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

The first line of the input contains an integer t. t test cases follow, each of them separated by a line break.

Each test case consists of only one line containing an integer m, the output of Gunnar's program.

Output

For each test case, print a line containing "Case #i:", where i is its number, starting at 1. Print two more lines, the first containing an integer x, the number of ways expressing m as a binomial coefficient. The second line contains 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. Each line of the output should end with a line break.

Constraints

- $1 \leq t \leq 100$
- $2 \leq m \leq 10^{15}$

Sample Input 1	Sample Output 1
2 2 15	Case #1: 1 (2,1) Case #2: 4 (6,2) (6,4) (15,1) (15,14)