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

The director of a new movie needs to create a scaled set for the movie. In the set there will be N skyscrapers, with distinct integer heights from 1 to N meters. The skyline will be determined by the sequence of the heights of the skyscrapers from left to right. It will be a permutation of the integers from 1 to N.

The director is extremely meticulous, so she wants to avoid a certain sloping pattern. She doesn't want for there to be ANY three buildings in positions i, j and k, $i < j < k$, where the height of building i is smaller than that of building j, and building j's height is smaller than building k's height.

Your task is to tell the director, for a given number of buildings, how many distinct orderings for the skyline avoid the sloping pattern she doesn't like.

Input

There will be several test cases in the input. Each test case will consist of a single line containing a single integer N ($3 \leq N \leq 1,000$), which represents the number of skyscrapers. The heights of the skyscrapers are assumed to be 1, 2, 3, ..., N. The input will end with a line with a single 0.

Output

For each test case, output a single integer, representing the number of good skylines - those avoid the sloping pattern that the director dislikes - modulo 1,000,000. Print each integer on its own line with no spaces. Do not print any blank lines between answers.

Example

```
Input:
3
4
0

Output:
5
14
```

QUESTION – 2

According to Wikipedia, an arithmetic progression (AP) is a sequence of numbers such that the difference of any two successive members of the sequence is a constant. For instance, the sequence 3, 5, 7, 9, 11, 13, . . . is an arithmetic progression with common difference 2. For this problem, we will limit ourselves to arithmetic progression whose common difference is a non-

zero integer.
On the other hand, a geometric progression (GP) is a sequence of numbers where each term after the first is found by multiplying the previous one by a fixed non-zero number called the common ratio. For example, the sequence 2, 6, 18, 54, . . . is a geometric progression with common ratio 3. For this problem, we will limit ourselves to geometric progression whose common ratio is a non-zero integer.
Given three successive members of a sequence, you need to determine the type of the progression and the next successive member.

Input

Your program will be tested on one or more test cases. Each case is specified on a single line with three integers ($-10,000 < a1, a2, a3 < 10,000$) where a1 , a2 , and a3 are distinct.
The last case is followed by a line with three zeros.

Output

For each test case, you program must print a single line of the form:
XX v
where XX is either AP or GP depending if the given progression is an Arithmetic or Geometric Progression. v is the next member of the given sequence. All input cases are guaranteed to be either an arithmetic or geometric progressions.

Example

Input:
```
4 7 10
2 6 18
0 0 0
```

Output:
```
AP 13
GP 54
```

QUESTION – 3

Take any positive number, find the sum of the squares of its digits, repeat! You'll end up with an infinite sequence with an interesting property that we would like to investigate further. Starting with the number 5, the sequence is:

(5, 25, 29, 85, 89, 145, 42, 20, 4, 16, 37, 58, . . .)

The interesting part is in what comes after 58: $5^2 + 8^2 = 89$ which is a number that's already been seen in the sequence. In other words, after 58, the sequence will fall into the repeating cycle:

89, 145, 42, 20, 4, 16, 37, 58.

What's amazing is that this cycle will appear for many other numbers: 3, 18, 36, and 64 just to

name a few. (see figure on the following page.) For some numbers, the sequence will fall into another repeating cycle by reaching 1. (see second figure on the following page) For example, starting with 19, you'll end up with the sequence:

(19, 82, 68, 100, 1, . . .)

And that's about it. Any number you choose will end up falling into a repeating cycle: Either the 89, 145, . . . cycle or the 1, . . . cycle.

Given two numbers, your objective is to generate as few numbers in their sequences for the two sequences to intersect at one common number. For example, given 61 and 29, we can achieve what's required by generating the sequences: (61, 37, 58, 89) and (29, 85, 89). Similarly, for 19 and 100, the sequences would be (19, 82, 68, 100) and (100).

Input

Your program will be tested on one or more test cases. Each test case is specified on a single line having two integers ($0 < A, B < 10^9$).

The last case is followed by a dummy line made of two zeros.

Output

For each test case, print the following line:

A B S

Where A, B are as in the input and S is the (minimum) sum of the lengths of the two sequences. If the sequences starting at A and B do not intersect, then S = 0.

