Labyrinth P79535_en

You are given an $R \times C$ grid. Some cells, marked with '`#`', have a wall. The rest of cells are free, and they are marked with '`.`'. There are two exceptions: one free cell is marked with '`S`' (it is your starting position), and another free cell is marked with '`T`' (it has a treasure).

Your goal is to reach the treasure as fast as possible. Every second, you can either move to an adjancent free cell, or hit an adjancent wall with a hammer. You know that every wall vanishes after H hits.

Input

Input consists of several cases, each with R, C and H, followed by R lines with C characters each. Assume that R and C are between 1 and 1000, and that H is between 1 and 10^5.

Output

For every case, print the minimum time to reach the treasure from the starting position.

Sample input 1

```
1 2 20
ST

2 3 10
S..
..T

2 3 10
S##
##T

3 3 10
T..
##.
S..

3 3 3
T..
##.
S..

4 6 100000
T##S#.
..###.
...#..
......
```

Sample output 1

```
1
3
23
6
5
100013
```

Problem information

Author: Pol Mauri

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