General Intro to Search Algorithms & Minimax

Lok Huang

Oct 29, 2018

What will we focus on?

- Just a general introduction
  - No discussion on completeness, optimality, time complexity, and space complexity
  - No pseudo-code or actual codes
  - Only simple methodology

- Minimax
  - A strategy in game theory

Search Algorithms

- BFS
  - Dijkstra's Algorithm
- DFS
  - DLS (Depth Limited Search)
  - IDS (Iterative Deepening DFS)
- UCS (Uniform Cost Search)
- A* Algorithm
- MST
  - Prim’s Algorithm: Starting at one node…
  - Kruskal’s Algorithm: Starting at any edge…

Minimax

- Assumption: Two players, and each of them is intelligent enough to make itself better off and its rival in the worst occasion.

- Two players: MIN and MAX
- Weight for each decision: the score we assign to evaluate how good the occasion is to MAX
- So…
  - MAX chooses the highest score it can choose
  - MIN chooses the lowest score it can choose
- DFS/DLS for multiple rounds of choosing

Minimax

- Example: Tiny Tic-tac-toe
  - 2x2, 2 players
  - A player wins when its symbol lines up diagonally (NOT horizontally or vertically)
  - Let’s assume that MIN goes first and choose the left-top corner…
  - PS; Minimax usually starts with MAX

Any Questions?