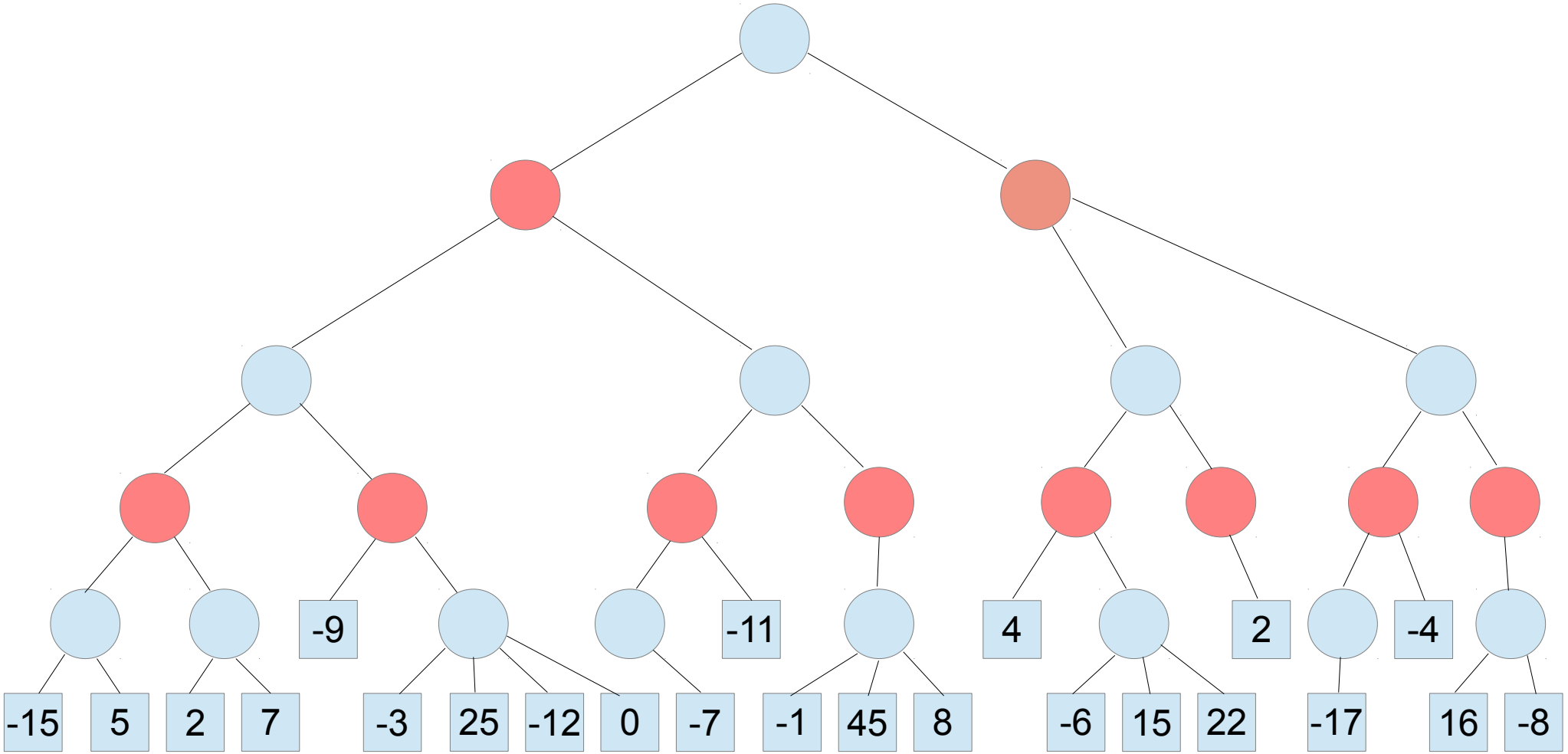
