

# Problem 7: Gib Neb's Perilous Plot

## 10 Points

Problem ID: lavapit

Rank: 3

### Introduction

In the newest update of Minecraft, Mojang has introduced a new boss - Gib Neb. These are Gib Neb's stats:

- He is [5'2" and weighs 7000 lbs.](#)
- He loves eating paint and more paint.
  - And also sniffing paint.
- He cannot prove [P = NP](#).
- He's old and highly mortal.
- He's illiterate and uneducated.
- He can't see anything [more than 5 feet away](#).
- He will not outrun you.
- He lives in a cave and rarely leaves.
- His favorite class is [EECS 16B](#).

Unfortunately, due to years of [paint abuse](#) he's neither strong enough or smart enough to fight Steve. His only avenue for violence is placing elaborate traps outside of Steve's house, laced with blocks of diamond ore and lava, and hoping that Steve's greed will outweigh his reason and he will fall victim to them.

Steve however is as greedy as he is clever, and armed with just a water bucket and an iron pickaxe he sets out to collect as many diamonds as he can before leaving to track down Gib Neb.

# Problem Statement

There is a lava pit with  $N$  rows and  $M$  columns of blocks. You're given a map of the lava pit represented by a grid of characters.

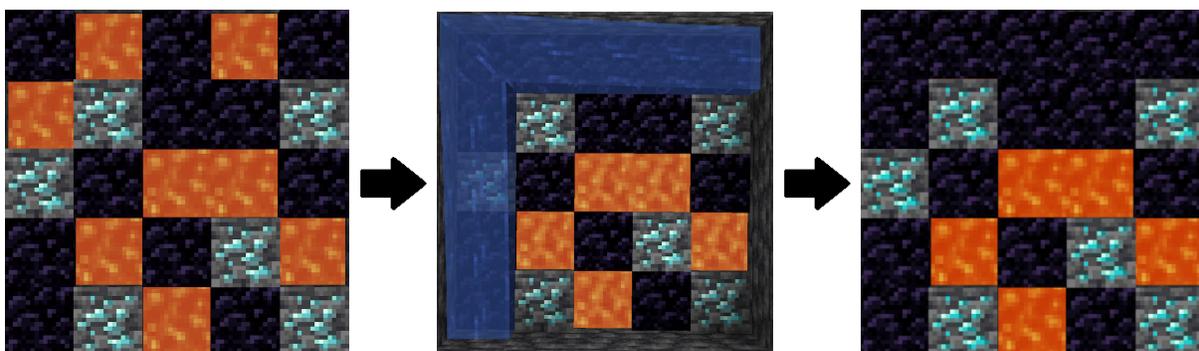
Steve starts at the top left corner of the map, and must reach the bottom right corner to escape while **only moving right or down**.

The map consists of the following 3 types of blocks:

Block Type	Character	Description
Obsidian	O	A block of obsidian that Steve can step on.
Lava	L	A block of lava that Steve <i>cannot</i> step on.
Diamond Ore	D	A block of diamond ore that Steve can step on. When Steve steps on a block of diamond ore, he collects one diamond.

At any point in time, Steve can use the *water bucket* on his current block or the block above, below, left, or right of his current block. Upon use, all blocks of lava in the same row or column of the block it's used on turn into obsidian. The water bucket **can only be used once**.

The following diagram illustrates the effect of using a water bucket in the top left corner:



What is the maximum number of diamonds that Steve can collect?

Maps do not guarantee a route from the top left corner to the bottom right corner. If it is not possible to reach the bottom right, even with a water bucket, output `IMPOSSIBLE`

## Input Format

The first line of the input contains a single integer **T** denoting the number of test cases that follow. For each test case:

- The first line contains two space separated integers **N** and **M**, denoting the number of rows and columns of the lava pit respectively.
- The next **N** lines contain a single string with **M** characters each. Together, they denote the map of the lava pit.
  - `O` denotes a block of obsidian.
  - `L` denotes a block of lava.
  - `D` denotes a block of diamond ore.

## Output Format

For each test case, output a single line containing an integer denoting the maximum amount of diamonds Steve can collect. If it is not possible to reach the bottom right even after using the water bucket, output `IMPOSSIBLE`

## Constraints

Time limit: 1.5 seconds

$$1 \leq T \leq 10$$

$$1 \leq N, M \leq 1000$$

The top left block is guaranteed to not be lava.

The sum of **N** over all test cases does not exceed 1000.

The sum of **M** over all test cases does not exceed 1000.

# Sample Test Cases

## Sample Input

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```
4
2 2
OD
DO
3 3
OLD
ODO
DLO
5 5
OLOLO
LDOOD
DOLLO
OLODL
ODLOD
4 4
DLDL
LDDL
DOLL
LOLO
```

## Sample Output

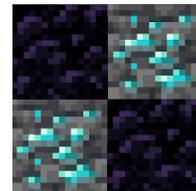
[Download](#)

```
1
1
3
IMPOSSIBLE
```

## Sample Explanations

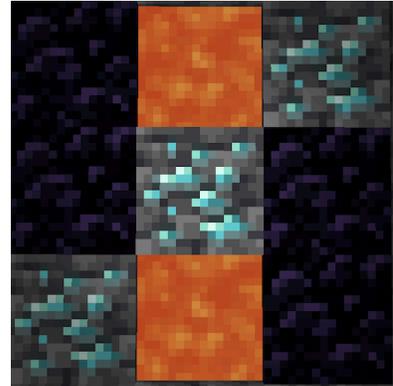
### Test Case #1:

In the first test case, The lava pit looks like the figure on the right. Steve will start on the block of obsidian at the top left. Steve can either go down and then right, collecting one block of diamond ore, or right and then down, collecting also one diamond, so the answer is 1.



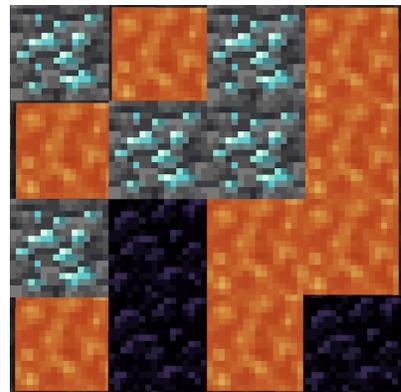
Test Case #2:

In the second test case, Steve can go from the start to the end without using any water bucket and collect one diamond on the way there. There is no water bucket placement that will allow Steve to collect more than one diamond, so the answer is 1.



Test Case #4:

In the fourth test case, there is no possible water bucket placement that will let Steve cross the lava pit. If we consider the start to be in coordinates (1,1), Steve has to place the water bucket either at (1,2) or (2,1) to move away from the first block. However, in neither of those options the blocks (3,4) or (4,3) are in water, so it's impossible to reach block (4,4).



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