9a) Write a program to traverse a graph using BFS method.

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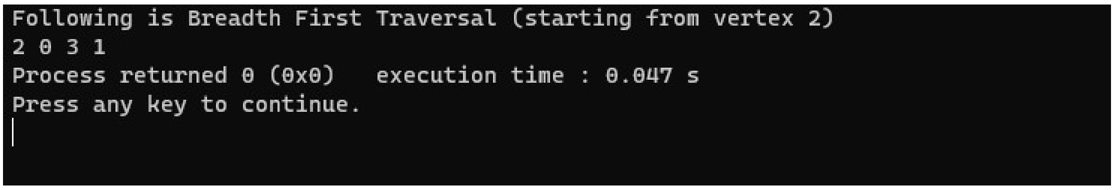
```
#include <stdbool.h>

#include <stdio.h>

#include <stdlib.h>



#define MAX_VERTICES 50



typedef struct Graph_t {



        int V;

        bool adj[MAX_VERTICES][MAX_VERTICES];

} Graph;



Graph* Graph_create(int V)

{

        Graph* g = malloc(sizeof(Graph));

        g->V = V;



        for (int i = 0; i < V; i++) {

                for (int j = 0; j < V; j++) {

                        g->adj[i][j] = false;
        }
    }

    return g;
}

void Graph_destroy(Graph* g) { free(g); }


void Graph_addEdge(Graph* g, int v, int w)
{
    g->adj[v][w] = true;
}

void Graph_BFS(Graph* g, int s)
{
    bool visited[MAX_VERTICES];
    for (int i = 0; i < g->V; i++) {
        visited[i] = false;
    }
    int queue[MAX_VERTICES];
    int front = 0, rear = 0;
    visited[s] = true;
    queue[rear++] = s;

    while (front != rear) {
        s = queue[front++];
        printf("%d ", s);
        for (int adjacent = 0; adjacent < g->V;
            adjacent++) {
            if (g->adj[s][adjacent] && !visited[adjacent]) {
                visited[adjacent] = true;
                queue[rear++] = adjacent;
            }
        }
    }
}

int main()
{
    Graph* g = Graph_create(4);
    Graph_addEdge(g, 0, 1);
    Graph_addEdge(g, 0, 2);
    Graph_addEdge(g, 1, 2);
    Graph_addEdge(g, 2, 0);
    Graph_addEdge(g, 2, 3);
```

```
        Graph_addEdge(g, 3, 3);


        printf("Following is Breadth First Traversal "

               "(starting from vertex 2) \n");

        Graph_BFS(g, 2);

        Graph_destroy(g);


        return 0;

}
```

Output:



```
Following is Breadth First Traversal (starting from vertex 2)
2 0 3 1
Process returned 0 (0x0)   execution time : 0.047 s
Press any key to continue.
```