CODEFORCES $^\beta$
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acmASCIS Contest#1

A. Firas and the Prime Numbers

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Firas and Nour's teacher gave them a sequence of numbers. They will compete for who will find out first if the i-th number in the sequence is prime or not, but Firas needs your help to win.

Could you help him by writing a program that differentiates between prime numbers and non-prime numbers?

Input
The first line of the input consists one integer, T (1 ≤ T ≤ 1000), which indicates the number of test cases, or the number of numbers in the sequence.

For each test case, there is a single line consisting of one integer N (2 ≤ N ≤ 1000).

Output
For each test case write "Prime Number" if the number is prime and "Not Prime Number" if it is not.

Sample test(s)

input
3
5
60
97

output
Prime Number
Not Prime Number
Prime Number

Note
A prime number is a number which is divisible by 1 and itself only.

B. Leap Year

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

A leap year is a year containing an extra day. It has 366 days instead of the normal 365 days. The extra day is added in February, which has 29 days instead of the normal 28 days.

Leap year is the year that is divisible by 4, but if the year is divisible by 100 it must also be divisible by 400 to be a leap year.

Ayman is interested in leap years. He was asked to find out whether year A is a leap year or not . He asked for your help to answer the question.

Input
The input consists of one integer A, $(0 < A \leq 10^{18})$.

Output
Print a line containing "YES" (without the double quotes), if A is a leap year. Otherwise, print "NO" (without the double quotes).

Sample test(s)

input
2012

output
YES

C. Matrices

time limit per test: 1 second
memory limit per test: 20 megabytes
input: standard input
output: standard output

Given integer N you have to output N rows. Each row contains N elements in such a way that makes all elements of each diagonal - having a negative value for its slope - have the same value as the number of elements in the same diagonal.

A diagonal is a sloping line that is a segment joining two nonconsecutive vertices of a polygon.
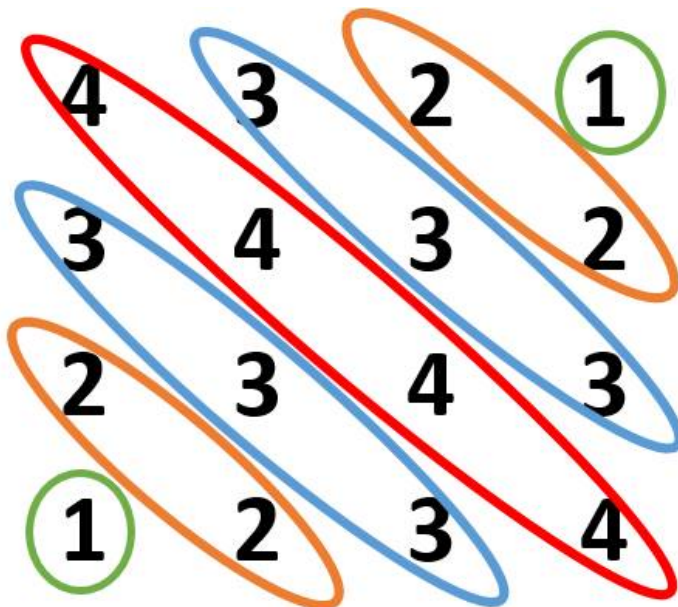
Input

The input consists of one integer N (1 ≤ N ≤ 1000).

Output

The output contains N lines. Each line contains N numbers that are the answer to the problem.

Sample test(s)

input
1
output
1

input
2
output
2 1 1 2

input
3
output
3 2 1 2 3 2 1 2 3

input
4
output

```
4 3 2 1
3 4 3 2
2 3 4 3
1 2 3 4
```

D. Cubic

time limit per test: 0.25 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Hercule Poirot - Agatha Christie's famous detective - is in love with cubes. He thinks cubes are the perfect geometric shapes. He lives in a cubic house, writes on cubic papers and so on. He even dreams of the day the world will see cubic eggs. Hercule loves cubic numbers as well. Given a number n, your task is to help him check if the number n is cubic or not.

Input
The input consists of a single integer N ($1 \leq N \leq 2^{31}-1$), which is the number to be checked.

