HUST

ĐẠI HỌC BÁCH KHOA HÀ NỘI

HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

ONE LOVE. ONE FUTURE.

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Applied Algorithm Lab

MAZE

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MAZE

- Find the shortest path to get out of a maze
- A rectangular maze is represented by a 0-1 NxM matrix in which

  A[i,j] = 1 represents cell (i,j) as a brick wall, and

  A[i,j] = 0 represents cell (i,j) as an empty cell

  From an empty cell, we can move to 1 of 4 neighboring cells (up, down, left, right) if that cell is empty.

  Starting from an empty cell in the maze, find the shortest path out of the maze.
- Input: the matrix representing the maze, the starting cell.
- Output: the shortest path's length, or -1 for non-existing cases.

MAZE

- Example

stdin	stdout

8 12 5 6
1 1 0 0 0 0 1 0 0 0 0 1
1 0 0 0 1 1 0 1 0 0 1 1
0 0 1 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 1 0 0 1 0 1
1 0 0 1 0 0 0 0 0 1 0 0
1 0 1 0 1 0 0 0 1 0 1 0
0 0 0 0 1 0 1 0 0 0 0 0
1 0 1 1 0 1 1 1 0 1 0 1
	7

MAZE

- Idea to solve: Use BFS and queue:
  - use a queue to store the cell to visit
  - start from the starting cell
  - add cell that can be visited by the current cell to the node
  - termination conditions: the cell is on the edge, or the queue is empty (return -1)
  - to return answer: use a matrix to store the length of the path from source for each visited cell in the maze

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THANK YOU !