Problem D: Not One Bit More

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 $N_0 = 27$, $N_1 = 4$.

In general, 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 $K(N_0)$ be the minimum i such that N_i is one. For example, if $N_0 = 31$, then $N_1 = 5$, $N_2 = 2$, $N_3 = 1$, so $K(31) = 3$.

Given a range of consecutive numbers, and a value X, how many numbers in the range have a $K(\ldots)$ value equal to X?

Input

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

LO HI X

where LO and HI ($1 \leq \text{LO} \leq \text{HI} \leq 10^{18}$) are the lower and upper limits of a range of integers, and X ($0 \leq X \leq 10$) is the target value for $K(\ldots)$.

The data file will end with a line with three 0s.

Output

For each test case, output a line with a single integer, representing the number of integers in the range from LO to HI (inclusive) which have a $K(\ldots)$ value equal to X in the input.

Example

Input:

Given the input

```
LO HI X
31 31 3
31 31 1
27 31 1
27 31 2
1 4 1
1023 1025 1
1023 1025 2
0 0 0
```

the output would be

Output:

```
1
0
0
3
2
1
1
```