Output
If the number is cubic, print "Yes". If not, print "No".

Sample test(s)

input
8

output
Yes

input
127

output
No

E. Equations

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Ahmed hates math. His teacher gave him a problem which he should solve. Because he doesn't like to lose points, he asked you to help him solve the problem.

The problem is: You have two equations, (A1 * X + B1 * Y = C1) and (A2 * X + B2 * Y = C2). Given the values of A1, B1, C1, A2, B2 and C2, help Ahmed find the values of X and Y.

Input
The first line contains three space-separated integers: A1, B1 and C1 respectively. The second line contains three space-separated integers: A2, B2 and C2 respectively. [-2^{32} < A1, B1, C1, A2, B2, C2 < 2^{32}].

Output
Print a line containing the values of X and Y, respectively, rounded to 2 digits after the decimal point , if there is exactly one solution. Otherwise print "-1" (without the double quotes).

Sample test(s)

input
1 1 2 1 2 3
output
1.00 1.00

input
3 5 21 4 3 17
output
2.00 3.00

input
2 5 23 8 1 54
output
6.50 2.00

F. Shafiq and the Taxi Fare

<div align="center">
time limit per test: 1 second

memory limit per test: 64 megabytes

input: standard input

output: standard output
</div>

Shafiq is a student in FCIS (or the so called "El-Ma7rosa") in Egypt. Now in Egypt, everything is possible, literally nothing is impossible, specifically in Cairo. One of the things that you won't find in any city in the world (except in Cairo), is a taxi whose fare depends on the current date. For example, if today is the first of November then the fare is 1 pound only and if today is the 30th of November then the fare is 30 pounds.

Shafiq is a lazy student. He goes to the college only to meet his friends and eat from that restaurant called "Mido" (don't try eating there). Also, he doesn't go everyday. He chooses the number of days he'll go to the college depending on the current month. For example, if the current month is November then he'll go 11 days and if it is February he'll go 2 days.

Shafiq isn't only a lazy student but he also can't add anything even if it was 1+1, so he asked for your help. Shafiq wants you to write a program that can help him calculate the taxi fare he should pay throughout the month. He will input the current month followed by the days he will go to the college and you should output the total of the taxi fares he will pay in that month.

Input
On the first line, Shafiq will enter the current month m ($1 \le m \le 12$), followed by one line consisting of m days. Each day d ($1 \le d \le 30$) refers to a day he will go to the college in.

Output
Your program should calculate the total fare f he will pay throughout the month ($1 \le f \le 294$).

Sample test(s)

input
1 30
output
30

input
7 2 6 7 12 15 18 20
output
80

G. Solution Set

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

You have been given an assignment but you are too lazy to do it, so you will write a program to do it for you.

Your program is meant to find all the possible solutions for the following equation: $a^2 + b^2 + c^2 = d$ such that a, b, c and d are all non-negative integers.

Input
You will be given an integer d. $(0 \leq d \leq 10^5)$

Output
Print all the possible solutions for a, b and c, sorted lexicographically. (See the notes for more explanation.)

If there is no solution, print -1.

Sample test(s)

input
1

output
0 0 1 0 1 0 1 0 0

input
6

output
1 1 2 1 2 1 2 1 1

Note
Lexicographical order: http://en.wikipedia.org/wiki/Lexicographical_order

H. What's Next?

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Emma loves sequences, especially the simple ones. She picked two random numbers, a and b. She wonders what the next number in the progression is, that will form an arithmetic sequence.

Given the first two random numbers that Emma picked, find what is next.

Input
You will be given the first two numbers a and b, $(1 \le a, b \le 100)$.

Output
Print the number that is next in the progression.

Sample test(s)

input
1 2
output
3

input
3 6
output
9

Note
In mathematics, an arithmetic progression (AP) or arithmetic sequence is a sequence of numbers such that the difference between the consecutive terms is constant. For instance, the sequence 5, 7, 9, 11, 13, 15 … is an arithmetic progression with common difference of 2.

