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Artificial Intelligence
Übungsblatt 2

5. Dezember 2017

1 Simulated Annealing

2 LRTA*

a)

node	f-Value	explored	next
a	b:4, e:2, f:7	-	e
e	b:4, c:8, d:8, g:8, f:7	a	b
b	c:7, d:8, g:8, f:7	a,e	c
c	d:8, g:8, f:7	a,e,b	f
f	d:8, g:8	a,e,c,b	g
g	finished	a,e,c,f,b	-

Our Path is therefore $a \rightarrow b \rightarrow c \rightarrow d \rightarrow g$ with cost 8. Another path with the same cost would have been $a \rightarrow e \rightarrow g$ but we prioritize b over e due to alphabetical order.

b)

a	s	s'	H[a]	H[b]	H[c]	H[d]	H[e]	H[f]	H[g]
-	-	-	3	3	3	1	1	1	0
-	-	a	3	3	3	1	1	1	0
(a,e)	a	e	3	3	3	1	1	1	0
(e,a)	e	a	3	3	3	1	4	1	0
(a,b)	a	b	4	3	3	1	4	1	0
(b,a)	b	a	4	5	3	1	4	1	0
(a,e)	a	e	5	5	3	1	4	1	0
(e,a)	e	a	5	5	3	1	6	1	0
(a,b)	a	b	6	5	3	1	6	1	0
(b,c)	b	c	6	6	3	1	6	1	0
(c,d)	c	d	6	6	4	1	6	1	0
(d,g)	d	g	6	6	4	1	6	1	0

c)

we now use $H(n)$ instead of $h(n)$ as our heuristic.

n	h(n)	H(n)
a	3	6
b	3	6
c	3	4
d	1	1
e	1	6
f	1	1
g	0	0

When now apply the normal A* algorithm we get:

node	f-Value	explored	next
a	b:7, e:7, f:7	-	b
b	c:8, e:7, f:7	a	e
e	d:8, c:8, f:7, g:8	a,b	f
f	d:8, c:8, g:8	a,b,e	c
c	d:8, g:8	a,b,e,f	d
d	g:8	a,b,e,f,c	g
g	finished	a,b,e,f,c,d	-

We can see that even though we might have a more accurate $H(n)$ it does not necessarily lead to a faster search. In this case we needed to expand more nodes.