

Informed Search 2

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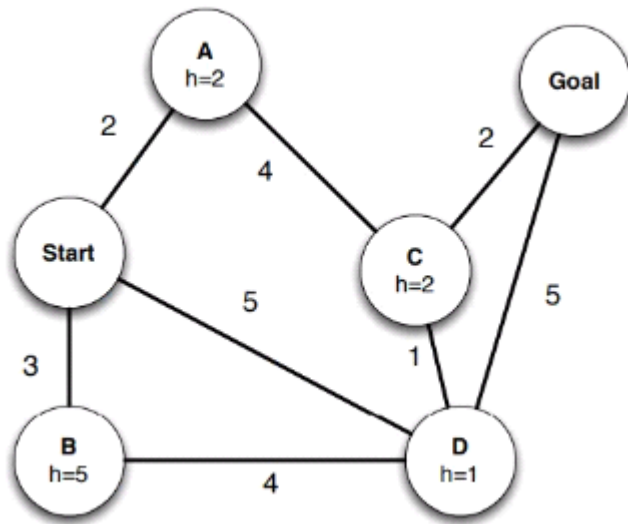
Heuristic based search techniques

1. Best-first search:
 - Heuristic cost used to guide search
 - Using an evaluation function $f(n)$
2. Greedy best-first search:
 - Choose the option that is best at every step of the search
 - Not optimal or complete (loops)
3. A*
 - Most popular
 - Evaluation function: $g(n)$ [cost so far] + $h(n)$ [estimated cost from n to goal]
 - Looking at the past + future
 - Complete, unless infinitely many nodes and optimal
 - But exponential space and time complexity

Dominance of Heuristics

- If $h_2(n) > h_1(n)$ for all n , then h_2 dominates over h_1 and is better for search
4. Iterative Deepening A* (IDA)
 - Combination
 - Complete and optimal
 - Reduces number of nodes in memory
 5. Recursive best-first search
 - At every explored node, it stores the next best option.
 - Backtracks if current goal is more costlier than next best option
 - Reduces memory (a little too less memory)
 6. Simplified memory A*
 - Cut off nodes least likely to visit
 - Limiting the number of nodes visited

Better heuristic --> reduced branching factor



Work out order, path returned by search. Branches expanded in alphabetical order.

1. DFS

S	A	C	D	B	G
S	A	C	G		

2. BFS

S	A	B	D	C	G
S	A	C	G		

3. UCS

S	A2	B3	C4	D1
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S -> A2, B3, D5

A2-> C4

S - A

S	A	C	D	G
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4. Greedy with h

$h(G) = 0$

S	D1	G(0)
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5. A* with h

S	1. A4		
		4. C8 (Go to d)	G8

	3. B8	D8 (go to c)	
	2. D6	G10(go to b)	