Goose Coins

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

The Goose Kingdom uses n types of goose coins as their national currency. The i-th type of goose coin has a value of c_i goose-dollars and a weight of w_i. For all i $(1 \leq i \leq n-1)$, c_{i+1} is a multiple of c_i and $c_i < c_{i+1}$.

You visited Goose Market and bought p goose-dollars worth of goods. You want to pay the exact price using exactly k goose coins. You have infinitely many coins of each type, so you don't have to worry about running out of coins.

Write a program to find the minimum and maximum possible total weights of k coins with total value of p goose-dollars. If there is no such set of coins, output -1.

Input

The first line contains three integers n, k, and p $(1 \leq n \leq 60, 1 \leq k \leq 10^3, 1 \leq p \leq 10^{18})$. n is the number of types of goose coins. k is the number of coins you have to use to make exactly p goose-dollars.

In the following n lines, the i-th line contains two integers c_i $(1 \leq c_i \leq 10^{18})$ and w_i $(1 \leq w_i \leq 10^{15})$, representing the value and the weight of the i-th type of goose coin.

For all i $(1 \leq i \leq n-1)$, c_{i+1} is a multiple of c_i and $c_i < c_{i+1}$.

Output

If it is possible to pay exactly p goose-dollars using exactly k goose coins, output the minimum and maximum possible total weights of the k coins. Otherwise, output -1.

Examples

standard input	standard output
3 9 20 1 2 2 5 6 10	37 44
2 5 10 1 1 3 3	-1