 Marwadi University	Marwadi University Faculty of Technology Department of Information and Communication Technology	
Subject: DAA (01CT0512)	AIM: Breadth First Search:	
Experiment No: 20	Date: 3/10/2023	Enrolment No: 92100133020

Breadth First Search:

BFS explores all the vertices of a graph in breadth-first manner, i.e., it visits all the vertices at distance k from the source before visiting the vertices at distance $k+1$.

Algorithm:

1. Enqueue the source vertex and mark it as visited.
2. While the queue is not empty, dequeue a vertex, visit it, and enqueue its adjacent unvisited vertices.

Code:

```
#include <iostream>
#include <queue>
#include <vector>
#include <algorithm>
using namespace std;


class Graph {
    int V;
    vector<int> *adj;

public:
    Graph(int V) {
        this->V = V;
        adj = new vector<int>[V];
    }

    void addEdge(int v, int w) {
        adj[v].push_back(w);
    }

    void BFS(int s) {
        bool *visited = new bool[V];
        fill(visited, visited + V, false);
        queue<int> q;
        visited[s] = true;
        q.push(s);

        while (!q.empty()) {
            int v = q.front();
            cout << v << " ";
            q.pop();
            for (int i : adj[v]) {
```

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```

        if (!visited[i]) {
            visited[i] = true;
            q.push(i);
        }
    }
}
};

int main() {
    Graph g(7);
    g.addEdge(0, 1);
    g.addEdge(0, 2);
    g.addEdge(1, 3);
    g.addEdge(1, 4);
    g.addEdge(2, 5);
    g.addEdge(2, 6);
    cout << "BFS starting from vertex 0: ";
    g.BFS(0);
    return 0;
}

```

Output:

```
BFS starting from vertex 0: 0 1 2 3 4 5 6
```

Space complexity: _____

Justification: _____

Time complexity:

Best case time complexity: _____

Justification: _____

Worst case time complexity: _____

Justification: _____