Vivid Colors

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

RGB values specify colors by assigning values between 0 and 255 to each of the colors Red, Green, and Blue.

For example, if $(R, G, B) = (0, 0, 128)$, the color is navy, and if $(R, G, B) = (255, 255, 0)$, the color is yellow. Additionally, if all R, G, and B values are the same, the color is monochromatic, such as white, gray, or black.

Considering that 256^3 possible colors are insufficient, Aoba-san devised an extended RGB model where each parameter can take a real value between 0 and 2×10^5.

There are N paints on the palette, and the extended RGB values of the i-th color are (r_i, g_i, b_i) in order.

For a color with extended RGB values (r, g, b), its **vividness** is defined by the variance of (r, g, b). For instance, if $(r, g, b) = (0, 120, 480)$, the vividness is $\frac{(0-200)^2+(120-200)^2+(480-200)^2}{3} = 41600$. Aoba-san wants to create a vivid color by mixing some of the paints on the palette.

When multiple colors are mixed simultaneously, a color whose extended RGB values are the average of the original colors is produced. Formally, when mixing k colors with extended RGB values $(r_1, g_1, b_1), \ldots, (r_k, g_k, b_k)$, the extended RGB value of the mixed color will be $\left(\frac{r_1+\ldots+r_k}{k}, \frac{g_1+\ldots+g_k}{k}, \frac{b_1+\ldots+b_k}{k}\right)$. Note that the parameter values after mixing can be non-integer.

You are given N paints on the palette. Find the maximum possible vividness of a color that can be obtained by mixing *exactly* k of these paints simultaneously, and output this vividness modulo 998244353.

Solve the above problem for $k = 1, 2, \ldots, N$.

Definition of vividness modulo 998244353:

It can be proven that the vividness sought in this problem will always be a rational number. Also, in the constraints of this problem, it is guaranteed that when the sought vividness is expressed in the form of an irreducible fraction $\frac{y}{x}$, x is not divisible by 998244353. In this case, there exists a unique $0 \le z < 998244353$ satisfying $y \equiv xz \pmod{998244353}$, so output z.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{l}
N \\
r_1\ g_1\ b_1 \\
\vdots \\
r_N\ g_N\ b_N
\end{array}
$$

- $2 \le N \le 2 \times 10^3$
- $0 \le r_i, g_i, b_i \le 2 \times 10^5$
- All input values are integers.

Output

Print N lines. The i-th line should contain the answer for $k = i$.

Examples

standard input	standard output
3 180 0 0 0 180 180 0 0 180	7200 5400 800
6 30594 32322 46262 63608 59020 98436 90150 32740 67209 82886 4627 54813 3112 67989 74995 60872 9967 9051	715162883 838096208 930330061 405079896 880764907 526006962

Note

In the first example, for $k = 2$, mixing the second and third colors produces a color with extended RGB values of $(0, 90, 180)$. The vividness of this color is $\frac{(0-90)^2+(90-90)^2+(180-90)^2}{3} = 5400$.