

Problem A

A. Nihilation

You are given an array $A = [A_1, A_2, \dots, A_N]$ consisting of N positive integers.

In one operation, you can choose integers m and k such that $1 \leq k < m \leq 10^9$ and set $A_i := (A_i \times k) \bmod m$ for $1 \leq i \leq N$.

What is the minimum number of operations needed to make all A_i equal to 0? Output any sequence of operations to be done. It can be proven that it is always possible to make all A_i equal to 0.

Input

Input begins with an integer N ($1 \leq N \leq 100\,000$). The next line contains N integers A_i ($1 \leq A_i \leq 10^9$) representing the given array A .

Output

In the first line, output the minimum number q of operations needed.

In the next q lines, output two integers m and k , representing the operation in the sequence of operations that makes all A_i equal to 0. If there are multiple such sequences, output any one of them.

Sample Input 1

```
5
4 1 2 6 3
```

Sample Output 1

```
2
12 6
3 2
```

Explanation of Sample 1: The following describes the sequence of operations done in the sample output.

1. $A_i := (A_i \times 6) \bmod 12 \implies A = [0, 6, 0, 0, 6]$

2. $A_i := (A_i \times 2) \bmod 3 \implies A = [0, 0, 0, 0, 0]$

It can be shown that no sequence of operations with length 1 can make all A_i equal to 0.

Sample Input 2

```
2
9 9
```

Sample Output 2

```
1
3 1
```



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