

## Introduction to Multi-Agent-Programming

B. Nebel, A. Kleiner  
C. Dornhege, D. Zhang  
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University of Freiburg  
Department of Computer Science

### Exercise Sheet 3

Due: November 16th, 2010

#### Exercise 3.1 (Search and Path-Finding)

Consider the following grid world. A robot  $S$  is moving to  $G$ .

8					
7		■	■	■	<b>G</b>
6		■	■	■	■
5		■	■	■	■
4		■	■	■	■
3		■	■	■	■
2		■	■	■	■
1					
0		<b>S</b>			
	0	1	2	3	4

Moving into a white cell costs 1, and moving into a gray cell costs 2.

- Draw the optimal trajectory. (1pt)
- $A^*$  is used in the search. The heuristic is Manhattan distance. Is this heuristic admissible, why? (1pt)
- Define the second heuristic which is admissible. (1pt)
- Use real-time adaptive  $A^*$  to solve the problem. (look ahead 2 steps). (2pt)

**This exercise should be submitted during the lecture on Tuesday (Nov. 16th)**