

## Problem Writing

Time Limit: 1 Second  
Memory Limit: 256 MB

LetianPie is going to spend the whole night writing problems for CS 495! To make sure he won't fall asleep, he prepared  $n$  different kinds of snacks to keep himself awake. The energy each kind of snack provides to LetianPie is a concave function with respect to the number of milliseconds since he consumed the snack (assuming that he can consume anything instantly). More formally, if LetianPie consumes the  $i$ -th kind of snack at time  $t_i$  (represented as milliseconds from now) and the energy function for this kind of snack is  $f_i$ , then the energy he receives from  $i$ -th kind of snack at time  $t$  is  $f_i(t - t_i)$ . The total energy he receives at a particular time is the sum of energy he receives from all kinds of snacks he has consumed tonight.

LetianPie wants to start writing problems at the most energetic moment in the next 12 hours (i.e. 0 to 43,200,000, inclusively). He has decided to consume all snacks now (time 0), but he doesn't know how to find out the moment when he should start writing problem, so he comes to you for help.

### Input

The first line contains a single integers  $n$  ( $1 \leq n \leq 10^5$ ) - the number of different kinds of snacks LetianPie prepared.

The next  $n$  lines describe each type of snack. Each line is in the following format:

$$k \quad c_1 \quad \dots \quad c_m$$

where  $k$  denotes the type of the concave function, and  $c_1, \dots, c_m$  are the coefficients for the function. The value of  $k$  can be one of the following:

- 1: a linear function. There will be two coefficients,  $c_1$  and  $c_2$  ( $-10 \leq c_1 < 0$ ,  $|c_2| \leq 10$ ), and the energy function  $f(x) = c_1x + c_2$ .
- 2: a quadratic function. There will be three coefficients,  $c_1$ ,  $c_2$ , and  $c_3$  ( $-10 \leq c_1 < 0$ ,  $|c_2|, |c_3| \leq 10$ ), and the energy function  $f(x) = c_1x^2 + c_2x + c_3$ .
- sqrt: a square root function. There will be two coefficients,  $c_1$  and  $c_2$  ( $0 < c_1 \leq 10$ ,  $|c_2| \leq 10$ ), and the energy function  $f(x) = \sqrt{c_1x} + c_2$ .
- log: a natural log function. There will be two coefficients,  $c_1$  and  $c_2$  ( $0 < c_1 \leq 10$ ,  $|c_2| \leq 10$ ), and the energy function  $f(x) = c_1 \log(x) + c_2$ .  $\log(0)$  is defined as  $-\infty$ .

### Output

Output a floating point number denoting the maximum energy LetianPie receives in a single millisecond. Please note that this value might be smaller than the global maximum of the total energy function because the inputs to the function are integers. Your answer will be accept if it has an absolute or relative error within  $10^{-6}$ .

### Sample Inputs

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3
2 -1 0 5
1 -10 5
sqrt 5 2
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### Sample Outputs

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12

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