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

Farmer John has decided to construct electric fences. He has fenced his fields into a number of bizarre shapes and now must find the optimal place to locate the electrical supply to each of the fences.

A single wire must run from some point on each and every fence to the source of electricity. Wires can run through other fences or across other wires. Wires can run at any angle. Wires can run from any point on a fence (i.e., the ends or anywhere in between) to the electrical supply.

Given the locations of all F (1 <= F <= 150) fences (fences are always parallel to a grid axis and run from one integer gridpoint to another, 0 <= X,Y <= 100), your program must calculate both the total length of wire required to connect every fence to the central source of electricity and also the optimal location for the electrical source.

The optimal location for the electrical source might be anywhere in Farmer John's field, not necessarily on a grid point.

Input

The first line contains F, the number of fences.
F subsequent lines each contain two X,Y pairs each of which denotes the endpoints of a fence.

Output

On a single line, print three space-separated floating point numbers, each with a single decimal place. Presume that your computer's output library will round the number correctly.

The three numbers are:

* the X value of the optimal location for the electricity,
* the Y value for the optimal location for the electricity, and
* the total (minimum) length of the wire required.

Example

Input:
```
3
0 0 0 1
2 0 2 1
0 3 2 3
```

Output:
```
1.0 1.6 3.7
```

QUESTION – 2

After a day trip with his friend Dick, Harry noticed a strange pattern of tiny holes in the door of his SUV. The local American Tire store sells fiberglass patching material only in square sheets. What is the smallest patch that Harry needs to fix his door?

Assume that the holes are points on the integer lattice in the plane. Your job is to find the area of the smallest square that will cover all the holes.

Input

The first line of input contains a single integer T expressed in decimal with no leading zeroes, denoting the number of test cases to follow. The subsequent lines of input describe the test cases.

Each test case begins with a single line, containing a single integer n expressed in decimal with no leading zeroes, the number of points to follow; each of the following n lines contains two integers x and y, both expressed in decimal with no leading zeroes, giving the coordinates of one of your points.

You are guaranteed that T <= 30 and that no data set contains more than 30 points. All points in each data set will be no more than 500 units away from (0,0).

Output

Print, on a single line with two decimal places of precision, the area of the smallest square containing all of your points. An answer will be accepted if it lies within 0.01 of the correct answer.

Example

Input:

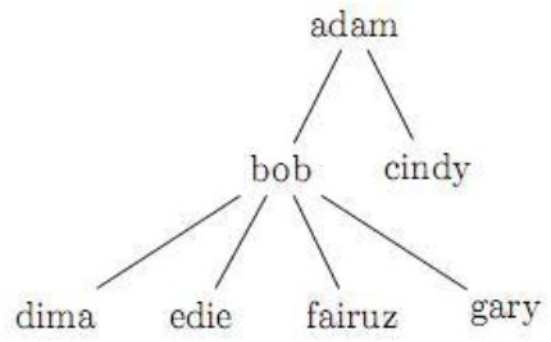
```
2
4
-1 -1
1 -1
1 1
-1 1
4
10 1
10 -1
-10 1
-10 -1
```

Output:

```
4.00
242.00
```

QUESTION – 3

A favorite pastime for big families in Acmestan is going to the movies. It is quite common to see a number of these multi-generation families going together to watch a movie. Movie theaters in Acmestan have two types of tickets: A single ticket is for exactly one person while a family ticket allows a parent and their children to enter the theater. Needless to say, a family ticket is always priced higher than a single ticket, sometimes as high as five times the price of a single ticket.



It is quite challenging for families to decide which ticket arrangement is most economical to buy. For example, the family depicted in the figure on the right has four ticket arrangements to choose from: Seven single tickets; Two family tickets; One family ticket (for adam, bob, cindy)plus four single tickets for the rest; Or, one family ticket (for bob and his four children) plus single tickets for the remaining two.

Write a program to determine which ticket arrangement has the least price. If there are more than one such arrangement, print the arrangement that has the least number of tickets.

