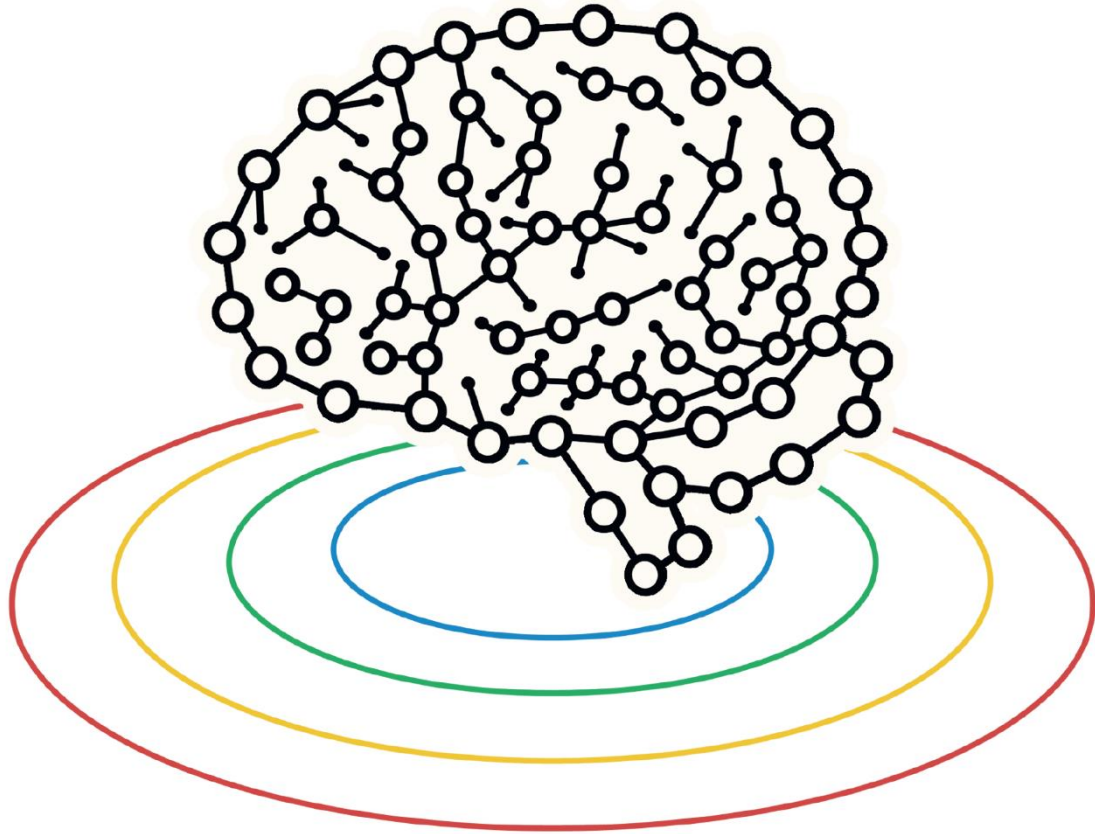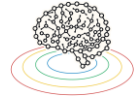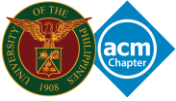Association for Computing Machinery
University of the Philippines Diliman Student Chapter, Inc.

ALGOLYMPICS 2022

UP ACM PROGRAMMING COMPETITION

PRACTICE PROBLEMS

Sample Problem

Starry Knight

Time limit: 3 seconds
Memory limit: 256 megabytes

One starry night, a Starry Knight gazes at the constellations in the night sky.

"One day, I'll grow and be like them", it says.

The Starry Knight is diligent, and trains at night on a cheese board, which is a grid of r rows and c columns. Too many people sent Star Cuteries over the holidays, so he used this as an opportunity to practice his cold cuts.

He's been spending some time watching Jack's Gambit on the Star Stream, and got inspired to add some feints to his footwork: in one move he'll move two cells vertically, then one cell horizontally; or two cells horizontally and then one cell vertically. He can't move to a cell which is blocked by a block of cheese, but his movement is not constrained even if the intermediate cells are blocked by cheese. In other words, he can hop over cheese.


Furthermore, at any time he can consume any number of **Star MarKorines**. These are reported to not only improve your broadcasting skill in the Star Stream, but also grow your physical ability.
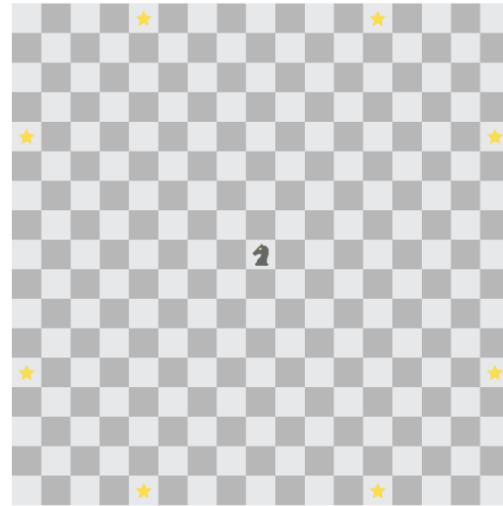
Consuming one Star MarKorine doubles the Starry Knight's step size, so after consuming one he will now be able to move 4 steps in one direction then 2 orthogonally; consuming another one will make one move be 8 steps then 4, and so on.
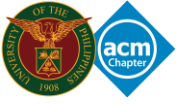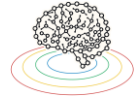
The following image illustrates the way a Starry Knight can move if he has consumed 1 and 2 Star Markorines, respectively.

Note that consuming a Star MarKorine is irreversible. In other words, after doubling the step size, he cannot move at the previously smaller step size. Also, consuming it does not take up any time nor does it count as a move.

Now, on the cheese board, not only do you have to be physically excellent, you also need to be strategic and be several steps ahead of your opponent. Given a starting cell, what is the minimum number of moves needed to reach another cell?
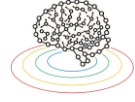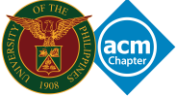
Input Format

The first line contains an integer b, the number of battles. Then b battles follow.

Each battle is described by a line with two space-separated integers r and c. Here, r and c denote the number of rows and columns of the cheese board grid, respectively. We number the rows 1 to r from top to bottom, and we number the columns 1 to c from left to right.

Then r lines follow with c characters per line. Each character will be either a " . " for a cell that can be moved to, or "○" if it's blocked by cheese.

A line follows containing an integer q, the number of queries. Then q lines follow.

Each of these lines describes a query and contains four space-separated integers i_s, j_s, i_t, j_t, where i_s and j_s are the row and column numbers of the starting cell, respectively, and i_t and j_t is the same but for the ending cell.

Constraints

- $1 \leq b \leq 100$
- $1 \leq r, c \leq 600$
- The sum of the rc in a single file is ≤ 360000.
- $1 \leq q \leq 4$
- $1 \leq i_s, i_t \leq r$
- $1 \leq j_s, j_t \leq c$
- The starting and ending cells are unique, and are not blocked by cheese.

Output Format

For each query, print a single line:

- If the ending cell can be reached, output the minimum number of moves needed.
- Otherwise, output `CAN'T CUT THE BLOCK OF CHEESE!` (without the double quotes).

Sample input

```
2
3 5
.ooo.
oo.oo
oooo.
2
1 1 1 5
1 1 3 5
4 6
ooooo.
oooooo
oooooo
oo.ooo
1
1 6 4 3
```

Sample Output

```
2
1
CAN'T CUT THE BLOCK OF CHEESE!
```