# Week 12: Homework 1: Project: "490. The Maze" - LC - Breadth-First Traversal

## Manual Approach

Manual Approach of Breadth First - Traversal (Maze).

Breadth - First - Traversal :-

initialize Step 1 :-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Queue :- ~~Add 0 to the queue~~

Step 2 :-

| | O | C | K | G | D | A | I | B | R | |
|---|---|---|---|---|---|---|---|---|---|---|
| visited | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X |

Queue :- Add O to the queue
Mark O as visited

Step 3 :-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| visited | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Queue :- Remove O from the queue

Print :- O

Step 4 :-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| visited | 1 | 1 | 1 | | | | | | |

Queue : C K ;

Print :- O

Step 5:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |

Queue :- K G

Print :- O C

Step 6:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |

Queue :- G

Print :- O C K

Step 7:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

Queue :- D

Print :- O C K G D

Step 8:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Queue :- A, I

1. Add A, I to the Queue and Mark A, I as visited

2. Remove A from the Queue

Print :- O C K G D A

Step 5:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |

Queue :- K G

Print :- O C

Step 6:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |

Queue :- G

Print :- O C K

Step 7:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

Queue :- D

Print :- O C K G D

Step 8:-

| | O | C | K | G | D | A | I | B | R |
|---|---|---|---|---|---|---|---|---|---|
| Visited | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Queue :- A, I

1. Add A, I to the Queue and Mark A, I as visited

2. Remove A from the Queue

Print :- O C K G D A

# Python Code:

```
from collections import deque
m = 4
n = 3
def Maze(matrix):
    q = deque()
    q.append((0, 0))
    count = 0

    while (len(q) > 0):
     p = q.popleft()

    if (p[0] == n - 1 and p[1] == m - 1):
     count += 1

    if (p[0] + 1 < n and
       matrix[p[0] + 1][p[1]] == 1):
       q.append((p[0] + 1, p[1]))

    if (p[1] + 1 < m and
       matrix[p[0]][p[1] + 1] == 1):
       q.append((p[0], p[1] + 1))
    return count
def main():
   matrix = [ [ 1, 0, 0, 1 ],
         [ 1, 1, 1, 1 ],
         [ 1, 0, 1, 1 ] ]
```

```
  print(Maze(matrix))


if __name__ == "__main__" :
 main()
```

# Screenshot: