Square Resistance Value

Input file: `standard input`
Output file: `standard output`
Time limit: 1 second
Memory limit: 1024 megabytes

Using only resistors with resistance 1 $[\Omega]$, *construct a resistor with resistance* $\sqrt{D}$ $[\Omega]$.

You are given a positive integer D. Construct one **connected undirected graph** satisfying all of the following conditions. Under the constraints of this problem, it can be proven that such a graph always exists.

- The number of vertices N is between 2 and 300, inclusive, and each vertex has a distinct label from 1 to N
- The number of edges M is at most 300, and self-loops and multiple edges are allowed
- The "effective resistance from vertex 1 to vertex N", defined as below, is within an **absolute error of** $\pm 10^{-6}$ **from** $\sqrt{D}$

Let G be a connected undirected graph with n vertices and m edges ($n \geq 2$), and suppose that the j-th edge connects vertices a_j, b_j. Consider assigning a real number V_i ($i = 1, 2, \cdots, n$) to each vertex of graph G, and a real number I_j ($j = 1, 2, \cdots, m$) to each edge, so that all of the following equations are satisfied.

- $I_j = V_{a_j} - V_{b_j} \ \ (j = 1, 2, \cdots, m)$
- $\sum_{b_j = i} I_j - \sum_{a_j = i} I_j = 0 \ \ (i = 2, 3, \cdots, n-1)$
- $\sum_{b_j = n} I_j - \sum_{a_j = n} I_j = 1$

It can be proven that such an assignment always exists, and furthermore that the value of $V_1 - V_n$ is uniquely determined. We define this value as the "effective resistance from vertex 1 to vertex n".

Input

The input consists of a single positive integer D. ($1 \leq D \leq 5000$)

Output

On the first line, print the number of vertices N and the number of edges M of the constructed graph, in this order, separated by spaces.

On each of the following M lines, the i-th line ($i = 1, 2, \cdots, M$) should contain the endpoints of the i-th chosen edge, separated by a space.

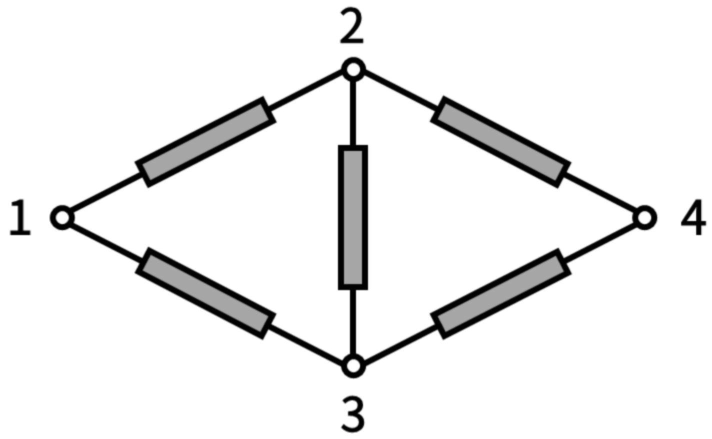
If there are multiple graphs satisfying the conditions, any one of them may be printed.

Example

standard input	standard output
1	4 5 1 2 1 3 2 3 2 4 3 4

Note

The following is an illustration of the output for the first example.



That the effective resistance from vertex 1 to vertex n is 1 [Ω] can be explained as follows.

- Since all resistors have resistance 1 [Ω], and by symmetry the potentials at vertices 2 and 3 are equal, the resistor between them can be treated as if it does not exist.
- As a result, the circuit reduces to two branches in parallel, each branch consisting of two 1 [Ω] resistors in series.
- The effective resistance of two 1 [Ω] resistors in series is 2 [Ω], and the effective resistance of two 2 [Ω] resistors in parallel is 1 [Ω].

The following output is also considered correct.

```
2 1
1 2
```