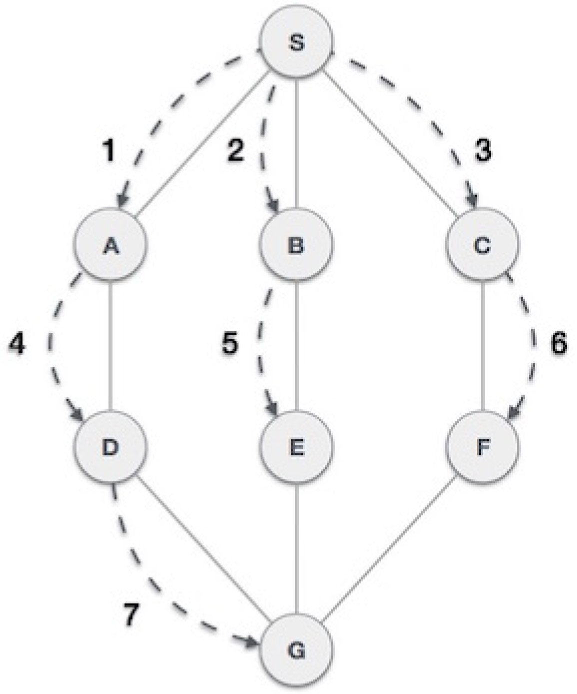
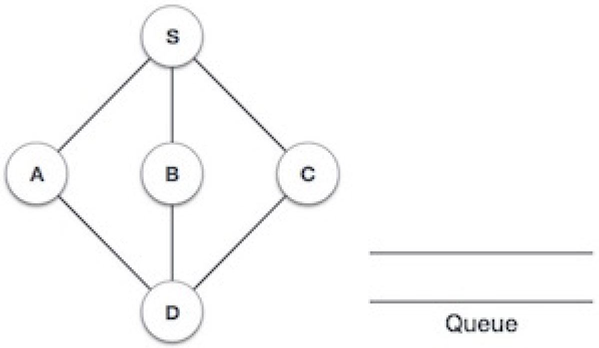
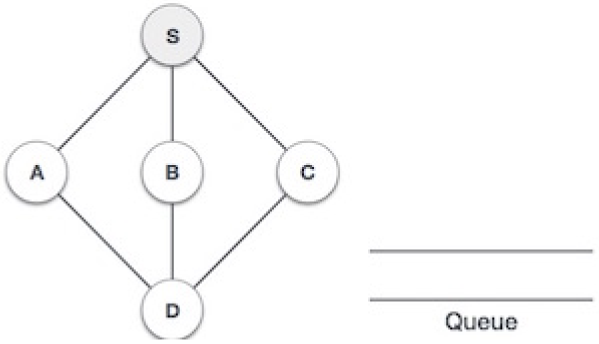
DATA STRUCTURE - BREADTH FIRST TRAVERSAL

Breadth First Search algorithm*BFS* traverses a graph in a breadthwards motion and uses a queue to remember to get the next vertex to start a search when a dead end occurs in any iteration.

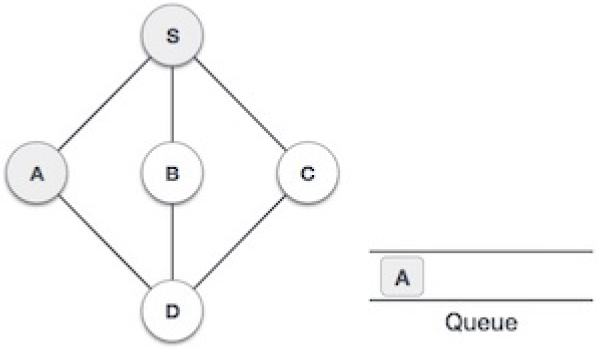


As in example given above, BFS algorithm traverses from A to B to E to F first then to C and G lastly to D. It employs following rules.

