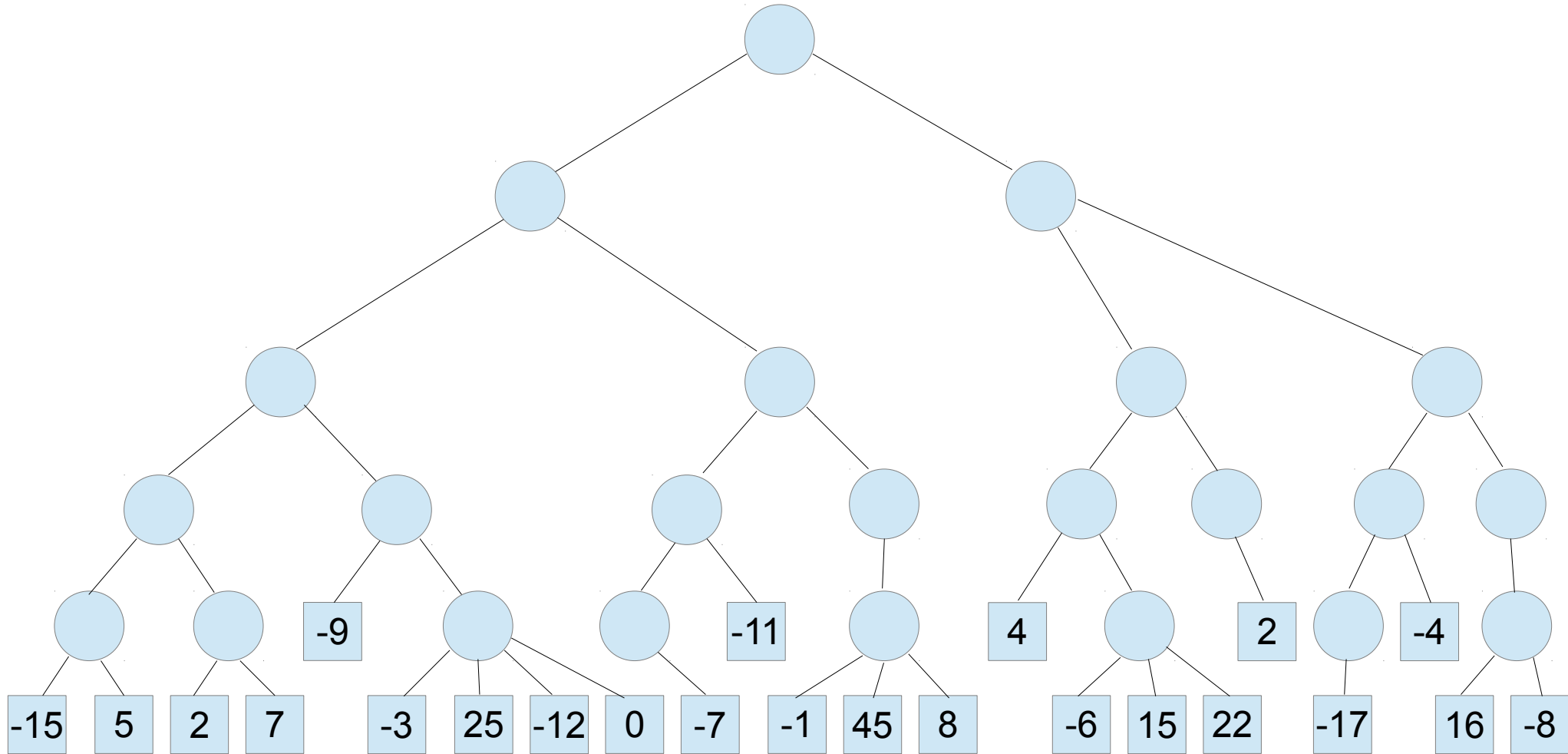You will be working on the MiniMax tree shown above.

Assume: 2 Players, player 1 moves first. Square nodes are terminal nodes.
Remember: MiniMax is a DFS search, *you must work in correct DFS order or things won't turn out as you would like.* For nodes at the same level, order of expansion is *left to right*.

Q1 - On the tree above, write next to each node (including terminals) the **order** in which the node is **expanded** by the MiniMax search.