I. Reversed Factorial

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

We all know that Fact(N) = N*(N-1)*(N-2)*...*3*2*1.

Given Fact(N), find N.

Input

You will be given Fact(N) (2 ≤ Fact(N) ≤ 10^{18}).

Output

Your program should print one line containing the value of N.

Sample test(s)

input
120

output
5

J. Breaking Buckets

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Walter White is a Meth cooker who's working under the alias of Heisenberg. Walter makes the best Meth in the world. He cooks meth for his employer Gustavo Fring, who owns a fast food franchise, called Los Pollos Hermanos, that sells fried chicken.

First, Walter hides the bags of meth inside the chicken buckets. Then, the cargo of chicken buckets goes to a hidden base that takes out the meth bags and then sends the buckets to the restaurants of Los Pollos Hermanos. But Gustavo's dealers always lose track of which bucket has the bags and which bucket just contains chicken.

So Heisenberg came up with a way to end the confusion. Suppose we have N bucket of chicken numbered from 1 to N. The buckets that contain the Crystal Meth bags are the buckets with numbers that are the divisors of N starting from 1 to N-1. For example, imagine there are 12 buckets. Then, using the previously mentioned method, the buckets with the Meth in them are 1,2,3,4 and 6, and all the other buckets are empty and clean. Can you help Gustavo find out which bucket has his Meth and which doesn't?

Input

The input consists of a single integer N ($1 \leq N \leq 10^5$), which denotes the number of buckets that are to be delivered to Gustavo's Meth distribution secret place.

Output

For each test case, print two lines.

The first line contains the number of each bucket, in ascending order, separated by white spaces. On the second line, print the total number of buckets that contain meth bags.

Sample test(s)

input
453

output
1 3 151 3

input
12

| output |
| --- |
| 1 2 3 4 6
5 |

K. Afifi's Will

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Finally, all the family members are gathered around their grandfather, Afifi, as per his wishes. He wants to tell them how to open the safe to be able to get his will from it after he dies.

The safe consists of 8 cells numbered from 1 to 8 as shown in the figure. It's possible to move its rotary dialer to the right or to the left.

To open the safe, the password depends on the shortest path between each cell and the other. After moving to any cell, a tick is heard. As one of the family members, you are to write a program that can help your family members with this process.

Figure
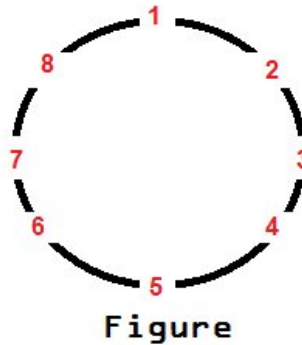
Input

The input consists of 3 lines:

The first line indicates the number of test cases 'T' (T ≤ 100).

The second line indicates the number of password digits 'N' ($2 \le N \le 15$).

The third line consists of N space-separated numbers, which represent each digit of the password 'M'($1 \le M \le 8$).

Output

For each test case, print the number of the password (as shown in the sample outputs), followed by the number of ticks that can be heard from moving the rotary dialer from one cell to another, using the shortest path.

Sample test(s)

input
3 3 1 3 5 4 2 5 7 8 2 1 2

output
Password #1 Gives: 4 Ticks. Password #2 Gives: 6 Ticks. Password #3 Gives: 1 Tick.

Note

1- The rotary dialer starts from the first given digit in 'M', not necessarily from 1. For example, like in case 2.

2- In the first case, when the rotary dialer moves from cell 1 to cell 3, 2 ticks will be heard. After moving from cell 3 to cell 5, another 2 ticks will be heard. So, the total number of ticks is 4.

L. Apples

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Our friend Koko's mom asked him to buy her a bag of apples from the market that does not weigh less than N kilos.

When Koko went to the market he only found one bag of fruits that weighs M kilos.

Should he buy the bag?

Input
Input consists of two integers N and M (1 ≤ N, M ≤ 10).

Output
Output "YES" if he should buy the bag and "NO" otherwise.

Sample test(s)

input
5 6
output
YES

input
5 4
output
NO

Note
"An apple a day keeps the doctor away."