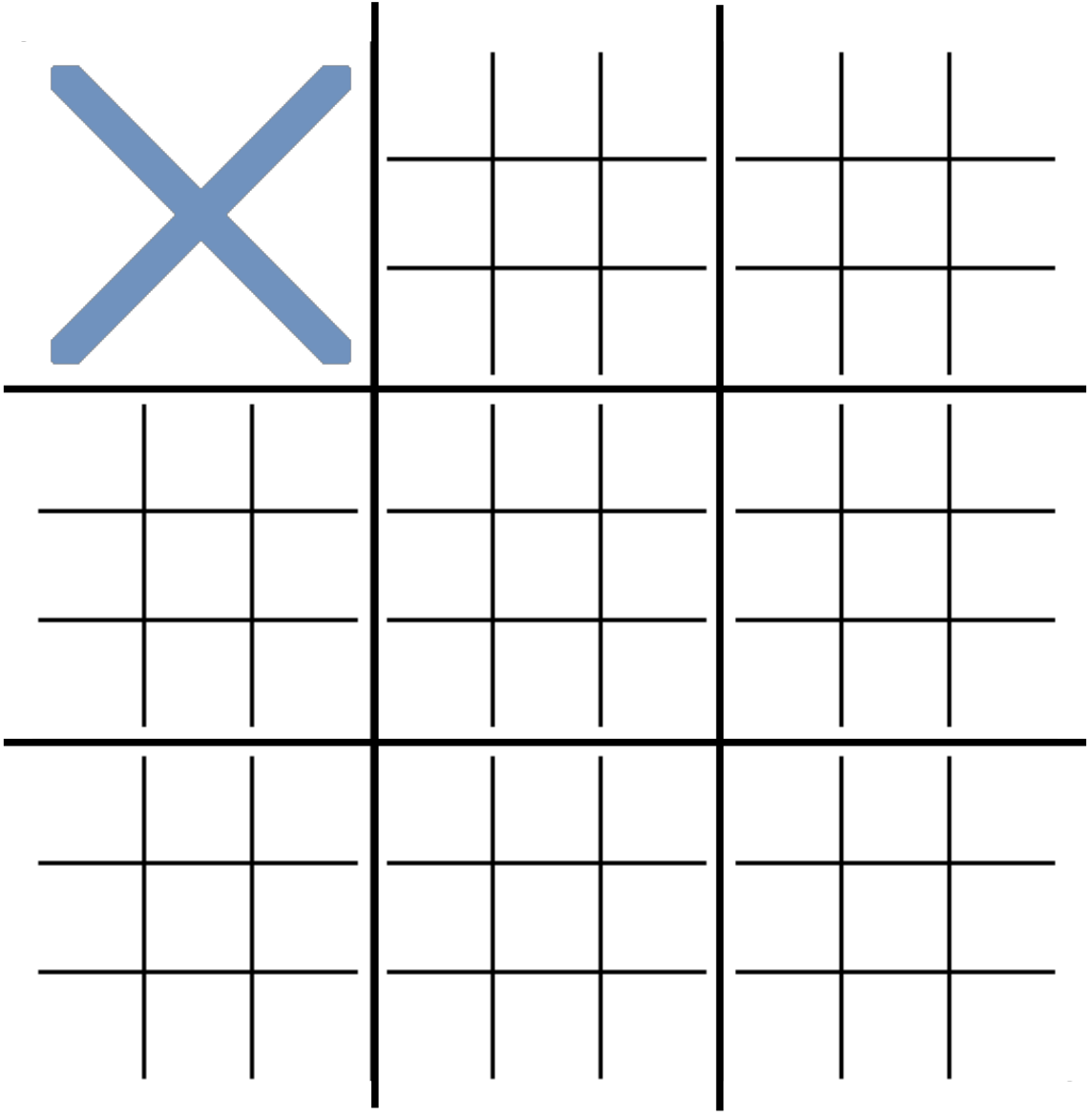


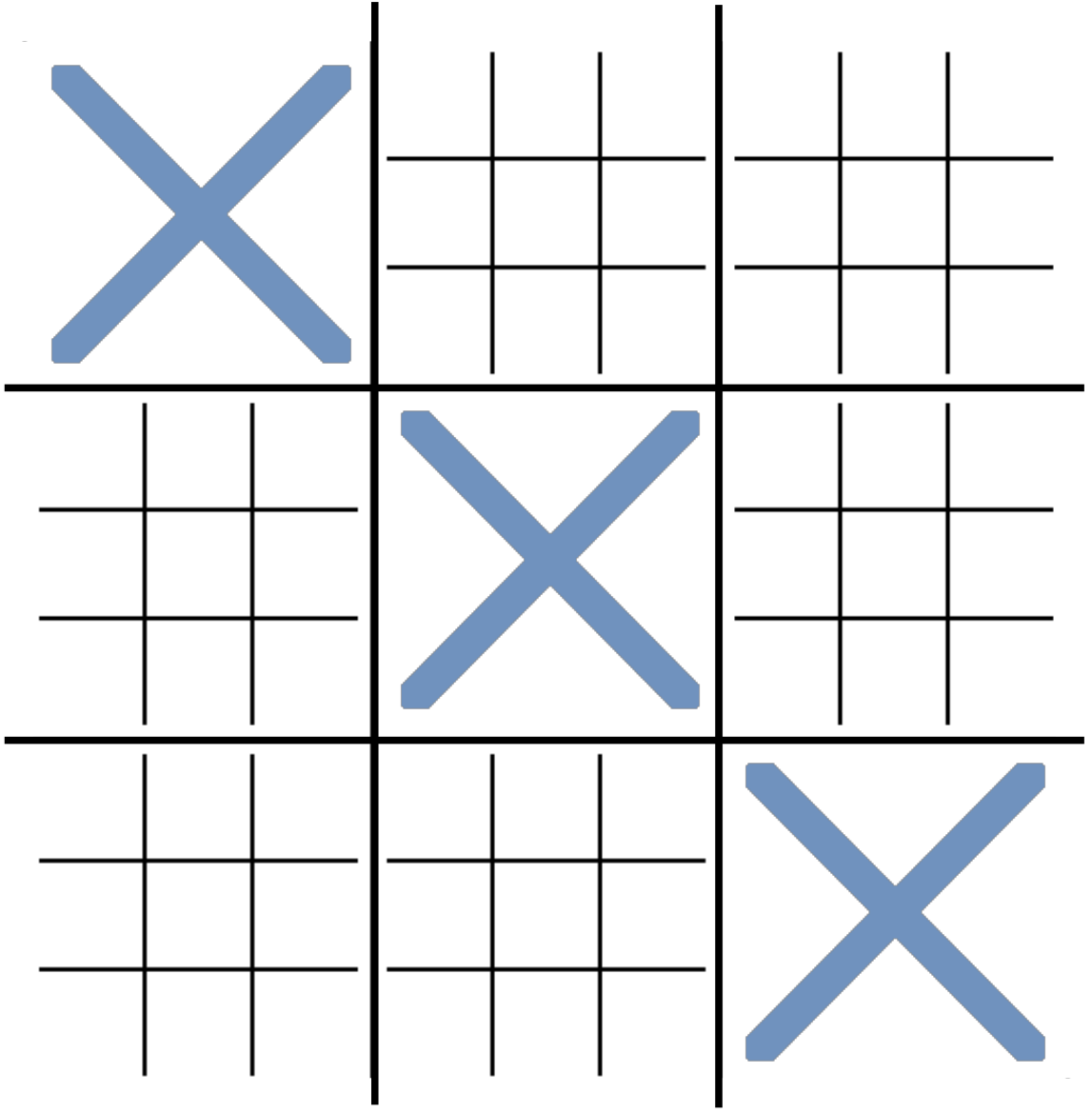


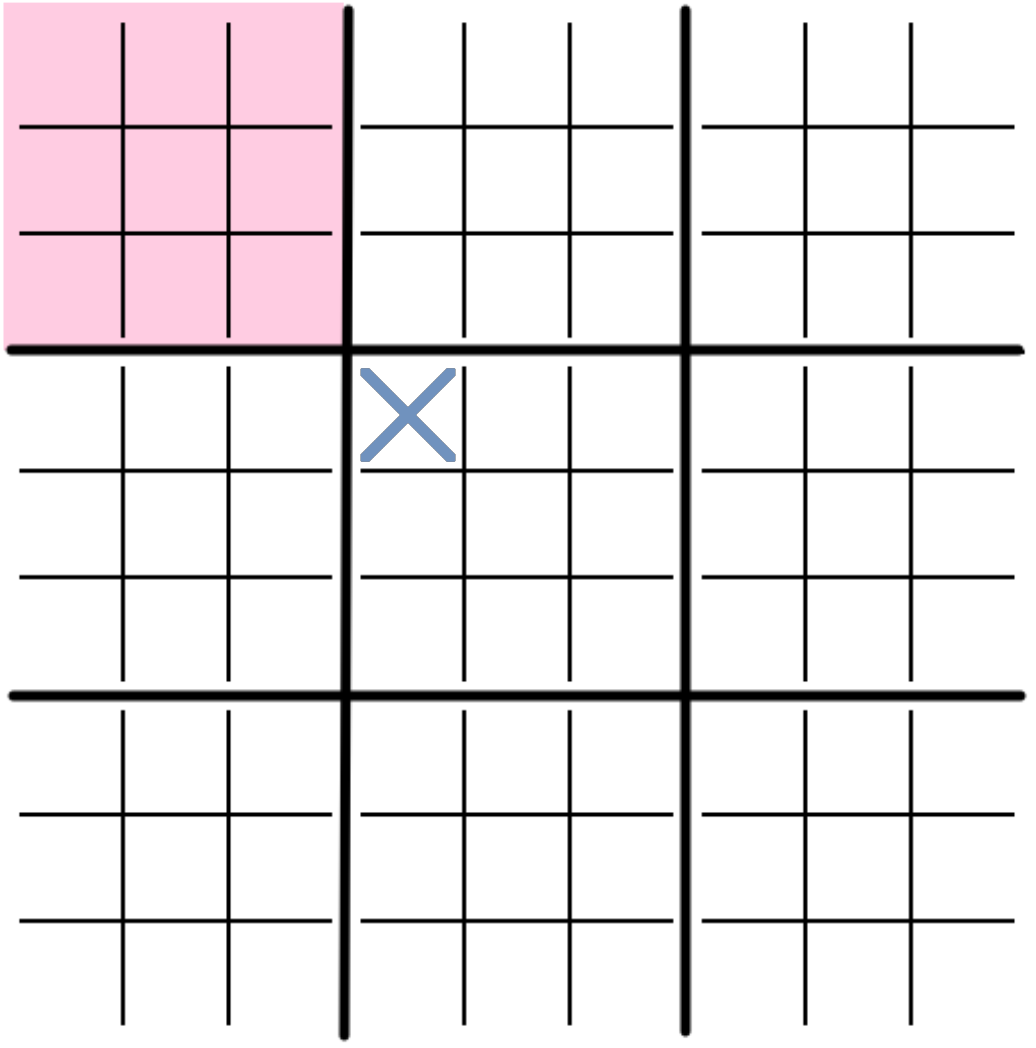


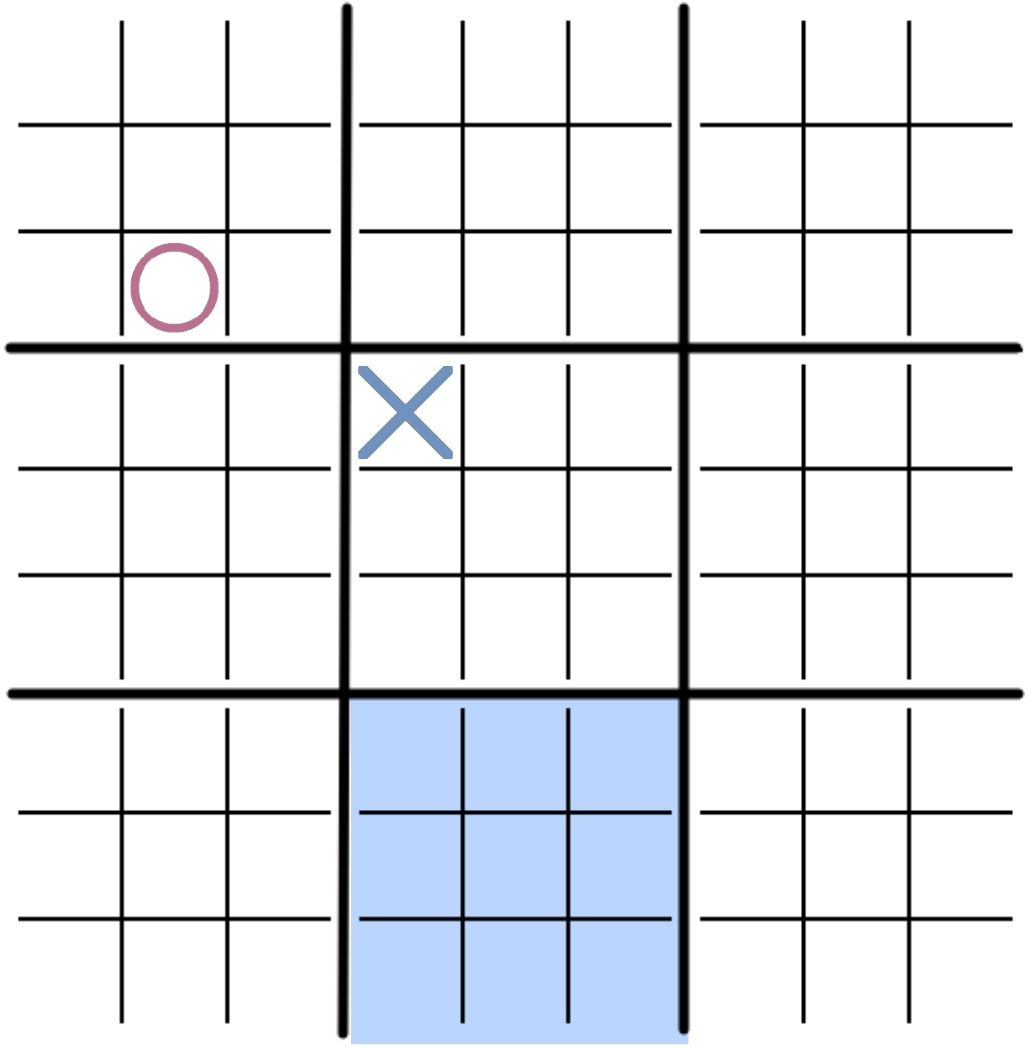


