C. Prime Swaps

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You have an array $a[1], a[2], ..., a[n]$, containing distinct integers from 1 to n. Your task is to sort this array in increasing order with the following operation (you may need to apply it multiple times):

- choose two indexes, i and j ($1 \le i < j \le n$; $(j - i + 1)$ is a prime number);
- swap the elements on positions i and j; in other words, you are allowed to apply the following sequence of assignments: $tmp = a[i], a[i] = a[j], a[j] = tmp$ (tmp is a temporary variable).

You do not need to minimize the number of used operations. However, you need to make sure that there are at most $5n$ operations.

Input

The first line contains integer n ($1 \le n \le 10^5$). The next line contains n distinct integers $a[1], a[2], ..., a[n]$ ($1 \le a[i] \le n$).

Output

In the first line, print integer k ($0 \le k \le 5n$) — the number of used operations. Next, print the operations. Each operation must be printed as "$i\ j$" ($1 \le i < j \le n$; $(j - i + 1)$ is a prime).

If there are multiple answers, you can print any of them.

Examples

input
3 3 2 1
output
1 1 3

input
2 1 2
output
0

input
4 4 2 3 1
output
3 2 4 1 2 2 4