ITERATIVE DEEPENING DFS

CSE 511A: Introduction to Artificial Intelligence

PROPERTIES

	BFS	DFS
Correct the solution it finds is optimal	Yes if cost is uniform	No
Complete it terminates	Yes if b is finite	Yes if b & m are finite
Space Complexity max nodes in memory	$O(b^{d+1})$	$O(bm)$
Time Complexity max nodes generated	$O(b^{d+1})$	$O(b^m)$

When should we use BFS and when should we use DFS?

ITERATIVE DEEPENING DFS

Combining the best of both worlds:
Iterative Deepening DFS pseudo-code:

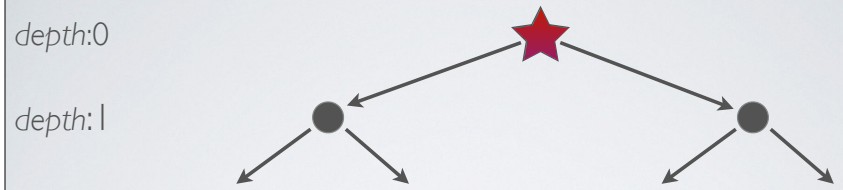
(1) *limit* = 0
(2) Run DFS with depth limit = *limit*
(3) If found goal, then stop
(4) *limit* = *limit* + 1
(5) Go to (2)

ITERATIVE DEEPENING DFS

depth:0

limit = 0

ITERATIVE DEEPENING DFS



limit = 1

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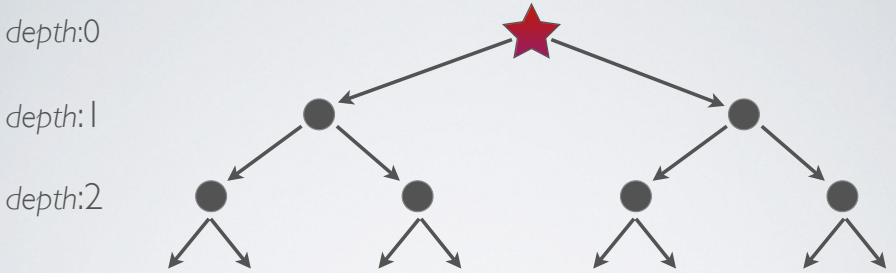
ITERATIVE DEEPENING DFS



limit = 2

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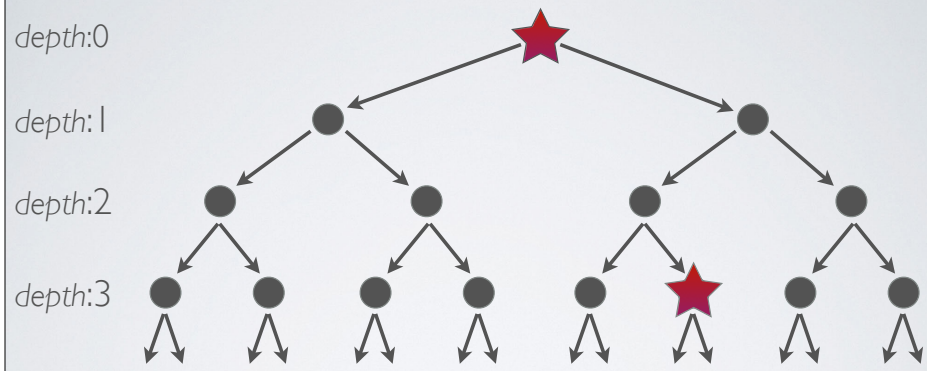
ITERATIVE DEEPENING DFS



limit = 3

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PROPERTIES

	BFS	DFS	ID-DFS
Correct the solution it finds is optimal	Yes if cost is uniform	No	Yes if cost is uniform
Complete it terminates	Yes if b is finite	Yes if b & m are finite	Yes if b is finite
Space Complexity max nodes in memory	$O(b^{d+1})$	$O(bm)$	$O(bd)$
Time Complexity max nodes generated	$O(b^{d+1})$	$O(b^m)$	$O(b^{d+1})$

branching factor b
depth of the goal d
depth of tree m

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