Bear And Cryptography

Limak is a little bear who loves school. Today was his first lesson in cryptography, and the teacher assigned some difficult homework—to find any number with exactly K divisors. Limak wants to go the extra mile and find the biggest possible number; however, his teacher explained that there are arbitrarily large numbers with this property.

To give this little bear a more achievable challenge, the teacher advised him to consider only numbers not greater than N.

Given N and K, what is the largest number Limak can find?

Input Format

The first line contains an integer, T (the number of test cases).
The T subsequent lines of test cases each contain two space-separated integers, N and K, respectively.

Constraints

- $1 \leq T \leq 50$
- $1 \leq N \leq 10^{12}$
- $1 \leq K \leq 40$

Output Format

For each test case, print the biggest number Limak can find on a new line. Print -1 if no such number exists.

Sample Input

```
3
15 3
15 4
15 5
```

Sample Output

```
9
15
-1
```

Explanation

As each test case uses $N = 15$, here are the numbers ranging from 1 to N and their divisors:
15 is evenly divisible by 4 numbers (1, 3, 5, and 15).
14 is evenly divisible by 4 numbers (1, 2, 7, and 14).
13 is evenly divisible by 2 numbers (1 and 13).
12 is evenly divisible by 6 numbers (1, 2, 3, 4, 6, and 12).
11 is evenly divisible by 2 numbers (1 and 11).
10 is evenly divisible by 4 numbers (1, 2, 5, and 10).
9 is evenly divisible by 3 numbers (1, 3, and 9).

8 is evenly divisible by 4 numbers (1, 2, 4, and 8).
7 is evenly divisible by 2 numbers (1 and 7).
6 is evenly divisible by 3 numbers (1, 2, and 3).
5 is evenly divisible by 2 numbers (1 and 5).
4 is evenly divisible by 3 numbers (1, 2, and 4).
3 is evenly divisible by 2 numbers (1 and 3).
2 is evenly divisible by 2 numbers (1 and 2).
1 is only evenly divisible by 1 number (1).

Test Case 0:
We must find the largest number ≤ 15 having *exactly* 3 *divisors*. Because 9 is the largest number ≤ 15 having exactly 3 divisors, we print 9 on a new line.

Test Case 1:
We must find the largest number ≤ 15 having *exactly* 4 *divisors*. Because 15 is the largest number in the list above having exactly 4 divisors, we print 15 on a new line.

Test Case 2:
There is no number between 1 and 15 having *exactly* 5 *divisors*, so we print -1 on a new line.