



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

In the zoo there are N cages in which we keep N snakes: each snake in its cage. For experimental reasons, in a month we will move each snake to a different cage: this reordering is given in the input.

Each cage is illuminated by special light, which may be of type A, type B or type C. Your task is to assign the lights A, B, C to the cages so that:

- 1) each snake will change its lighting, i.e. it will be moved to the cage illuminated differently from the cage it currently inhabits;
- 2) lightings are equally distributed, i.e. the number of cages A, the number of cages B and the number of cages C differ by at most one.

Input

The first line contains an integer N ($2 \leq N \leq 300\,000$), the number of snakes and cages. Cages are numbered from 1 to N .

Each of the next N lines contains an integer. When K -th of these lines contains the number L , it means that the snake from the cage K will be moved to the cage L ($K \neq L$). Two snakes will not move to the same cage.

Output

Print the string composed of the characters A, B and C, such that the K -th character denotes the lighting of the cage K .

If there are multiple solutions, print **any**.

Example

Input:

4
4
3
2
1

Output:

ACBC

QUESTION – 2

It is 2048, and a Martian robot called SSH3 wants to win galactical wars, as he does every year. He has been chosen to participate in the prestigious Sword Game, possibly the last one to ever happen. This is the format of the Sword Game.

Every sword has a name S which is a string of n characters from a-z. The strength of the sword is decided in the following way.

Define a function $f(l_1, l_2)$ for every $1 \leq l_1, l_2 \leq n$. Find all the substrings of the sword name S with length l_1 . Then, ind_1 is the index such that it is the lexicographically smallest among these l_1 length substrings. (If there are multiple such substrings, then we consider the **lower** index). Similarly, ind_2 is defined. Then, $f(l_1, l_2) = |ind_1 - ind_2|$. (All indices are 0-based)

Strength (S) = (Expected Value (f)), over all l_1, l_2 .

As a Martian, SSH3 is also expected to be very good at Maths. He is asked to find out the strength of the sword. But as all other Martians, he has come from the city of Quoda, where everybody is pathetic at Maths. Hence, he asks you to help him. Output the value of $n^2 * \text{Strength}(S)$.

Input:

First line contains the integer n .

Second line contains the name of the sword S .

Output:

A single line containing an **Integer**, that is the value of $n^2 * \text{Strength}(S)$.

Constraints:

$1 \leq n \leq 100000$

S contains exactly n characters from 'a' to 'z'.

Time Limit: 8 seconds.

Examples:

Input:

2
ab

Output:

0

QUESTION – 3

In the Galactical Wars happens the great event of designing a structure to honour the current generation of participants. (It is another matter that inevitably the monument is destroyed at the end of the Galactical Wars).

The organizers this year do not believe that this is a good event, and have reduced the event to building a right structure : a **right-angled** triangle that represents the geometry of the universe. Further they have given a specific **Odd Integer** n , which they want one of the **Shorter** sides of the triangle to be.

The organizers in the galaxy H2 are infuriated with this high-handedness. To demonstrate their prowess in this event, they have decided to build all possible right structures. Calculate how many different right structures they can possibly build.

Input:

First line contains a single integer T , denoting the number of Test Cases.

T lines follow, each containing an odd integer ' n ' denoting the given size of a side.

Output:

T lines, each containing a single integer denoting the number of ways to form a right angled triangle with one of the smaller sides as ' n '.

Constraints:

$1 \leq T \leq 10$

$1 \leq n \leq 10^{12}$

n is odd.

Time Limit: 1 seconds.

Example:

Input:

1

3

Output:

1

Explanation:

There exists only 1 right angled triangle with sides 3,4,5.

Input:

First line contains a single integer T , denoting the number of Test Cases.

T lines follow, each containing an odd integer ' n ' denoting the given size of a side.

Output:

T lines, each containing a single integer denoting the number of ways to form a right angled triangle with one of the smaller sides as 'n'.

Constraints:

$$1 \leq T \leq 10$$

$$1 \leq n \leq 10^{12}$$

n is odd.

Time Limit: 1 seconds.

Example:

Input:

1

3

Output:

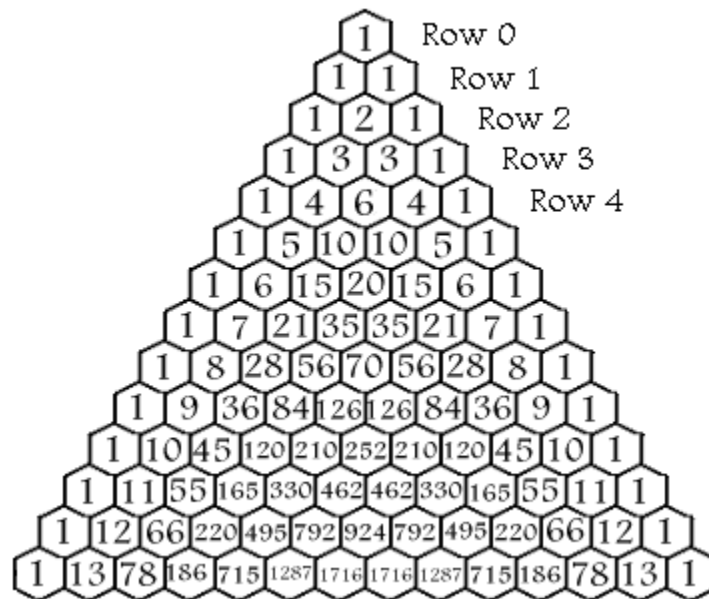
1

QUESTION – 4

Pika and Dukkar are roomie. Pika is a nerd and likes to play with mathematics! Pika's favourite topic is pascal triangle and he proclaims that he can solve any problem related to this. So Dukkar decides if it's really true!

Dukkar gives a number N and a prime number P. N is the Nth row of pascal triangle starting with 0. Dukkar asks Pika to find how many numbers in nth row are divisible by P. Since the number

can be very large so, Pika has to write a program. Since end sem are coming and Pika has to top in his batch so he asks you for help. Can you help Pika?



Input

The first line of the test file will contain T ($T < 100000$) where T is the no. of test cases. Each of the next T lines will contain two integers N ($0 \leq N \leq 10^{18}$) and P ($2 \leq P \leq 10^5$) as defined above.

Output

For each test case print on each line K the number of numbers divisible by P on N th row of the pascal triangle.

Example

Input:

2

2 2

7 7

Output:

1

6

QUESTION – 5

Gopu is playing with fishes, He likes playing them very much because they are lovely creatures. There are n fishes, All the n fishes are kept in n aquariums. Each fish is kept in different aquarium.

While he is playing with them, there comes a magic instant in his play. At that instant, fish in aquarium i can go to aquarium j with probability $p[i][j]$. At this magic instant, all the fishes go to aquariums according to their probabilities.

Now there is a slight issue in this, If more than one fishes land on the same aquarium, Then they can not survive because of lack of space. You have to find the probability that none of Gopu's fishes dies, otherwise he would be very sad.

Please help our little Gopu so that he could keep playing with his fishes :)

Input

First line contains number of test cases : T ($1 \leq T \leq 1000$)

Next line contains n : number of fishes ($1 \leq n \leq 15$).

For next n lines, each line contains n space seperated real numbers. In line i , j th number is $p[i][j]$. $p[i][j]$ is precise upto 6 decimal digits.

Output

For each test case, print the probability that none of Gopu's fishes dies. (probability is a real number and it should not have error more than $1e-6$), That is your answer should be correct upto 6 decimal digits.

Example

Input :

```
2
2
1 0
0 1
2
0.5 0.5
0.5 0.5
```

Output :

```
1.000000
0.500000
```