Death Star Escape

After boarding the Death Star, “Old Ben” Kenobi must sneakily disable the tractor beam to allow the Millennium Falcon to escape. Help him sneak past stormtroopers, force fields and crawl through vents to free the Millennium Falcon!

You will be given an N by N square grid with various types of obstacles. Here is the key for the different types of squares.

`O` = Empty space square, these can be freely moved through.

`1-9` = Stormtroopers: the number is the range of the stormtrooper's weapon. Ben can never be closer to a stormtrooper than the range of the stormtrooper’s weapon. In other words, if there is a stormtrooper with range E at position (x, y), Ben can never enter a square (x', y') with $\sqrt{(x-x')^2 + (y-y')^2} < E$ (note that this inequality is strict: it is allowed for Ben to enter a square exactly distance E from the stormtrooper).

`T` = The tractor beam room. This is where Ben is going.

`M` = The Millennium Falcon. This is where Ben starts out.

Output the length of the shortest path from the Millennium Falcon to the tractor beam room. If there is no valid path, output `-1`.

Input Format

The first line contains a single integer N, the size of the grid. The next N lines describe the grid. The jth character of the ith line describes position (i, j); it is either `O`, `T`, `M`, or one of the digits `1` through `9`.

Constraints

$3 \leq N \leq 50$

Output Format

Print a single line containing a single integer, the length of the shortest path Ben can take without getting within range of any stormtrooper. If there is no such path, output `-1`.

Sample Input 0

```
5
OOOOM
OOOOO
OOOO2
OOOOO
OOOOT
```

Sample Output 0

```
8
```

Explanation 0

Ben cannot enter any of the squares marked with an `X` below:

`OOOOM OOOXX OOOXX OOOXX OOOOT`

The shortest path through the allowed squares is of length `8`.

Sample Input 1

```
5
MO2OO
OOOOO
2OOO2
OOOOO
OOOOT
```

Sample Output 1

```
-1
```

Explanation 1

Ben cannot enter any of the squares marked with an `X` below:

`MXXXO XXXXX XXOXX XXOXX OOOOT`

There is no path from `M` to `T` that avoids all the `X`s.