

Game Computation

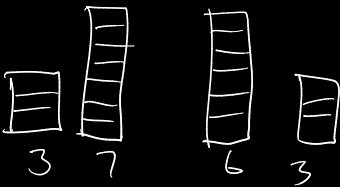
3 classes online

Types

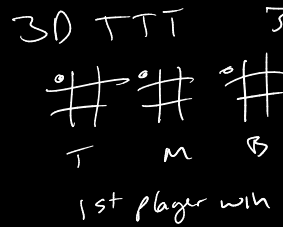
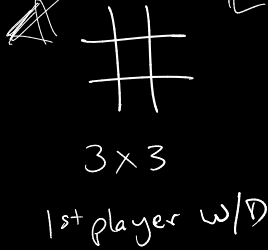
Combinatorial Games

- no hidden information
- no randomness

Nim



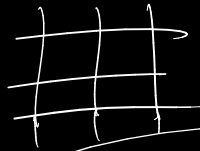
- break into smaller subgames
- algebraic structure (nim-line)
- Coherent throughout the game (TTT games)
- combinatorial chaos



Algorithmic Game Theory

- Strategy for games
- Is it a 1st player win?
- How hard is it to tell?

4x4

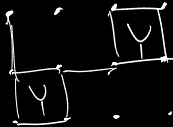


4x4x4

1st player win
complicated

5x5x5

~~Traditional Game Theory~~



Lab

What is a game?

- Anything
- Our definition captures
 - board games -- chess, go, --
 - card games - Poker --
 - puzzles - one-player games - Rush hour, Wordle, sliding block
 - zero-player games - automata / simulation
Conway's game of life

Four main features

1. Positions - finite configurations, card distributions, finite amt. of information
2. Players - players take turns w/ moves and win w/ some goal
3. Moves - a player moves one configuration to another
4. Goals - game state / configuration for a player to win.

- Assume optimal play
- Dice rolls as a player playing randomly
- Usually assume 1 or 2 players.