

Codeforces Round #186 (Div. 2)**A. Ilya and Bank Account**

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Ilya is a very clever lion, he lives in an unusual city ZooVille. In this city all the animals have their rights and obligations. Moreover, they even have their own bank accounts. The state of a bank account is an integer. The state of a bank account can be a negative number. This means that the owner of the account owes the bank money.

Ilya the Lion has recently had a birthday, so he got a lot of gifts. One of them (the gift of the main ZooVille bank) is the opportunity to delete the last digit or the digit before last from the state of his bank account no more than once. For example, if the state of Ilya's bank account is -123, then Ilya can delete the last digit and get his account balance equal to -12, also he can remove its digit before last and get the account balance equal to -13. Of course, Ilya is permitted not to use the opportunity to delete a digit from the balance.

Ilya is not very good at math, and that's why he asks you to help him maximize his bank account. Find the maximum state of the bank account that can be obtained using the bank's gift.

Input

The single line contains integer n ($10 \leq |n| \leq 10^9$) — the state of Ilya's bank account.

Output

In a single line print an integer — the maximum state of the bank account that Ilya can get.

Sample test(s)

input
2230
output
2230
input
-10
output
0
input
-100003
output
-10000

Note

In the first test sample Ilya doesn't profit from using the present.

In the second test sample you can delete digit 1 and get the state of the account equal to 0.

B. Ilya and Queries

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Ilya the Lion wants to help all his friends with passing exams. They need to solve the following problem to pass the IT exam.

You've got string $s = s_1s_2\dots s_n$ (n is the length of the string), consisting only of characters ".", "#", and " ". Each query is described by a pair of integers l_i, r_i ($1 \leq l_i < r_i \leq n$). The answer to the query l_i, r_i is the number of such integers i ($l_i \leq i < r_i$), that $s_i = s_{i+1}$.

Ilya the Lion wants to help his friends but is there anyone to help him? Help Ilya, solve the problem.

Input

The first line contains string s of length n ($2 \leq n \leq 10^5$). It is guaranteed that the given string only consists of characters ".", "#", and " ".

The next line contains integer m ($1 \leq m \leq 10^5$) — the number of queries. Each of the next m lines contains the description of the corresponding query. The i -th line contains integers l_i, r_i ($1 \leq l_i < r_i \leq n$).

Output

Print m integers — the answers to the queries in the order in which they are given in the input.

Sample test(s)

input
<pre>..... 4 3 4 2 3 1 6 2 6</pre>
output
<pre>1 1 5 4</pre>
input
<pre>#...### 5 1 3 5 6 1 5 3 6 3 4</pre>
output
<pre>1 1 2 2 0</pre>

C. Ilya and Matrix

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Ilya is a very good-natured lion. He likes maths. Of all mathematical objects, his favourite one is matrices. Now he's faced a complicated matrix problem he needs to solve.

He's got a square $2^n \times 2^n$ -sized matrix and 4^n integers. You need to arrange all these numbers in the matrix (put each number in a single individual cell) so that the *beauty* of the resulting matrix with numbers is maximum.

The *beauty* of a $2^n \times 2^n$ -sized matrix is an integer, obtained by the following algorithm:

1. Find the maximum element in the matrix. Let's denote it as m .
2. If $n = 0$, then the beauty of the matrix equals m . Otherwise, a matrix can be split into 4 non-intersecting $2^{n-1} \times 2^{n-1}$ -sized submatrices, then the beauty of the matrix equals the sum of number m and other four beauties of the described submatrices.

As you can see, the algorithm is recursive.

Help Ilya, solve the problem and print the resulting maximum beauty of the matrix.

Input

The first line contains integer 4^n ($1 \leq 4^n \leq 2 \cdot 10^6$). The next line contains 4^n integers a_i ($1 \leq a_i \leq 10^9$) — the numbers you need to arrange in the $2^n \times 2^n$ -sized matrix.

Output

On a single line print the maximum value of the beauty of the described matrix.

Please, do not use the `%lld` specifier to read or write 64-bit integers in C++. It is preferred to use the `cin`, `cout` streams or the `%I64d` specifier.

Sample test(s)

input
1 13
output
13

input
4 1 2 3 4
output
14

Note

Consider the second sample. You need to arrange the numbers in the matrix as follows:

1 2
3 4

Then the beauty of the matrix will equal: $4 + 1 + 2 + 3 + 4 = 14$.

D. Ilya and Roads

time limit per test: 3 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Everything is great about Ilya's city, except the roads. The thing is, the only ZooVille road is represented as n holes in a row. We will consider the holes numbered from 1 to n , from left to right.

Ilya is really keep on helping his city. So, he wants to fix at least k holes (perharps he can fix more) on a single ZooVille road.

The city has m building companies, the i -th company needs c_i money units to fix a road segment containing holes with numbers of at least l_i and at most r_i . The companies in ZooVille are very greedy, so, if they fix a segment containing some already fixed holes, they do not decrease the price for fixing the segment.

Determine the minimum money Ilya will need to fix at least k holes.

Input

The first line contains three integers n, m, k ($1 \leq n \leq 300, 1 \leq m \leq 10^5, 1 \leq k \leq n$). The next m lines contain the companies' description. The i -th line contains three integers l_i, r_i, c_i ($1 \leq l_i \leq r_i \leq n, 1 \leq c_i \leq 10^9$).

Output

Print a single integer — the minimum money Ilya needs to fix at least k holes.

If it is impossible to fix at least k holes, print -1 .

Please, do not use the `%lld` specifier to read or write 64-bit integers in C++. It is preferred to use the `cin, cout` streams or the `%I64d` specifier.

Sample test(s)

input
10 4 6 7 9 11 6 9 13 7 7 7 3 5 6
output
17
input
10 7 1 3 4 15 8 9 8 5 6 8 9 10 6 1 4 2 1 4 10 8 10 13
output
2
input
10 1 9 5 10 14
output
-1

E. Ilya and Two Numbers

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Ilya has recently taken up archaeology. He's recently found two numbers, written in the m -based notation. Each of the found numbers consisted of exactly n digits. Ilya immediately started looking for information about those numbers. He learned that the numbers are part of a cyphered code and the one who can decypher it can get the greatest treasure.

After considerable research Ilya understood that to decypher the code, he should do the following:

- Rearrange digits in the first number in some manner. Similarly, rearrange digits in the second number in some manner. As a result of this operation, the numbers can get leading zeroes.
- Add numbers, digit by digit, modulo m . In other words, we need to get the third number of length n , each digit of the number is the sum of the respective numbers of the found numbers. For example, suppose there are two numbers recorded in the ternary notation, 001210 and 012111, then if you add them to each other digit by digit modulo 3, you will get number 010021.
- The key to the code is the maximum possible number that can be obtained in the previous step.

Help Ilya, find the key to the code.

Input

The first line contains two integers n, m ($1 \leq n, m \leq 10^5, m > 1$). The second line contains the first found number, the third line contains the second found number.

The numbers are recorded as a sequence of digits in the m -based notation. Each digit is an integer from 0 to $m - 1$. The digits in the line are written in the order from the most significant digits to the least significant ones.

The given numbers can contain leading zeroes.

Output

Print n m -base digits. The resulting third number written in the m -based notation. Print the digits in the order from the most significant digits to the least significant ones.

Sample test(s)

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

input
5 5 2 4 4 1 3 1 0 1 2 4
output
4 4 4 3 2