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# Cube Cakes

Problem code: CUBE

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This winter our chef plans to unveil his latest creation - Cube Cakes. As the name suggests, this new delicacy is a cake in the form of a perfect cube with secret ingredients from the chef's inventory. Since it is a relatively new creation of the chef, he wants to master the ability to make perfectly identical Cube Cakes. For this, he wants you to write a program that will calculate the similarity between two given Cube Cakes.

Each Cube Cake can be represented as a cube of size **N** where each cell of the cube contains a lowercase alphabet ('a'-'z'). The similarity between two Cube Cakes ( of size **N** each ) is defined as the maximum sized *common* sub-cube that exists at exactly the same position in both the Cube Cakes. Two sub-cubes are said to be *common* if at-least **P**% of their corresponding characters are equal. You need to find the size **S** of the largest such sub-cube and also the number of *common* sub-cubes of size **S** in the Cube Cake.

## Input

The first line contains an integer **T** denoting the number of test cases. Then the descriptions of testcases follows.

The first line of each testcase contains integers **N** (the size of the Cube Cakes **A** and **B** that are to be compared) and **P**.

The next line contains a string **S<sub>A</sub>** containing **N<sup>3</sup>** lowercase characters ('a'-'z'), where the **A<sub>[i\*N\*N + j\*N + k]</sub>**<sup>th</sup> element of the Cube Cake **A** is given by **S<sub>A</sub>[ i\*N\*N + j\*N + k ]** where **0 ≤ i, j, k ≤ N-1** .

The next line contains a string **S<sub>B</sub>** containing **N<sup>3</sup>** lowercase characters ('a'-'z'), **S<sub>B</sub>** is the description of the Cube Cake **B** in the way analogical to **A**.

## Output

For every test case, print in a single line the similarity between the two Cube Cakes **S** and the number of *common* sub-cubes of size **S**.

If there is no *common* sub cube present, just print -1 in a single line.

## Constraints

- 1 ≤ T ≤ 40
- 1 ≤ N ≤ 40
- 0 ≤ P ≤ 100
- | S<sub>A</sub> |, | S<sub>B</sub> | = N<sup>3</sup>

## Example

Input:

```
3
2 40
abcdefgh
abcdefgh
2 100
abcdefgh
ccccccch
1 100
a
b
```

Output:

```
2 1
1 2
-1
```

## Explanation

Example case 1.

## SUCCESSFUL SUBMISSIONS

User	Time	Mem	Lang	Solution
airhawk	0.25	2.7M	C	<a href="#">View</a>
sam_1993	0.27	2.9M	C++ 4.3.2	<a href="#">View</a>
ashwin1907	0.29	2.9M	C++ 4.3.2	<a href="#">View</a>
giorgi	0.29	3.3M	C++ 4.3.2	<a href="#">View</a>
happyboy99x	0.31	3.1M	C++ 4.3.2	<a href="#">View</a>
paulocezar	0.31	3.2M	C++ 4.3.2	<a href="#">View</a>
darkloz	0.31	3.3M	C++ 4.3.2	<a href="#">View</a>
tornike4	0.31	3.3M	C++ 4.3.2	<a href="#">View</a>
xellos0	0.31	3.5M	C++11	<a href="#">View</a>
gdisastery1	0.33	3.3M	C++ 4.3.2	<a href="#">View</a>
anastas	0.33	3.3M	C++ 4.3.2	<a href="#">View</a>
lifting	0.33	3.4M	C++ 4.3.2	<a href="#">View</a>

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Since both the Cube Cakes are identical, the whole cube matches and hence the similarity is **2**. Also, there is only one sub-cube of size **2**.

#### Example case 2.

Since **P** is **100**, all characters in the sub-cube must match. The sub cube 'c' and 'h' each of size **1** are the largest cube satisfying this criteria. Hence the similarity is **1** and corresponding count is **2**.

#### Example case 3.

Since no characters match in the cube, we cannot find a *common* subcube here.

Author:	viv001
Tester:	gerald
Tags	viv001
Date Added:	1-10-2013
Time Limit:	0.5 sec
Source Limit:	50000 Bytes
Languages:	ADA, ASM, BASH, BF, C, C99 strict, CAML, CLOJ, CLPS, CPP 4.3.2, CPP 4.8.1, CPP11, CS2, D, ERL, FORT, FS, GO, HASK, ICK, ICON, JAR, JAVA, JS, LISP clisp, LISP sbcl, LUA, NEM, NICE, NODEJS, PAS fpc, PAS gpc, PERL, PERL6, PHP, PIKE, PRLG, PYTH, PYTH 3.1.2, RUBY, SCALA, SCM guile, SCM qobi, ST, TCL, TEXT, WSPC

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## Comments

**tinchy\_stryder** @ 6 Dec 2013 09:49 PM

"Two sub-cubes are said to be common if at-least P% of their corresponding characters are equal". By corresponding characters, you mean that the characters at same position (i,j,k) of subcube A and subcube B should be equal right?

**vivek\_adm** @ 6 Dec 2013 09:56 PM

@tinchy\_stryder: Yes, that's right.

**panditkipython** @ 7 Dec 2013 01:16 AM

So any continuous  $r^3$  characters will represent a sub cube of size  $r$ ?

**tiasang** @ 7 Dec 2013 10:06 AM

sorry admin! you can explain what is subcube?

**vivek\_adm** @ 7 Dec 2013 07:42 PM

A subcube can be defined as a cube of size  $S$  inside the given cube of size  $N$  where  $1 \leq S \leq N$ . Hope that explains it.

**jigneshjain25** @ 7 Dec 2013 09:18 PM

what if p% of chars is not an integer, like 40% of 4 characters, den do we take floor or ceil of that no?

**asimali246** @ 7 Dec 2013 10:34 PM

@jigneshjain25: Well, since the number of matches must be atleast p%, hence it will be ceil in case it is not an integer.

**flaminrage** @ 8 Dec 2013 01:28 AM

Must the two sub-cubes have the same positions and orientation or just their characters need to be in the same position?

**vivek\_adm** @ 8 Dec 2013 02:31 AM

@flaminrage : Same positions and orientation.

**t1g0f8b8sgresu @ 8 Dec 2013 11:59 AM**

what is the complexity of this prob, i think  $N^4$  each testcase shud work

Need help? Post a comment. But before that please spare a moment to read the [guidelines](#).

**Your name:**  
priyanshuid

**Comment:** \*

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The time now is: 05:07:42 PM

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### Practice Section - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

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