Indian Institute of Technology (Indian School of Mines) Dhanbad
Data Structures Lab (NCSC104)
B.Tech (CSE)

Assignment-8 (Queue & Binary Tree) [2+4+4]

1.Given a **binary tree**, find its minimum depth

Hint: The minimum depth is the number of nodes along the shortest path from the root node down to the nearest leaf node.

2. Write code to implement Deque using a circular array

Hint: Deque or Double Ended Queue is a generalized version of the Queue data structure that allows insert and delete at both ends.

3. Given an MxN matrix where each element can either be 0 or 1. We need to find the shortest path between a given source cell to a destination cell. The path can only be created out of a cell if its value is 1.
Hint: **Input:**

```
mat[ROW][COL]  = {{1, 0, 1, 1, 1, 1, 0, 1, 1, 1 },
                  {1, 0, 1, 0, 1, 1, 1, 0, 1, 1 },
                  {1, 1, 1, 0, 1, 1, 0, 1, 0, 1 },
                  {0, 0, 0, 0, 1, 0, 0, 0, 0, 1 },
                  {1, 1, 1, 0, 1, 1, 1, 0, 1, 0 },
                  {1, 0, 1, 1, 1, 1, 0, 1, 0, 0 },
                  {1, 0, 0, 0, 0, 0, 0, 0, 0, 1 },
                  {1, 0, 1, 1, 1, 1, 0, 1, 1, 1 },
                  {1, 1, 0, 0, 0, 0, 1, 0, 0, 1 }};
Source = {0, 0};
Destination = {3, 4};
```

Output:

```
The shortest Path is 11
```