Tic Tac Toe

ECEN 330

BYU Electrical & Computer Engineering
IRA A. FULTON COLLEGE OF ENGINEERING

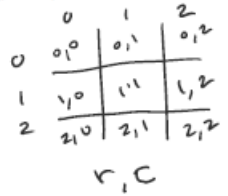
Several of the images from these slides come from:

https://www.neverstopbuilding.com/minimax

This website provides a a very good description of using minimax to implement a computer-player for Tic-Tac-Toe. We will use the approach from this website.

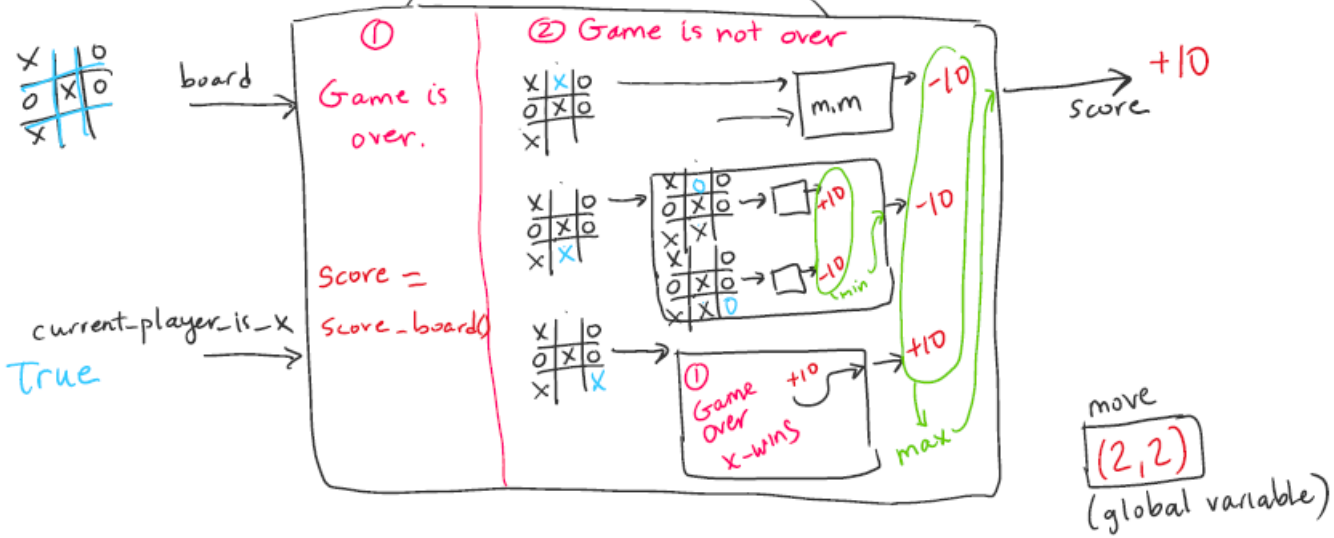
Tic-Tac-Toe

Tuesday, October 5, 2021 9:20 AM



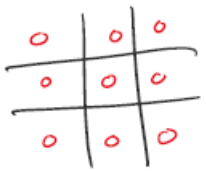
+10	X wins
0	draw
-10	O wins

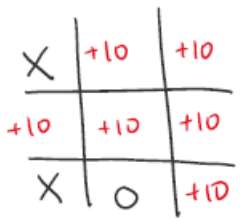
*Assuming both players play perfectly.



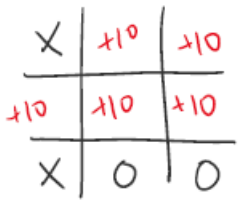
move
(2,2)
(global variable)

