Practice Contest 2

Coprime Division

You are given an array $A_1, A_2, \ldots A_N$. You want to divide the set of indices $I = \{1, 2, \ldots N\}$ into two disjoint sequences $P = (p_1, p_2, \ldots p_m)$ and $Q = (q_1, q_2, \ldots q_k)$, such that:

- Both P and Q are strictly increasing.
- Each index $1 \leq i \leq N$ belongs to **exactly** one of P and Q. In particular, $m + k = N$.
- For any two $1 \leq i \leq m, 1 \leq j \leq m, i \neq j$, A_{p_i} and A_{p_j} must be coprime.
- For any two $1 \leq i \leq k, 1 \leq j \leq k, i \neq j$, A_{q_i} and A_{q_j} must be coprime.

Please note that these sequences are allowed to be empty.

You want to maximize the size m of P. If there are multiple solutions that maximize m, you must print the one that lexicographically minimizes P. A sequence X is said to be lexicographically smaller than a sequence Y, if and only if X is a proper prefix of Y or there exists a index $1 \leq i \leq \min(|X|, |Y|)$ such that:

- $X_j = Y_j$ for all $1 \leq j < i$
- $X_i < Y_i$

Input

- The first line contains T, the number of testcases. Each testcase consists of two lines.
- The first line of each testcase contains N.
- The second line contains N space separated integers, $A_1, A_2, \ldots A_N$.

Output

For each testcase,

- If there doesn't exist a valid division, print -1.
- Else, print two lines. On the first line, print the maximum possible size of P. On the second line, print the lexicographically smallest possible valid P with this size.

Test Data

In all inputs,

- $1 \leq T \leq 3$
- $1 \leq N \leq 10^5$
- $1 \leq A_i \leq 2 \times 10^6$

Subtask 1 (16 Points): $N \leq 15$

Subtask 2 (32 Points): $N \leq 1000$

Subtask 3 (30 Points): $N \leq 2 \times 10^4$

Subtask 4 (22 Points): No additional constraints

Sample Input

```
2
5
7 2 27 4 5
5
2 3 4 5 6
```

Sample Output

```
4
1 2 3 5
-1
```

Explanation

In the first testcase, it is optimal to choose $P = (1, 2, 3, 5), Q = (4)$. Note that $P = (1, 3, 4, 5), Q = (2)$ is another solution that maximizes the size of P but it is not the lexicographically smallest.
There is no valid division in the second testcase.

Limits

Time: 2 seconds

Memory: 256 MB