

Graph Traversal

Computing

Depth-first and breadth-first — the two ways to walk anything connected.

Depth-first (DFS)

- Uses a stack, or recursion
- Goes deep before wide
- Cycle detection, topological sort
- Lower memory on wide graphs
- Does NOT find shortest paths

Breadth-first (BFS)

- Uses a queue
- Explores level by level
- Shortest path in an unweighted graph
- Higher memory — holds a whole level
- Finds the nearest match first

THE DIFFERENCE THAT MATTERS

Both are $O(V + E)$. The difference is the order of visiting, and that is what decides which problems they solve.

Mark nodes as visited in both. Without that, any cycle turns the traversal into an infinite loop.