Q2 - For each level of the tree, indicate whether nodes are **MAX** nodes or **MIN** nodes. How many **complete turns** are there?
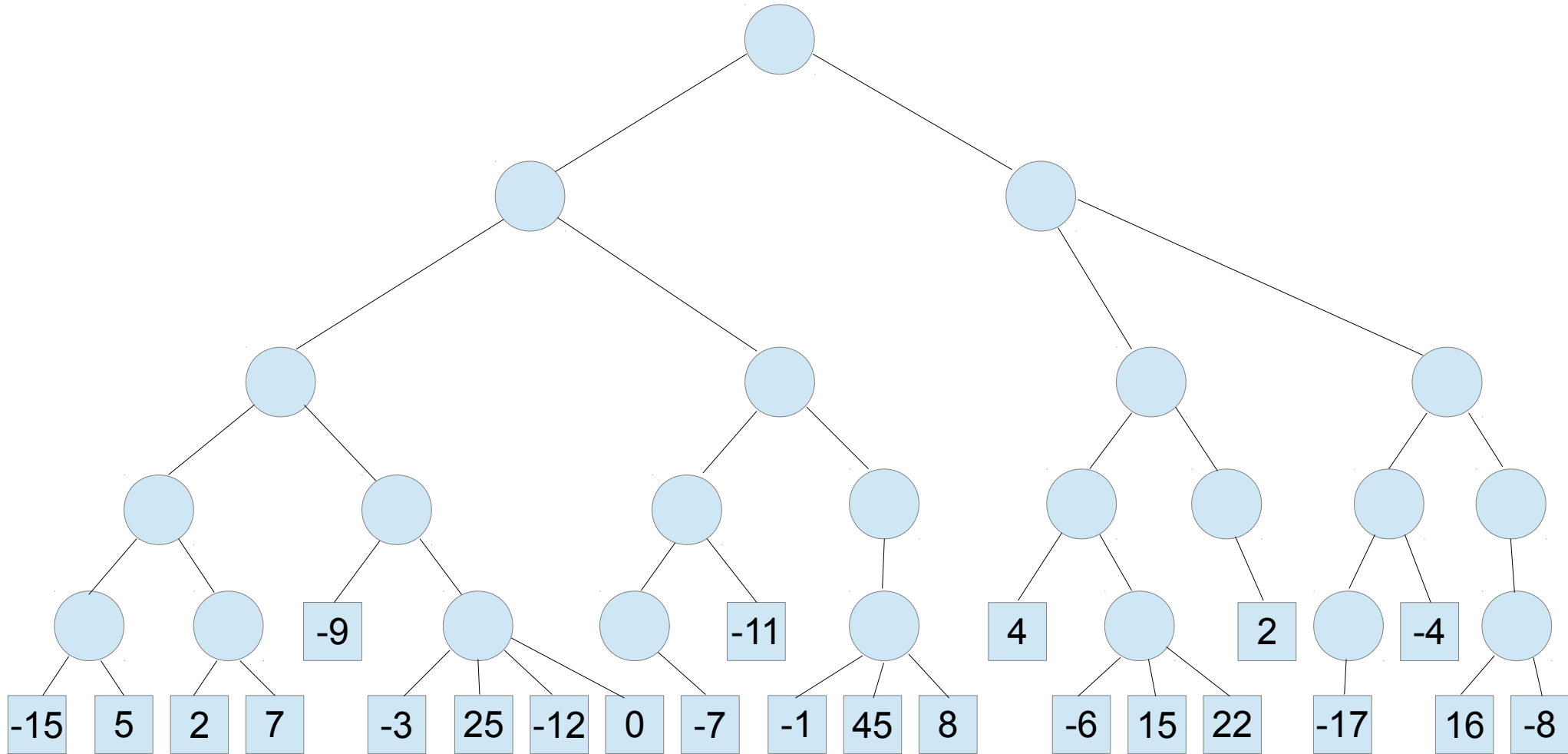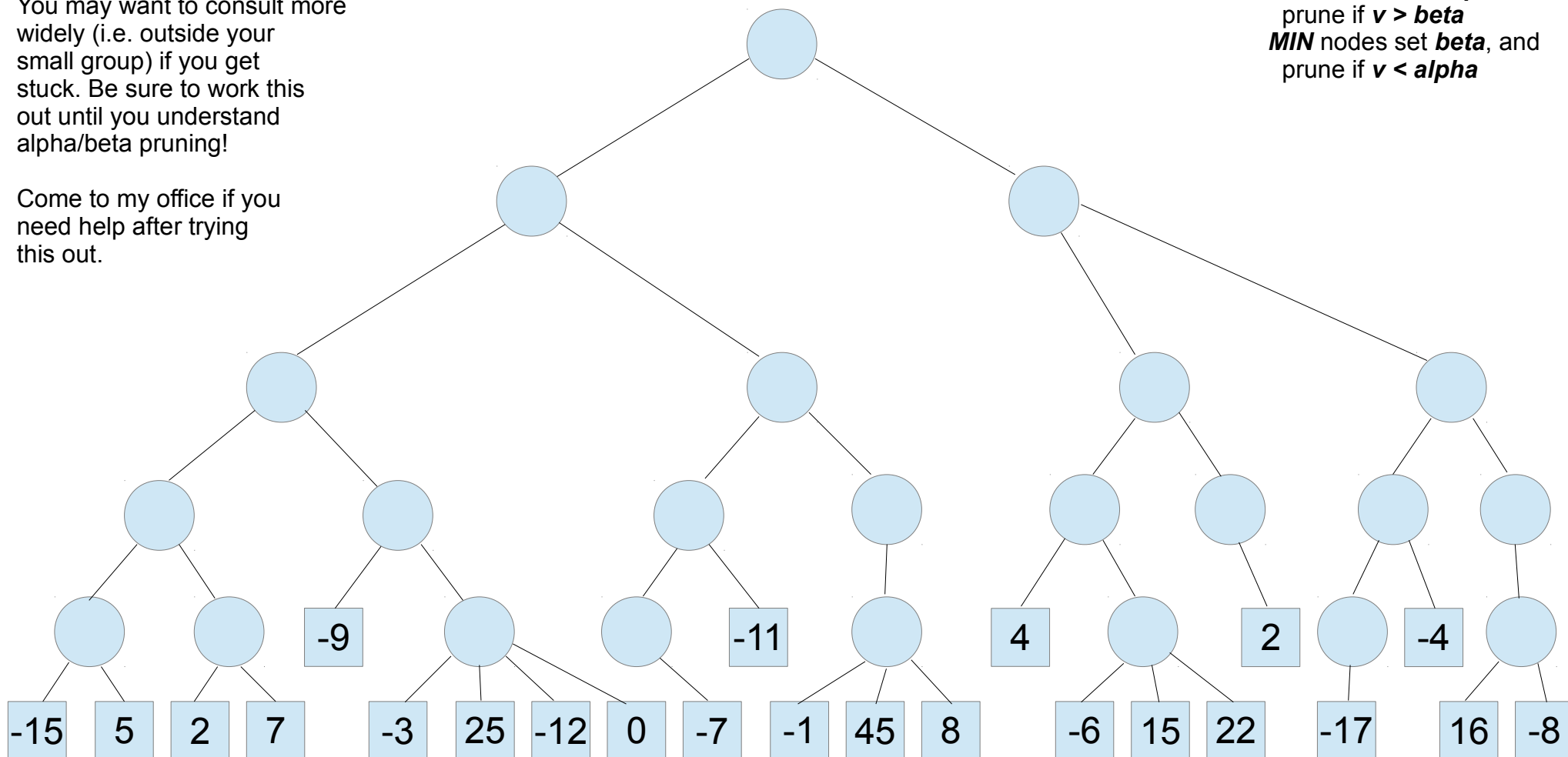
Q3 - Write *within each node* the correct *MiniMax* score for the node. Do this in the same order in which that score would be computed by the search procedure.

Q4 - Mark the path corresponding to the actions that would be selected by each player all the way to a terminal node. Who wins the game?

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You may want to consult more widely (i.e. outside your small group) if you get stuck. Be sure to work this out until you understand alpha/beta pruning!

Come to my office if you need help after trying this out.

Remember:
MAX nodes set **alpha,** and prune if **v > beta**
MIN nodes set **beta,** and prune if **v < alpha**

Tree leaf values (left to right): -15, 5, 2, 7, -9, -3, 25, -12, 0, -7, -11, -1, 45, 8, 4, -6, 15, 22, 2, -17, -4, 16, -8

Q5 – This is the tricky but very important part:
Using the correct **DFS search order**, the **MiniMax scores** for each node, and assuming **alpha=-10000, beta=10000** initially for the root node:

Mark which nodes/branches are pruned by **alpha/beta pruning**. And note the alpha or beta value that caused the pruning to take place.

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:

Write a concise plan that will ensure you fully understand and can implement alpha/beta pruning. Indicate how you plan to go about the coding and testing of the pruning algorithm.

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.