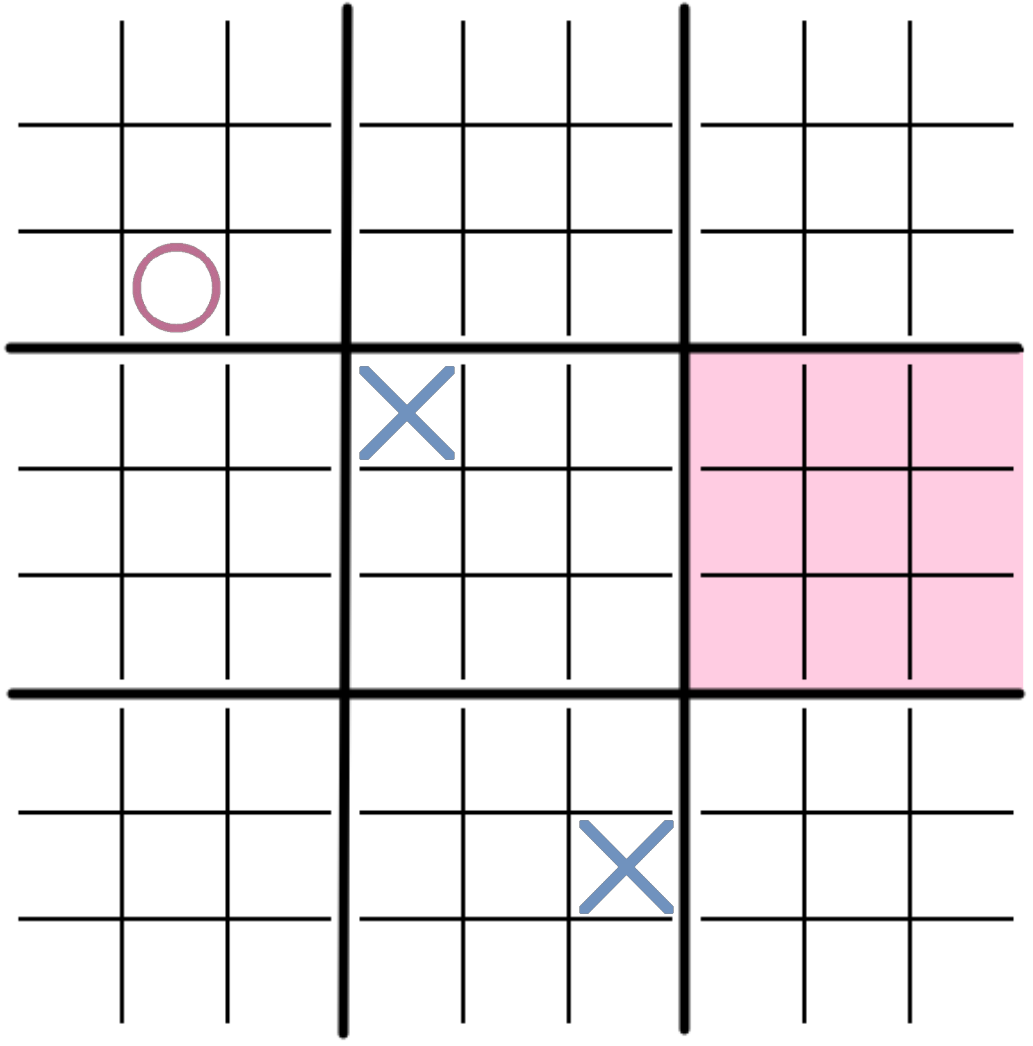


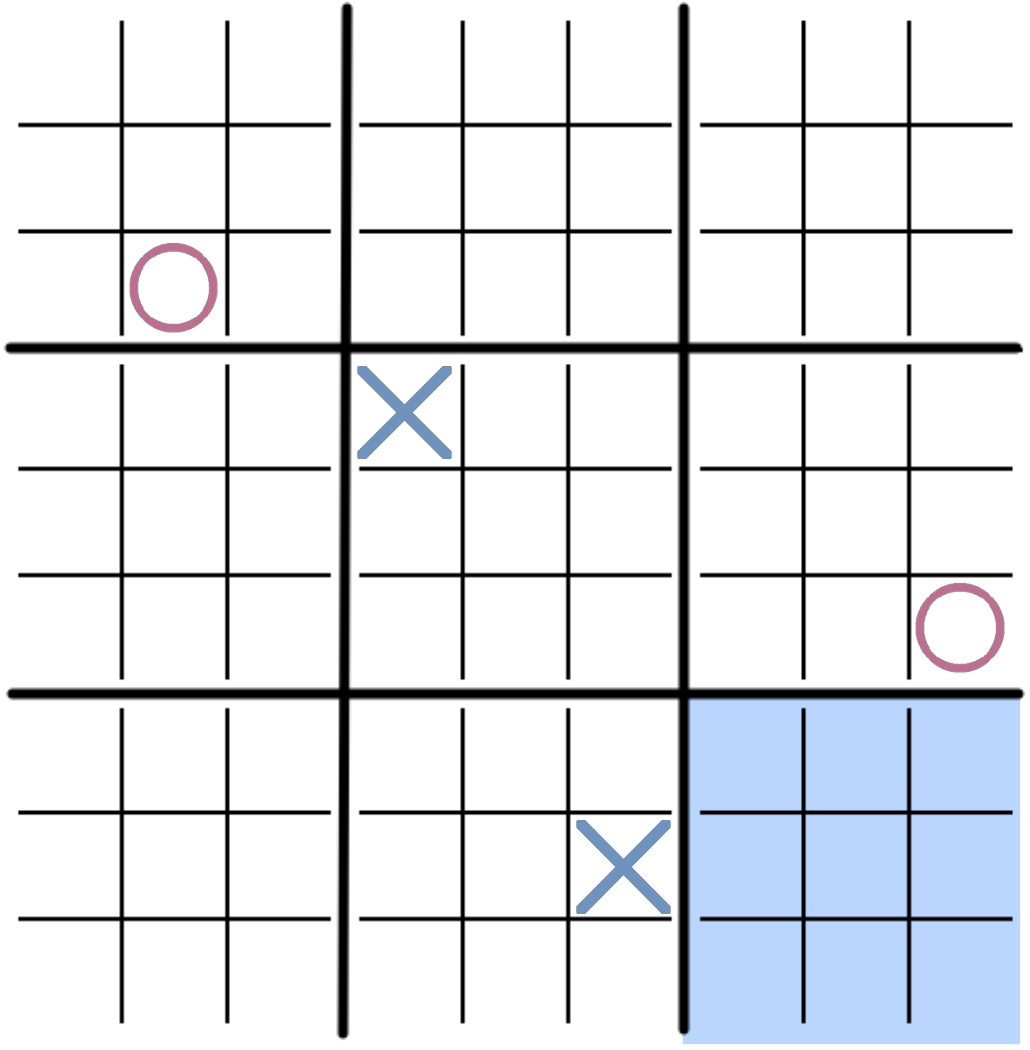


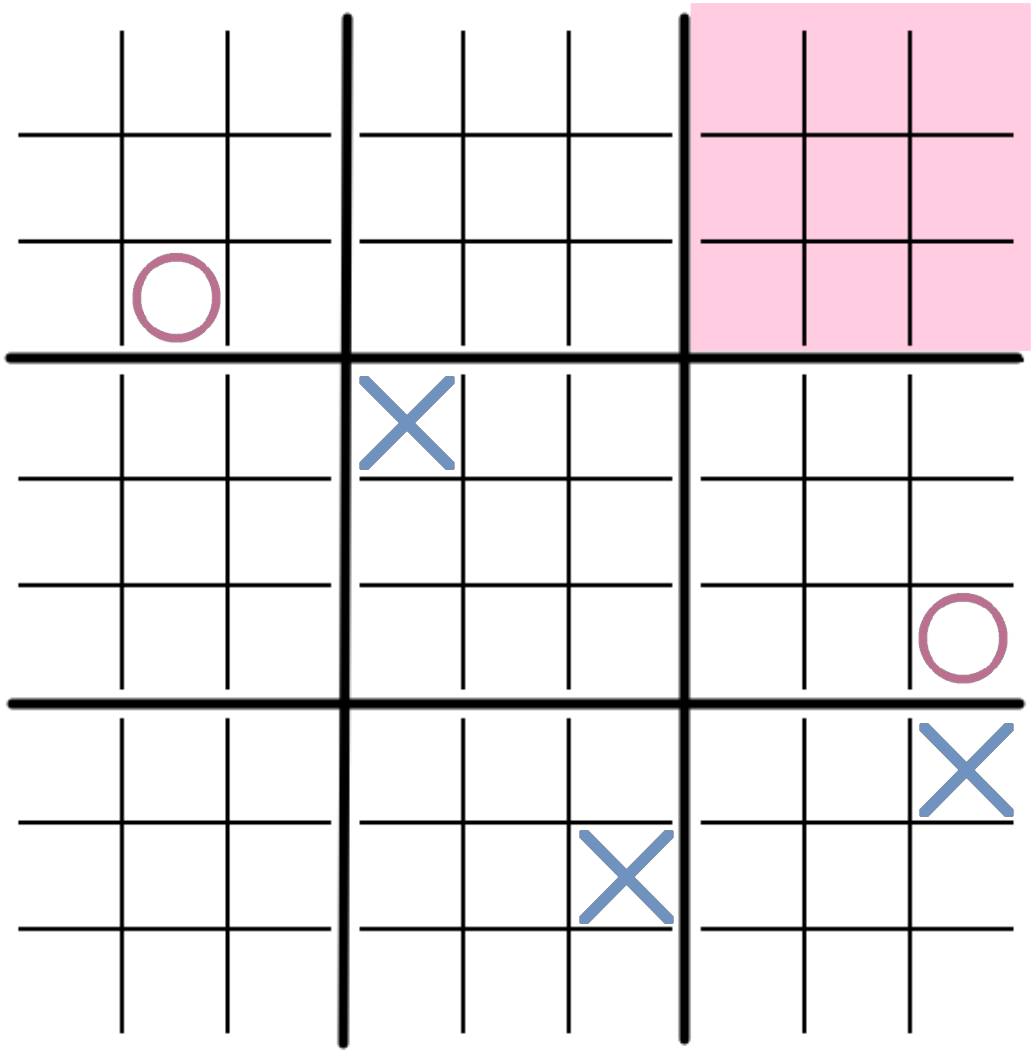








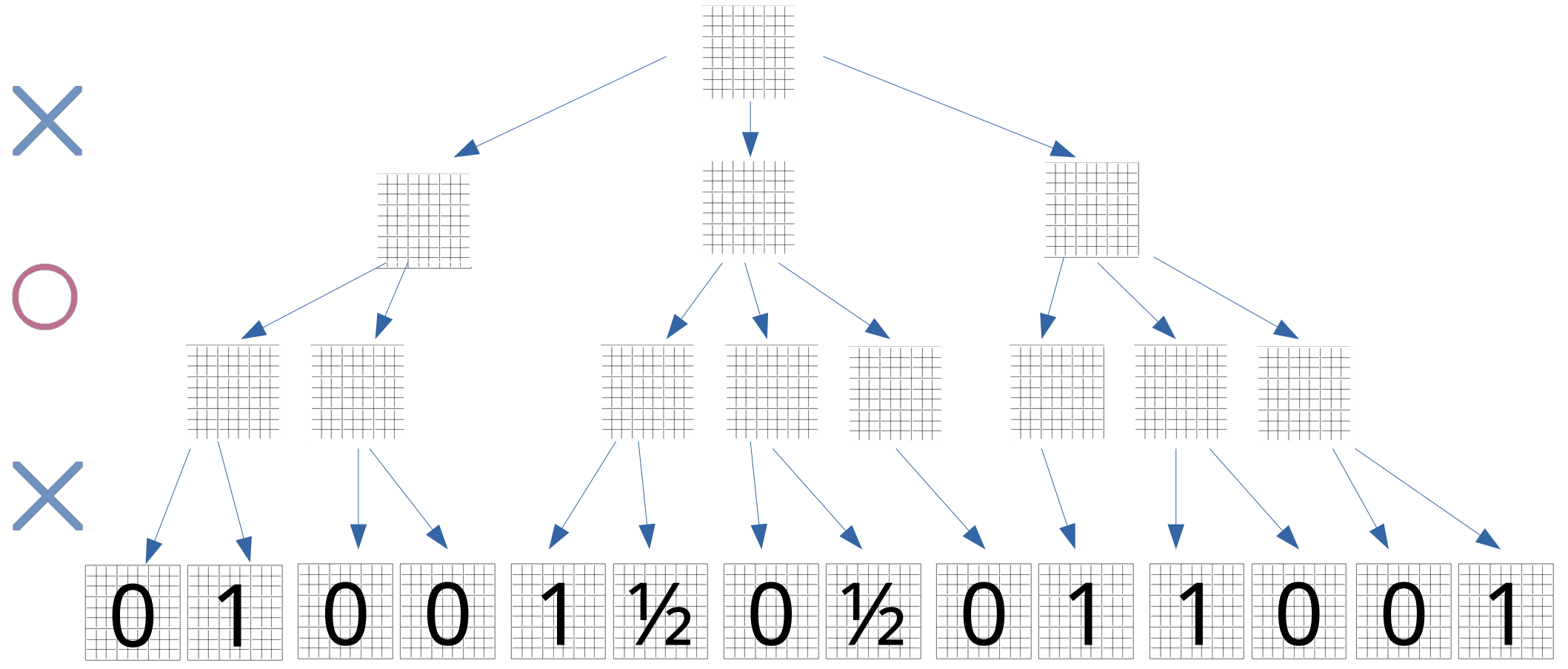


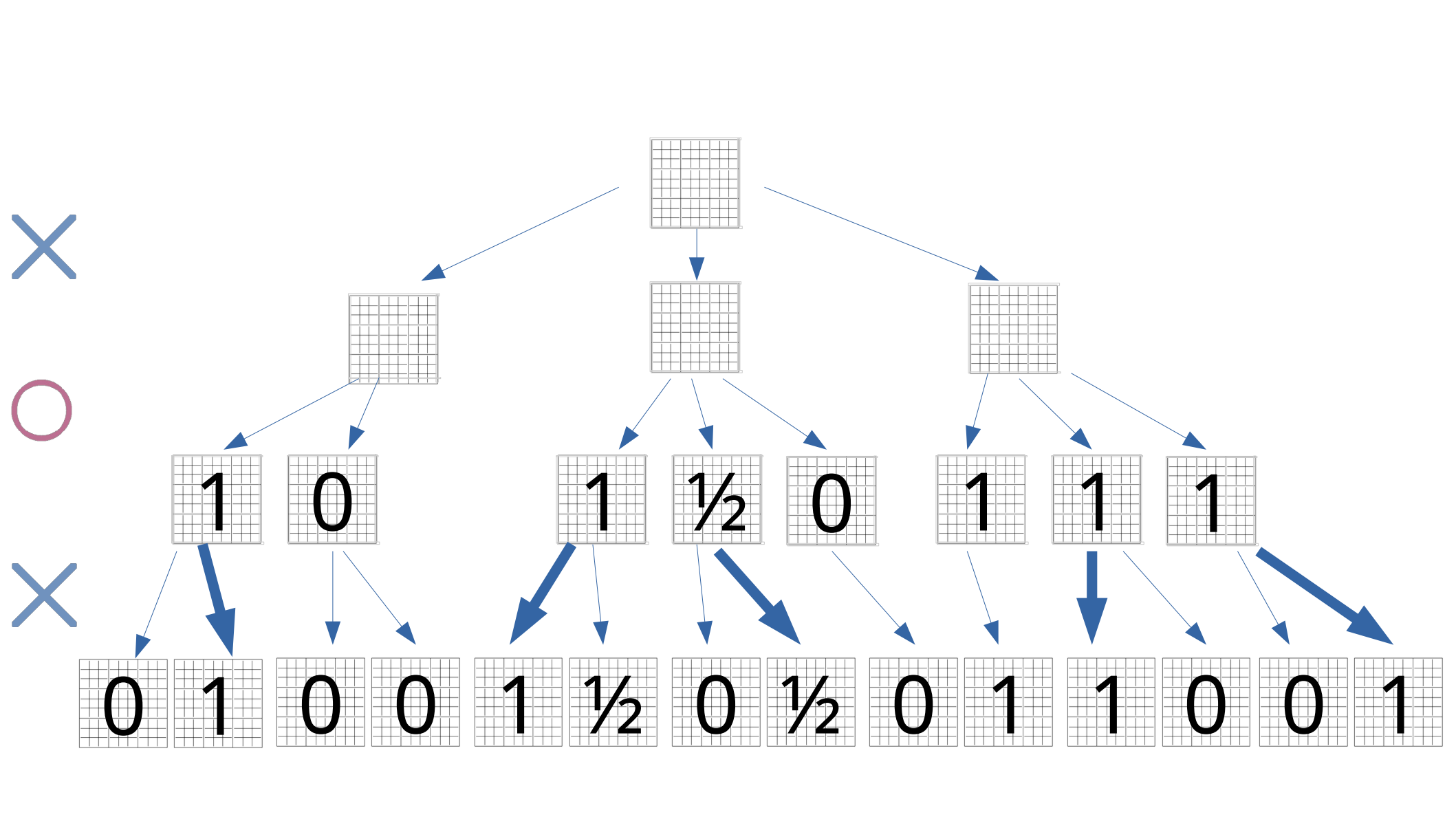


Recap

- Win by getting a row, column, or diagonal in the big game.
- Winning a small game, gives you that cell in the big game.
- A player’s move determines which small game the next player must choose.
- If you are forced to play in a small game that is full or has been won, you can play in any cell.
- On the first turn of the game, the player can choose any cell.

