

## Problem K. Spoiler

Input file: *standard input*  
 Output file: *standard output*  
 Time limit: 1 second  
 Memory limit: 256 mebibytes

For a positive integer  $k$  and a positive integer  $f_1$ , a sequence  $f$  is recursively generated according to the following formula for  $n \geq 2$ :

$$f_n = kn + \left\lfloor \frac{f_{n-1}}{n} \right\rfloor \cdot n$$

For example, if  $k = 4$  and  $f_1 = 23$ :

$$\begin{aligned} f_1 &= 23 \\ f_2 &= 4 \cdot 2 + 24 = 32 \\ f_3 &= 4 \cdot 3 + 33 = 45 \\ f_4 &= 4 \cdot 4 + 48 = 64 \\ f_5 &= 4 \cdot 5 + 65 = 85 \\ f_6 &= 4 \cdot 6 + 90 = 114 \\ f_7 &= 4 \cdot 7 + 119 = 147 \end{aligned}$$

For such a sequence, an index  $m \geq 2$  is called the *starting index of interpolation* if there exists a polynomial  $P(n)$  such that  $P(n) = f_n$  for every  $n \geq m$ , but  $P(m-1) \neq f_{m-1}$ . In the example above, 5 is the starting index of interpolation: for every index greater than 4,  $f_n = P(n) = 2n^2 + 7n$ , but  $f_4 = 64 \neq P(4) = 60$ .

You are given an integer  $x$ . Find any pair of parameters  $f_1$  and  $k$  and an index  $m$  satisfying the following conditions, or report there are none:

- $1 \leq f_1 \leq 10^{10}$ ,  $1 \leq k \leq 10^5$ ,  $2 \leq m \leq 10^{18}$ ;
- $m$  is the starting index of interpolation for the sequence generated with these parameters;
- $f_m = x$ .

The condition with inequalities is important. In particular, if, for some input, the only triplets  $(f_1, k, m)$  which satisfy the last two conditions don't meet the first one, then you should report there is no solution.

### Input

Each test contains one or more test cases. The first line contains the number of test cases  $t$  ( $1 \leq t \leq 100$ ).

The only line of each test case contains an integer  $x$  ( $2 \leq x \leq 10^{18}$ ). There is at most one test case with  $x > 10^9$ .

### Output

For each test case, if there is no answer, print -1.

Otherwise, output a line with three integers:  $f_1, k, m$  ( $1 \leq f_1 \leq 10^{10}$ ,  $1 \leq k \leq 10^5$ ,  $2 \leq m \leq 10^{18}$ ). If there are multiple solutions, print any one of them.

### Example

<i>standard input</i>	<i>standard output</i>	<i>notes</i>
4	23 4 5	Warning! For the third test case, "2 2 2" is not a right answer because in that case $P(1) = f_1$ , thus 2 is not the starting index of interpolation.
85	-1	
7	1 2 2	
6	-1	
637275712755506		