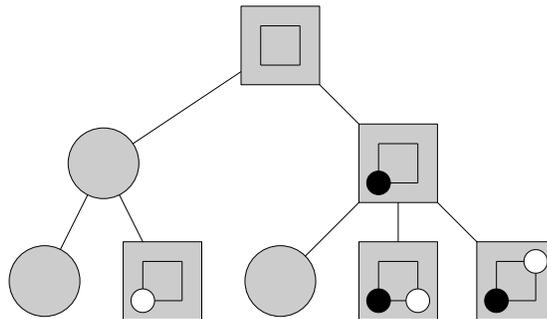
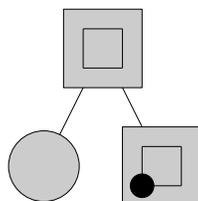


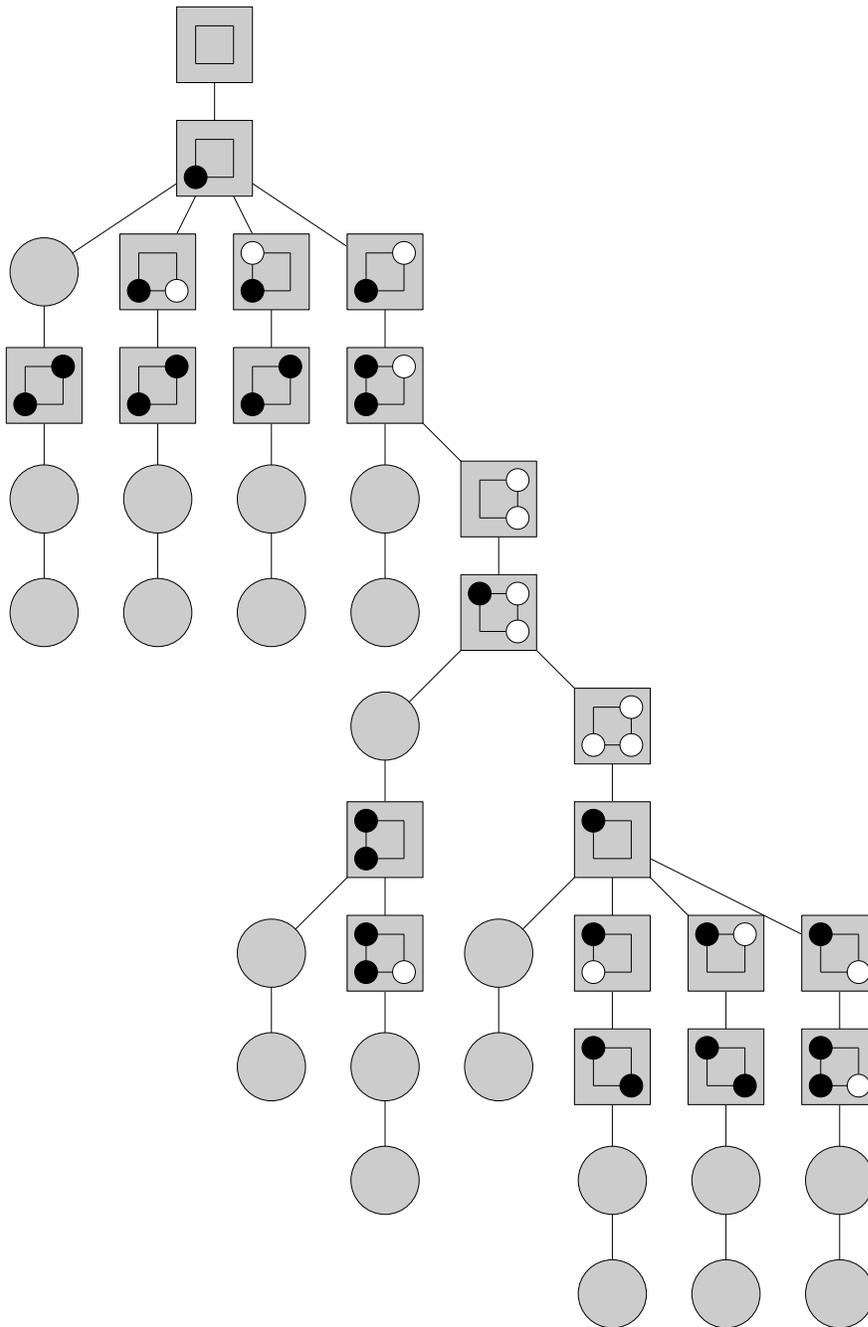
Each student submits their own assignment. Discuss this assignment only within your group.

1. Acknowledge that you understand that discussion of this assignment with anyone outside your group is considered plagiarism. Acknowledge any resources (except for class notes or text) you accessed when working on this assignment.
2. course text Chapter 1 Exercise 3 (page 20)
3. course text Chapter 1 Exercise 5
4. course text Chapter 1 Exercise 18
5. A *W-L game* is a combinatorial game where each terminal node is either ++ or -+ . Mimicking the proof of Zermelo's theorem, prove that for every W-L game, either Louise has a winning strategy or Richard has a winning strategy.
6. Below are the top 3 levels of the game tree (tree of all continuations) of 2x2 go, with symmetry pruning. Each pass move is shown as an empty circle. Draw the next two levels of the game tree (you can prune for symmetry).



7. The next page shows a 2x2 go first-player (Black) strategy that shows how Black can win by at least 1 point. In this tree, each node with Black to play shows Black's strategy move, and each node with White to play shows all White moves (with some strategy pruning). (a) After 1.B[a1] 2.W[b2] 3.B[a2] 4.W[b1] 5.B[a2] 6.W[pass] 7.B[a1], the only White responses shown are 8.W[pass] and 8.W[b1]: why is 8.W[b2] not shown after these 7 moves? (b) Draw a 2x2 go second-player (White) strategy that shows how White can lose by at most 1. You can prune symmetric subtrees, so the top 2 levels of your strategy tree will look like this:





8. For a go position and a color, a *chain* (also called *solid block*) is a maximal connected set of stones of that color. Answer these questions for this position, from Figure 3.1 in *Mathematical Go: Chilling Gets the Last Point* by Berlekamp and Wolfe.
- (i) Give the number of black chains, white chains, black stones, white stones, black territory, white territory and the current score (e.g. Black by x or White by y or tied).
- (ii) Assume White now makes a non-pass move, and then both players pass. What is a best move for White? Explain briefly.
- (iii) From the position, assume White makes some number of non-pass moves and that Black passes after each and then White passes. What is the best score that White can achieve? Explain briefly.

