K1 – Asteroid field

Plot a path through the asteroid field. Given a starting location, final destination, and a description of the asteroid fields plot a shortest path that takes you from the starting location to the final destination without running into any asteroids. The asteroid field is described using a $m \times m$ grid of characters with

- `s` for starting location;
- `d` for final location;
- `-` for open space; and
- `*` asteroid.

Your ship can move up, down, left, and right (not diagonally). Each position in a $m \times m$ grid will be assigned an integer between 0 and $m^2 - 1$ as follows.

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

Input

The first line will have a positive integer n representing the number of data sets. The first line of each data set will contain an integer m, followed by m lines, and each line will contain m characters. The character `s` will always be in the top left corner and `d` will always be in the bottom right corner.

Output

For each data set print the minimal number of moves needed to reach the destination or -1 if there is no solution.

Example

Input:
4 s*-* -*-* --*- *-*d

Output:
-1

Input:
6 s*---* -*-*-- ---**- ***--- --*-** *-*--d

Output:
18