Minimax Algorithm

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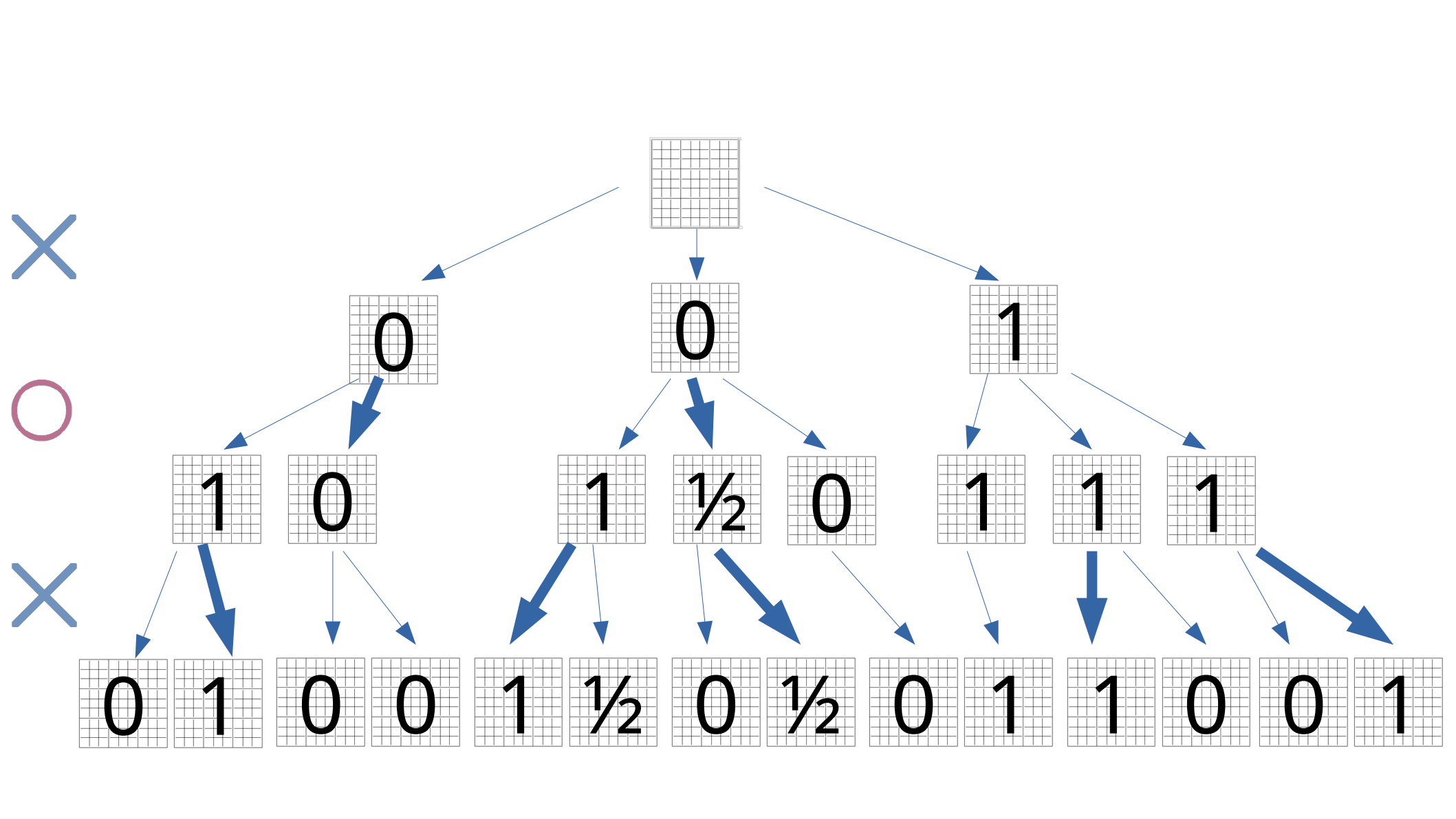
0
1
½
0
1
1
1
0
1
0
0
1
½
0
½
0
1
1
0
0
1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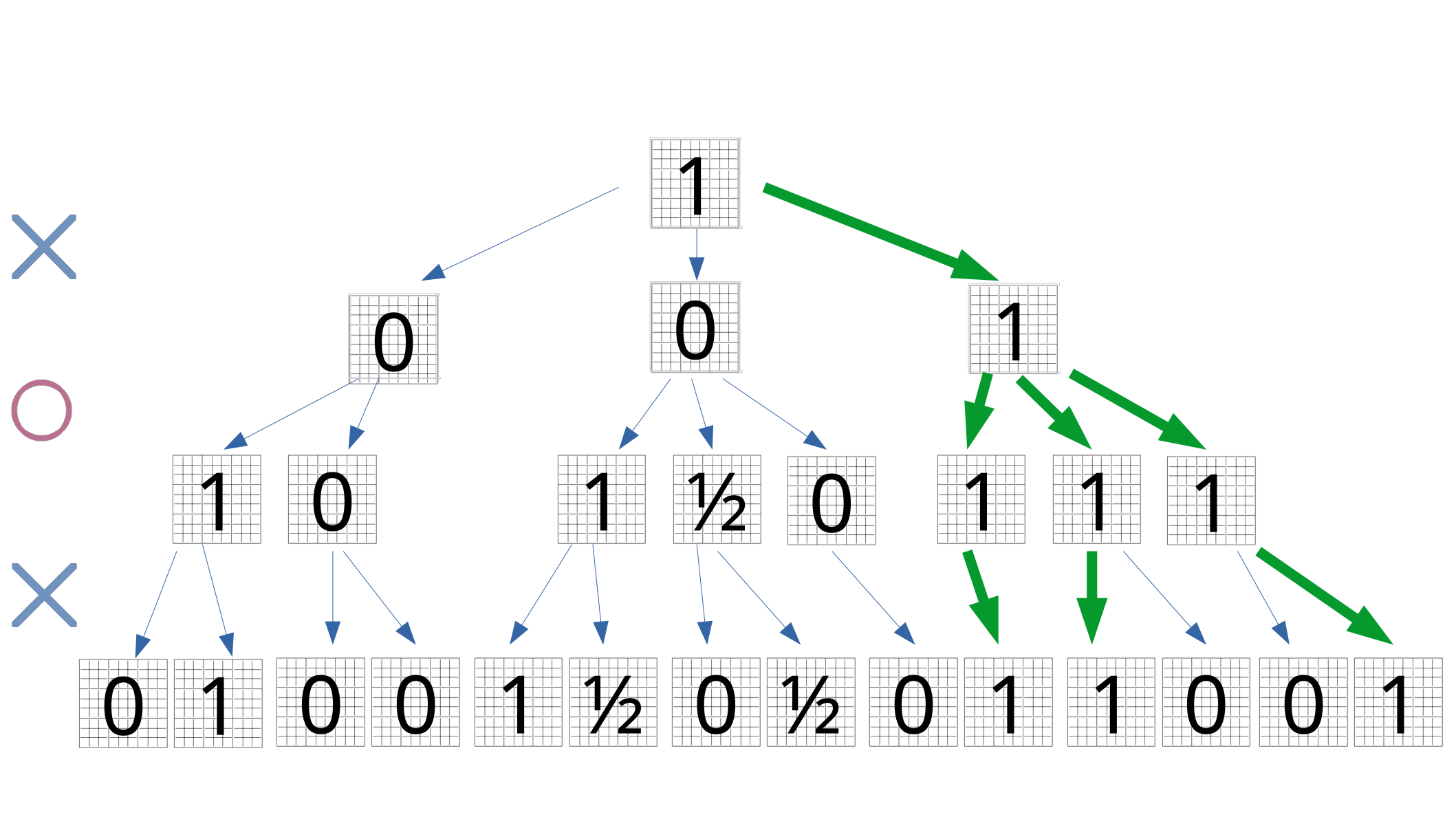
0
1
1
0
1
½
0
1
1
1
