A. Lanran's infinite string

Description

Lanran has an infinite string only contains 'L' and 'R'. The string is built in the following rule:

Lanran(1) = L

Lanran(2) = LLR

Lanran(3) = LLRLLRR

...

Lanran(n) = Lanran(n−1)+'L'+reverse(convert(Lanran(n−1))

where reverse(s) means reversing the string s, convert(s) means change all L to R and change all R to L in the string s.

Lanran wants to ask you how many 'L' are there in the range from the position to the position.

Input format

The first line contains one integer n, which indicates the number of test cases.

Following n lines contain two integers i, j each line.

Output format

Output integers, indicating the answers.

Samples

Sample input

```
3
1 3
2 7
4 7
```

Sample output

```
2
3
2
```

Limitations & Hints

Limit

1 second for each test case. The memory limit is 256MB.

For 50% of the test cases, $n \leq 1000, 1 \leq i, j \leq 10^6$.

For 100% of the test cases, $n \leq 1000, 1 \leq i, j \leq 10^{18}$.