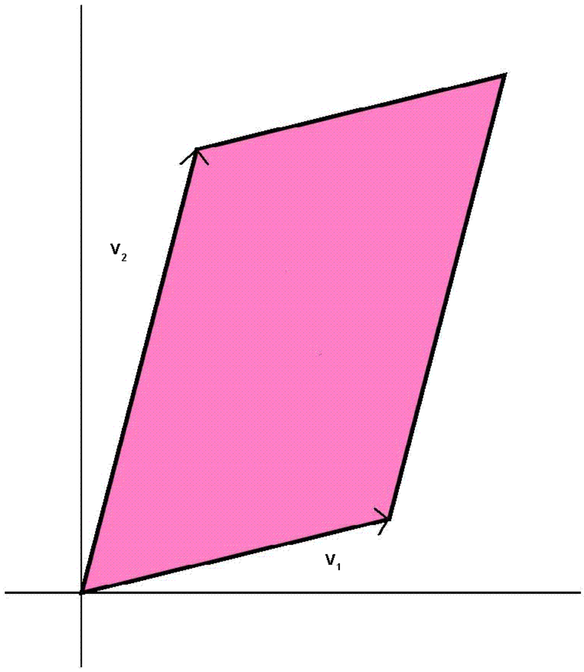
11273 Warping of N Dimensional Space

In this problem, we want to apply a linear transformation to warp an N dimensional volume. Let $Volume(v)$ denote the volume of the N dimensional parallelepiped spanned by N, N dimensional vectors $\{v_1, v_2, \ldots, v_N\}$. An example of a 2D volume spanned by 2, 2 dimensional vectors is shown below. In a strange twist, we have decided to apply a "Linear GCD" transformation. That is, if we represent our linear transformation $f : R^N \to R^N$ by the matrix A, where R denotes the set of real numbers, then $\mathrm{A}(i, j) = \gcd(i, j)$ for $1 \le i, j \le N$, where $\gcd(i, j)$ stands for the greatest common divisor of i and j. Given, S, any set of N vectors of R^N, such that $Volume(S)$ is positive, we ask you to compute the ratio of the volume after the transformation to the volume before the GCD Transformation. In other words, compute $r(S) = Volume(F(S))/Volume(S)$, where $F(S) = \{f(v)|v \text{ in } S\}$. However, since $r(S)$ can be quite large, we only ask you to compute $T(S) = floor(r(S)) \bmod 4000039$. In an even stranger twist, we will not give you S, but instead ask you to compute, the mean value of $T(S)$ over all N vectors S of R^N, such that $Volume(S)$ is positive.



Input

The input of each test cases is simply the value N ($N < 4000000$) on its own line.

Output

For each input value, output the answer rounded to an integer, followed by a newline.

Sample Input

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10000
10001
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Sample Output

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2747606
295638
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