Problem A. Algorithm Course

Kotori has just learnt the *Knuth-Morris-Pratt algorithm* in the algorithm course and would like to give the following problem a try:

Find the total number of occurrence of the strings "cat" and "dog" in a given string s.

As Kotori is not familiar with the KMP algorithm, she turns to you for help. Can you help Kotori solve this problem?

Input

There is only one test case in each test file.

The first and only line contains a string s ($1 \leq |s| \leq 1000$) which only contains lower-cased English letters.

Output

Output one line containing one integer indicating the total number of occurrence of "cat" and "dog" in the string.

Examples

standard input	standard output
catcatcatdogggy	4
docadosfascat	1
icpcnanjing	0

Note

For the first sample test case, there are 3 "cat" and 1 "dog" in the string, so the answer is 4.

For the second sample test case, there is only 1 "cat" and no "dog" in the string, so the answer is 1.

Problem B. Best Grouping

Kotori and her $(n-1)$ classmates are going to the park. For convenience, their teacher Umi has numbered the students from 1 to n and decides to form the students into some groups, where each group consists of exactly two students.

For some reason, Kotori requires that the indices of the two students in the same group should have a common divisor greater than 1. Note that each student can only belong to at most one group, and it's not necessary that every student belongs to a group.

Please help Kotori form as many groups as possible.

Input

There are multiple test cases. The first line of the input contains an integer T indicating the number of test cases. For each test case:

The first and only line contains an integer n ($1 \leq n \leq 10^5$) indicating the number of students.

It's guaranteed that the sum of n of all test cases will not exceed 10^6.

Output

For each test case output one line. The line first contains an integer k indicating the number of groups, then $2k$ integers $a_1, a_2, \ldots, a_{2k}$ follow, indicating that student a_1 and a_2 belong to the same group, student a_3 and a_4 belong to the same group, ..., student a_{2k-1} and a_{2k} belong to the same group. The integers in a line are separated by a space. If there are multiple valid answers, you can print any of them.

Please, DO NOT output extra spaces at the end of each line, otherwise your answer may be considered incorrect!

Example

standard input	standard output
3 1 4 6	0 1 2 4 2 2 4 3 6

Problem C. Computer Science Ability Test

Computer Science Ability Test (CSAT) aims to evaluate objectively, through unified examinations with 10 true or false questions, the abilities of testees in computer science.

Kotori is taking the test, but soon she discovers with dismay that she cannot answer even a single question. Now she presents you with these 10 questions. Can you tell her the correct answer to each question?

1. (On linear algebra) Two vectors v_1 and v_2 are linearly dependent if there exists two scalars k_1 and k_2 such that $k_1 v_1 + k_2 v_2 = \overrightarrow{0}$.
2. (On calculus) $\frac{y\mathrm{d}x - x\mathrm{d}y}{x^2 - y^2} = \mathrm{d}(\frac{1}{2} \ln \left|\frac{x-y}{x+y}\right|)$.
3. (On discrete mathematics) $\emptyset \subseteq \{\emptyset\}$.
4. (On physics) One mole of ideal gas is expanded from V_0 to $2V_0$ in a reversible adiabatic process. If the temperature of the gas decreases by 25%, the gas may be a type of monatomic gas.
5. (On data structure) The amortized time complexity of an insert operation of a Fibonacci heap is $O(1)$.
6. (On approximation algorithm) If $P \neq NP$, there does not exist a polynomial-time 2-approximation algorithm for the traveling salesman problem on a complete graph, but there exists a polynomial-time 2^n-approximation algorithm for this problem.
7. (On quantum algorithm) There exists a comparison-based quantum sorting algorithm which takes less than $\Omega(n \log n)$ steps and is better than classical algorithms.
8. (On operating system) A system consists of 4 resources with the same type. Suppose that at most 3 processes simultaneously apply the resource and every process applies at most 2 resources, so the system is deadlock free.
9. (On theory of computation) Let $L(M)$ be the language that the Turing machine M accepts, then the language $\{\text{“}M\text{”} | M \text{ is a Turing machine and } L(M) \text{ is uncountable}\}$ is recursively enumerable but not recursive.
10. (On compiler principles) There exists a grammar which is LL(1) but not LALR(1).

Input

This problem has no input. You're on your own!

Output

Output one line containing 10 characters. The characters must be either 'T' or 'F', where 'T' means true and 'F' means false. The i-th character indicates the answer to the i-th true or false question.

Example

standard input	standard output
(No input)	FTFTFTTFTF

Note

Note that the sample output is not the correct answer! It only serves the purpose of showing you the output format.