Problem 1   Grid Paths [Standard]

You are given a grid containing M rows and N columns. Each cell of the grid is either a digit from '1' to '9', '#', 'S' or 'T'. They denote the following:

- 'S' : The cell in which you start.
- 'T' : Your target cell.
- '#' : You cannot cross such cells.
- Digits '1' to '9' : The digit represents the time it takes to enter this cell from a neighbouring cell. The time taken to enter the target cell is 0.

You start in the cell marked 'S'. Initially, you choose the direction that you are facing (N/S/E/W). In each step, you can move from the current cell to the neighbouring cell in the direction that you are facing, provided you remain on the grid and do not step onto a cell marked '#'. Also, at any point, you can stay in the same cell and turn 90 degrees clockwise or anti-clockwise and this takes exactly 1 time unit. Your aim is to reach the target cell, facing any direction.

Output the minimum amount of time it takes to reach the target, or -1 if it is impossible to reach the target.

Input format

The first line contains two integers M and N, denoting the number of rows and columns in the grid, respectively. The next M lines contain N characters each, where each character is either a digit from '1' to '9', '#', 'S' or 'T'.

Output format

If it is impossible to reach the target, output -1. Otherwise, output a single integer denoting the minimum time it takes to reach the target.

Test Data

- *Subtask 1 (50 marks):* $1 \leq M, N \leq 40$.

- *Subtask 2 (50 marks):* $1 \leq M, N \leq 300$.

In all test case, there will be exactly one 'S' and one 'T' character in each grid.

Sample input 1	Sample input 2
3 3	3 3
S19	S11
111	32#
91T	4#T

Sample output 1	Sample output 2
5	-1

Time and memory limits

The time limit for this task is 3 seconds. The memory limit is 32 MB