

Problem A: Sum

(blue balloon)

For this problem you will compute various running sums of values for positive integers.

Standard Input

The first line of input contains a single integer P , ($1 \leq P \leq 10000$), which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set consists of a single line of input. It contains the data set number, K , followed by an integer N , ($1 \leq N \leq 10000$).

Standard Output

For each data set there is one line of output. The single output line consists of the data set number, K , followed by a single space followed by three space separated integers $S1$, $S2$ and $S3$ such that:

$S1$ = The sum of the first N positive integers.

$S2$ = The sum of the first N odd integers.

$S3$ = The sum of the first N even integers.

Sample Input	Sample Output
3 1 1 2 10 3 1001	1 1 1 2 2 55 100 110 3 501501 1002001 1003002

Problem B: Programming language

(red balloon)

Programming languages such as C++ and Java can prefix characters to denote the *base* of constant integer values. For example, hexadecimal (base 16) constants are preceded by the string “0x”. Octal (base 8) values are preceded by the character “0” (zero). Decimal (base 10) values do not have a prefix. For example, all the following represent the same integer constant, albeit in different bases.

0x1234
011064
4660

The prefix makes it clear to the compiler what base the value is in. Without the “0x” prefix, for example, it would be impossible for the compiler to determine if 1234 was hexadecimal. It could be octal or decimal.

For this problem, you will write a program that interprets a string of decimal digits as if it were an octal value, a decimal value or a hexadecimal value.

Standard Input

The first line of input contains a single decimal integer P , ($1 \leq P \leq 10000$), which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set consists of a single line of input. It contains the data set number, K , followed by a single space, followed by a string of at most 7 decimal digits.

Standard Output

For each data set there is one line of output. The single output line consists of the data set number, K , followed by a space followed by 3 space separated decimal integers which are the value of the input as if it were interpreted to as octal, decimal and hexadecimal respectively. If the input value cannot be interpreted as an octal value, use the value 0.

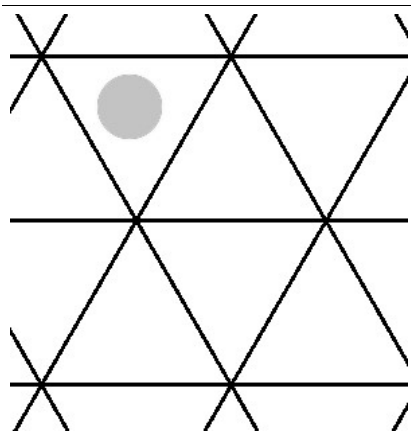
Sample Input	Sample Output
4 1 1234 2 9 3 1777 4 129	1 668 1234 4660 2 0 9 9 3 1023 1777 6007 4 0 129 297

Problem C: Survivor

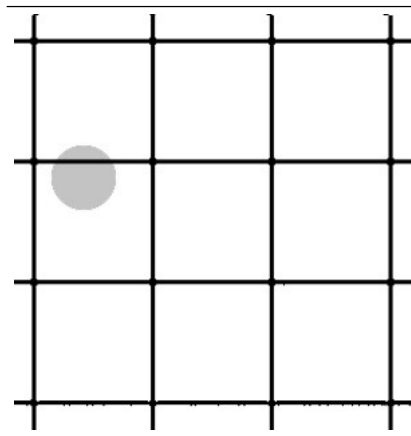
(yellow balloon)

It is the end of the world, the fish community rises up against years of humanity's abuse, and declares war against mankind.

