



Problem H
 GCD Determinant

Input File: H.IN
 Output File: standard output
 Program Source File: H.C, H.CPP, H.JAVA

We say that a set $S = \{x_1, x_2, \dots, x_n\}$ is *factor closed* if for any $x_i \in S$ and any divisor d of x_i we have $d \in S$. Let's build a GCD matrix $(S) = (s_{ij})$, where $s_{ij} = \text{GCD}(x_i, x_j)$ – the greatest common divisor of x_i and x_j . Given the *factor closed* set S , find the value of the determinant:

$$D_n = \begin{vmatrix} \text{gcd}(x_1, x_1) & \text{gcd}(x_1, x_2) & \text{gcd}(x_1, x_3) & \dots & \text{gcd}(x_1, x_n) \\ \text{gcd}(x_2, x_1) & \text{gcd}(x_2, x_2) & \text{gcd}(x_2, x_3) & \dots & \text{gcd}(x_2, x_n) \\ \text{gcd}(x_3, x_1) & \text{gcd}(x_3, x_2) & \text{gcd}(x_3, x_3) & \dots & \text{gcd}(x_3, x_n) \\ \dots & \dots & \dots & \dots & \dots \\ \text{gcd}(x_n, x_1) & \text{gcd}(x_n, x_2) & \text{gcd}(x_n, x_3) & \dots & \text{gcd}(x_n, x_n) \end{vmatrix}$$

The input file contains several test cases. Each test case starts with an integer n ($0 < n < 1000$), that stands for the cardinality of S . The next line contains the numbers of S : x_1, x_2, \dots, x_n . It is known that each x_i is an integer, $0 < x_i < 2 \cdot 10^9$. The input data set is correct and ends with an end of file.

For each test case find and print the value $D_n \bmod 1000000007$.

Input	Output
2	1
1 2	12
3	4
1 3 9	
4	
1 2 3 6	