Given a grid of size m x n where some eggs are placed at some positions. But among them some are rotten. Now a rotten egg at position[i,j] can rot other fresh eggs at position [i-1,j], [i+1,j], [i,j-1], [i,j+1] (up, down, left and right). Find the minimum time required to rot all eggs.
Convention for the grid is
‘e’ – Empty cell
‘f’ – fresh egg
‘r’ – rotten egg

Input Format:
First line contains the the number of test cases, T.
The lines that follow contain the test cases. The first line in each test case contains M and N. The next M lines contains strings of size N (string contains only characters ‘e’,’f’,’r’).

Ouput Format
Print the minimum time required to rot all the eggs. If it is not possible to rot all the eggs just print -1.

Constraints
1 <= T <= 10
1 <= M, N <= 1000
A[i][j] = {'e', 'f', 'r'} for 1<=i<=N, 1<=j<=M
Time limit : 1 sec
Memory Limit: 256 MB

Sample Input
2
3 5
rferf
fefrf
feerf
3 5
rferf
eefrf
feerf

Sample Output
2
-1