

Problem H. Sets

Input file: **standard input**
 Output file: **standard output**
 Time limit: 1s

For a fixed number n , we define $S_1(n)$ as the set of integers $1, 2, \dots, n$. And for any $i > 1$, we define $S_i(n)$ as a set containing all sums of two different numbers in $S_{i-1}(n)$, e.g. e.g., $S_i(n) = \{x+y : \exists x, y \text{ in } S_{i-1}(n) \text{ such that } x \neq y\}$.

For example, if $n = 3$, we have

$$\begin{aligned} S_1(n) &= \{1, 2, 3\}, \\ S_2(n) &= \{3, 4, 5\}, \\ S_3(n) &= \{7, 8, 9\}, \\ S_4(n) &= \{15, 16, 17\}. \end{aligned}$$

Then, we sort each set respectively, and combine them in order into a sequence L . In above case, we have the sequence $L = 1, 2, 3, 3, 4, 5, 7, 8, 9, 15, 16, 17, \dots$.

Now, given integers n and k , what is the k -th number in sequence L ?

Input

The input file contains several test cases, please handle it to the end of file.

For each case, there is only one line containing two integers n and k ($n \leq 1000, k \leq 10^{1000}$).

Output

For each case, output one integer indicating the k -th number of the sequence. Output -1 if it does not exist.

Example

standard input	standard output
4 6	4
2 20	-1