



Problem D. Modular Knapsack

Input file: standard input
Output file: standard output
Time limit: 1.5 seconds
Memory limit: 256 megabytes

Today you should solve unusual knapsack problem. You are given n items, i -th of them has weight w_i and cost c_i . Also a prime p is given. For every remainder r modulo p you should find the maximum total cost of a set of items with total weight having remainder r modulo p . All weights and costs in each test except samples are chosen randomly and independently from range $[0 \dots 10^9]$. n and p are chosen manually.

Input

The first line contains two integers n, p ($1 \leq n \leq 10^6, 2 \leq p \leq 3000$) – the number of items and the prime modulo.

The next line contains n integers w_i ($0 \leq w_i \leq 10^9$) — the weights of items.

The next line contains n integers c_i ($0 \leq c_i \leq 10^9$) — the costs of items.

Output

Output one line with p integers. i -th of them (0-indexed) should be equal to the maximum total cost of a set of items with total weight having remainder i modulo p , or -1 if such set doesn't exist.

Examples

standard input	standard output
2 2 1 2 1 1	1 2
2 2 2 2 1 1	2 -1