- **Rule 1** − Visit adjacent unvisited vertex. Mark it visited. Display it. Insert it in a queue.
- **Rule 2** − If no adjacent vertex found, remove the first vertex from queue.
- **Rule 3** − Repeat Rule 1 and Rule 2 until queue is empty.

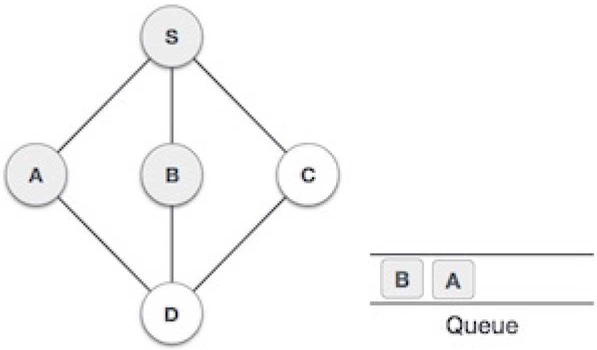
Step	Traversal	Description
1.		Initialize the queue.
2.		We start from visiting **S** *startingnode*, and mark it visited.

3.



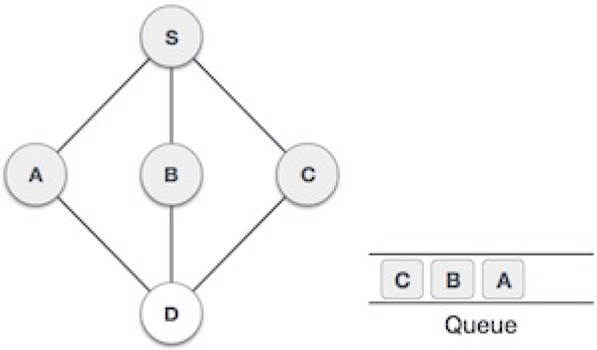
We then see unvisited adjacent node from **S**. In this example, we have three nodes but alphabetically we choose **A** mark it visited and enqueue it.

4.



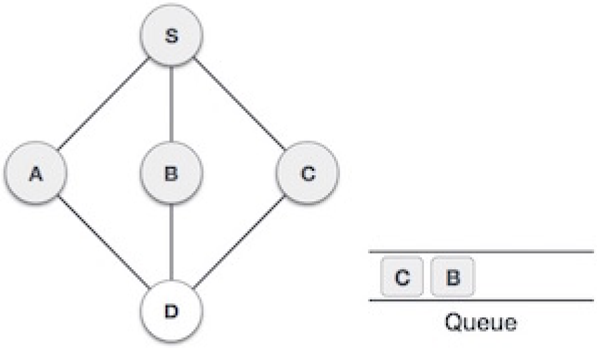
Next unvisited adjacent node from **S** is **B**. We mark it visited and enqueue it.

5.



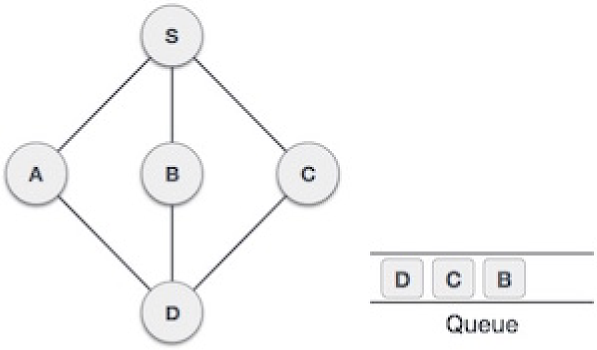
Next unvisited adjacent node from **S** is **C**. We mark it visited and enqueue it.

6.



Now **S** is left with no unvisited adjacent nodes. So we dequeue and find **A**.

7.



From **A** we have **D** as unvisited adjacent node. We mark it visited and enqueue it.

At this stage we are left with no unmarked *unvisited* nodes. But as per algorithm we keep on dequeuing in order to get all unvisited nodes. When the queue gets emptied the program is over.

The implementation of this algorithm in C programming language can be seen here.