

# Little Z's Function

Input file:            **standard input**  
Output file:          **standard output**  
Time limit:          5.5 seconds  
Memory limit:        1024 megabytes

Little Z was obsessed with number-theoretic functions such as Euler's totient function  $\varphi^*$  back in high school.

One day, Little Z decides to play a game with his robotic friend. First, Little Z gives a permutation<sup>†</sup>  $p$  of length  $n$ . Then he asks his friend multiple queries. For a given interval  $[l, r]$  ( $1 \leq l < r \leq n$ ), find the maximum value of  $\varphi(p_i \times p_j)$  where  $l \leq i < j \leq r$ .

Formally, for each query with two integers  $l, r$ , you need to compute:

$$\max_{l \leq i < j \leq r} \varphi(p_i \times p_j)$$

Little Z has solved exactly 0 queries. Please help him compute the remaining  $q$  queries.

## Input

The first line contains a positive integer  $n$  ( $2 \leq n \leq 5 \times 10^5$ ) — the length of the permutation.

The second line contains  $n$  distinct integers  $p_1, p_2, \dots, p_n$  ( $1 \leq p_i \leq n$ ) — the given permutation  $p$ .

The third line contains a positive integer  $q$  ( $1 \leq q \leq 5 \times 10^5$ ) — the number of queries.

Each of the next  $q$  lines contains two integers  $l_i$  and  $r_i$  ( $1 \leq l_i < r_i \leq n$ ) — the endpoints of the  $i$ -th query.

## Output

For each query, output a single integer — the maximum value.

## Example

| standard input | standard output |
|----------------|-----------------|
| 6              | 2               |
| 3 2 5 4 1 6    | 8               |
| 8              | 8               |
| 4 5            | 4               |
| 2 6            | 8               |
| 3 5            | 8               |
| 2 3            | 2               |
| 3 4            | 8               |
| 1 5            |                 |
| 4 5            |                 |
| 2 6            |                 |

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\* $\varphi(n)$  denotes the number of positive integers not exceeding  $n$  that are coprime to  $n$ .

<sup>†</sup>A permutation of length  $n$  is an array consisting of  $n$  distinct integers from 1 to  $n$  in arbitrary order. For example,  $[2, 3, 1, 5, 4]$  is a permutation, but  $[1, 2, 2]$  is not a permutation (2 appears twice in the array), and  $[1, 3, 4]$  is also not a permutation ( $n = 3$  but there is 4 in the array).