12670   Counting ones

Carl is right now the happiest child in the world: he has just learned this morning what the binary system is. He learned, for instance, that the binary representation of a positive integer k is a string $a_n a_{n-1} \ldots a_1 a_0$ where each a_i is a binary digit 0 or 1, starting with $a_n = 1$, and such that $k = \Sigma_{i=0}^{n} a_i \times 2^i$. It is really nice to see him turning decimal numbers into binary numbers, and then adding and even multiplying them.

Caesar is Carl's older brother, and he just can't stand to see his little brother so happy. So he has prepared a challenge: "Look Carl, I have an easy question for you: I will give you two integers A and B, and you have to tell me how many 1's there are in the binary representation of all the integers from A to B, inclusive. Get ready". Carl agreed to the challenge. After a few minutes, he came back with a list of the binary representation of all the integers from 1 to 100. "Caesar, I'm ready". Caesar smiled and said: "Well, let me see, I choose $A = 10^{15}$ and $B = 10^{16}$. Your list will not be useful".

Carl hates loosing to his brother so he needs a better solution fast. Can you help him?

Input

The input file contains several test cases, each of them as described below.

A single line that contains two integers A and B ($1 \leq A \leq B \leq 10^{16}$).

Output

For each test case, output a line with an integer representing the total number of digits 1 in the binary representation of all the integers from A to B, inclusive.

Sample Input

```
1000000000000000  10000000000000000
2 12
9007199254740992 9007199254740992
```

Sample Output

```
239502115812196372
21
1
```