1 - Quick Change

J.P. Flathead's Grocery Store hires cheap labor to man the checkout stations. The people he hires (usually high school kids) often make mistakes making change for the customers. Flathead, who's a bit of a tightwad, figures he loses more money from these mistakes than he makes; that is, the employees tend to give more change to the customers than they should get.

Flathead wants you to write a program that calculates the number of quarters ($0.25), dimes ($0.10), nickels ($0.05) and pennies ($0.01) that the customer should get back. Flathead always wants to give the customer's change in coins if the amount due back is $5.00 or under. He also wants to give the customers back the smallest total number of coins. For example, if the change due back is $1.24, the customer should receive 4 quarters, 2 dimes, 0 nickels, and 4 pennies.

Input

The first line of input contains an integer N which is the number of datasets that follow. Each dataset consists of a single line containing a single integer which is the change due in cents, C, ($1 \leq C \leq 500$).

Output

For each dataset, print out the dataset number, a space, and the string: Q QUARTER(S), D DIME(S), n NICKEL(S), P PENNY(S) Where Q is the number of quarters, D is the number of dimes, n is the number of nickels and P is the number of pennies.

Sample Input

```
3
124
25
194
```

Output for Sample Input

```
1 4 QUARTER(S), 2 DIME(S), 0 NICKEL(S), 4 PENNY(S)
2 1 QUARTER(S), 0 DIME(S), 0 NICKEL(S), 0 PENNY(S)
3 7 QUARTER(S), 1 DIME(S), 1 NICKEL(S), 4 PENNY(S)
```

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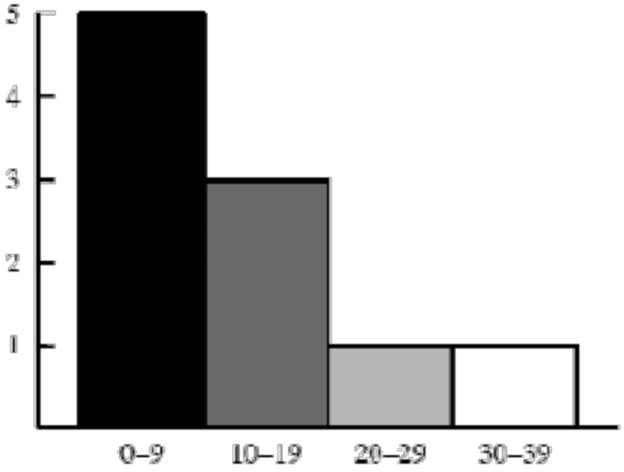
2 - Grey Area

Dr. Grey is a data analyst, who visualizes various aspects of data received from all over the world everyday. He is extremely good at sophisticated visualization tools, but yet his favorite is a simple self-made histogram generator.

Figure 1 is an example of histogram automatically produced by his histogram generator. A histogram is a visual display of frequencies of value occurrences as bars. In this example, values in the interval 0–9 occur five times, those in the interval 10–19 occur three times, and 20–29 and 30–39 once each.



Dr. Grey's histogram generator is a simple tool. First, the height of the histogram is fixed, that is, the height of the highest bar is always the same and those of the others are automatically adjusted proportionately. Second, the widths of bars are also fixed. It can only produce a histogram of uniform intervals, that is, each interval of a histogram should have the same width (10 in the above example). Finally, the bar for each interval is painted in a grey color, where the colors of the leftmost and the rightmost intervals are black and white, respectively, and the darkness of bars monotonically decreases at the same rate from left to right. For instance, in Figure 1, the darkness levels of the four bars are 1, 2/3, 1/3, and 0, respectively.

In this problem, you are requested to estimate ink consumption when printing a histogram on paper. The amount of ink necessary to draw a bar is proportional to both its area and darkness.

