J1 – Escape route

You are surrounded by Imperial warships and must land on a planet to escape. Your best chance is to find a route to the closest planet. Unfortunately the navigation system has been damaged. Your job is to write a program that will find the planet that is closest to your current location. The problem will be described using a $m \times m$ grid containing the characters:

`s` your ship;

`w` imperial warship;

`p` planet; and

`-` open space .

The two dimensional location of an object (i.e., your ship, imperial warship, or planet) corresponds to its location in the grid. For example given a 4×4 grid the locations are specified by the following table.

(0,0)	(0,1)	(0,2)	(0,3)
(1,0)	(1,1)	(1,2)	(1,3)
(2,0)	(2,1)	(2,2)	(2,3)
(3,0)	(3,1)	(3,2)	(3,3)

Recall that the distance between two points (x_1, y_1) and (x_2, y_2) is given by the formula

$$dist = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}.$$

Input

The first line will have a positive integer, n, specifying the number of data sets to follow. Each data set will have a positive integer, m, on the first line followed by m lines and each line will have exactly m characters. The characters will be either `s`, `w`, `p`, or `-`.

Output

For each data set print one line with the coordinates of your current location followed by a colon, coordinates of a closest planet followed by a colon, and the distance to that planet formatted to two decimal places.

Example

Input:
4
-wp-
s--w
-w-p
-pw-

Output:
(1,0):(0,2):2.24

Input:
5
s--wp
w--pw
-w-p-
p--wp
w--pw

Output:
(0,0):(3,0):3.00