

# All-Star Showdown

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            2 seconds  
Memory limit:         1024 megabytes

In a bold departure from tradition, the Grand Contest this year will feature a special All-Star Showdown: a show match pitting two elite squads, Team Red and Team Blue, against each other in a head-to-head programming duel. Unlike the standard contest format, this match allows for flexible team sizes, as long as every contestant is assigned to exactly one team.

There are  $n$  all-star contestants selected from the hall of fame. Each contestant  $i$  is evaluated across three core dimensions: algorithmic insight, implementation speed, and debugging resilience. These attributes are quantified as positive integers  $(x_i, y_i, z_i)$ , forming a 3D capability vector that captures their competitive profile. Additionally, each contestant  $i$  is assigned a positive integer synergy value  $w_i$ , reflecting their ability to amplify team performance. The overall team value of a squad is defined as the product of the synergy values of its members.

To maintain competitive integrity and prevent dominance by clusters of stylistically similar coders, the organizers enforce a strict diversity rule: within any single team, the Euclidean distance between the capability vectors of any two members must be at least  $d$ . Formally, for any two different contestants  $i$  and  $j$  in the same team, it must hold that  $\sqrt{(x_i - x_j)^2 + (y_i - y_j)^2 + (z_i - z_j)^2} \geq d$ . This ensures that each team comprises a well-rounded mix of problem-solving approaches.

The organizing committee wishes to analyze the combinatorial landscape of all valid assignments. Specifically, for each integer  $k = 1, 2, \dots, n - 1$ , they request the sum of the Team Red values over all valid partitions in which Team Red contains exactly  $k$  contestants.

Since the answers may be large, output them modulo 998 244 353.

## Input

There is only one test case in each test file.

The first line contains two integers  $n$  and  $d$  ( $2 \leq n \leq 10^5$ ,  $1 \leq d \leq 10^8$ ).

For the following  $n$  lines, the  $i$ -th line contains four integers  $x_i, y_i, z_i$ , and  $w_i$  ( $1 \leq x_i, y_i, z_i, w_i \leq 10^8$ ), indicating the capability vector and synergy value of contestant  $i$ .

## Output

Output  $(n - 1)$  lines, where the  $i$ -th line contains an integer, indicating the sum of the Team Red values over all valid partitions in which Team Red contains exactly  $i$  contestants modulo 998 244 353.

## Examples

standard input	standard output
3 1 1 1 1 1 1 2 1 10 1 2 3 100	111 1110
3 2 1 1 1 1 1 2 1 10 1 2 3 100	11 1100
3 2 2 1 1 1 1 2 1 10 1 1 2 100	0 0