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DECODE
AiML

2.19.2

Graph Traversal Algorithms

→ A graph traversal algorithm is a method to systematically visit all the nodes of the graph.

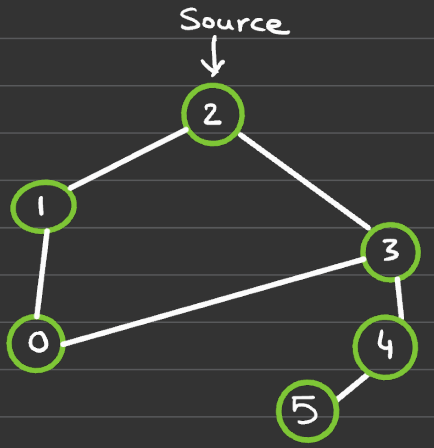
→ There are mainly 2 types of Graph traversal Algorithms.

① Breadth-First Search (BFS)
② Depth-First Search (DFS)

Breadth-First Search (BFS)

→ Also called level order Traversal.
→ Implemented using Queue data structure.

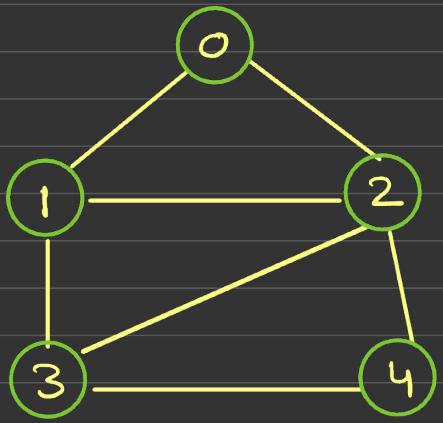
→ Steps
① Start from source node
② Visit all it's immediate neighbors
③ Then move to next level of neighbors.



BFS Sequence : 2 1 3 0 4 5

BFS Dry Run

→ Visited
→ Explored



⓪ Input & output
- → Input → adjacency matrix, src
- → Output → bfs sequence (list)

① Initial Setup:
- ↳ Queue data structure → deque in Python
- ↳ visited array → List in Python.

② Dry Run:

BFS sequence

src = 0

Queue

Visited

0 1 2 3 4

Time & space Complexity → Adjacency List R

→ Time Complexity = $O(n) + O(2E) = O(n+E)$

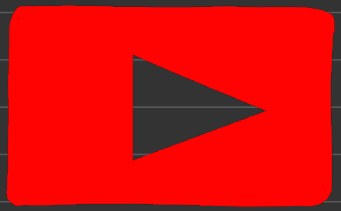
- $O(n)$ ↑ all nodes are pushed into queue.
- $O(2E)$ ↑ for each nodes, check all the neighbours
  - ↳ equal to sum of degree
    - ↳ equal to $2 \times E$

→ Space Complexity = Auxiliary space → Excluding Input & Output space.

$= O(n) + O(n)$

- $O(n)$ ↑ Space for Queue
- $O(n)$ ← Space for visited array.

$= O(n)$

Like  Subscribe