California, Rome, Dubai, Paris, Amsterdam, London, Rousse, Emiliyan is travelling again.

He is in cell *S* of a given map and wants to reach cell *F*. The remaining cells of the map are *.* and *#*. Cells *S*, *F* and *.* symbolize land and the *#* cells symbolize water. Unfortunately, he cannot swim and can only move on land. For a unit of time, he can move to cells that are directly up, down, left, or right from his current one.

There are also $q$ two-way airline routes. Each is characterized by 5 parameters $(x1, y1, x2,y2, t)$, which means he can move from cell $(x1, y1)$ to cell $(x2,y2)$ or from cell $\left(x2,y2\right)$ to cell $(x1, y1)$ for $t$ units of time. Cells $(x1, y1)$ and $(x2,y2)$ are part of the land.

Find the minimum amount of time it takes to get from *S* to *F*.

**Input**

The first line of the file **tourism.in** contains the numbers$ n$ and $m$. Each of the next $n$ lines contains $m$ symbols that describe the map. It is guaranteed that there is exactly 1 *S* cell and exactly 1 *F* cell.

The next line contains the number $q$, the number of airline lines, and the next $q$ lines contain 5 numbers each, $(x1, y1, x2,y2, t)$, characterizing the corresponding airline route.

**Output**

On the only line of the file **tourism.out**, print the minimum time it takes to get from S to F. If there is no possible path, print $-1$.

**Constraints**

$$1\leq n, m\leq 200$$

$$1\leq q\leq 20 000$$

$$1\leq t\leq 1000$$

$$1\leq x1, x2\leq n$$

$$1\leq y1,y2\leq m$$

**Time limit: 0.4 sec.**

 **Memory limit: 256 MB.**

**Sample test**

|  |  |
| --- | --- |
| **Input (tourism.in)** | **Output (tourism.out)** |
| 5 3S#....###.....F15 3 1 3 100 | 104 |