RCC 2014 Warmup (Div. 2)

A. Elimination

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

The finalists of the "Russian Code Cup" competition in 2214 will be the participants who win in one of the elimination rounds.

The elimination rounds are divided into main and additional. Each of the main elimination rounds consists of c problems, the winners of the round are the first n people in the rating list. Each of the additional elimination rounds consists of d problems. The winner of the additional round is one person. Besides, k winners of the past finals are invited to the finals without elimination.

As a result of all elimination rounds at least $n \cdot m$ people should go to the finals. You need to organize elimination rounds in such a way, that at least $n \cdot m$ people go to the finals, and the total amount of used problems in all rounds is as small as possible.

Input
The first line contains two integers c and d ($1 \le c, d \le 100$) — the number of problems in the main and additional rounds, correspondingly. The second line contains two integers n and m ($1 \le n, m \le 100$). Finally, the third line contains an integer k ($1 \le k \le 100$) — the number of the pre-chosen winners.

Output
In the first line, print a single integer — the minimum number of problems the jury needs to prepare.

Examples

input
1 10 7 2 1
output
2

input
2 2 2 1 2
output
0

B. Crash

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

During the "Russian Code Cup" programming competition, the testing system stores all sent solutions for each participant. We know that many participants use random numbers in their programs and are often sent several solutions with the same source code to check.

Each participant is identified by some unique positive integer k, and each sent solution A is characterized by two numbers: x — the number of different solutions that are sent before the first solution identical to A, and k — the number of the participant, who is the author of the solution. Consequently, all identical solutions have the same x.

It is known that the data in the testing system are stored in the chronological order, that is, if the testing system has a solution with number x ($x > 0$) of the participant with number k, then the testing system has a solution with number $x - 1$ of the same participant stored somewhere before.

During the competition the checking system crashed, but then the data of the submissions of all participants have been restored. Now the jury wants to verify that the recovered data is in chronological order. Help the jury to do so.

Input

The first line of the input contains an integer n ($1 \le n \le 10^5$) — the number of solutions. Each of the following n lines contains two integers separated by space x and k ($0 \le x \le 10^5$; $1 \le k \le 10^5$) — the number of previous unique solutions and the identifier of the participant.

Output

A single line of the output should contain «YES» if the data is in chronological order, and «NO» otherwise.

Examples

input
2 0 1 1 1
output
YES

input
4 0 1 1 2 1 1 0 2
output
NO

input
4 0 1 1 1 0 1 0 2
output
YES

C. Football

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

One day, at the "Russian Code Cup" event it was decided to play football as an out of competition event. All participants was divided into n teams and played several matches, two teams could not play against each other more than once.

The appointed Judge was the most experienced member — Pavel. But since he was the wisest of all, he soon got bored of the game and fell asleep. Waking up, he discovered that the tournament is over and the teams want to know the results of all the matches.

Pavel didn't want anyone to discover about him sleeping and not keeping an eye on the results, so he decided to recover the results of all games. To do this, he asked all the teams and learned that the real winner was friendship, that is, each team beat the other teams exactly k times. Help Pavel come up with chronology of the tournir that meets all the conditions, or otherwise report that there is no such table.

Input

The first line contains two integers — n and k ($1 \le n, k \le 1000$).

Output

In the first line print an integer m — number of the played games. The following m lines should contain the information about all the matches, one match per line. The i-th line should contain two integers a_i and b_i ($1 \le a_i, b_i \le n$; $a_i \ne b_i$). The numbers a_i and b_i mean, that in the i-th match the team with number a_i won against the team with number b_i. You can assume, that the teams are numbered from 1 to n.

If a tournir that meets the conditions of the problem does not exist, then print -1.

Examples

input
3 1

output
3 1 2 2 3 3 1

D. Cunning Gena

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

A boy named Gena really wants to get to the "Russian Code Cup" finals, or at least get a t-shirt. But the offered problems are too complex, so he made an arrangement with his n friends that they will solve the problems for him.

The participants are offered m problems on the contest. For each friend, Gena knows what problems he can solve. But Gena's friends won't agree to help Gena for nothing: the i-th friend asks Gena x_i rubles for his help **in solving all the problems** he can. Also, the friend agreed to write a code for Gena only if Gena's computer is connected to at least k_i monitors, each monitor costs b rubles.

Gena is careful with money, so he wants to spend as little money as possible to solve all the problems. Help Gena, tell him how to spend the smallest possible amount of money. Initially, there's no monitors connected to Gena's computer.

Input

The first line contains three integers n, m and b ($1 \le n \le 100$; $1 \le m \le 20$; $1 \le b \le 10^9$) — the number of Gena's friends, the number of problems and the cost of a single monitor.

The following $2n$ lines describe the friends. Lines number $2i$ and $(2i + 1)$ contain the information about the i-th friend. The $2i$-th line contains three integers x_i, k_i and m_i ($1 \le x_i \le 10^9$; $1 \le k_i \le 10^9$; $1 \le m_i \le m$) — the desired amount of money, monitors and the number of problems the friend can solve. The $(2i + 1)$-th line contains m_i distinct positive integers — the numbers of problems that the i-th friend can solve. The problems are numbered from 1 to m.

Output

Print the minimum amount of money Gena needs to spend to solve all the problems. Or print -1, if this cannot be achieved.

Examples

input
2 2 1 100 1 1 2 100 2 1 1
output
202

input
3 2 5 100 1 1 1 100 1 1 2 200 1 2 1 2
output
205

input
1 2 1 1 1 1 1
output
-1

E. Square Table

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

While resting on the ship after the "Russian Code Cup" a boy named Misha invented an interesting game. He promised to give his quadrocopter to whoever will be the first one to make a rectangular table of size $n \times m$, consisting of positive integers such that the sum of the squares of numbers for each row and each column was also a square.

Since checking the correctness of the table manually is difficult, Misha asks you to make each number in the table to not exceed 10^8.

Input

The first line contains two integers n and m ($1 \le n, m \le 100$) — the size of the table.

Output

Print the table that meets the condition: n lines containing m integers, separated by spaces. If there are multiple possible answers, you are allowed to print anyone. It is guaranteed that there exists at least one correct answer.

Examples

input
1 1
output
1

input
1 2
output
3 4