
DSA Lab 7 Set 2 | GridSearch

Input file: **standard input**
Output file: **standard output**
Time limit: 3 seconds
Memory limit: 1024 megabytes

Given a N by N grid where each cell can be either 1 or 0, 1 indicates vacant space and 0 indicates an obstacle. Given the coordinates of vacant source and destination cells, your task is to find the shortest route between the two. A route can only be created of a cell if it is vacant. Refer to the resource(slides) shared to figure out the algorithm to perform this task using queue data structure. If there exists more than one shortest paths from source to destination, output any one of them.

Input

First line contains an integer N , indicating the grid dimension N by N . Second line containing four single space separated integers x_s y_s x_d y_d where x represents column number, y represents row number, s represents source, d represents destination. Assume 0-based indexing. Next N lines represent the grid, with each line representing a row, containing N space separated values, either '1' or '0'

Constraints:

Basic: $1 \leq N \leq 10$

Advanced: $1 \leq N \leq 500$

Output

Gives the shortest path coordinates. For the shortest distance of length k (including source and destination cells), the output contains k lines containing cell coordinates along the path (all coordinates must be in 0-based indexing)

x_1 y_1
 x_2 y_2
...
...
 x_{k-1} y_{k-1}
 x_k y_k

Note

Sample Test Case:

Input:

4
1 1 3 3
1 0 1 1
1 1 1 1
1 0 0 1
1 1 0 1

Output:

1 1
2 1
3 1
3 2
3 3