Input

Your program will be tested on one or more test cases. The first line of each test case includes two positive integers (S and F)where S is the price of a single ticket and F is the price of a family ticket. The remaining lines of the test case are either the name of a person going by him/herself, or of the form:

```
N1 N2 N3 ... Nk
```

where N1 is the name of a parent, with N2 ... Nk being his/her children. Names are all lower-case letters, and no longer than 1000 characters. No parent will be taking more than 1000 of their

children to the movies :-). Names are unique, the name of a particular person will appear at most twice: Once as a parent, and once as a child. There will be at least one person and at most 100,000 people in any test case.

The end of a test case is identified by the beginning of the following test case (a line made of twointegers.) The end of the last test case is identified by two zeros.

Output

For each test case, write the result using the following format:

```
k. NS NF T
```

Where k is the test case number (starting at 1,) NS is the number of single tickets, NF is the number of family tickets, and T is the total cost of tickets.

Sample

```
input
1 3
adam bob cindy
bob dima edie fairuz gary
1 2
john
paul
george
ringo
1 3
a b c
0 0

output
1. 2 1 5
2. 4 0 4
3. 0 1 3
```

QUESTION – 4

Any square grid can be viewed as one or more rings, one inside the other. For example, as shown in figure (a), a 5 x 5 grid is made of three rings, numbered 1,2 and 3 (from outside to inside.) A square grid of size N is said to be sorted, if it includes the values from 1 to N^2 in a row-major order, as shown in figure (b) for N = 4. We would like to determine if a given square grid can be sorted by only rotating its rings. For example, the grid in figure (c) can
be sorted by rotating the first ring two places counter-clockwise, and rotating the second ring one place in the clockwise direction.

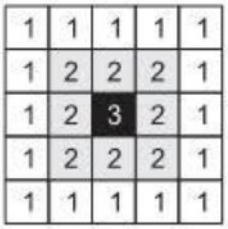


Figure (a)

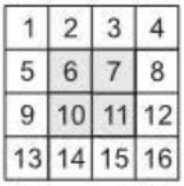


Figure (b)

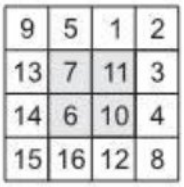


Figure (c)

Input

Your program will be tested on one or more test cases. The first input line of a test case is an integer N which is the size of the grid. N input lines will follow, each line made of N integer values specifying the values in the grid in a row-major order. Note than $0 < N \leq 1,000$ and grid values are natural numbers less than or equal to 1,000,000.

The end of the test cases is identified with a dummy test case with N =0.

Output

For each test case, output the result on a single line using the following format:

```
k. result
```

Where k is the test case number (starting at 1,) and result is "YES" or "NO" (without the double quotes.) and single space between "." and "result".

Sample

```
input
4
9 5 1 2
13 7 11 3
14 6 10 4
15 16 12 8
3
1 2 3
5 6 7
8 9 4
0

output
1. YES
2. NO
```

QUESTION – 5

Given a non-empty string composed of digits only, we may group these digits into sub-groups (but maintaining their original order) if, for every sub-group but the last one, the sum of the digits in a sub-group is less than or equal to the sum of the digits in the sub-group immediately on its right. Needless to say, each digit will be in exactly one sub-group.

For example, the string 635 can only be grouped in one sub-group [635] or in two sub-groups as follows: [6-35] (since 6 < 8.) Another example is the string 1117 which can be grouped in one sub-group [1117] or as in the
following: [1-117], [1-1-17], [1-11-7], [1-1-1-7], [11-17],and [111-7] but not any more, hence the total number of possibilities is 7.

Write a program that computes the total number of possibilities of such groupings for a given string of digits.

Input

Your program will be tested on a number of test cases. Each test case is specified on a separate line. Each line contains a single string no longer than 25, and is made of decimal digits only.

The end of the test cases is identified by a line made of the word "bye" (without the quotes.) Such line is not part of the test cases.

Output

For each test case, write the result using the following format:

```
k. n
```

where k is the test case number (starting at 1,) and n is the result of this test case.

Sample

```
input
635
1117
9876
bye

output
1.                                                                  2
2.                                                                  7
3. 2
```