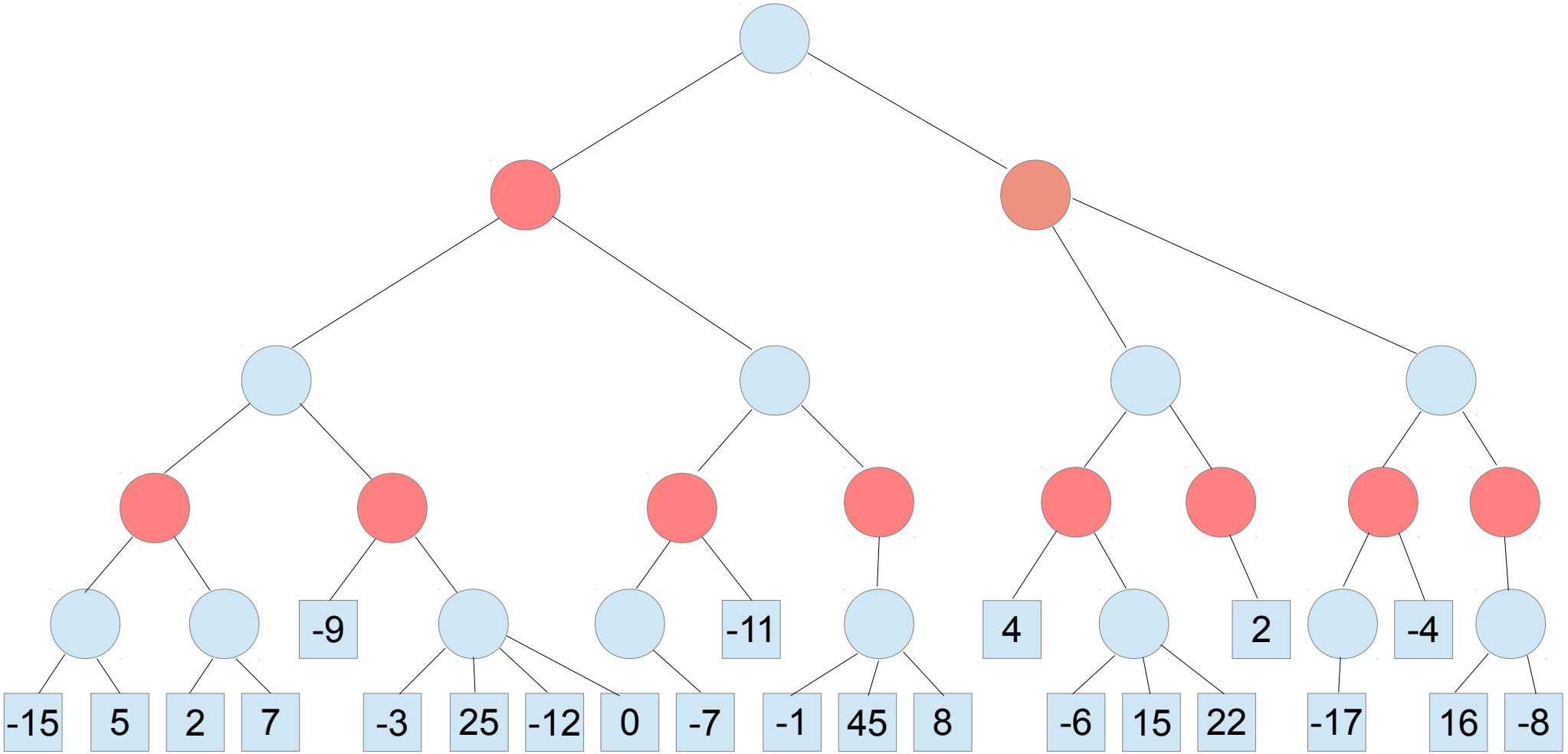


