Minimax

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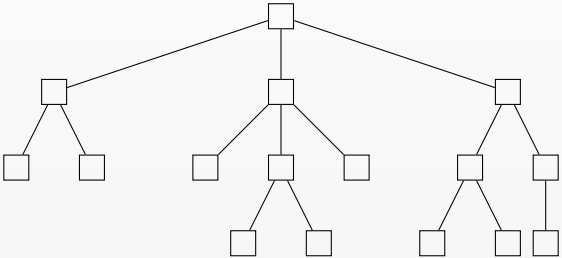
Setup

- Say we are playing a two-player, turn-based, deterministic, finite game of perfect information that ends with a winner (the details of which don't matter).

Game tree

- Then we can draw the state of the game as we progress in a game tree.
  - Moving from top to bottom indicates moves being taken.
  - Lines indicate a game state can be moved to this position.
  - Alternate rows of the tree represent each player's possible moves.



Scoring

- Suppose further that the end state of the game can be scored, such that one player is trying to get a high score and the other is trying to get a low score.

Max

- Start with the top of the game tree, which represents the current game position.
- The moves available to the next player are represented by the nodes connected to this one.
- The player wants to choose the *maximum* score from the available options.

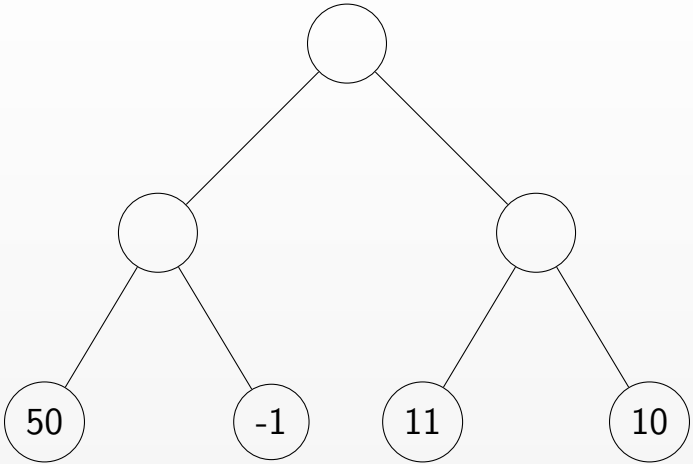
Min

- The positions under the top node are potential game states.
- These are positions from which the opponent will play.
- The opponent is trying to get the *minimum* score from the available options.

Minimax

- We work from the bottom of the tree, scoring the end states, then choosing the maximum or minimum value at each level of the tree depending on whose go it is.

Example game tree



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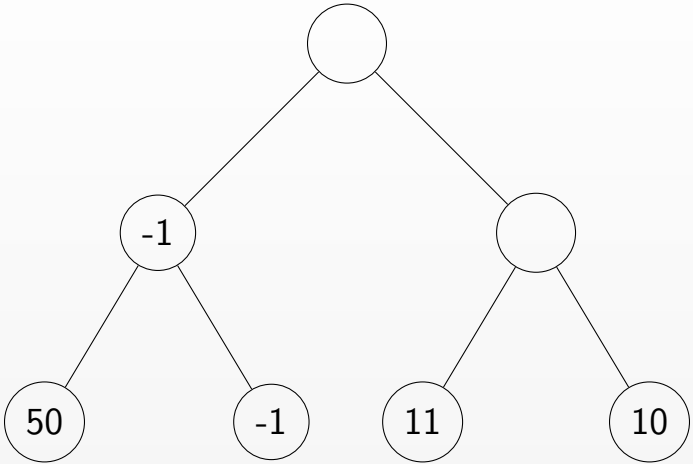

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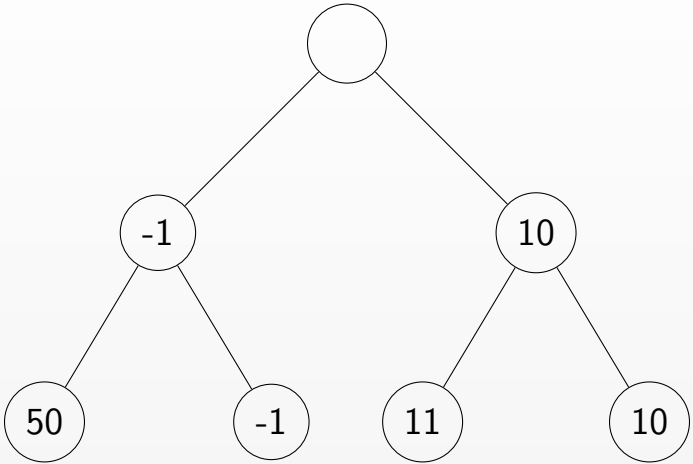

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