

# GCD Determinant

[English](#)

[Vietnamese](#)

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:

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

## Input

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.

## Output

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

## Sample

Input :

```
2
1 2
3
1 3 9
4
1 2 3 6
```

Output:

```
1
12
4
```