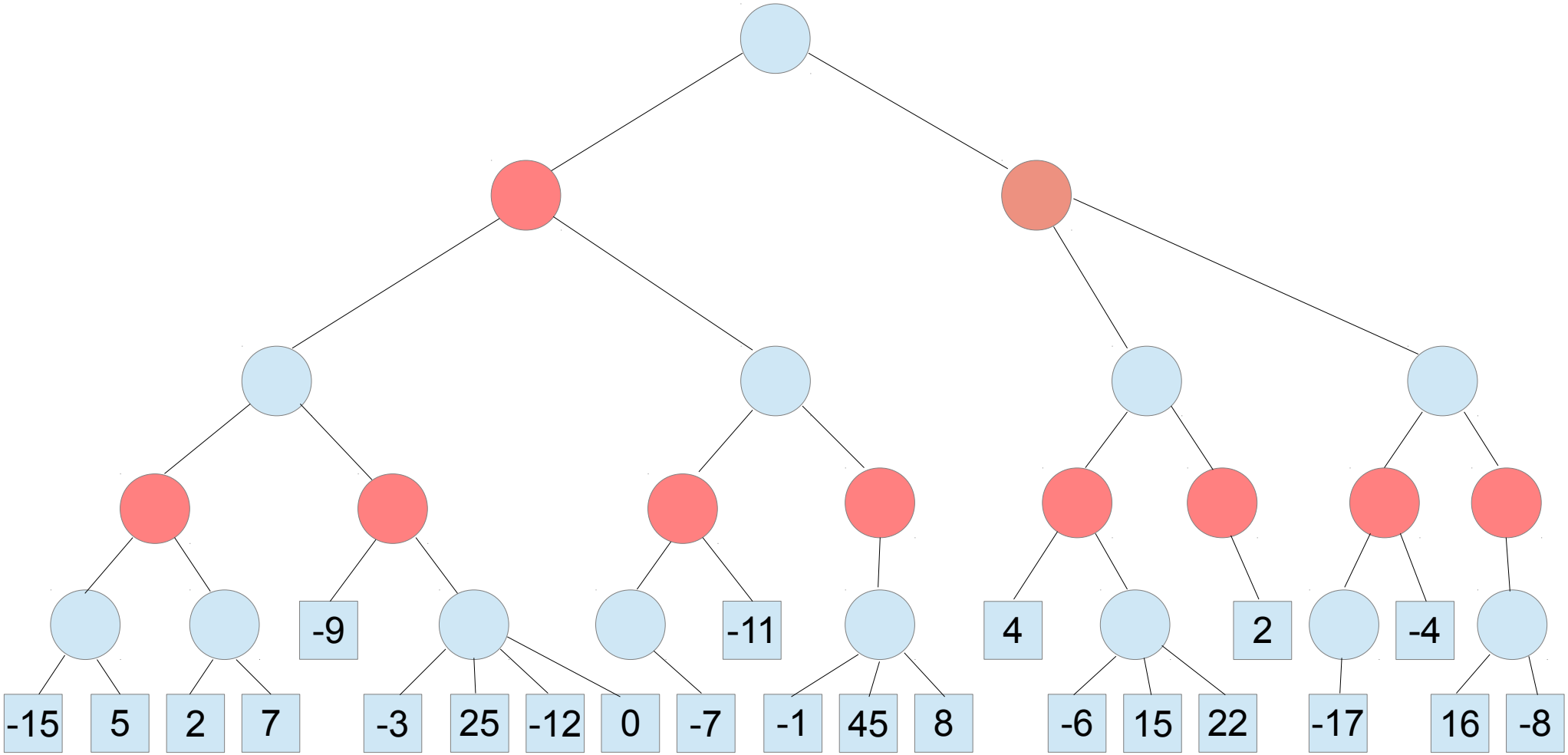
This is the same tree as that of Tutorial #4. However, the cat is now moving randomly. This means that the ***red*** nodes are now ***chance*** nodes, not ***MIN*** nodes. ***Player 1*** (mouse) will try to maximize its ***expected utility***.

