Problem B. Based Zeros

Time limit: 2 seconds
Memory limit: 1024 megabytes

Barbara has always known how to represent integers in the decimal numeral system (base ten), using digits $0, 1, 2, \ldots, 9$. Recently she has learned that for any integer base $b \geq 2$, she can also represent integers in base b, using symbols with values from 0 to $b - 1$, inclusive, as digits.

Barbara's favorite digit is 0. Luckily, it looks the same in all bases.

Today Barbara is playing with a positive integer n. Now she wonders: in what bases does the representation of n contain the biggest number of zeros? Help her to find all such bases.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 1000$). The description of the test cases follows.

The only line of each test case contains a single integer n ($2 \leq n \leq 10^{18}$).

Output

For each test case, in the first line, print two integers k and m, denoting the maximum number of zeros the representation of n can have in any integer base, and the number of such bases, respectively.

In the second line, print m integers $b_1, b_2, \ldots, b_m$, denoting all such bases in increasing order ($2 \leq b_1 < b_2 < \cdots < b_m \leq n$).

Example

standard input	standard output
3 11 1007 239	1 3 2 3 11 2 2 3 10 1 4 2 6 15 239

Note

Here are the representations with the maximum number of zeros for the example test cases:

- $11 = 1011_2 = 102_3 = 10_{11}$ (one zero);
- $1007 = 1101022_3 = 1007_{10}$ (two zeros);
- $239 = 11101111_2 = 1035_6 = 10\mathtt{E}_{15} = 10_{239}$ (one zero).

In the $239 = 10\mathtt{E}_{15}$ representation, `E` stands for a digit with the value of 14.