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UNIVERSITY

HOME CONTESTS PROBLEMSET GROUPS **RATING** EDU API CALENDAR HELP TOP CATALOG GYM

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D. Ceil Divisions

time limit per test: 2 seconds memory limit per test: 256 megabytes input: standard input output: standard output

You have an array a_1, a_2, \ldots, a_n where $a_i = i$.

In one step, you can choose two indices x and y ($x \neq y$) and set $a_x = \left\lceil \frac{a_x}{a_v} \right\rceil$ (ceiling

Your goal is to make array a consist of n-1 ones and 1 two in no more than n+5 steps. Note that you don't have to minimize the number of steps.

The first line contains a single integer t (1 < t < 1000) — the number of test cases.

The first and only line of each test case contains the single integer n ($3 \le n \le 2 \cdot 10^5$) — the length of array a.

It's guaranteed that the sum of *n* over test cases doesn't exceed $2 \cdot 10^5$.

Output

For each test case, print the sequence of operations that will make a as n-1 ones and 1two in the following format: firstly, print one integer m ($m \le n + 5$) — the number of operations; next print m pairs of integers x and y $(1 \le x, y \le n; x \ne y)$ (x may be greater or less than y) — the indices of the corresponding operation.

It can be proven that for the given constraints it's always possible to find a correct sequence of operations.

Example

input	Сору
2	
3	
4	
output	Сору
2	
3 2	
3 2	
3	
3 4	
4 2	
4 2	

Note

In the first test case, you have array a = [1, 2, 3]. For example, you can do the following:

1. choose 3, 2:
$$a_3 = \left\lceil \frac{a_3}{a_2} \right\rceil = 2$$
 and array $a = [1, 2, 2]$; 2. choose 3, 2: $a_3 = \left\lceil \frac{2}{2} \right\rceil = 1$ and array $a = [1, 2, 1]$.

You've got array with 2 ones and 1 two in 2 steps.

In the second test case, a = [1, 2, 3, 4]. For example, you can do the following:

1. choose 3, 4:
$$a_3 = \left\lceil \frac{3}{4} \right\rceil = 1$$
 and array $a = [1,2,1,4]$; 2. choose 4, 2: $a_4 = \left\lceil \frac{4}{2} \right\rceil = 2$ and array $a = [1,2,1,2]$; 3. choose 4, 2: $a_4 = \left\lceil \frac{2}{2} \right\rceil = 1$ and array $a = [1,2,1,1]$.

Educational Codeforces Round 101 (Rated for Div. 2)

Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

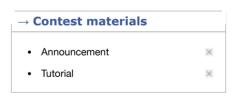
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→ Problem tags brute force | constructive algorithms math number theory *1700 No tag edit access



22/01/2022, 15:23 Problem - D - Codeforces

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