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- Can we be sure that when the goal state is popped out of the priority queue in A* graph search the function $f(n)$ will be minimized?

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1. Consistent heuristic:

$$h(n) \leq c(n, a, n') + h(n')$$

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  Is the above sentence correct?

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- Will A* graph search give minimum path length to goal state?

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2. Admissibility
   - Consistency $\Rightarrow$ Admissibility

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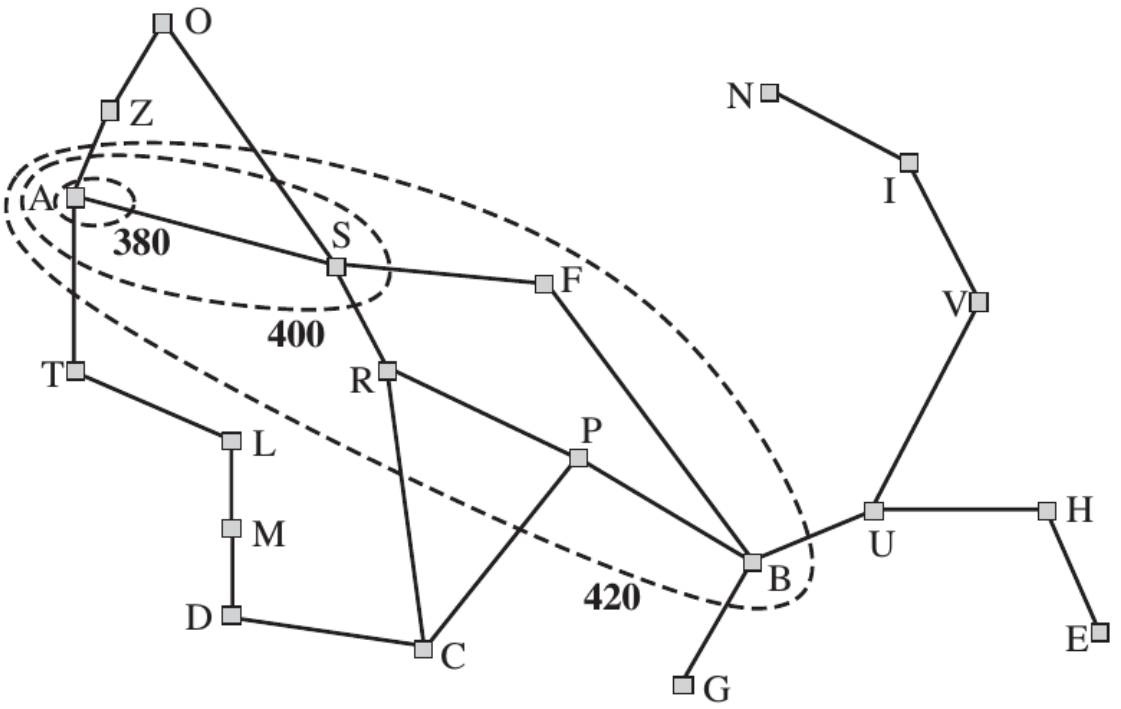

Figure 3.25 Map of Romania showing contours at $f = 380$, $f = 400$, and $f = 420$, with Arad as the start state. Nodes inside a given contour have f-costs less than or equal to the contour value.

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- In the worst case, A* search will expand all nodes with $f(n) \leq C^*$.
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Further Improvements

- Iterative deepening A* (IDA*)

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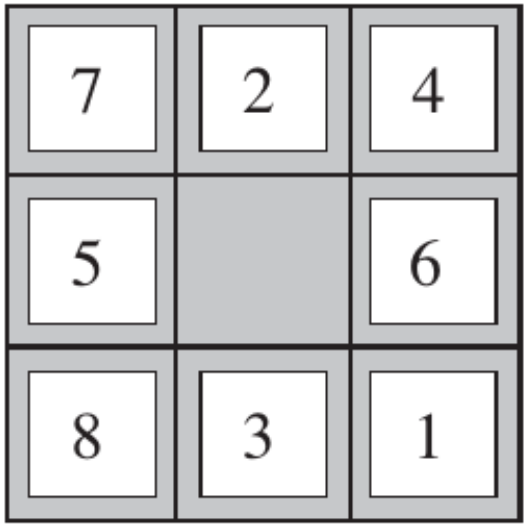
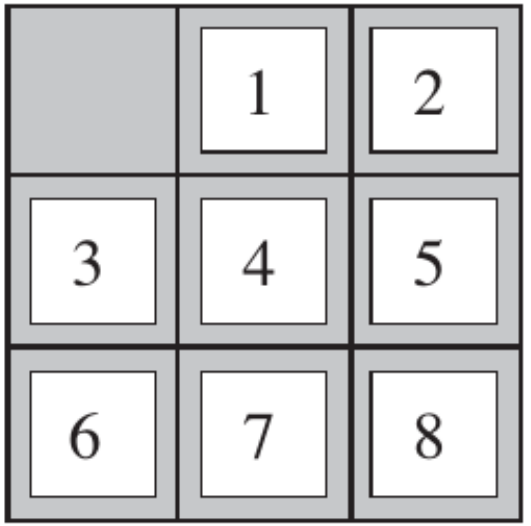
- Recursive best-first search (RBFS)
- Memory-bounded A* (MA*)

