

## Problem A. Arrangement of Carrots

Input file:            *standard input*  
Output file:           *standard output*  
Time limit:            2 seconds  
Memory limit:         256 mebibytes

Rabbit loves to eat carrots. He has a large square-shaped field, and he is going to cultivate carrots there. He wants the arrangement of carrots to be strange: he tries to plant some seeds inside the field so that there are exactly  $N$  lines which pass through at least two seeds.

The field is represented as a square with corners  $(0, 0)$ ,  $(10^9, 0)$ ,  $(10^9, 10^9)$ ,  $(0, 10^9)$  in the coordinate field. Seeds can be planted at points of integer coordinates inside this square (including its boundary). Rabbit also tries to minimize the number of seeds to plant. Write a program that finds the arrangement of seeds satisfying the conditions.

### Input

The input is given in the following format:

$N$

The first line contains an integer  $N$  ( $1 \leq N \leq 10^6$ ).

### Output

If there does not exist an arrangement satisfying the condition, output an integer  $-1$  in the only line. Otherwise, the output should be in the following format:

$K$   
 $X_1 Y_1$   
 $\vdots$   
 $Y_K Y_K$

The first line should contain a positive integer  $K$ , which is the minimum possible number of seeds. The  $i$ -th line of the following  $K$  lines ( $1 \leq i \leq K$ ) should contain two integers  $X_i$  and  $Y_i$  ( $0 \leq X_i \leq 10^9$ ,  $0 \leq Y_i \leq 10^9$ ), denoting the coordinates of the position where the  $i$ -th seed will be planted in your arrangement. No two of  $K$  points should be coincide. If there are multiple solutions, output any.

### Examples

| standard input | standard output               |
|----------------|-------------------------------|
| 4              | 4<br>0 0<br>1 0<br>2 0<br>1 1 |
| 6              | 4<br>0 0<br>0 1<br>1 0<br>1 1 |