Overview of Three Game Types

See also: http://en.wikipedia.org/wiki/Game_theory#Types_of_games

Combinatorial Games

- Perfect information:
    - "perfectly informed of all the events that have previously occurred"
    - having all relevant, known information for optimal decision-making
- Deterministic action outcomes: same state + same action → same state transition

Example Game: Chomp

- See also: Wikipedia, Andries E. Brouwer page

Games of Chance

- Perfect Information
- Probabilistic action outcomes: same state + same action →probabilistic state transition
- E.g. Markov Decision Processes, Sequential Stochastic Games with Perfect Information

Example Game: Pig

- See also: Wikipedia

Strategic Games

- Imperfect Information:
    - not having all relevant known information for optimal decision-making
    - "a player who does not know everything that his opponent knows"
    - Example: Simultaneous games modeled as sequential games with imperfect information:[1]
        - First player commits to action (unknown to second)
        - Then second player commits to action
        - Then actions carried out simultaneously
        - Example Game: Rock-Paper-Scissors with playing cards played in turn then both revealed

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[1] Note: Some authors consider these to be perfect information games. The fact that these may be equivalently represented as sequential imperfect information games is a good argument against such classification. For simultaneous games, players commit to a decision prior to action, and this relevant information is unknown to the opponent (who might change their decision if it was known). The distinction is in what is considered "known information".

- o Example: Hidden information (e.g. private hand of cards, dice)
  - ▪ e.g. Kuhn Poker
- Deterministic action outcomes
  - o Chance events are sometimes modeled as including extra "player" to make "moves by nature".

Example Games: Rock-Paper-Scissors, Kuhn Poker

(Generalizing all of these: Partially-Observable Stochastic Games)

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