Problem C. Cutting the Strip

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

You work on a factory and operate a paper cutting machine. This machine can take a strip of paper of any length and cut it in either 2 or 3 equal parts.

As a part of your daily routine you receive a paper strip of length n and a list of desired pieces' lengths you should make. The list consists of m pairs of integers c_i and l_i meaning the result of your work should contain exactly c_i paper strips of length l_i. The times are tough and none of your clients tolerate paper losses so the total length of all pieces equals n, i.e. $\sum_{i=1}^{m} l_i \cdot c_i = n$.

Determine whether it is possible to fulfill the order and design the list of instructions to do so.

Input

The first line of the input contains single integer n ($1 \le n \le 2^{62}$) — the length of the paper strip you are given at the beginning. It is guaranteed that $n = 2^a \cdot 3^b$ for some integer a and b.

The second line contains a single integer m ($1 \le m \le 700$) — the number of pairs that describe the resulting lengths.

Next follow m lines, the i-th of these lines contains two integers l_i and c_i ($1 \le l_i \le n$, $1 \le c_i \le n$). It is guaranteed that all l_i are distinct and that the total length of all pieces equals to n.

Output

If there is no way to fulfill the order print "`NO`" (without quotes) in the only line of the output.

Otherwise, print "`YES`" (without quotes) in the first line of the output. In the second line print the number of operations blocks k ($0 \le k \le 500\,000$). The print k lines containing blocks descriptions. Each description consists of three integers l_i, c_i and o_i ($1 \le l_i, c_i \le n$, $2 \le o_i \le 3$) and means one should use the cutting machine to take c_i paper strips of length l_i and cut each of them in o_i parts of equal length.

It is guaranteed that if the solution exists, there exists a solution that uses no more than 500 000 blocks of operations.

If there are several possible solutions, you are allowed to print any of them.

Examples

standard input	standard output
1 1 1 1	YES 0
6 2 2 2 1 2	YES 2 6 1 3 2 1 2
6 3 2 1 3 1 1 1	NO
6 2 5 1 1 1	NO

Note

In the second sample one cannot swap the order of operations blocks.