**Q: Show that DFS and BFS visit all vertices in a connected graph G reachable from any one of vertices.**

In the breadth first search we start at a vertex v and mark it as having been reached. The

vertex v is at this time said to be unexplored. A vertex is said to have been explored by an

algorithm when the algorithm has visited all vertices adjacent from it. All unvisited vertices

adjacent from v are visited next. These are new unexplored vertices. Vertex v has now been explored. The newly visited vertices haven’t been explored and are put onto the end of a list of unexplored vertices. The first vertex on this list is the next to be explored. Exploration continues until no unexplored vertex is left.

**Breadth first search**

We start at a vertex V and mark it as have been reached. The vertex v is at this

time said to be unexplorted. All visited vertices adjacent from v are visited next.

If G is represented by its adjacent then the time is O(n2).

Algorithm BFS(v)

{

u := v;

visited[v] := 1;

repeat

{

for all vertices w adjacent from u do

{

if (visited[w] = 0) then

{

add w to q;

visited[w] := 1;

}

}

if q is empty then return;

delet u from q;

} until (false)

}

A depth first search of a graph differs from a breadth first search in that the exploration

of a vertex v is suspended as soon as a new vertex is reached.

At this time the exploration of the new vertex u begins. When the new vertex has been explored, the exploration of v continues.

**Depth first search**

The exploration of a vertex V is suspended as soon as a new vertex is reached.

Algoithm DFS(v)

{

visited[v]:=1;

for each vertex q adjacent from v do

{

if (visited[w] =0 ) then DFS(w);

}

}