Lecture 20 - Game Theory

Modular Framework for the following kinds of Games

- 2-player (alternate turns)
- deterministic (no dice)
- perfect information (no hidden state)
- zero-sum (I win, you lose; ties OK)
- finitely-branching (maybe even finite)

Game Trees

- **Nodes** represent current "state of game"
- **Edges** represent possible moves
- A given **level** corresponds to a given player, alternating turns

Estimators

In practice, trees are too large to visit all leaves.

Instead,

- expand tree to **some depth**
- use **game-specific estimator** to assign values (not just `1` or `-1`) at bottom-most nodes explored

Then, backchain minimax as before.

Repeat this after each actual move.

Issue: Horizontal Effect

Modular Framework

- Game: `GAME`
- Player: `PLAYER`
- Referee: `GO`

Implementation

See code.