## Program 9a

Write a program to traverse a graph using BFS method.

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Code:
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```
#include <stdio.h>
#include <stdlib.h>
#define MAX 100
struct Queue {
  int items[MAX];
  int front, rear;
};
void initQueue(struct Queue* q) {
  q->front = -1;
  q->rear = -1;
}
int isEmpty(struct Queue* q) {
  return q->front == -1;
}
void enqueue(struct Queue* q, int value) {
  if (q->rear == MAX - 1) {
     printf("Queue is full\n");
     return;
  if (q->front == -1) {
     q->front = 0;
  q->rear++;
  q->items[q->rear] = value;
int dequeue(struct Queue* q) {
  if (isEmpty(q)) {
     printf("Queue is empty\n");
     return -1;
  int item = q->items[q->front];
  q->front++;
  if (q->front > q->rear) {
     q->front = q->rear = -1;
  return item;
}
```

```
void BFS(int graph[MAX][MAX], int n, int startVertex) {
  int visited[MAX] = \{0\};
  struct Queue q;
  initQueue(&q);
  visited[startVertex] = 1;
  enqueue(&q, startVertex);
  printf("BFS Traversal: ");
  while (!isEmpty(&q)) {
     int currentVertex = dequeue(&q);
     printf("%d ", currentVertex);
     for (int i = 0; i < n; i++) {
       if (graph[currentVertex][i] == 1 && !visited[i]) {
          visited[i] = 1;
          enqueue(&q, i);
     }
  printf("\n");
int main() {
  int graph[MAX][MAX], n, startVertex;
  printf("Enter the number of vertices in the graph: ");
  scanf("%d", &n);
  printf("Enter the adjacency matrix of the graph:\n");
  for (int i = 0; i < n; i++) {
     for (int j = 0; j < n; j++) {
       scanf("%d", &graph[i][j]);
     }
  }
  printf("Enter the starting vertex (0 to %d): ", n - 1);
  scanf("%d", &startVertex);
  BFS(graph, n, startVertex);
  return 0;
}
```

```
Enter the number of vertices in the graph: 4
Enter the adjacency matrix of the graph:
0 1 0 0
1 0 1 1
0 1 0 1
0 1 1 0
Enter the starting vertex (0 to 3): 0
BFS Traversal: 0 1 2 3
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