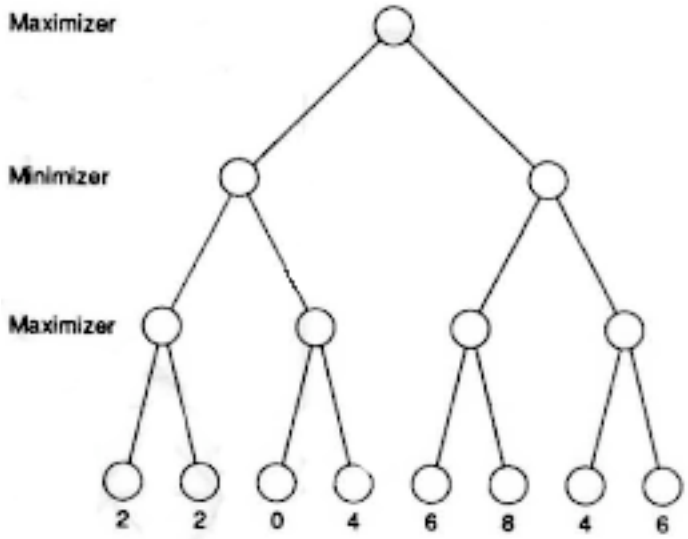
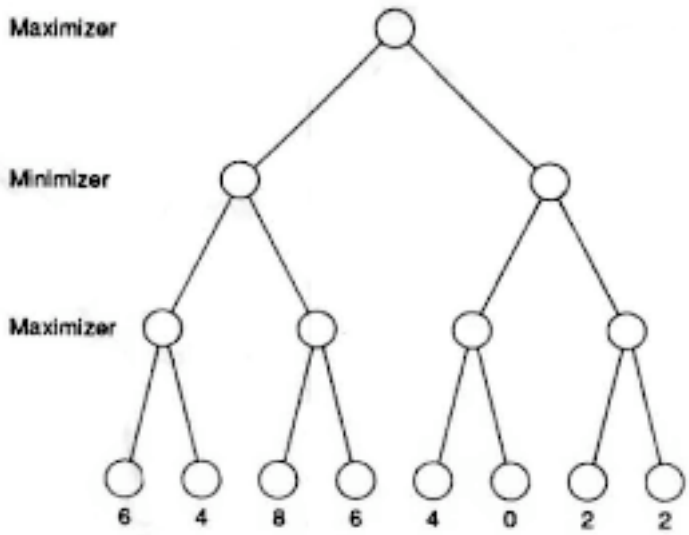
6.034 Recitation 3: Game Search Exercises (10/01/04)

LOrtiz (Orig. by KKoile)

1. Consider the game tree shown below. Explore the tree using the alpha-beta procedure. Indicate all parts of the tree that are cut off, and indicate the winning path or paths. Strike out all static evaluation values that do not need to be computed.



2. Now consider the tree shown below. which is a mirror image of the tree shown above. Explore the tree using the alpha-beta procedure. Indicate all parts of the tree that are cut off. Indicate the winning path or paths. Strike out all static evaluation values that do not need to be computed.



3. Compare the amount of cutoff in the above two trees. What do you notice about how the order of static evaluation nodes affects the amount of alpha-beta cutoff?

(over)

4. Tic-Tac-Toe

You are the X player, looking at the board shown below, with five possible moves. You want to look ahead to find your best move and decide to use the following evaluation function for rating board configurations:

```
value V = 0
do over all rows, columns, diagonals R:
    if R contains three Xs, V = 1000
    else if R contains three Os, V = -1000
        else when R contains only two Xs, V = V + 100
        else when R contains only one X, V = V + 10
        else when R contains only two Os, V = V – 100
        else when R contains only one O, V = V – 10
  end do
return V
```

Draw the four configurations possible from the leftmost and rightmost board configurations below. Use the above static evaluation function to rate the 8 board configurations and choose X's best move. (A reminder: The board configurations that you draw will show possibilities for O's next move.)