Input

The input consists of multiple datasets, each of which contains integers and specifies a value table and intervals for the histogram generator, in the format to the right. `n` is the total number of value occurrences for the histogram, and each of the `n` lines following the first line contains a single value. Note that the same value may possibly occur multiple times. `w` is the interval width. A value `v` is in the first (i.e. leftmost) interval if `0 ≤ v < w`, the second one if `w ≤ v < 2w`, and so on. Note that the interval from 0 (inclusive) to `w` (exclusive) should be regarded as the leftmost even if no values occur in this interval. The last (i.e. rightmost) interval is the one that includes the largest value in the dataset.

```
 n       w
v1
v2
.
.
vn
```

You may assume the following:

You can also assume that the maximum value is no less than `w`. This means that the histogram has more than one interval.

The end of the input is indicated by a line containing two zeros.

```
1 ≤ n ≤ 100
10 ≤ w ≤ 50
0 ≤ vi ≤ 100    for     1 ≤ i ≤ n
```

Output

For each dataset, output a line containing the amount of ink consumed in printing the histogram.

One unit of ink is necessary to paint one highest bar black. Assume that 0.01 units of ink per histogram is consumed for various purposes except for painting bars such as drawing lines and characters (see Figure 1). For instance, the amount of ink consumed in printing the histogram in Figure 1 is:

$$1 \times 1 + \frac{2}{3} \times \frac{3}{5} + \frac{1}{3} \times \frac{1}{5} + 0 \times \frac{1}{5} + 0.01$$
$$= 1 + \frac{2}{5} + \frac{1}{15} + 0.01$$
$$= 1.47666 \ldots$$

Each output value should be a 6 decimal fraction.

Sample Input

```
3 50
100
0
100
3 50
100
100
50
10 10
1
2
3
4
5
16
17
18
29
30
0 0
```

Output for Sample Input

```
0.510000
0.260000
1.476667
```

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3 - Alaska

The Alaska Highway runs 1422 miles from Dawson Creek, British Columbia to Delta Junction, Alaska. Brenda would like to be the first person to drive her new electric car the length of the highway. Her car can travel up to 200 miles once charged at a special charging station. There is a charging station in Dawson Creek, where she begins her journey, and also several charging stations along the way. Can Brenda drive her car from Dawson City to Delta Juntion and back?

Input

The input contains several scenario. Each scenario begins with a line containing n, a positive number indicating the number of charging stations. n lines follow, each giving the location of a filling station on the highway, including the one in Dawson City. The location is an integer between 0 and 1422, inclusive, indicating the distance in miles from Dawson Creek. No two filling stations are at the same location. A line containing 0 follows the last scenario.

Output

For each scenario, output a line containing POSSIBLE if Brenda can make the trip. Otherwise, output a line containing the word IMPOSSIBLE.

Sample Input

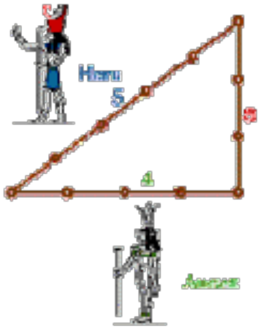
```
2
0
900
8
1400
1200
1000
800
600
400
200
0
0
```

Sample Output

```
IMPOSSIBLE
POSSIBLE
```

4 - Egypt

A long time ago, the Egyptians figured out that a triangle with sides of length 3, 4, and 5 had a right angle as its largest angle. You must determine if other triangles have a similar property.



Input

Input represents several test cases, followed by a line containing 0 0 0. Each test case has three positive integers, less than 30,000, denoting the lengths of the sides of a triangle.

Output

For each test case, a line containing "right" if the triangle is a right triangle, and a line containing "wrong" if the triangle is not a right triangle.

Sample Input	**Sample Output**

`6 8 10`
`25 52 60`
`5 12 13`
`0 0 0`
	`right`
	`wrong`
	`right`

5 - Triangular Sums

The n-th Triangular number, T(n) = 1 + ... + n, is the sum of the first n integers. It is the number of points in a triangular array with n points on side. For example T(4):

```
   X
  X X
 X X X
X X X X
```

Write a program to compute the weighted sum of triangular numbers:

```
W(n) = SUM[k = 1..n; k*T(k+1)]
```

Input

The first line of input contains a single integer N, (1 ≤ N ≤ 1000) which is the number of datasets that follow.

