Bunnies Return

Filename: bunnies2

The Problem

Jill, the new lab assistant has made new cages for the lab rabbits, Peter and Cottontail. Unfortunately, these new cages are more like mazes with walls in every direction. Help Arup determine the shortest distance between the two rabbits. Each rabbit can hop one square directly up, down, right or left. They can hop as many times as they want from one free square to another. Each rabbit must stay on the grid.

The Input

Each input will start with a single integer T ($1 \leq T \leq 100$) on the first line. The number T will denote the number of test cases that follow. Each test case will begin with two integers, R and C ($1 \leq R, C \leq 10$) separated by a space. Each of the next R lines will contain C characters of either '_','#', 'P' or 'C' (Quotes for clarity). This will form a grid that represents the cage. A '_' represents a cell free of obstructions, '#' represents a wall, 'P' is Peter's location and 'C' is Cottontail's location. Each grid is guaranteed to have one and only one P and C.

The Output

For each test case output a single line containing the shortest distance between Peter and Cottontail if they can reach one another and -1 if they can not.

Sample Input

```
4
2 2
P#
#C
2 2
P_
C_
8 7
__P____
####_##
_____#_
_____#C
##_###_
_____#_
___#_#_
___#___
5 7
__P____
####_##
_____#_
_____#C
##_###_
```

Sample Output

```
-1
1
19
-1
```