Assume: Square nodes are terminal nodes.
Remember: ***Expectimax*** is just a variation of ***MiniMax***. Search order is the same, and you only need to worry about the score at each node.



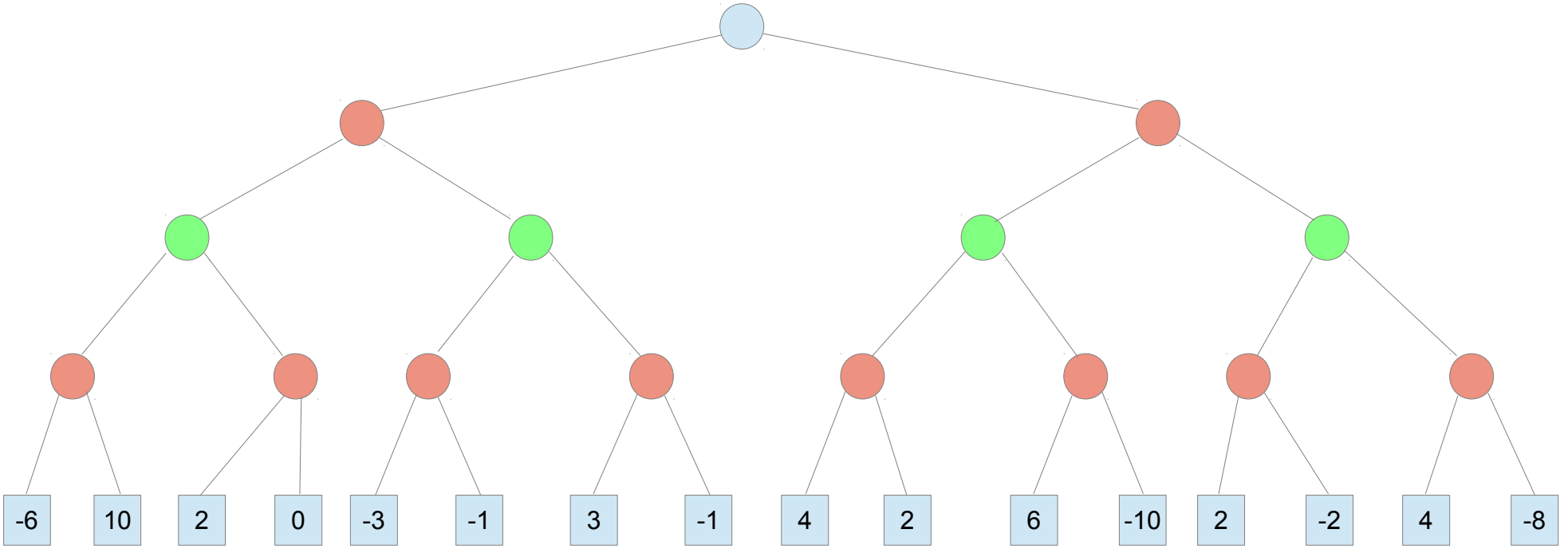
Q1 – Complete the tree above with the ***utility*** at each node. Assume that for ***chance nodes*** there is a uniform probability of choosing any of the successors

Q2 –What is the optimal move for the mouse? What possible end-nodes could it find itself at?



Q3 – If the mouse ***did not know the cat moves randomly*** and instead chose its path using ***MiniMax*** search would it have chosen the same path?

Q4 – Can we do alpha/beta pruning on the ***ExpectiMax*** tree?



The tree above is an ***ExpectiMiniMax*** tree. Player 1 nodes are ***blue***, chance nodes are ***red*** and player 2 nodes are ***green***. Complete the missing scores in the tree, assume the chance nodes select a successor with uniform probability.

Q5 – Complete the utility scores for the nodes in the tree. What are the possible end-nodes given the optimal choice made by player 1 at the root?

Q6 – To think about: ***Is it possible to do (some form) of alpha/beta pruning on the tree above? if so, where (what type of nodes), and how? If not, why not?*** It may help knowing the ***minimum and maximum possible utilities!***

The 1-minute paper

One minute before the end of tutorial, your TA will ask you to bring out a clean sheet of paper to hand in. In this sheet you will write:

Name (last, first)

Student number

And briefly answer the following question:

Is there any possible way one could improve over MiniMax for 2-player adversarial games? (i.e. is MiniMax the optimal algorithm for such games?) Please answer yes/no, and explain the rationale that leads to this conclusion.

Hand this sheet to your TA. We will use these 1-minute papers (there will be one after each tutorial) along with your TA's observations on your ***preparedness, participation, and hard work*** during tutorials to assess the 5% of your final mark corresponding to tutorial participation.