Empty Board

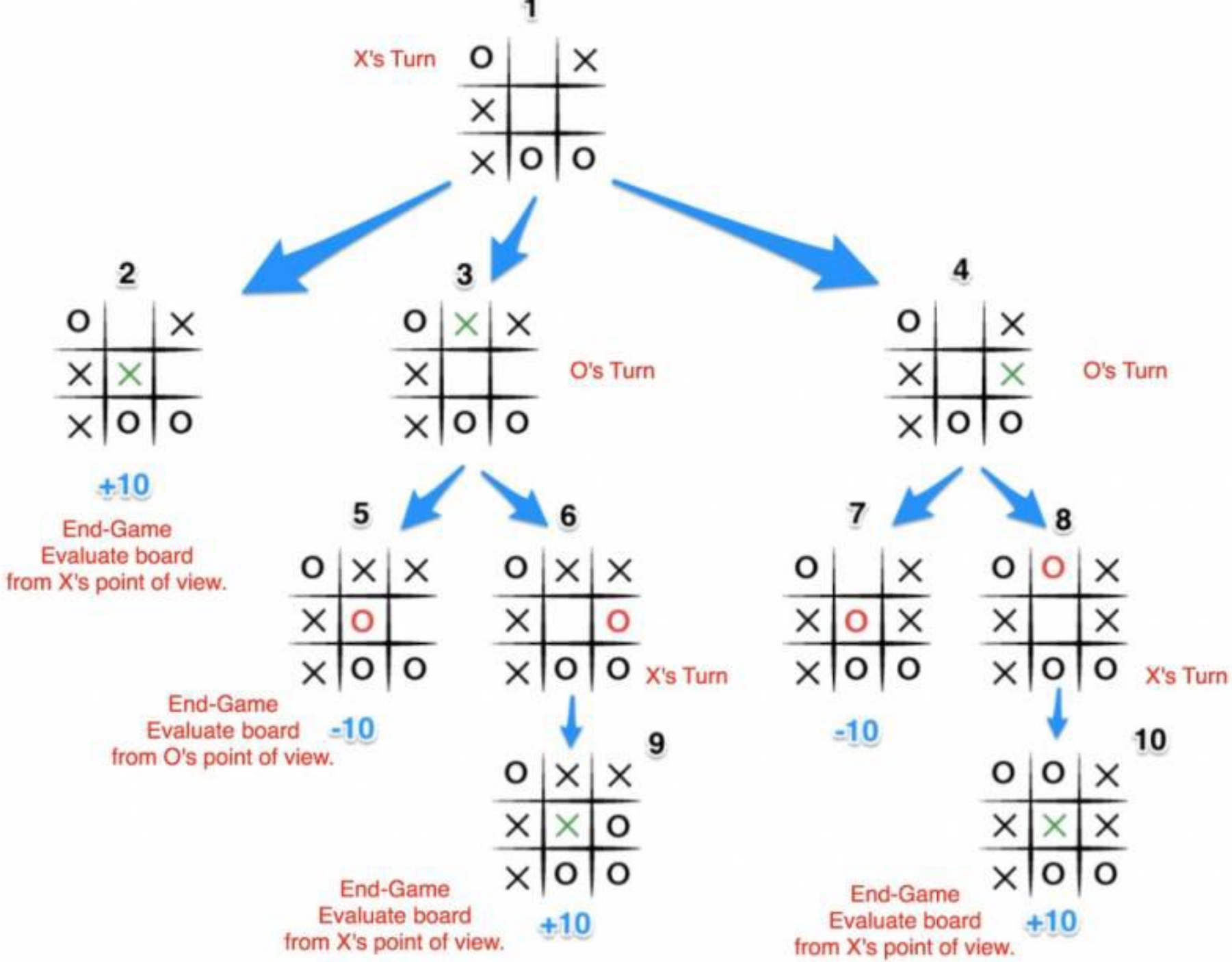


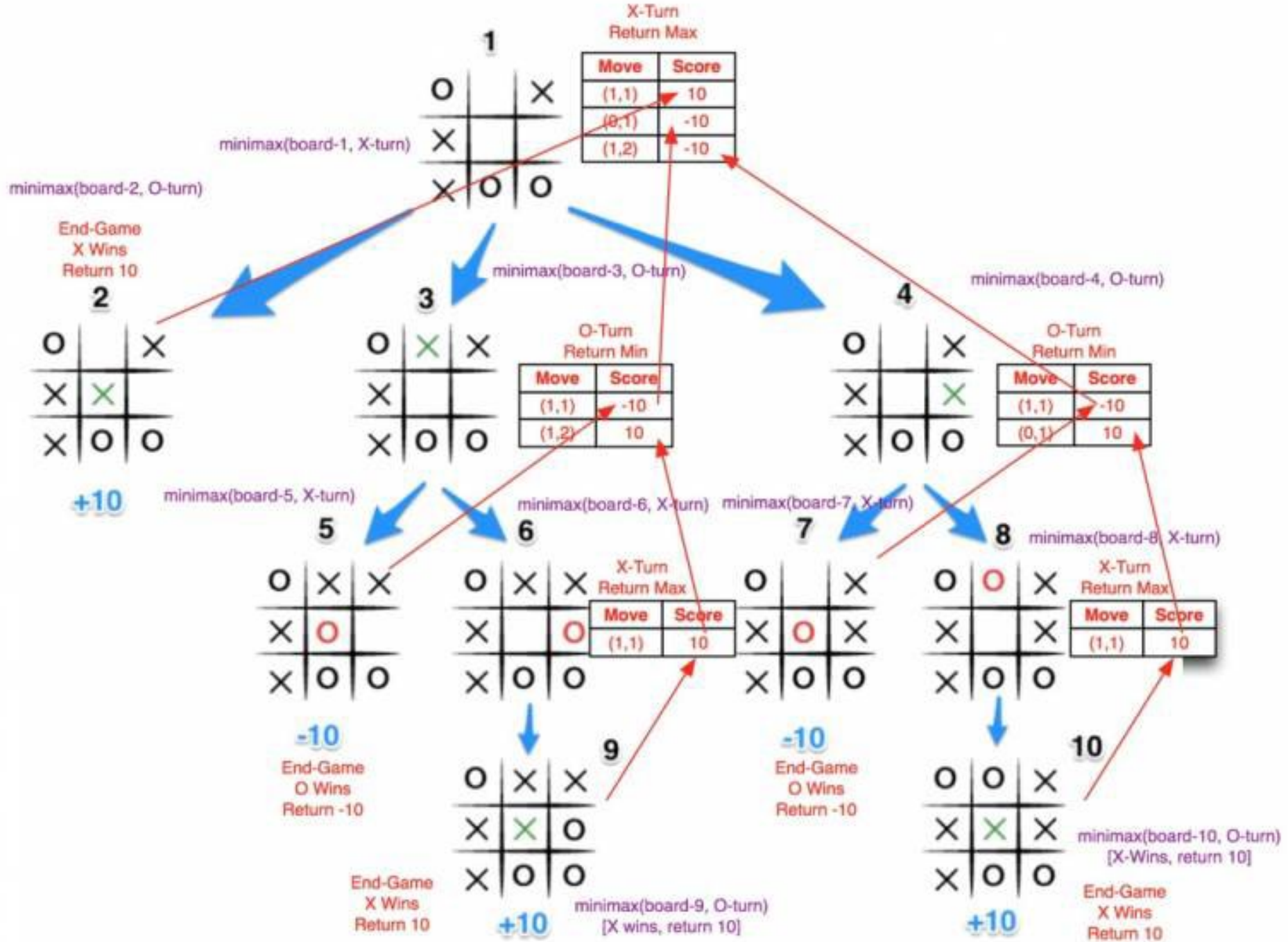


(Already lost)



(Knows it can win later)


1
X's Turn
2
+10
End-Game
Evaluate board
from X's point of view.
3
O's Turn
4
O's Turn
5
End-Game
Evaluate board
from O's point of view.
-10
6
X's Turn
9
End-Game
Evaluate board
from X's point of view.
+10
7
-10
8
X's Turn
10
End-Game
Evaluate board
from X's point of view.
+10


1
X-Turn
Return Max
Move | Score
(1,1) | 10
(0,1) | -10
(1,2) | -10
minimax(board-1, X-turn)
minimax(board-2, O-turn)
End-Game
X Wins
Return 10
2
+10
minimax(board-3, O-turn)
3
O-Turn
Return Min
Move | Score
(1,1) | -10
(1,2) | 10
minimax(board-4, O-turn)
4
O-Turn
Return Min
Move | Score
(1,1) | -10
(0,1) | 10
minimax(board-5, X-turn)
5
-10
End-Game
O Wins
Return -10
minimax(board-6, X-turn)
6
X-Turn
Return Max
Move | Score
(1,1) | 10
minimax(board-7, X-turn)
7
-10
End-Game
O Wins
Return -10
minimax(board-8, X-turn)
8
X-Turn
Return Max
Move | Score
(1,1) | 10
9
End-Game
X Wins
Return 10
+10
minimax(board-9, O-turn)
[X wins, return 10]
10
minimax(board-10, O-turn)
[X-Wins, return 10]
End-Game
X Wins
Return 10
+10