0 1 0 0 1 ½ 0 ½ 0 1 1 0 0 1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0
0
1
1
0
1
½
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1
1
1
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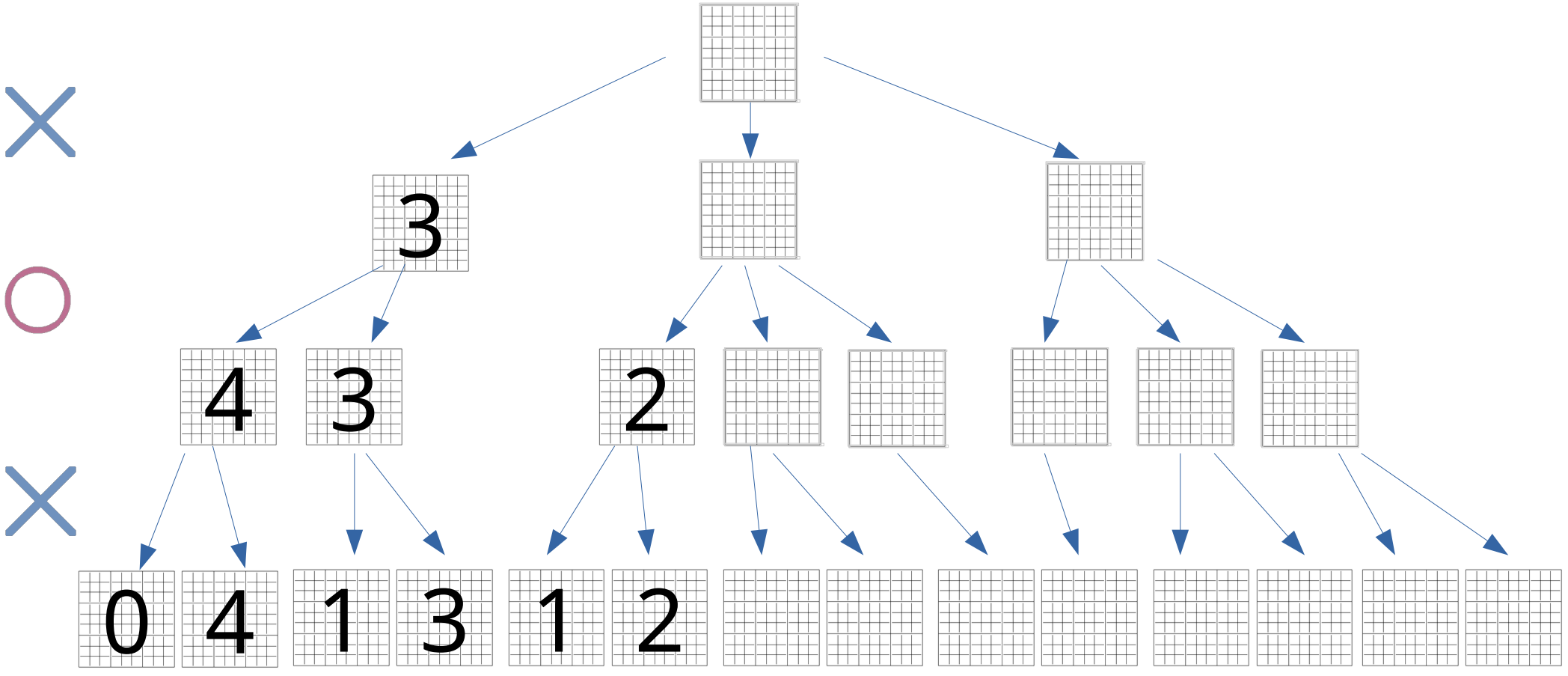
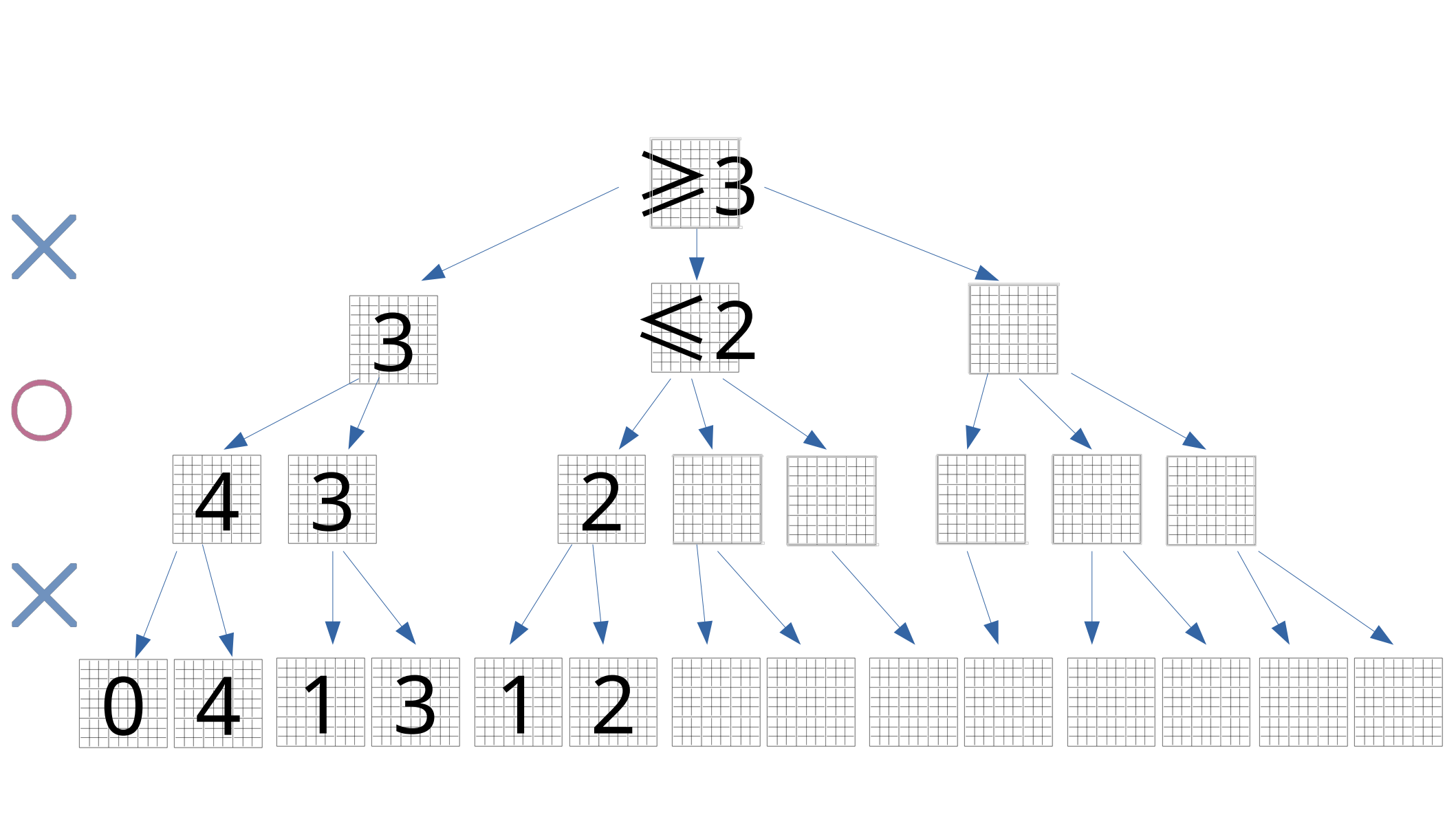
1
½
0
½
0
1
1
0
0
1

