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Given a positive integer n, find another integer p and non-negative integer o such that $n = O2^P$.

Example: For n = 24, o = 3 and p = 3.

Write a program that for each data set:

- Read a positive integer n,
- calculates the whole non-negative integer o and p such that $n = O2^P$,
- writes the result.

Input

The first line of input contains a positive integer d, indicating the number of data sets, $1 \leq d \leq 10$

The following lines are data sets. Each data set consists of exactly one line that contains exactly one integer n, $1 \leq n \leq 10^6$.

Output

The output consists of exactly d lines, one line for each data set.

Line i, $1 \leq i \leq d$, corresponding to the i-th entry and must contain two integers o and p separated by a single space so that $n = O2^P$

Example

Input:
2
24
32

Output:
3 3
1 5