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
    ~ 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