

Problem E. Odd-even

Input file: `oddeven.in`
Output file: `oddeven.out`
Time limit: 2 seconds
Memory limit: 256 megabytes
Detailed Feedback: full

You are given an increasing sequence of positive integers 1, 2, 4, 5, 7, 9, 10, 12, 14, 16, 17, ... It is formed by taking one odd integer, then two even integers, then three odd integers and so on. Output N -th element of this sequence.

Input

One positive integer N ($1 \leq N \leq 10^{100}$).

Output

Output one integer N -th element of the sequence.

Examples

<code>oddeven.in</code>	<code>oddeven.out</code>
1	1
4	5

50% of tests contain $N \leq 10^{18}$.

Problem F. Skyline

Input file: `skyline.in`
Output file: `skyline.out`
Time limit: 2 seconds
Memory limit: 256 megabytes
Detailed Feedback: none

You want to have in your city a beautiful skyline. You have decided to build N skyscrapers in a straight row. The i -th of them should have exactly $h[i]$ floors.

You have got offers from different construction companies. One of them offers to build one floor in any of the skyscrapers for 3 Million Euros. The other one offers to build one floor in each of two neighbouring skyscrapers for 5 Millions in total. Note that it doesn't matter whether these floors are on the same height or not. The third one can build one floor in each of three consecutive skyscrapers for only 7 Millions.

You can build the floors in any order you want. Calculate the minimal possible total amount of money needed to finish the construction.

Input

The first line contains integer number N ($1 \leq N \leq 300$). The second line contains space separated N integer numbers, $h[1], h[2], \dots, h[N]$, $1 \leq h[i] \leq 200$.

Output

Output one integer number: the amount of money, in Millions.

Examples

skyline.in	skyline.out
3 2 2 2	14
4 1 3 1 1	15

Problem G. Collider

Input file: `collider.in`
Output file: `collider.out`
Time limit: 2 seconds
Memory limit: 256 megabytes
Detailed Feedback: none

Physicians are investigating particles of three types: x , y and z . They load a numbered row of n particles into collider. During the experiment an exposure on a concrete particle is having place, after which the particle disappears from i -th position of the row and instantly appears on position j . After disappearance of the particle numbers of particles to the right are decreased by 1 and after the appearance number of particles to the right of that place are increased by 1. After a number of exposures scientists want to know, which particle is on place k . Write program, which will help them.

Input

The first line of the input file contains two integer number: n — number of particles and m — total number of exposures and queries ($1 \leq n \leq 1000000$, $1 \leq m \leq 15000$).

In the second line there is a sequence of characters x , y and z of length n . Each of the next m lines contains exposure or query description. Line, containing an exposure, starts with character a and space and contains two integer number from interval $[1; n]$. First number is start position of the particle during the exposure and the second one is finish position. Line, describing a query, starts with character q and space and contains one number from interval $[1; n]$ — position, which scientists are interested in.

Output

Output one line for each question from input file. Line number i must contain the answer to the question i — name of the corresponding particle x , y or z .

Examples

<code>collider.in</code>	<code>collider.out</code>
15 6 xxxyyzzxxzyzyx a 2 10 a 15 4 q 3 a 12 2 q 14 q 2	y z y

Note. Sequence after the first exposure — `xxxyyzzxxzyzyx`, after the second — `xxxyyzzxxzyzyzy`, after the third — `xyxyyzzxxzyzy`.

Problem H. K-th path

Input file: `kthpath.in`
Output file: `kthpath.out`
Time limit: 2 seconds
Memory limit: 256 megabytes
Detailed Feedback: none

Suppose you have a table of N rows and M columns. Each cell of the table contains a single lowercase english letter. Consider any path from the top-left to the bottom-right cell of the table, if you are only allowed to move right and down. Letters in the cells met along the path form a string. This string is said to be the value of the path. Now consider all such possible paths and sort them by their values in alphabetical order. Your task is to find the value of the K -th path in this sorted list.

Input

The first line of the input file contains two integer numbers N — the number of rows and M — the number of columns of the given table ($1 \leq N, M \leq 30$). Each of the next N lines contains exactly M lowercase english letters. The last line of the input file contains a single integer K ($1 \leq K \leq 10^{18}$). It is guaranteed that the answer exists for the given K .

Output

The first and only line of the output file must contain a single string — the answer to the problem.

Examples

<code>kthpath.in</code>	<code>kthpath.out</code>
3 4 abcd efdg hijk 4	abfdgk

abcdgk, abcdgk, abcdjk, abfdgk, abfdjk, abfijk, aefdgk, aefdjk, aefijk, aehijk