

4864 Bit Counting

Start with an integer, N_0 , which is greater than 0. Let N_1 be the number of ones in the binary representation of N_0 . So, if $N_0 = 27$, $N_1 = 4$. For all $i > 0$, let N_i be the number of ones in the binary representation of N_{i-1} . This sequence will always converge to one. For any starting number, N_0 , let K be the minimum value of $i \geq 0$ for which $N_i = 1$. For example, if $N_0 = 31$, then $N_1 = 5$, $N_2 = 2$, $N_3 = 1$, so $K = 3$.

Given a range of consecutive numbers, and a value X , how many numbers in the range have a K value equal to X ?

Input

There will be several test cases in the input. Each test case will consist of three integers on a single line:

$LO HI X$

Where LO and HI ($1 \leq LO \leq HI \leq 10^{18}$) are the lower and upper limits of a range of integers, and X ($0 \leq X \leq 10$) is the target value for K . The input will end with a line with three 0s.

Output

For each test case, output a single integer, representing the number of integers in the range from LO to HI (inclusive) which have a K value equal to X in the input. Print each integer on its own line with no spaces. Do not print any blank lines between answers.

Sample Input

```
31 31 3
31 31 1
27 31 1
27 31 2
1023 1025 1
1023 1025 2
0 0 0
```

Sample Output

```
1
0
0
3
1
1
```