

Fuzzy Graph

Time limit: 1 s

Memory limit: 512 MB

Rashad is a famous researcher in the Institute of Lovely Graphs. His latest research focuses on determining the social comfort of the given people network, represented as a graph. After long and detailed observations, Rashad hypothesizes that the properties of coprime numbers are significant in social environments. Thus, he defines a fuzzy graph as a simple graph (undirected graph without any self-loops or multiple-edges) in which for all edges (u, v) , the property $\gcd(\text{degree}[u], \text{degree}[v]) = 1$ is true (i.e., degrees of vertices u and v are coprime). The degree of a vertex is defined as the number of edges it is connected to. Note that the fuzzy graph does not need to be connected.

To test his hypothesis, Rashad invited N previous IOI participants to his renowned experiment. He wants to prove that even with this extreme setting, he can achieve 100% social comfort. That is why he wants to create a fuzzy graph with N vertices and *as many edges as possible* to apply it to the experiment subjects and observe the situation. Your job, as Rashad's research assistant, is to do his all work (i.e., design the fuzzy graph) while he checks out other lovely graph problems to focus on in the future.

Input

You are given one integer N – the number of vertices the fuzzy graph will need to have. The vertices will be numbered as $1, 2, \dots, N$ in the graph.

Output

In the first line, print M , the number of edges you have achieved in your fuzzy graph. Print the edges in the next M lines as pairs of numbers. Note that if the printed graph is not fuzzy, you will get 0 points as the experiment subjects will leave because of high levels of social anxiety.

Constraints

- $3 \leq N \leq 1000$

Examples

Input	Output	Explanation
3	1 1 2	This is a correct answer, but jury has a better answer with 2 edges. So, the score for such an answer will be: $2 \times 0.01^{1-\frac{1}{2}} = 0.2 \text{ points.}$ See the scoring section below.

Scoring

In this task there are **50 tests**, each worth **2 points**. These 50 different values of N are given in a text file named “`tests.txt`” as an attachment. Please download it from the “*Attachments*” section of the task in the judging system.

Each test will be scored separately.

Let E be the number of edges in contestant’s and J in jury’s answer in a particular test.

- If $E = 0$ or the graph is not fuzzy, you will get 0 points and “Wrong Answer”.
- If $0 < E < J$, you will get $2 \times 0.01^{1-\frac{E}{J}}$ points.
- If $E \geq J$, you will get 2 points.