

3240. Maximum Number That Sum of the Prices Is Less Than or Equal to K

Difficulty : Medium

<https://leetcode.com/problems/maximum-number-that-sum-of-the-prices-is-less-than-or-equal-to-k>

You are given an integer k and an integer x . The price of a number num is calculated by the count of set bits at positions $x, 2x, 3x,$ etc., in its binary representation, starting from the least significant bit. The following table contains examples of how price is calculated.

x	num	Binary Representation	Price
1	13	00000 1101	3
2	13	00000 1101	1
2	233	0 11101001	3
3	13	00000 1101	1
3	362	101101010	2

The **accumulated price** of num is the **total** price of numbers from 1 to num . num is considered **cheap** if its accumulated price is less than or equal to k .

Return the **greatest** cheap number.

Example 1:

Input: $k = 9, x = 1$

Output: 6

Explanation:

As shown in the table below, 6 is the greatest cheap number.

x	num	Binary Representation	Price	Accumulated Price
1	1	00 1	1	1
1	2	0 10	1	2
1	3	0 11	2	4
1	4	100	1	5
1	5	101	2	7
1	6	110	2	9
1	7	111	3	12

Example 2:

Input: $k = 7, x = 2$

Output: 9

Explanation:

As shown in the table below, 9 is the greatest cheap number.

x	num	Binary Representation	Price	Accumulated Price
2	1	000 1	0	0
2	2	00 10	1	1
2	3	00 11	1	2

2	4	<u>0</u> 1 <u>0</u> 0	0	2
2	5	<u>0</u> 1 <u>0</u> 1	0	2
2	6	<u>0</u> 1 <u>1</u> 0	1	3
2	7	<u>0</u> 1 <u>1</u> 1	1	4
2	8	<u>1</u> 0 <u>0</u> 0	1	5
2	9	<u>1</u> 0 <u>0</u> 1	1	6
2	10	<u>1</u> 0 <u>1</u> 0	2	8

Constraints:

- $1 \leq k \leq 10^{15}$
- $1 \leq x \leq 8$