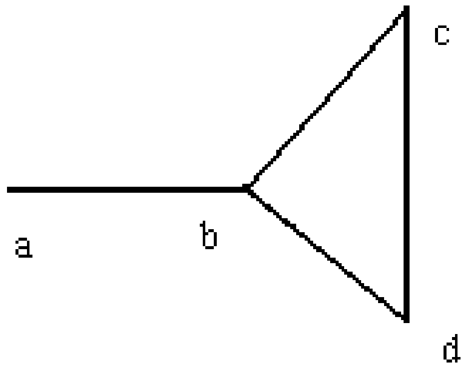
A *graph* G is a set of point V(G), together with a set of edges E(G), where each element of E(G) is an unordered pair of distinct points of V(G).

Example 1: Let G be a graph where V(G) $= \{a, b, c, d\}$ and E(G) $= \{(a, b), (b, c), (c, d), (d, b)\}$. The figure gives a depiction of G.



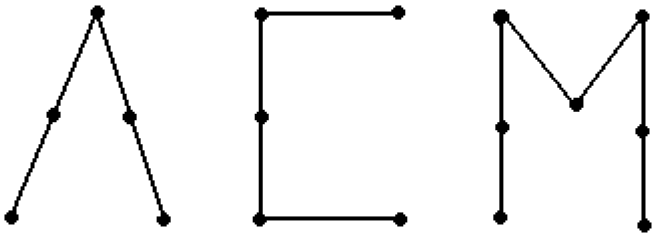
A depiction of the graph of G.

Notice that G contains the "cycle", $\{(b, c), (c, d), (d, b)\}$. A graph devoid of cycles is called a *tree*. A *path* in a graph G is an alternating sequence of points and edges, (beginning and ending with a point) such that all the points of the path are distinct. In the graph of example 1, $\{a, (a, b), b, (b, c), c, (c, d), d\}$ is a path.

Fact: Every two points of a tree are joined by a unique path.

A graph is called *connected* if every pair of points are joined by a path. The graph of example 1 is connected. If a graph is not connected then it is made up of "subgraphs" which are. Each one of these subgraphs is called a *connected component* of the graph G.

A graph for which each connected component is a tree is called a *forest*, see figure below.



A forest with three trees

One extreme case worth mentioning is the case when one of the component trees has one point but no edges joined to it. This tree likes like an isolated dot. We will call this an *acorn*. We are ready to define the problem.

Problem: Given a forest you are to write a program that counts the number of trees and acorns.

Input

The first line of the input file contains the number of test cases your program has to process. Each test case is a forest description consisting of two parts:

1. A list of edges of the tree, (one per line, given as an unordered pair of capital letters delimited by a row of asterisks).
2. A list of points in the tree, (these will be given on one line with a maximum on 26 corresponding to the capital letters, `A`..`Z`).

Output

For each test case your program should print the number of trees and the number of acorns, in a sentence, for example:

`There are` x `tree(s) and` y `acorn(s).`

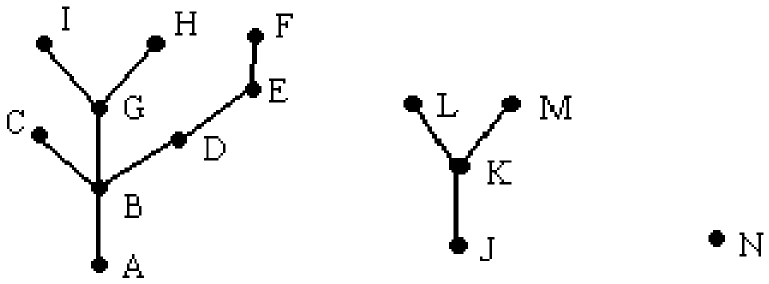
where x and y are the numbers of trees and acorns, respectively.

Notes: A forest may have no trees and all acorns, all trees and no acorns, or anything in between, so keep your eyes open and don't miss the forest for the trees!

Example 2: Let G be a graph whose edges and points are given by the first test case in the sample input. A depiction of this graph is given in figure following.

Sample Input

```
2
(A,B)
(B,C)
(B,D)
(D,E)
(E,F)
(B,G)
(G,H)
(G,I)
(J,K)
(K,L)
(K,M)
****
A,B,C,D,E,F,G,H,I,J,K,L,M,N
(A,B)
(A,C)
(C,F)
**
A,B,C,D,F
```



Sample Output

```
There are 2 tree(s) and 1 acorn(s).
There are 1 tree(s) and 1 acorn(s).
```