

CSCI 3202

Lecture 10

September 15, 2025



Frank and Ernest by Thaves. <https://www.gocomics.com/frank-and-ernest>

Announcements

- Homework 3 due Friday
- Quiz 4 on Friday

Quiz 3

- Average was 82%
 - On question 1, I gave credit for both "No" and "Sometimes"
- Review

Search Summary

- Posted in Canvas

9/22/24

Search Algorithm										
	BFS	DFS	UCS	Greedy	A*					
Type	Uninformed	Uninformed	Uninformed	Partially Informed	Informed					
Frontier	Queue	Stack	Priority Queue	NA	Priority Queue					
Optimal	Yes	No	Yes(1)	No	Yes(2)					
Optimizes for	Nodes traversed	"(3)"	Weighted Path Cost	"(4)"	Weighted Path Cost					
Consistent	Yes	No(5)	Yes	No	Yes					
Time Complexity	$O(b^d)$ (6)	$O(b^m)$ (7)	$O(b^{(1+C/e)})$ (9)	Unk (10)	$O(b^{(ed)})$ (11)					
Space Complexity	$O(b^d)$ (6)	$O(m^b)$ (8)	$O(b^{(1+C/e)})$ (9)	Unk (10)	$O(b^{(ed)})$ (11)					
Step Cost	Each node is same	Each node is same	Given by user	Not used	Given by user					
Path Cost	Number of nodes in path	Number of nodes in path	Sum of step costs for path	Not used	Sum of step costs for path					
Heuristic	None	None	None	Given by user	Given by user					
Estimated Cost	None	None	None	heuristic cost from next node to goal	Path cost to n plus heuristic cost to goal					
Pro	Easy to understand and implement. Consistent, Optimal.	Faster than BFS. Iterative versions can be quite fast and memory efficient.	Finds optimal weighted solution. Consistent.	Very fast. Uses minimal CPU and memory	Fast, consistent, optimal, visits few nodes to find solution					
Con	Uses much memory and CPU. Not weighted.	Not optimal. Returned path depends on tree or graph structure	Uses much CPU and Memory	Can find local optimum or get stuck depending on graph configuration. Not optimal.	Depends on configuration and heuristic					
Notes:										
"(0)"	Assumes a Finite Tree or Graph									
"(1)"	Assumes all weights > 0									
"(2)"	If heuristic is admissible									
"(3)"	Sometimes minimizes number of nodes traversed									
"(4)"	Minimum heuristic weight to goal									
"(5)"	Not consistent if tree or graph has cycles (See https://stackoverflow.com/questions/9250630/completeness-of-depth-first-search)									
"(6)"	b = branching factor, d = depth to solution									
"(7)"	worst case, b = branching factor, m = maximum depth of tree									
"(8)"	worst case for recursive									
"(9)"	C = Optimal path cost, e =minimum step cost									
"(10)"	Depends on the heuristic function and configuration of the graph									
"(11)"	Depends strongly on configuration, e =error in heuristic, d =solution depth									
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Probability

- Probability Review.pdf

Next Time

- Finish probability review
 - Make sure you understand Mad Cow Disease example
 - Spam filter
- Start on Bayes