# Factorization

Time Limit: 1 Second
Memory Limit: 2048 MB

Given an integer $n$, find the prime factorization of $n!$.

## Input

A single integer $n$ ($1 \leq n \leq 10^7$).

## Output

On the first line, output $k$, the number of distinct prime factors of $n!$.

On each of the next $k$ lines, output two integers $p_i, c_i$, meaning $p_i^{c_i}$ is a factor of $n!$ but $p_i^{c_i+1}$ is not. Order the lines by increasing $p_i$.

## Sample Inputs

```
7
```

## Sample Outputs

```
4
2 4
3 2
5 1
7 1
```