



الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري

Arab Academy for Science, Technology & Maritime Transport

Research on Depth First Search and Breadth First Search

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Breadth First Search (BFS)

Breadth First Search is a horizontal based technique for finding a shortest path in graph. It uses a Queue data structure that follows first in first out. In BFS, you visit and finish one layer then after finishing the layer you start by visiting the second layer. It explore the neighbor nodes first, before moving to next level neighbors.

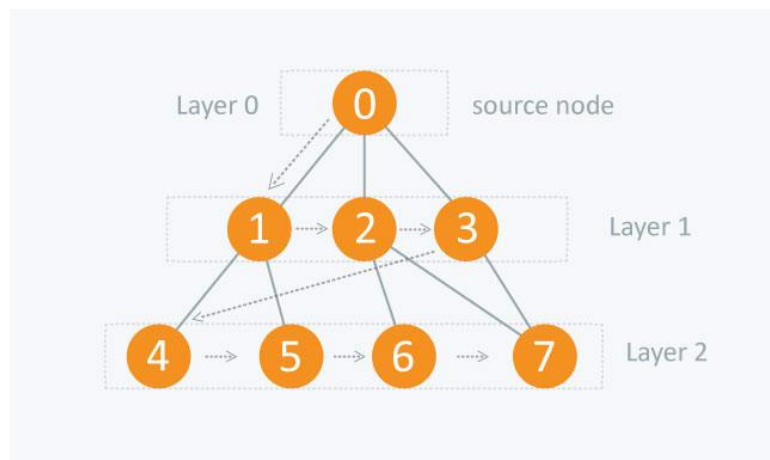


Figure 1: Breadth First Search

BFS is used when you need to find the shortest path to a certain value without searching all over a certain node and viewing its entire child's. Moreover, it is as if you need to search part of the tree for a solution.

Advantage of BFS

- Used to find the shortest path between vertices.
- Always finds optimal solutions.
- Finds the closest goal in less time.

Disadvantage of BFS

- All of the connected vertices must be stored in memory. So it consumes more memory.

Depth First Search (DFS)

Depth First Search is a vertical based technique. It uses the Stack data structure that follows last in first out. It is commonly used when you need to search the entire tree. It explore as far as possible nodes of each branch. DFS is more space-efficient than BFS, but may go to unnecessary depths.

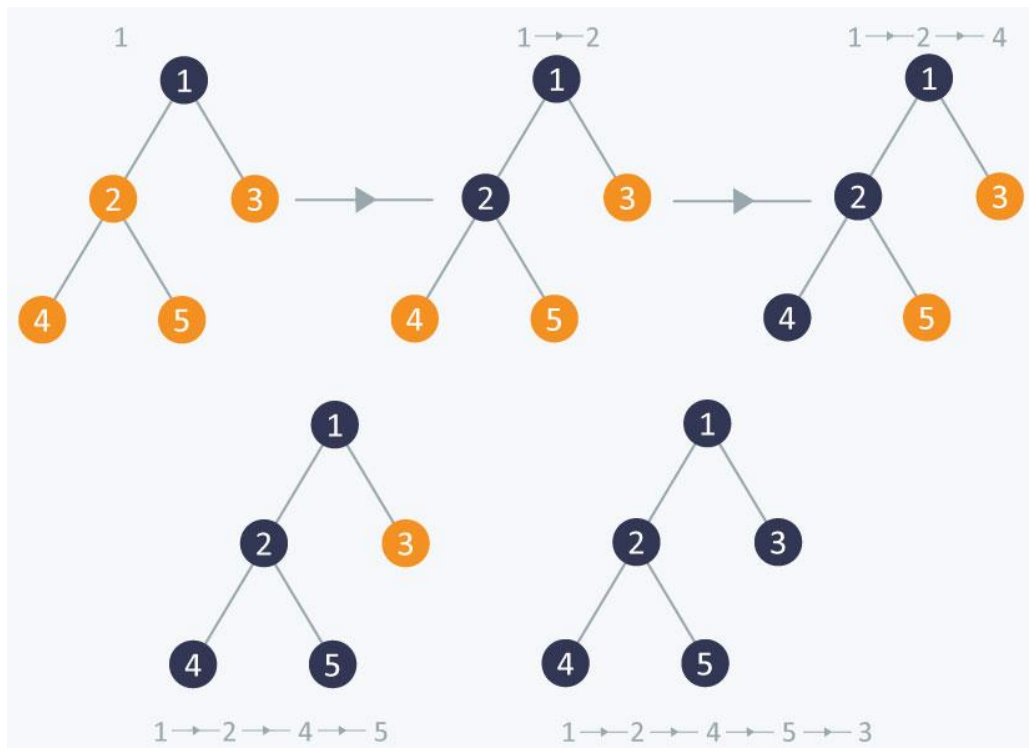


Figure 2: Depth First Search

DFS is used when the search tree is very deep and you need to restrict the search depth. Moreover, if solutions are frequent but located deep in the tree.

Advantage of DFS

- Consumes less memory
- Finds the larger distant element(from source vertex) in less time.

Disadvantage of DFS

- May not find optimal solution to the problem.
- May get trapped in searching useless path.