Example

Input:

```
89 89
19 100
61 19
0 0
```

Output:

```
89 89 2
19 100 5
61 19 0
```

QUESTION – 4

My kid's school cleared a large field on their property recently to convert it into a playing area. The field is polygonal. The school administration decided to separate the field into two areas by building a straight picket fence between the area for the older kids and the area for the younger kids. The fence would go between two non-adjacent vertices of the polygonal field, and given the shape of the field, all such possible fences would lie strictly and entirely within the field.

Naturally, the smaller of the two areas would go to the younger kids. So can you help the school determine what the area of the smaller play-area would be for different fence positions?

INPUT
The first line contains 2 numbers N denoting the number of points in the convex polygon and Q denoting the number of possible locations of straight line fences.
The next N lines contain 2 integers each. The ith line contains the integers xi yi denoting the coordinates of the ith point of the polygon. The points are given in clockwise order.
The next Q lines contain 2 integers a b denoting that a straight line fence is to be drawn connecting a and b.

OUTPUT
Output Q lines one corresponding to each query. For each query, output the area of the smaller region for the corresponding query truncated to 1 decimal place. Always have 1 digit after the decimal place, so if the answer is 1, output it as 1.0 instead.

CONSTRAINTS
4 <= N <= 50000
1 <= Q <= 50000
-20,000,000 <= x,y <= 20,000,000
0 <= a < b-1
b < N

SAMPLE INPUT
4 2
0 0
0 1
1 2
1 0
1 3
0 2

SAMPLE OUTPUT
0.5
0.5
rst line contains an integer T (the number of test cases). Then, T lines follow. Each test case consists of a single line with two non-negative integers N and M.

QUESTION – 5

My kid's kindergarten class is putting up a Christmas play. (I hope he gets the lead role.) The kids are all excited, but the teacher has a lot of work. She has to produce costumes for a scene with K soldiers. She wants to buy all the costumes in the same size, allowing for some small amount of length alteration to be done by the kids' parents later. So she has taken all the kids' height measurements. Can you help her select K kids from her class of N to play the soldier role, such that the height difference between the

tallest and shortest in the group is minimized, and alternations will be easiest? Tell her what this minimum difference is.

INPUT
The first line contains the number of test cases T. T test cases follow each containing 2 lines.

The first line of each test case contains 2 integers N and K.
The second line contains N integers denoting the height of the N kids.

OUTPUT
Output T lines, each line containing the required answer for the corresponding test case.

CONSTTRAINTS
T <= 30
1 <= K <= N <= 20000
1 <= height <= 1000000000

SAMPLE INPUT
3
3 1
2 5 4
3 2
5 2 4
3 3
2 5 4

SAMPLE OUTPUT
0
1
3

first line contains an integer T (the number of test cases). Then, T lines follow. Each test case consists of a single line with two non-negative integers N and M.

Output

For each test case you have to output a single line containing the answer for the task.

Example

```
Input:
3
0 3
3 5
10 19

Output:
4
10
10857
```

QUESTION – 5

A fantastic discovery is about to happen in the biology field, and you are part of the team making the research. The research is about measuring the cells growth in an environment oxygenless and in presence of a toxic substance. The team came to a courious hypothesis, the analyzed data tells them that: the growth, the number of days and the toxicity; are related by this formula:

$\mathbf{P} = \mathbf{N} * \mathbf{N}^{\mathbf{cN}}$;

where **P** is the growth measured in thousands of cells.

N is the elapsed number of days.

and **c** is the constant that relates to the toxicity level of the experiment.

Your biology partners need to takeout some tissues from the cells when these cells reach a specific growth. They require you to write a program that tells them the exact time when this will happen, given a toxicity level and the growth required.

Input

The first line is **T** ($1 \leq \mathbf{T} \leq 40{,}000$), the number of test cases, then **T** test cases follow.

Each test case is a line with 2 integers(**P c**) separated by a space.

P ($1 \leq \mathbf{P} \leq 10^{15}$)

c ($1 \leq \mathbf{c} \leq 5$)

Output

For each test case you have to output the expected time in decimal format.

Example

```
Input:
3
1 1
3 4
100 1
Output:
1.000000
1.207384
3.086308
```