Codeforces Round #228 (Div. 2)

A. Fox and Number Game

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel is playing a game with numbers now.

Ciel has n positive integers: $x_1, x_2, ..., x_n$. She can do the following operation as many times as needed: select two different indexes i and j such that $x_i > x_j$ hold, and then apply assignment $x_i = x_i - x_j$. The goal is to make the sum of all numbers as small as possible.

Please help Ciel to find this minimal sum.

Input
The first line contains an integer n ($2 \le n \le 100$). Then the second line contains n integers: $x_1, x_2, ..., x_n$ ($1 \le x_i \le 100$).

Output
Output a single integer — the required minimal sum.

Examples

input
2 1 2
output
2

input
3 2 4 6
output
6

input
2 12 18
output
12

input
5 45 12 27 30 18
output
15

Note
In the first example the optimal way is to do the assignment: $x_2 = x_2 - x_1$.

In the second example the optimal sequence of operations is: $x_3 = x_3 - x_2$, $x_2 = x_2 - x_1$.

B. Fox and Cross

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel has a board with n rows and n columns. So, the board consists of $n \times n$ cells. Each cell contains either a symbol '.', or a symbol '#'.

A cross on the board is a connected set of exactly five cells of the board that looks like a cross. The picture below shows how it looks.

Ciel wants to draw several (may be zero) crosses on the board. Each cross must cover exactly five cells with symbols '#', and any cell with symbol '#' must belong to some cross. No two crosses can share a cell.

Please, tell Ciel if she can draw the crosses in the described way.

Input

The first line contains an integer n ($3 \le n \le 100$) — the size of the board.

Each of the next n lines describes one row of the board. The i-th line describes the i-th row of the board and consists of n characters. Each character is either a symbol '.', or a symbol '#'.

Output

Output a single line with "YES" if Ciel can draw the crosses in the described way. Otherwise output a single line with "NO".

Examples

input
5 .#... ####. .#### ...#. .....
output
YES

input
4 #### #### #### ####
output
NO

input
6 .#.... ####.. .####. .#.##. ###### .#..#.
output
YES

input
6 .#..#. ###### .####. .####. ###### .#..#.
output
NO

input
3

```
...
...
...
```

output

```
YES
```

Note

In example 1, you can draw two crosses. The picture below shows what they look like.

In example 2, the board contains 16 cells with '#', but each cross contains 5. Since 16 is not a multiple of 5, so it's impossible to cover all.

C. Fox and Box Accumulation

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel has n boxes in her room. They have the same size and weight, but they might have different strength. The i-th box can hold at most x_i boxes on its top (we'll call x_i the strength of the box).

Since all the boxes have the same size, Ciel cannot put more than one box directly on the top of some box. For example, imagine Ciel has three boxes: the first has strength 2, the second has strength 1 and the third has strength 1. She cannot put the second and the third box simultaneously directly on the top of the first one. But she can put the second box directly on the top of the first one, and then the third box directly on the top of the second one. We will call such a construction of boxes a *pile*.

Fox Ciel wants to construct piles from all the boxes. Each pile will contain some boxes from top to bottom, and there cannot be more than x_i boxes on the top of i-th box. What is the minimal number of piles she needs to construct?

Input

The first line contains an integer n ($1 \le n \le 100$). The next line contains n integers $x_1, x_2, \ldots, x_n$ ($0 \le x_i \le 100$).

Output

Output a single integer — the minimal possible number of piles.

Examples

input
3 0 0 10
output
2

input
5 0 1 2 3 4
output
1

input
4 0 0 0 0
output
4

input
9 0 1 0 2 0 1 1 2 10
output
3

Note

In example 1, one optimal way is to build 2 piles: the first pile contains boxes 1 and 3 (from top to bottom), the second pile contains only box 2.

In example 2, we can build only 1 pile that contains boxes 1, 2, 3, 4, 5 (from top to bottom).

D. Fox and Minimal path

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel wants to write a task for a programming contest. The task is: "You are given a simple undirected graph with n vertexes. Each its edge has unit length. You should calculate the number of shortest paths between vertex 1 and vertex 2."

Same with some writers, she wants to make an example with some certain output: for example, her birthday or the number of her boyfriend. Can you help her to make a test case with answer equal exactly to k?

Input

The first line contains a single integer k ($1 \le k \le 10^9$).

Output

You should output a graph G with n vertexes ($2 \le n \le 1000$). There must be exactly k shortest paths between vertex 1 and vertex 2 of the graph.

The first line must contain an integer n. Then adjacency matrix G with n rows and n columns must follow. Each element of the matrix must be 'N' or 'Y'. If G_{ij} is 'Y', then graph G has a edge connecting vertex i and vertex j. Consider the graph vertexes are numbered from 1 to n.

The graph must be undirected and simple: G_{ii} = 'N' and $G_{ij} = G_{ji}$ must hold. And there must be at least one path between vertex 1 and vertex 2. It's guaranteed that the answer exists. If there multiple correct answers, you can output any of them.

Examples

input
2

output
4 NNYY NNYY YYNN YYNN

input
9

output
8 NNYYYNNN NNNNNYYY YNNNNYYY YNNNNYYY YNNNNYYY NYYYYNNN NYYYYNNN NYYYYNNN

input
1

output
2 NY YN

Note

In first example, there are 2 shortest paths: 1-3-2 and 1-4-2.

In second example, there are 9 shortest paths: 1-3-6-2, 1-3-7-2, 1-3-8-2, 1-4-6-2, 1-4-7-2, 1-4-8-2, 1-5-6-2, 1-5-7-2, 1-5-8-2.

E. Fox and Card Game

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel is playing a card game with her friend Fox Jiro. There are n piles of cards on the table. And there is a positive integer on each card.

The players take turns and Ciel takes the first turn. In Ciel's turn she takes a card from the top of any non-empty pile, and in Jiro's turn he takes a card from the bottom of any non-empty pile. Each player wants to maximize the total sum of the cards he took. The game ends when all piles become empty.

Suppose Ciel and Jiro play optimally, what is the score of the game?

Input

The first line contain an integer n ($1 \le n \le 100$). Each of the next n lines contains a description of the pile: the first integer in the line is s_i ($1 \le s_i \le 100$) — the number of cards in the i-th pile; then follow s_i positive integers $c_1, c_2, ..., c_k, ..., c_{s_i}$ ($1 \le c_k \le 1000$) — the sequence of the numbers on the cards listed from top of the current pile to bottom of the pile.

Output

Print two integers: the sum of Ciel's cards and the sum of Jiro's cards if they play optimally.

Examples

input
2 1 100 2 1 10
output
101 10

input
1 9 2 8 6 5 9 4 7 1 3
output
30 15

input
3 3 1 3 2 3 5 4 6 2 8 7
output
18 18

input
3 3 1000 1000 1000 6 1000 1000 1000 1000 1000 1000 5 1000 1000 1000 1000 1000
output
7000 7000

Note

In the first example, Ciel will take the cards with number 100 and 1, Jiro will take the card with number 10.

In the second example, Ciel will take cards with numbers 2, 8, 6, 5, 9 and Jiro will take cards with numbers 4, 7, 1, 3.