DMOPC '22 Contest 2 P3 - Good Permutations

Time limit: 2.0s **Memory limit:** 256M

Mr. Gregory recently discovered the existence of $\gcd$. Enthralled by its beauty, he challenges you to a puzzle. Mr. Gregory gives you a target permutation T of the integers $1, 2, \ldots, N$. He tells you that a permutation P is good if it can be turned into T using the following operation any number of times: choose an integer i $(1 \leq i \leq N-1)$, such that $\gcd(P_i, P_{i+1}) = 1$, and swap elements P_i and P_{i+1}. The answer to the puzzle is the lexicographically maximal good permutation P.

Prove your worth by solving the puzzle!

Constraints

$1 \leq N \leq 5 \times 10^5$

$1 \leq T_i \leq N$

T is a permutation of the integers $1, 2, \ldots, N$.

Subtask 1 [40%]

$1 \leq N \leq 3 \times 10^3$

Subtask 2 [60%]

No additional constraints.

Input Specification

The first line contains the integer N.

The next line contains N space-separated integers, representing the target permutation T.

Output Specification

Output N space-separated integers $P_1, P_2, \ldots, P_N$, the lexicographically maximal good permutation P.

Sample Input

```
4
2 1 3 4
```

Sample Output

```
3 2 4 1
```