Find The Determinant

In this problem you have to calculate the determinant of an N x N matrix whose entries are given by **m[i][j] = gcd(i,j)**, $1 \leq i,j \leq N$.

Here gcd(i,j) denotes the greatest common divisor of i and j.

As the determinant D can grow very large, you have to print D%1000003.

Input

First line of input consists of a single integer containing the number of test cases T (equal to around 500000), each of the following T lines contain an integer N the size of the matrix. N lies between 1 and 2000000 (both inclusive).

Output

One line corresponding to each test case containing the determinant modulo 1000003 for the corresponding test case.

Example

Input:
3
1
3
5

Output:
1
2
16