Alpha-Beta Pruning

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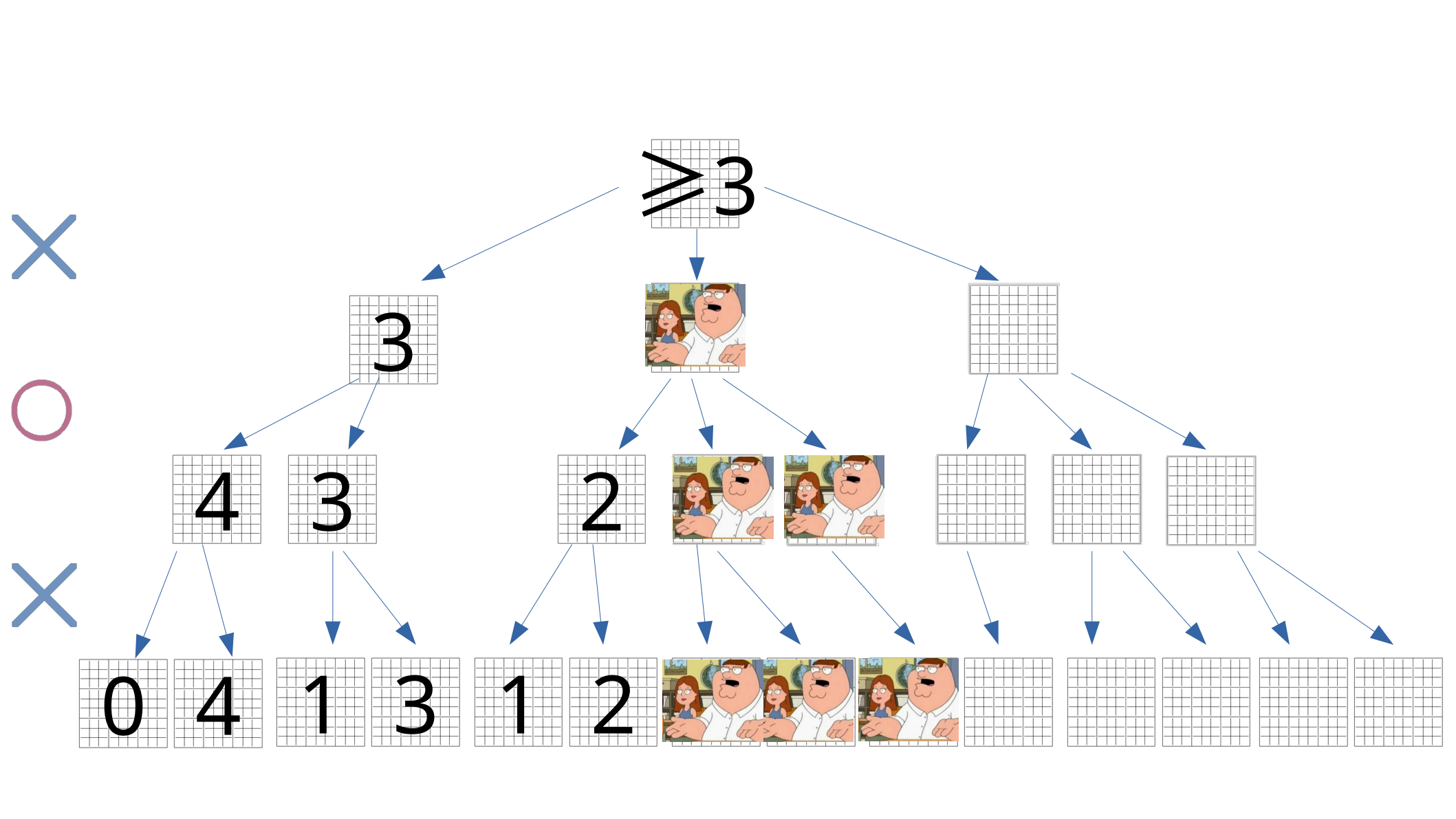
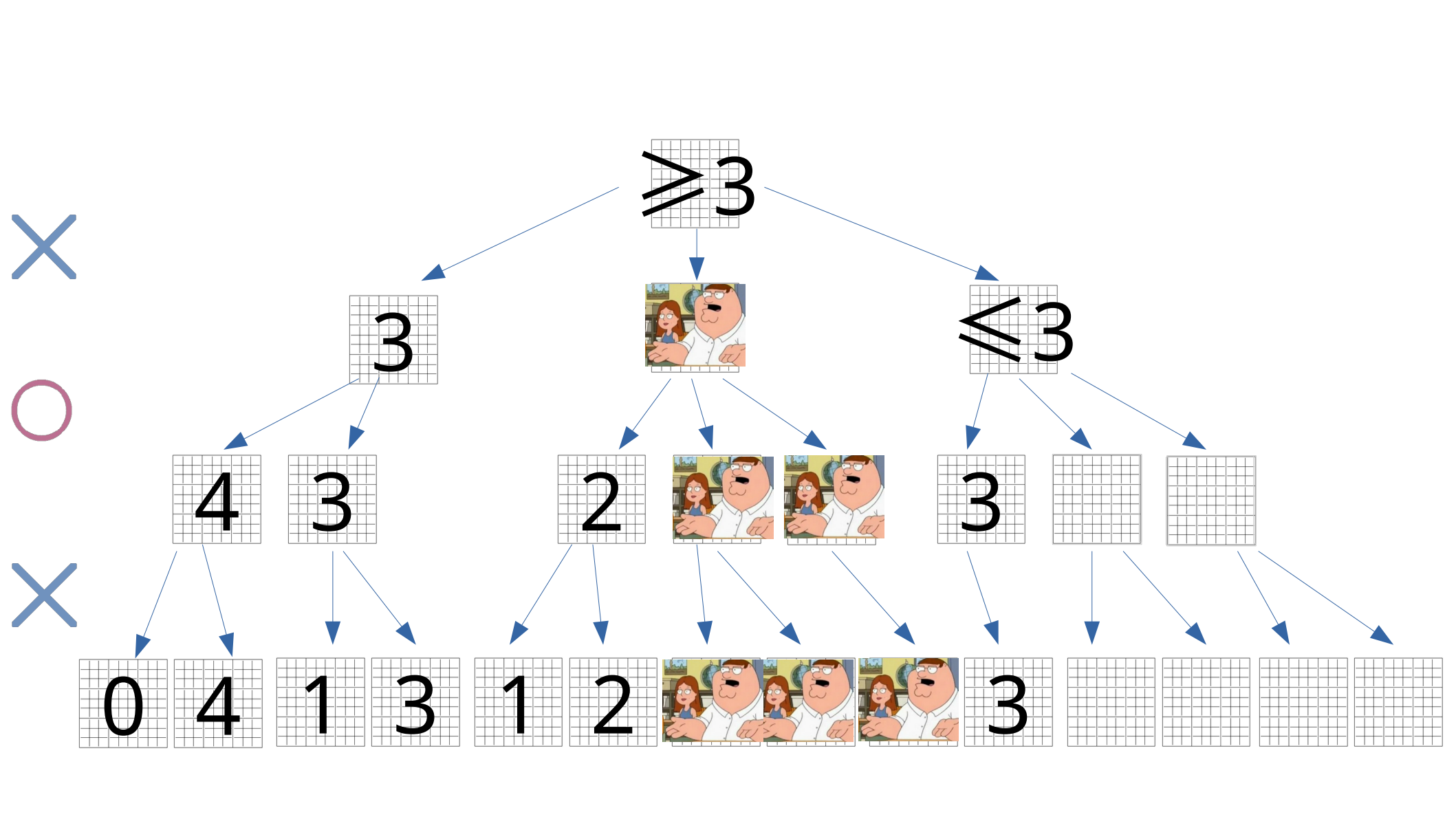
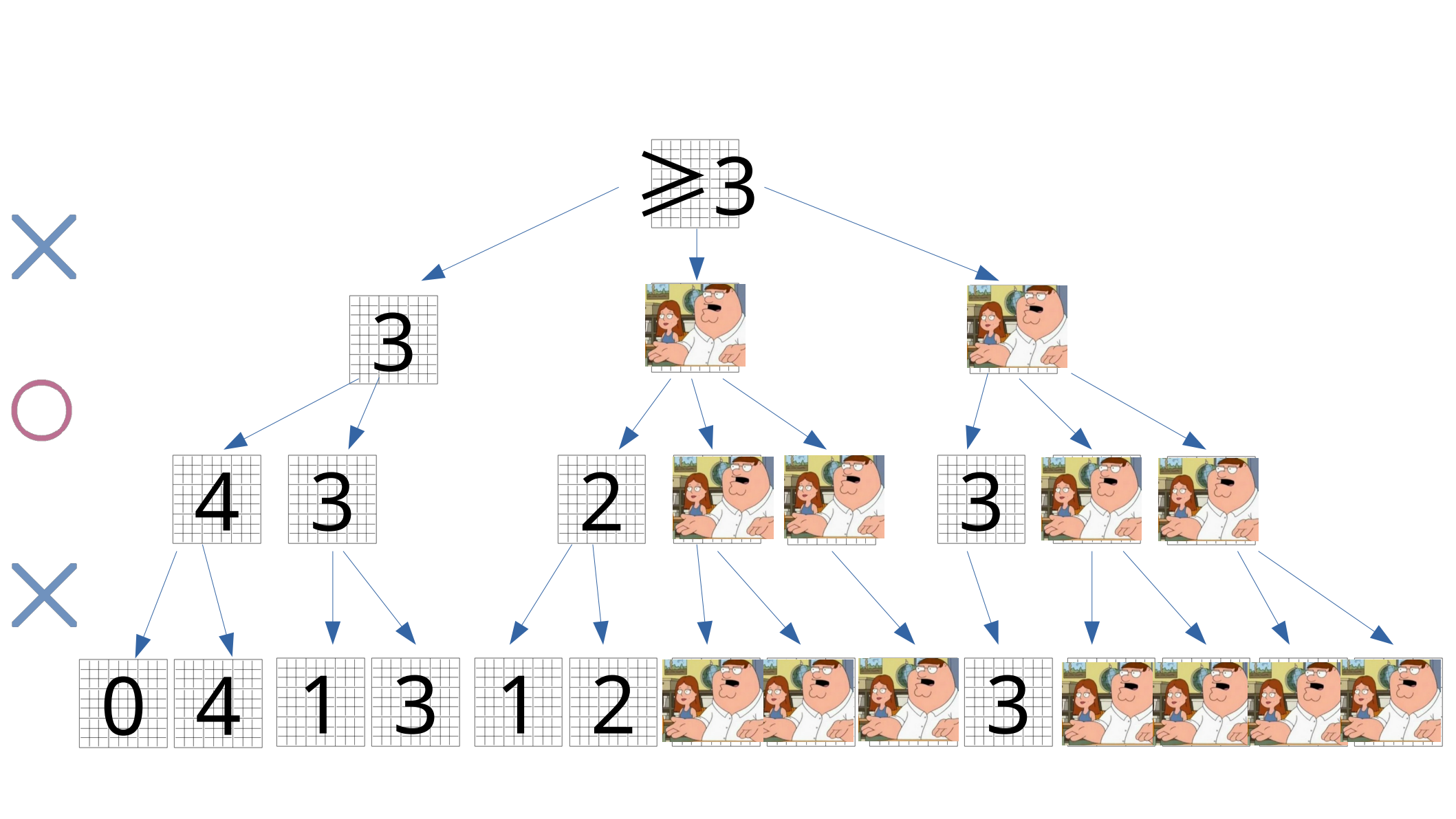
3
≤ 2
4
3
2
0
4
1
3
1
2


