Games – State of the Art

- Checkers -- solved!
- Othello
  - Human champions refuse to play against computers (they're too good)
- Go
  - Human champions refuse to play against computers (they're too bad)
  - Play at advanced amateur level
  - Difficulty: b $\approx$ 300, requires advanced pattern matching

Games – State of the Art

- Games of chance
  - Backgammon
    - TD-Gammon plays at world champion level
    - High branching factor => evaluation function is key
- Chance + Partial Observability: Bridge
  - GIB program -- 2000 computer bridge champion
  - Uses Monte Carlo method
  - "Explanation-based generalization"
    - E.g.,   player1 has A K 5 3, player2 has 7 8
      $$\approx$$
      player1 has A Q 4 3, player2 has 6 7
    - Solves a deal *exactly* in one second!

Games – State of the Art

- Chance + Partial Observability: Poker
  - Has tended to focus on two-player game
    - 2007 University of Alberta tournament at AAAI conference
      - 500 Duplicate hands vs. top pros
      - Computer player Polaris finished 1-2-1
    - 2008 UofA tournament at World Series of Poker
      - Computer finished 3-2-1 against pros

Games -- Summary

- Working on games is fun
  - But potentially counterproductive
- Lessons for AI:
  - Perfection unattainable, must approximate
  - Good idea to "think about what to think about"
  - Uncertainty constrains assignment of values to states
  - Optimal decisions depend on information state, not actual state
- Games are to AI as…

Games -- Summary

- Generally, computer methods for gameplaying are radically different from human ones

- How much does this matter?

- Turing Test vs. Seagull Test