

Comparison between DFS and BFS

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	DFS		BFS	
	Length of path	No. of nodes expanded	Length of path	No. of nodes expanded
Missionaries and Cannibals	9	10	7	10
Farmer, Fox, Chicken, and Grain	7	8	7	10
4-Disk Towers of Hanoi	40	40	18	74

Path found from start to goal

(i) Missionaries and Cannibals

DFS

[[3, 0], [3, 0]]
[[2, 1], [2, 1]]
[[3, 0], [2, 1]]
[[0, 3], [2, 1]]
[[2, 1], [2, 1]]
[[1, 2], [1, 2]]
[[3, 0], [1, 2]]
[[0, 3], [1, 2]]
[[1, 2], [1, 2]]
[[0, 3], [0, 3]]

BFS

[[3, 0], [3, 0]]
[[2, 1], [2, 1]]
[[3, 0], [2, 1]]
[[1, 2], [1, 2]]
[[3, 0], [1, 2]]
[[0, 3], [1, 2]]
[[1, 2], [1, 2]]
[[0, 3], [0, 3]]

(ii) Farmer, Fox, Chicken, and Grain

DFS

[[1, 0], [1, 0], [1, 0], [1, 0]]
[[0, 1], [1, 0], [0, 1], [1, 0]]
[[1, 0], [1, 0], [0, 1], [1, 0]]
[[0, 1], [0, 1], [0, 1], [1, 0]]
[[1, 0], [0, 1], [1, 0], [1, 0]]
[[0, 1], [0, 1], [1, 0], [0, 1]]
[[1, 0], [0, 1], [1, 0], [0, 1]]
[[0, 1], [0, 1], [0, 1], [0, 1]]

BFS

[[1, 0], [1, 0], [1, 0], [1, 0]]
[[0, 1], [1, 0], [0, 1], [1, 0]]
[[1, 0], [1, 0], [0, 1], [1, 0]]
[[0, 1], [1, 0], [0, 1], [0, 1]]
[[1, 0], [1, 0], [1, 0], [0, 1]]
[[0, 1], [0, 1], [1, 0], [0, 1]]
[[1, 0], [0, 1], [1, 0], [0, 1]]
[[0, 1], [0, 1], [0, 1], [0, 1]]

(iii) 4-Disk Towers of Hanoi

DFS

[[4, 3, 2, 1], [], []]
[[4, 3, 2], [1], []]
[[4, 3], [1], [2]]
[[4, 3, 1], [], [2]]
[[4, 3], [], [2, 1]]
[[4], [3], [2, 1]]
[[4, 1], [3], [2]]
[[4], [3, 1], [2]]
[[4, 2], [3, 1], []]
[[4, 2, 1], [3], []]
[[4, 2], [3], [1]]
[[4], [3, 2], [1]]
[[4, 1], [3, 2], []]
[[4], [3, 2, 1], []]
[[], [3, 2, 1], [4]]
[[1], [3, 2], [4]]
[[], [3, 2], [4, 1]]
[[2], [3], [4, 1]]
[[2, 1], [3], [4]]
[[2], [3, 1], [4]]

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[[],[3,1],[4,2]]
[[1],[3],[4,2]]
[[],[3],[4,2,1]]
[[3],[],[4,2,1]]
[[3,1],[],[4,2]]
[[3],[1],[4,2]]
[[3,2],[1],[4]]
[[3,2,1],[],[4]]
[[3,2],[],[4,1]]
[[3],[2],[4,1]]
[[3,1],[2],[4]]
[[3],[2,1],[4]]
[[],[2,1],[4,3]]
[[1],[2],[4,3]]
[[],[2],[4,3,1]]
[[2],[],[4,3,1]]
[[2,1],[],[4,3]]
[[2],[1],[4,3]]
[[],[1],[4,3,2]]
[[1],[],[4,3,2]]
[[],[],[4,3,2,1]]

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BFS

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[[4,3,2,1],[],[[]]]
[[4,3,2],[1],[[]]]
[[4,3],[1],[2]]
[[4,3,1],[],[2]]
[[4,3],[],[2,1]]
[[4],[3],[2,1]]
[[4,1],[3],[2]]
[[4,1],[3,2],[[]]]
[[4],[3,2,1],[[]]]
[[],[3,2,1],[4]]
[[1],[3,2],[4]]
[[],[3,2],[4,1]]
[[2],[3],[4,1]]
[[2,1],[3],[4]]
[[2,1],[],[4,3]]
[[2],[1],[4,3]]
[[],[1],[4,3,2]]
[[1],[],[4,3,2]]
[[],[],[4,3,2,1]]

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