

# Breadth First Search

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## Estimated Time

25 minutes

## Learning Objectives of this Module:

Welcome to this module on BFS! Take a look at what we will learn in this module:

- Graph traversal and its types
- What is BFS and when is it used?
- Practice BFS Algorithm
- Interactive BFS Exercise
- A quiz to check your understanding of BFS

## Definition

- Breadth First Search (BFS) is a technique for traversing a finite graph. BFS visits the neighbour vertices before visiting the child vertices, and a queue is used in the search process. This algorithm is often used to find the shortest path from one vertex to another.
- Here we start traversing from a selected node (source node) and traverse the graph layer/level wise thus exploring the neighbour nodes (nodes which are directly connected to source node). We must move to the next layer/level only after traversing the current layer/level completely.
- In short:
  - i. Move horizontally and visit all the nodes of the current layer/level.
  - ii. Move to the next layer.

## BFS Algorithm

The algorithm starts with examining the source node and all of its neighbours. In the next step, the neighbours of the nearest node of the source node are explored. The algorithm then explores all neighbours of all the nodes and ensures that each node is visited exactly once and no node is visited twice.

**STEP 1:** Set visited as 0 for all nodes in the Graph.

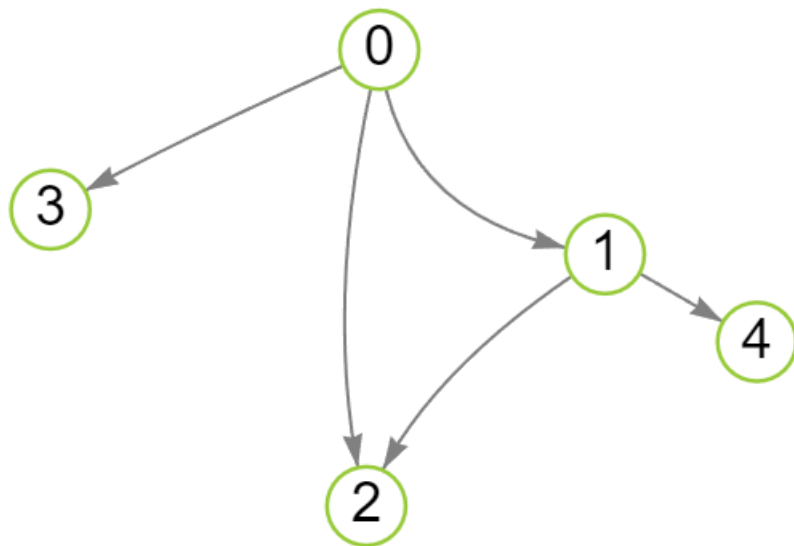
**STEP 2:** Enqueue the selected source node into the queue.

**STEP 3:** Dequeue a node N from queue and update its visited as 1.

**STEP 4:** Enqueue all the neighbours of node N which are not present in the queue and whose visited is 0.

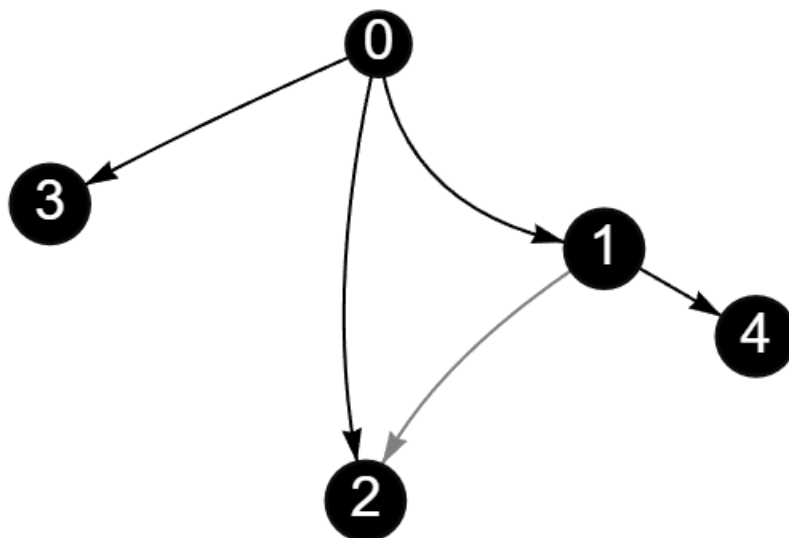
**STEP 5:** Repeat steps 3 and 4 until queue is empty.

**STEP 6:** EXIT



### Observations

Execution is reset



### Observations

BFS is done on the node 0 !!!

Sequence of nodes visited on performing BFS on node 0 : 0 , 1 , 2 , 3 ,