

Play with Binary Numbers

Let S be the binary representation of an Integer. We define two functions $a(i)$ and $b(i)$ such that

$a(i)$ = Number of occurrences of '1' at odd positions of S .

$b(i)$ = Number of occurrences of '1' at even positions of S .

For example: for integer 19, $S=10011$.

so, $a(19)=2$ and $b(19)=1$

Input

First line contains an integer T . T =Number of test cases. Then T lines follow

On each line, you will be given three integers M,N,K .

Output

For each test case output a single integer R .

Where, R is the number of integers ' i ' between M and N (both inclusive) such that absolute difference of $a(i)$ and $b(i)$ is equal to K .

Answer of each each test case should be on separate line

Constraints

$T \leq 50$

$1 \leq M < N \leq 10^{19}$

$1 \leq N - M \leq 10^6$

$0 \leq K \leq 50$

Example

Input:

1

1 10 2

Output:

2