2's complement



Understanding 2's complement representation is fundamental to learning about Computer Science. It allows us to write negative numbers in binary. The leftmost digit is used as a sign bit. If it is 1, we have a negative number and it is represented as the two's complement of its absolute value. Let's say you wrote down the 2's complement representation for each 32-bit integer in the inclusive range from a to b. How many 1's would you write down in all?

For example, using an 8-bit byte rather than 32 bit integer, the two's complement of a number can be found by reversing all its bits and adding 1. The two's complement representations for a few numbers are shown below:

```
|Number|
                   Representation in
Number Binary Inverse Two's Complement
   00000011 11111100 111111101
   00000010 11111101 11111110
-2
-1
   00000001 11111110 11111111
    00000000
                    00000000
    00000001
                    00000001
1
2
    00000010
                    00000010
    00000011
                    00000011
```

To write down that range of numbers' two's complements in 8 bits, we wrote $26 \, 1$'s. Remember to use 32 bits rather than 8 in your solution. The logic is the same, so the 8 bit representation was chosen to reduce apparent complexity in the example.

Input Format

The first line contains an integer T, the number of test cases.

Each of the next $oldsymbol{T}$ lines contains two space-separated integers, $oldsymbol{a}$ and $oldsymbol{b}$.

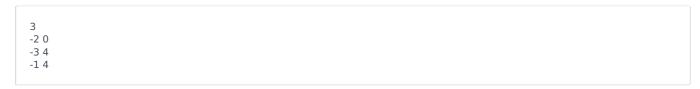
Constraints

- $T \le 1000$
- $-2^{31} \le a \le b \le 2^{31} 1$

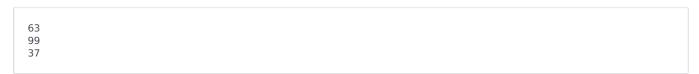
Output Format

For each test case, print the number of 1's in the 32-bit 2's complement representation for integers in the inclusive range from a to b on a new line.

Sample Input 0



Sample Output 0



Explanation 0

Test Case 0:

- -2 contains 31 ones followed by a zero.
- -1 contains 32 ones.

 ${\bf 0}$ contains ${\bf 0}$ ones.

$$31 + 32 + 0 = 63$$

Test Case 1:

$$31 + 31 + 32 + 0 + 1 + 1 + 2 + 1 = 99$$

Test Case 2:

$$32 + 0 + 1 + 1 + 2 + 1 = 37$$