Castle's Treasures

Problem Statement

In the world of Atod, you find yourself in a castle brimming with treasures (fortunately, no monsters this time), and you have a map of the castle. The castle has rooms, doors, keys located somewhere, and golden coins somewhere else.

By default, all doors in the castle are closed. To open them, you need to find and pick up the key (i.e., move to its cell) and then move to the cell of the respective door to open it. You can collect as many keys as you want, and the doors, once opened, remain open **forever**.

A **room** is defined as a set of empty cells such that for any two cells A and B, you can always move from A to B without opening any doors.

You have been given some tasks to perform in the castle:

1. Find the maximum number of rooms that can be visited, Q.
2. Find the maximum number of golden coins that can be collected, W.

Map Notations

The map of the castle uses the following symbols:

Wall

. Floor or empty cell

D Door

K Key

P Your starting coordinates

G Gold coin

You are allowed to move up, down, left, right but not diagonally on the map.

Input

Two integers N, M representing the height and width of the map, respectively. The next N lines contain M characters describing the map.

Output

1. The maximum number of rooms that can be visited, Q.
2. The maximum number of coins that can be collected, W.

Constraints

$$1 \leq N \leq 10^3$$
$$1 \leq M \leq 10^3$$

Samples

Input	Output
6 26 ########################## #.............G.......# #...P...................# #............G........G.# #................G......# ##########################	1 4
6 26 ########################## #................#......# #...P............D......# #................#....G.# #.K.............#......# ##########################	2 1
13 26 ########################## #.G..#.......#.......G...# #....D.......D.....G....K# ######.......############## #....#...................# #..P.#...G.......K..K....# #....#...................# #######D################### #.G.........#............# #...........#............# #...........D..........GG# #.K.........#..........GG# ##########################	1 0
13 26 ########################## #.G..#.......#.......G...# #....D.......D.....G....K# ######.......############## #........................# #..P.....G.......K..K....# #........................# #######D################### #.G.........#............# #...........#............# #...........D..........GG# #.K.........#..........GG# ##########################	5 10