A Binomial coefficients

Gunnar is quite an old and forgetful researcher. Right now he is writing a paper on security in social networks and it actually involves some combinatorics. He wrote a program for calculating binomial coefficients to help him check some of his calculations.

A binomial coefficient is a number

$$\binom{n}{k} = \frac{n!}{k!(n-k)!},$$

where n and k are non-negative integers.

Gunnar used his program to calculate $\binom{n}{k}$ and got a number m as a result. Unfortunately, since he is forgetful, he forgot the numbers n and k he used as input. These two numbers were a result of a long calculation and they are written on one of many papers lying on his desk. Instead of trying to search for the papers, he tried to reconstruct the numbers n, k from the output he got. Can you help him and find all possible candidates?

Input

On the first line a positive integer: the number of test cases, at most 100. After that per test case:

- one line with an integer m ($2 \leq m \leq 10^{15}$): the output of Gunnar's program.

Output

Per test case:

- one line with an integer: the number of ways of expressing m as a binomial coefficient.
- one line with all pairs (n, k) that satisfy $\binom{n}{k} = m$. Order them in increasing order of n and, in case of a tie, order them in increasing order of k. Format them as in the sample output.

Sample in- and output

Input	Output
2 2 15	1 (2,1) 4 (6,2) (6,4) (15,1) (15,14)

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