# Problem H: Hangar Hurdles

Time limit: 8 s
Memory limit: 512 MiB

You are evaluating constructions plans for a giant new hangar that will house an airplane assembly line. The hangar floor can be represented as a rectangular grid consisting of $n$ rows and $n$ columns where every cell is either empty or blocked. The rows are numbered with integers 1 through $n$ top to bottom, while the columns are numbered with integers 1 through $n$ left to right.

It is important that large crates containing airplane parts can be freely moved between various locations inside the hangar. We can model a crate as a square aligned with grid cells and centered in one of the cells. Therefore, for an odd integer $k$, a *crate of size* $k$ consists of cells in $k$ consecutive rows and $k$ consecutive columns. The crate can be moved up, down, left or right as long as it fits completely inside the grid and never contains a blocked cell.

You are given $q$ pairs of cells $A_k$ and $B_k$. For each pair, find the size of the largest crate that can be centered in $A_k$ and then moved across the hangar floor until it's centered in $B_k$.

## Input

The first line contains an integer $n$ ($2 \leq n \leq 1\,000$) — the size of the hangar floor. Each of the following $n$ lines contains a string of exactly $n$ characters describing one row of the floor. The character "`#`" denotes a blocked cell while the character "`.`" denotes an empty cell.

The following line contains an integer $q$ ($1 \leq q \leq 300\,000$) — the number of queries. The $k$-th of the following $q$ lines contains four integers $r_{A_k}, c_{A_k}, r_{B_k}, c_{B_k}$ ($1 \leq r_{A_k}, c_{A_k}, r_{B_k}, c_{B_k} \leq n$) — the row number and column number of cells $A_k$ and $B_k$ respectively. Cell $A_k$ will be different than the cell $B_k$. Also, both cells will always be empty.

## Output

Output $q$ lines. The $k$-th line should contain a single integer $s_k$ — the size of the largest crate that can be moved from $A_k$ to $B_k$. If no crate can be moved from $A_k$ to $B_k$ then $s_k$ should be 0.

## Example

| input | output |
|---|---|
| 7<br>.....#.<br>...#.#.<br>....#..<br>....###<br>....#..<br>#......<br>.......<br>5<br>2 5 5 2<br>2 5 3 6<br>2 2 6 3<br>2 2 6 6<br>1 1 7 7 | 1<br>0<br>3<br>1<br>1 |