Farey Polygon

In mathematics, the Farey sequence of order **n** is the sequence of completely reduced fractions between 0 and 1 which, when in lowest terms, have denominators less than or equal to **n**, arranged in order of increasing size. Each Farey sequence starts with the value 0, denoted by the fraction 0⁄1, and ends with the value 1, denoted by the fraction 1⁄1 (taken from Wikipedia). For this problem we append a fraction 0/0 at the beginning of each series. So, the modified Farey sequences of order 1 to 8 are given below:

$F_1 = \{0/0, 0/1, 1/1\}$
$F_2 = \{0/0, 0/1, 1/2, 1/1\}$
$F_3 = \{0/0, 0/1, 1/3, 1/2, 2/3, 1/1\}$
$F_4 = \{0/0, 0/1, 1/4, 1/3, 1/2, 2/3, 3/4, 1/1\}$
$F_5 = \{0/0, 0/1, 1/5, 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 1/1\}$
$F_6 = \{0/0, 0/1, 1/6, 1/5, 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 1/1\}$
$F_7 = \{0/0, 0/1, 1/7, 1/6, 1/5, 1/4, 2/7, 1/3, 2/5, 3/7, 1/2, 4/7, 3/5, 2/3, 5/7, 3/4, 4/5, 5/6, 6/7, 1/1\}$
$F_8 = \{0/0, 0/1, 1/8, 1/7, 1/6, 1/5, 1/4, 2/7, 1/3, 3/8, 2/5, 3/7, 1/2, 4/7, 3/5, 5/8, 2/3, 5/7, 3/4, 4/5, 5/6, 6/7, 7/8, 1/1\}$

Now we can represent each fraction **p/q** as a point **(q, p)** in the Cartesian plane. If we connect these points in the same order of Farey sequence (additionally the last one is connected to the first) we get a polygon. In this problem such a polygon will be called Farey Polygon of magnification 1. For example if we plot the fractions of $\mathbf{F_4}$ in Cartesian plane and connect them in the same order as they are in the Farey sequence we get a Farey polygon of order four and magnification 1. This polygon is shown in Figure 1 (see the next page).

By multiplying the coordinates of vertices of Farey Polygon of order **n**, and magnification 1 with an integer **m** (and of course then connecting them) we get a Farey Polygon of order **n** and magnification **m**. For example in Figure **2** we see a Farey Polygon of order **4** and magnification **2**. The number of lattice points inside this polygon is **5**. Given the number of lattice points inside a lattice polygon, you will have to find its order and magnification.

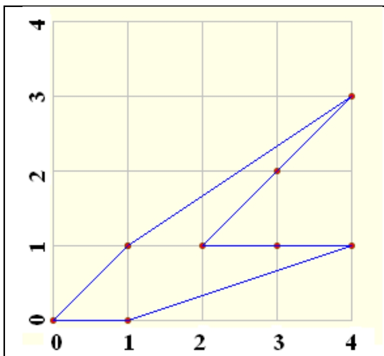
Input

The input file contains **12000** lines of inputs. Each line contains a non-negative integer **I**, which denotes the number of lattice points inside the Farey Polygon. The value of **I** does not exceed $\mathbf{10^{16}}$. Input is terminated by a line containing **-1**. This line should not be processed.

Output

For each line of input produce one line of output. This line may contain two positive integers **n** and **m** that indicates the order and magnification respectively of the Farey Polygon, that has exactly **I** lattice points inside it. If there is more than one answer produce the one that has the minimum positive **n**. If there is still a tie choose the minimum positive **m**. If no such Farey Polygon is found whose order and magnitude is less than **15001**, then print the line **"NOT FOUND"** (Without the quotes) instead.

Sample Input	Output for Sample Input
5 1 100 102 -1	4 2 1 3 2 11 NOT FOUND



Figue 1: Farey Polygon of order 4 and magnification 1

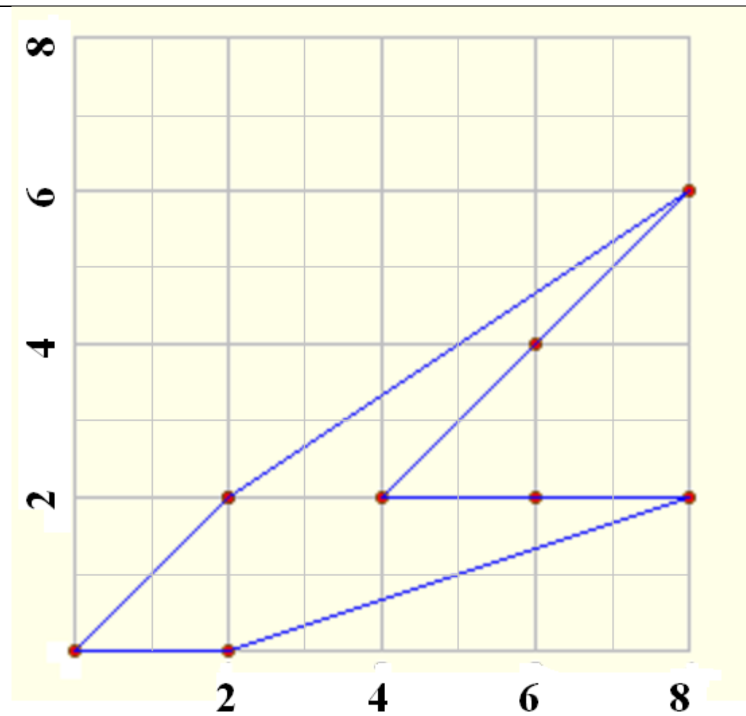


Figure 2: Farey Polygon of order 4 and magnification 2

Problem Setter: Shahriar Manzoor, Special Thanks: Derek Kisman