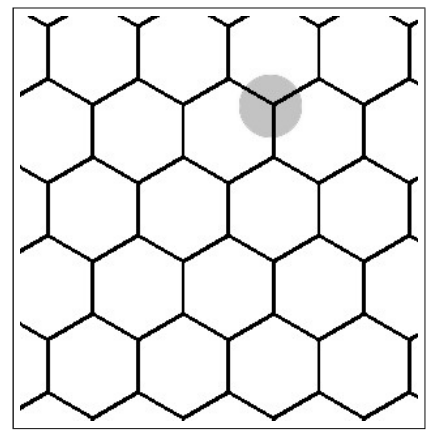
After millions of years of unemployment and reliance on robots, humans became spheres of radius R consisting of only one part, the brain. Fish rebels developed special weapons named "the rains of Atlantic" which consist of large heavy sieves prepared to slice humans, a sieve is composed of extremely thin stretched strings in the form of a grid of convex regular N -sided polygons* of side length s . The figure below is an example of the cases when $N = 3$, $N = 4$, $N = 6$:



$N = 3$



$N = 4$



$N = 6$

You are the last survivor but they have finally identified the city where you hide. They are going to throw a sieve that will cover the whole city. Your brain will be sliced if one of the threads from the sieve touches it. What is the probability that your brain will be sliced if you can be located anywhere in the city with equal probability?

Standard Input

Your program will be tested on one or more test cases. The first line of the input contains a single integer T ($1 \leq T \leq 100$) the number of test cases.

Each test case consists of one line contains three integers:

- N : The number of sides of the polygon in the sieve ($3 \leq N \leq 100$)
- S : The side length of the polygon in the sieve ($1 \leq S \leq 1,000,000$)
- R : The radius of your brain ($1 \leq R \leq 1,000,000$)

Standard Output

For each test case, print a single line containing the probability that your brain will be sliced, rounded to four decimal places.

Sample Input	Sample Output
2	0.0205
82 875072 117331	0.1952
50 475634 389028	

Note

A regular polygon is a polygon that is equiangular (all angles are equal in measure) and equilateral (all sides have the same length)

Problem D: NASA (Orange balloon)

After NASA discovered water on Mars, they decided to expand their exploration hoping to find some alien intelligence on the planet. After months of exploration, they were actually surprised to find out that the planet has been inhabited by minions.

NASA started communications with the minions and the first message they received was Mo amo Banana. At first, it was really hard to decipher the message but after sometime they managed to workout a dictionary that maps English words to Minionese words. You are going to help NASA build the translator to ease their communication with Minions for the good and prosperity of mankind and minionkind.

Standard Input

The first line of input will contain a single integer N , the number of words in the dictionary ($1 \leq N \leq 100$). The following N lines will each contain a sentence of the format $x=y$ where x is an English word and y is a Minionese word. The next line will contain an integer T , the number of test cases ($1 \leq T \leq 100$). Each test case will start with a line containing an integer K , the number of words in the sentence ($1 \leq K \leq 100$) and the next line will contain K space separated English words. All the English words in the test cases exist in the defined dictionary. Also, all the words consist only of English alphabet, and will be at most 20 characters long.

Standard Output

For each test case, print a single line containing the space separated Minionese words after translation.

Sample Input	Sample Output
<pre>4 I = mo love = amo icecream = gelatooo banana = banana 2 3 I love banana 3 I love icecream</pre>	<pre>mo amo banana mo amo gelatooo</pre>

Problem E: Quiz **(Purple balloon)**

The minions have finally found their new master. This time, he is a Math professor and he is trying very hard to teach them math. He has been teaching them bitwise operators for over a year! They learnt about AND (&) and OR (|) operators and it is time for a quiz to test them.

The quiz is very simple, they will be given a number A of AND (&) operators, a number B of OR (|) operators and (A + B + 1) integers. They have to find the maximum number that can be obtained by inserting the & and | operators between the given nonnegative integers without changing their order.

Finally, there is a special requirement for this quiz, they are required to evaluate the operators from left to right.

Standard Input

The first line of the input will be a single integer T, the number of test cases ($1 \leq T \leq 100$), followed by T test cases.

Each test case will consist of 2 lines. The first line will contain 2 integers A and B ($0 \leq A, B \leq 10,000$) representing the number of AND (&) and OR (|) operators, respectively. The second line of input will consist of (A + B + 1) 64-bit nonnegative integers separated by single spaces.

Standard Output

For each test case, output a single line containing the maximum number that can be obtained by inserting the operators between the given integers.

Sample Input	Sample Output
2 1 1 1 4 5 2 2 2 3 11 4 5	5 7