Problem D
Delft Distance
Time limit: 5 seconds

You are currently in your hotel at the north-west corner of Delft, and want to go to the contest site at the university in the south-east corner of Delft. To get there, you have to go right through the historical centre of the city. Like Manhattan, the city consists of a grid of $h \times w$ buildings. But unlike Manhattan, the city does not only contain square residential buildings but also some round medieval towers. All the square buildings are axis aligned with a side length of 10 m and all round towers have a diameter of 10 m. There is just enough space for a small alley of negligible width between two neighbouring buildings.



Delft water tower.
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Since you are already late for the contest start, you need to find a shortest path from your hotel to the contest site. Fortunately, you have a map of the city. See Figure D.1 for an example.

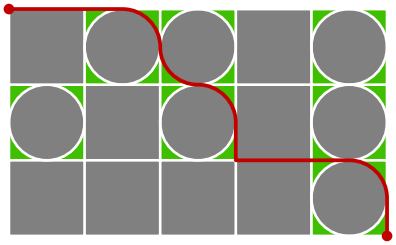


Figure D.1: Illustration of Sample Input 1, with a shortest path shown in red.

Input

The input consists of:

- One line with two integers h and w ($1 \leq h, w \leq 700$), the number of rows and the number of columns of buildings shown on the map of the city.
- h lines, each with w characters which are either '`O`' (for round towers) or '`X`' (for square buildings) describing the shapes of the buildings.

The map is oriented with the north side up.

Output

Output the length of a shortest path from the north-west corner to the south-east corner of Delft in metres. Your answer may have a relative or absolute error of at most 10^{-6}.

Sample Input 1	Sample Output 1
3 5 XOOXO OXOXO XXXXO	71.4159265359

Sample Input 2	Sample Output 2
1 4 XOOX	45.7079632679