≥3
3
4
3
2
0
4
1
3
1
2


⩾3
3
⩽3
4
3
2
3
0
4
1
3
1
2
3


≥3
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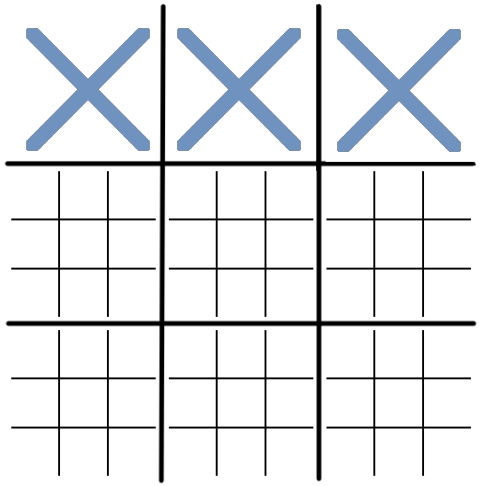
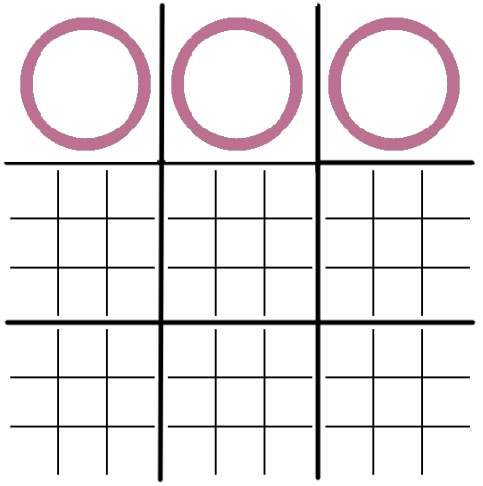
4
3
2
3
0
4
1
3
1
2
3

Heuristic

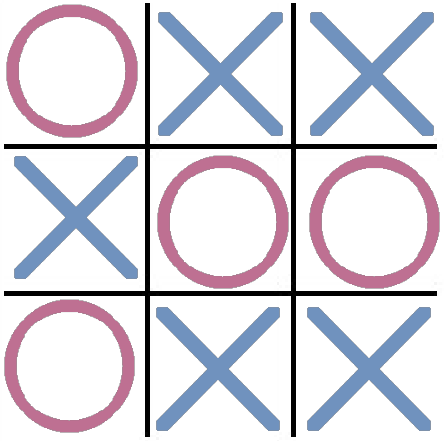
- A shortcut in problem solving that trades optimality for time



Win: infinity



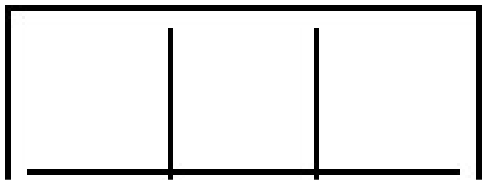
Loss: negative infinity



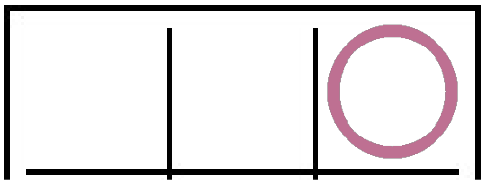
Draw: zero

Otherwise: f(game, X) – f(game, O)

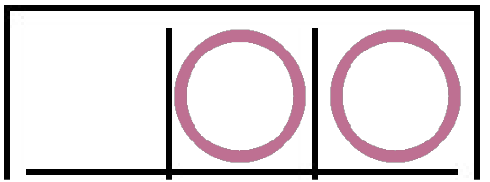
½ * ½ * ½



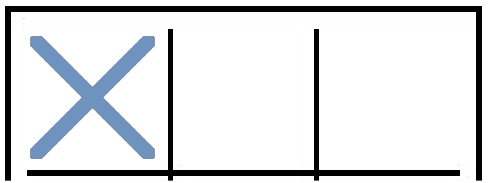
½ * ½ * 0



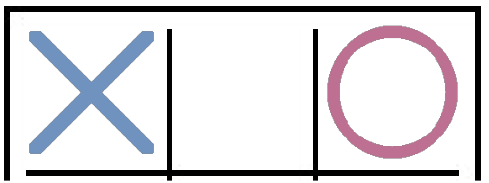
½ * 0 * 0



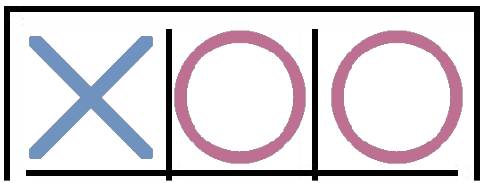
1 * ½ * ½



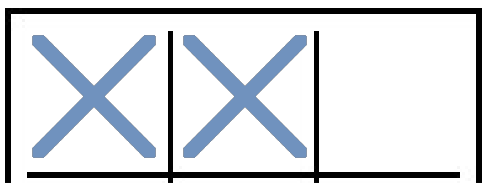
1 * ½ * 0



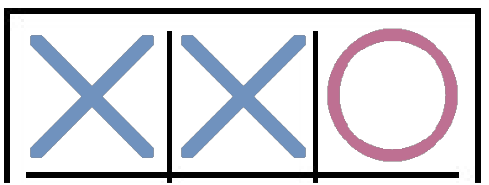
1 * 0 * 0

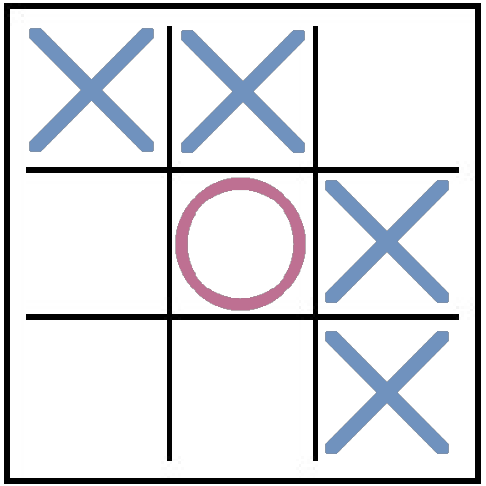


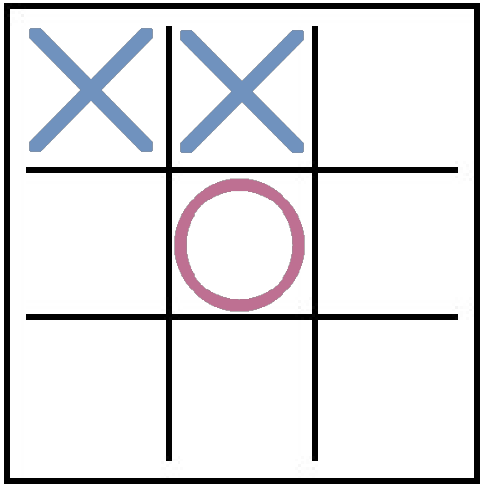
1 * 1 * ½



1 * 1 * 0







There are more lines that are one away from a win.

But there are the same number of ways to win in one move.

The End