Assignment-5

Breadth-First Search and Shortest Path

Find shortest path with obstacle avoidance

- You are given an m x n integer matrix grid where each cell is either 0 (empty) or 1 (obstacle). You can move up, down, left, or right from and to an empty cell in one step.

- Write a C/C++ program that prints the minimum number of steps needed to reach from the upper left corner (0, 0) to the lower right corner (m - 1, n - 1).

m = 8
n = 10
Steps = 20

0	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	1	1
1	0	1	0	1	1	1	0	1	1
1	0	1	0	1	0	0	0	1	1
1	0	0	0	1	0	1	1	1	1
1	1	1	1	1	0	0	0	0	0
1	1	1	1	1	1	1	1	1	0

Minimum obstacle removal

- You are given an m x n integer matrix grid where each cell is either 0 (empty) or 1 (obstacle). You can move up, down, left, or right from and to an empty cell in one step.
- Write a C/C++ program that prints the minimum number of obstacles to be removed such that a walk from the upper left corner (0, 0) to the lower right corner (m - 1, n - 1) is possible.

m = 8
n = 10
Obstacles = 1

0	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	1	1
1	0	1	0	1	1	1	0	1	1
1	0	1	0	1	0	0	0	1	1
1	0	0	0	1	0	1	1	1	1
1	1	1	1	1	0	0	0	0	0
1	1	1	1	1	1	1	1	1	0

Find shortest path with at most K obstacle removal

- You are given an m x n integer matrix grid where each cell is either 0 (empty) or 1 (obstacle). You can move up, down, left, or right from and to an empty cell in one step.
- Write a C/C++ program that prints the minimum number of steps to walk from the upper left corner (0, 0) to the lower right corner (m - 1, n - 1) given that you can eliminate at most k obstacles. If it is not possible to find such walk return -1.

m = 8
n = 10
k = 1
Steps = 16

0	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	1	1
1	0	1	0	1	1	1	0	1	1
1	0	1	0	1	0	0	0	1	0
1	0	0	0	1	0	1	1	1	0
1	1	1	1	1	0	1	1	1	0
1	1	1	1	1	0	0	0	0	0

Submission

- Last date: 8-SEP-2024 (till 11:59 P.M.) (Sunday)
- Programming language: C/C++
- Single File: 24CS06001_A5.c/.cpp or 24AI06001_A5.c/.cpp
- Subject Line: 24CS06001_A5 or 24AI06001_A5
- Email to: pds2016autumn@gmail.com