Principles of AI Planning

Dr. J. Rintanen, M. Ragni
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University of Freiburg
Department of Computer Science

Exercise Sheet 3

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Exercise 3.1 (A^* Search)

Assume that you have a puzzle consisting of 5 cells. The first two cells contain black tiles, the next two white ones, and the last cell is empty.

B	B	W	W	

A tile can be moved in a neighbored empty cell (costing 1 unit) or a tile can 'jump' over at most two cells into an empty cell (costing the # of cells jumped over). The goal of the game is to have both black tiles to the right of the white tiles, the empty cell may have an arbitrary position.

(a) Solve the puzzle with an A^* algorithm and the following heuristic function h_1: A black tile on the first cell costs 1 unit, on the second cell 0.5 unit (the initial configuration costs 1.5 units). Show that h_1 is admissible, i.e., $h_1 \leq h^*$.
(b) Define a better informed heuristic function h_2 with $h_1 \leq h_2 \leq h^*$.
(c) Solve the problem by using your heuristic function h_2.