Heuristic Functions for 8-puzzle problem

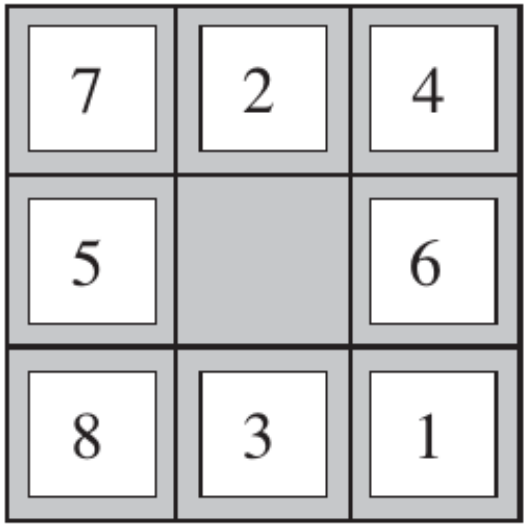


Start State

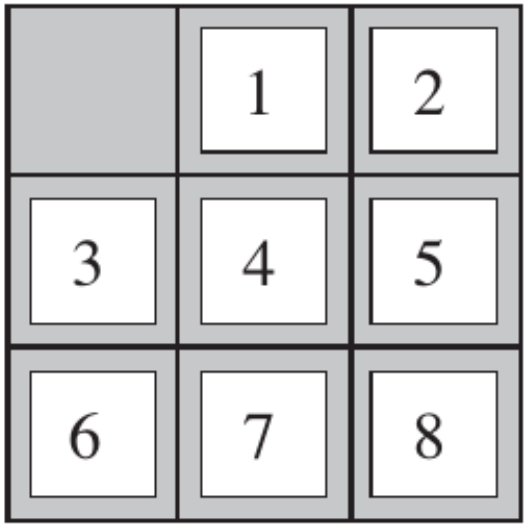


Goal State

Heuristic Functions for 8-puzzle problem



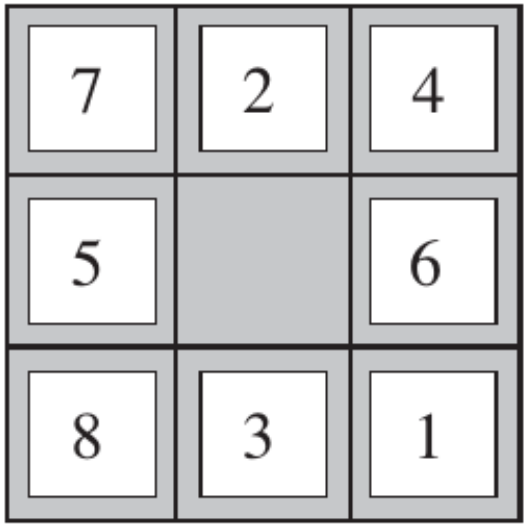
Start State



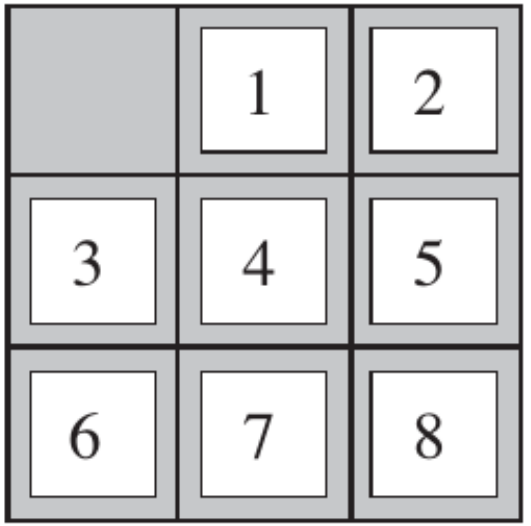
Goal State

1. Number of misplaced tiles (h_1)

Heuristic Functions for 8-puzzle problem



Start State



Goal State

1. Number of misplaced tiles (h_1)
2. Manhattan distance (h_2)