Each dataset consists of a single line of input containing a single integer n, (1 ≤ n ≤300), which is the number of points on a side of the triangle.

Output

For each dataset, output on a single line the dataset number, (1 through N), a blank, the value of n for the dataset, a blank, and the weighted sum , W(n), of triangular numbers for n.

Sample Input	**Sample Output**

4
3
4
5
10
	1 3 45
	2 4 105
	3 5 210
	4 10 2145

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6 - User Names

A university's computer system assigns user names according to the following set of rules:

1. The maximum length of a username is MAXLEN characters. (The value of MAXLEN will be specified in the input for each problem instance.)
2. The first character of the user name is the first letter of the person's first name, converted to lower case. Ignore apostrophes and hyphens here and in Step 3.
3. Append as many letters of the person's last name as possible (converted to lower case, if necessary), without exceeding a total of MAXLEN characters. Starting with the first letter of the last name, append these letters in the order in whch they appear in the last name.
4. If a user name assigned on basis of Rules 1 - 3 already exists in the database, break the tie as follows: append serial numbers 1 - 9, in that order, to the username from step 3, if that can be done without exceeding the limit of MAXLEN characters in the username. Otherwise, drop the last letter before appending the serial number.
5. If a user name assigned on basis of Rules 1 - 4 already exists in the database, break the tie as follows: append serial numbers 10 - 99, in that order, to the username from step 3, if that can be done without exceeding the limit of MAXLEN characters in the username. Otherwise, drop the last letter or the last two letters (whichever is necessary) before appending the serial number.
6. It is assumed that the above rules will avoid ties.

Input

The input will contain data for a number of test cases. The first line of each test case will contain two positive integers: the number of names and the value of MAXLEN (5 ≤ MAXLEN &le 80). This will be followed by the list of names. Each name will consist of at most 80 characters and will begin with the first name, followed by middle names, if any, and will conclude with the last name. A single blank space will separate first, middle, and last names. Any name can contain upper and lower case letters, hyphens, and apostrophes. A last name will contain at least two letters, other names will contain at least one letter (they could be just initials). There will be no more than 200 names in each case. The last test case will be followed by a line containing two zeros for the number of names and MAXLEN.

Output

For each case, the output will begin with a line containing the case number. This will be followed by the list of user names, one per line, in the same order as the corresponding names in the input.

Sample Input

```
2 6
Jenny Ax
Christos H Papadimitriou
11 8
Jean-Marie d'Arboux
Jean-Marie A d'Arboux
Jean-Marie B d'Arboux
```

Sample Output

```
Case 1
jax
cpapad
Case 2
jdarboux
jdarbou1
jdarbou2
```

Jean-Marie C d'Arboux Jean-Marie D d'Arboux Jean-Marie D d'Arboux Jean-Marie F d'Arboux Jean-Marie G d'Arboux Jean-Marie H d'Arboux Jean-Marie I d'Arboux Jean-Marie J d'Arboux 11 9 Jean-Marie d'Arboux Jean-Marie A d'Arboux Jean-Marie B d'Arboux Jean-Marie C d'Arboux Jean-Marie D d'Arboux Jean-Marie D d'Arboux Jean-Marie F d'Arboux Jean-Marie G d'Arboux Jean-Marie H d'Arboux Jean-Marie I d'Arboux Jean-Marie J d'Arboux 0 0	jdarbou3 jdarbou4 jdarbou5 jdarbou6 jdarbou7 jdarbou8 jdarbou9 jdarbo10 Case 3 jdarboux jdarboux1 jdarboux2 jdarboux3 jdarboux4 jdarboux5 jdarboux6 jdarboux7 jdarboux8 jdarboux9 jdarbou10

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