Greetings From Globussoft

- Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.

- These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP

- To solve these 3 questions you've max. 3 hours.

- While Solving these questions you are not allowed to use any Search Engine like Google, Yahoo, Bing ...

All the best for your test

Globussoft

QUESTION - 1

Morphic is a tree that grows very rapidly, bringing happiness to its owner. It has a single trunk consisting of a number of cells stacked one on top of another. Each cell has one of n possible colors which determine the way it mutates during the night, while nobody can see it. Florists denote these colors by the first **n** small letters of the English alphabet and know exactly into how many cells, and of what colors, a cell of each color divides. In fact, they have wrote their knowledge down simply with **n** nonempty words, each word representing the resulting sequence of colors.

A seed of a Morphic has a single cell of color a and is rooted firmly in the ground. As long as the Morphic is still alive, each night all its cells simultaniously morph according to the aforementioned rules, possibly causing an exponential growth because each new cell is of the same size as the original one. For example, if rules say that a becomes ab, and b becomes ca, then after two nights a seed will evolve to a trunk consisting of 4 cells: abca.

Therefore the top of a Morphic is usually hidden in clouds. The only way to tell if it is still alive is to check if visible part of the trunk is changing colors. In order to do so, one can build enormously high (yet still of constant height) tower, and watch from its top a fixed fragment of the trunk.

As you can easily see, it is either sufficient to observe first **k** cells from the bottom for some fixed **k**, or no matter how high the tower is, you will not be able to tell for sure if a Morphic died. The latter happens when for every **k**, rules cause the **k**-th cell to eventually stop changing colors, even though the tree is still alive and mutating.

To prevent waste of money on building such enormous towers, you are to write a program that determines if it is possible to monitor health of a Morphic.

Input

The input contains several Morphics descriptions. The first line contains the number of descriptions **t** (**t** <= 10000) that follow. Each of them begins with the number of colors **n** (1 <= **n** <= 26). Next **n** lines contain the rules by which the Morphic grows. The i-th one describes the sequence of colors in bottom-up order obtained from a single cell of i-th color. Each line contains at most 100 lowercase English letters.

Output

For each test case output one line containing YES if building of a tower is pointless (as in: YES, we can save money!). Otherwise output NO.

Example

```
Input:
4
```

```
2
ab
a
3
ba
c
c
3
ba
c
b
3
bbbbbbbbbbbbbbb
ccccccccccccccc
c
```

Output:

```
YES
YES
NO
YES
```

QUESTION – 2

There are given two strings, A and B. An expansion of some string X is a string created by adding or inserting any number (zero, one or more) of blanks anywhere in the string, or in the beggining or the end of the string. Eg., if the string X is ‘abcbcd’, then the strings 'abcb-cd', '-a-bcbcd-' and 'abcb-cd-' are expansions of the string X (blanks are denoted by the character ‘-‘).

If A1 is an expansion of the string A, and B1 is and expansion of the string B, and if A1 and B1 are of the same length, then we define the distance of the strings A1 and B1 as the sum of the distances of the characters on the same positions in these strings. We define the distance of two characters as the absolute difference of their ASCII codes, except the distance of the blank and another character, which is given (and equal for all characters).

You are to write a program which finds the expansions A1 and B1 of strings A and B, that have the smallest difference.

Input

The first line of the input file consists of the string A, and the second line of string B. They are consisted only of lower case characters of the english alphabet (a-z), and the number of characters in any of the strings is less than or equal to 2000.

The third line consists of an integer K, $1 \leq K \leq 100$, the distance of the blank and the other characters.

Output

The first only line of the input file should consist of the smallest distance as defined in the text of the task.

Sample

```
blast.in

cmc
snmn
2

blast.out

10

blast.in

koiv
ua
1

blast.out

5

blast.in

mj
jao
4

blast.out

12
```

QUESTION – 3

Given a graph with N ($2 \le N \le 5{,}000$) vertices numbered 1 to N and M ($1 \le M \le 30{,}000$) undirected, weighted edges, compute the maximum flow / minimum cut from vertex 1 to vertex N.

Input

The first line contains the two integers N and M. The next M lines each contain three integers A, B, and C, denoting that there is an edge of capacity C ($1 \le C \le 10^9$) between nodes A and B ($1 \le A, B \le N$). Note that it is possible for there to be duplicate edges, as well as an edge from a node to itself.

Output

Print a single integer (which may not fit into a 32-bit integer) denoting the maximum flow / minimum cut between 1 and N.

Example

```
Input:
4 6
1 2 3
2 3 4
3 1 2
2 2 5
3 4 3
4 3 3

Output:
5
```

QUESTION – 4

In number theory there is a very deep unsolved conjecture of the Hungarian Paul Erdős (1913-1996), that there exist infinitely many primes of the form x^2+1, where x is an integer. However, a weaker form of this conjecture has been proved: there are infinitely many primes of the form x^2+y^4. You don't need to prove this, it is only your task to find the number of (positive) primes not larger than n which are of the form x^2+y^4 (where x and y are integers).

Input

An integer T, denoting the number of testcases ($T \leq 10000$). Each of the T following lines contains a positive integer n, where $n < 10000000$.

Output

Output the answer for each n.

Example

```
Input:
4
1
2
10
9999999

Output:
0
1
2
```

13175

QUESTION – 5

Oh no! A number of stray cats have been let loose in the city, and as the City Cat Catcher, you have been assigned the vital task of retrieving all of the cats. This is an ideal opportunity to test your latest invention, a cat trap which is guaranteed to retrieve every cat which walks into a square-shaped subsection of the city.

Fortunately, you have the assistance of one of the world's foremost cat psychologists, who has the amazing ability of predicting, given a square subsection of the city, exactly which of the four cardinal directions (north, east, south or west) the cat will head. While this information is handy, you still don't know where all the cats currently are.

In order to prove the cost-effectiveness of your method to the City it would, of course, be important to minimize the number of traps used.

Input

The input will begin with a line consisting of two numbers n and m, separated by a space ($1 \leq n, m \leq 1000$). The city will be an n x m grid of square subsections. The next n lines will each consist of a string of length m, consisting of the letters 'N', 'E', 'S', or 'W', representing north, east, south and west, respectively. (The first character of the first line will be the northwesternmost point.) The direction in the square is the direction which cats will head if they are in that square. The cat psychologist assures you that cats have no interest in leaving the city.

Output

Output the minimum number of traps needed.

Example

```
Input:
3 4
SWWW
SEWN
EEEN

Output:
2
```