Pattern Database Heuristics for Greedy Search

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Proposal

Greedy search will solve the sliding tile puzzle better with the fringe pattern database than a more specialized pattern database as a heuristic.

Algorithm: Greedy Search

Assume b is branching factor and m is maximum depth.

- Best-first search with queue ordered by heuristic value
- Complete in finite spaces
- Inadmissible
- b^m time
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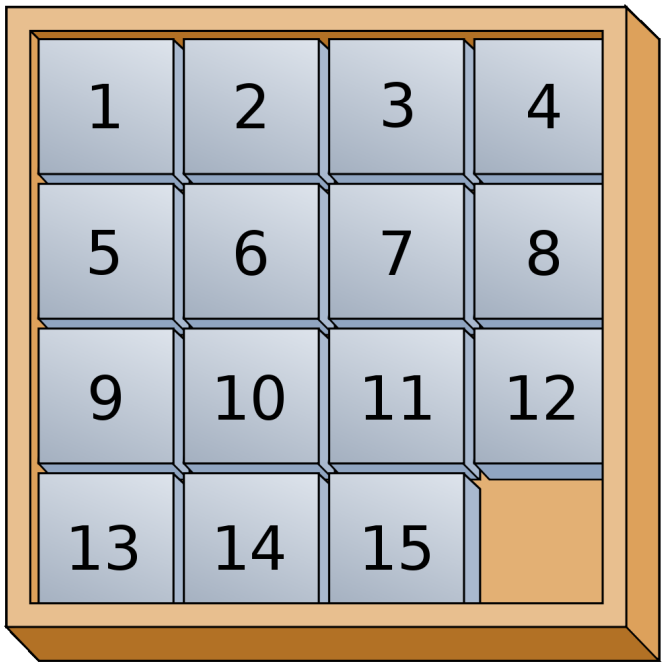
- **Tends to yield suboptimal solutions in a reasonable time**

Domain: N-Puzzle



- N numbered square tiles, one blank tile
- Objective: rearrange tiles by sliding the blank space to reach goal configuration
- Commonly solved with A* using Manhattan Distance heuristic

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  - Admissible heuristic

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- Less tiles abstracted, more powerful pattern database
- More timely to calculate and larger space required when fewer tiles are abstracted

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Heuristic value of state:

$h = cost + cost$

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  - Solving remaining tiles will not disturb solved tiles
  - $h = 0$ means you're actually close to the goal
- Specialized
  - Solving remaining tiles might disturb solved tiles
  - $h = 0$ does not guarantee you're close to the goal

Results

	Greedy	A*
Fringe	44,171	218,816
Specialized	196,073	333,928

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- Previously, it was shown specialized works better on big puzzles with big pattern databases, this does not generalize to smaller puzzles with disjoint pattern databases (Which one?)