

DancingSeq

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 2048 MB

Once upon a time, there was a young, handsome gentleman who loved to dance with his lady. His concerned father once asked him how he filled the time between two dances.

His reply was immediate: “With another dance.”

And so, between dance 1 and dance 2, he inserted dance 3. Then between dance 1 and dance 3, he added dance 4; between dance 3 and dance 2, he added dance 5; and so on. The sequence continued indefinitely.

Formally, each dancing sequence i is constructed from the previous sequence $i - 1$ by inserting a new dance between every pair of consecutive dances, with the index of each new dance increasing by one.

The first few dancing sequences are:

- Sequence 0: 1 2
- Sequence 1: 1 3 2
- Sequence 2: 1 4 3 5 2
- Sequence 3: 1 6 4 7 3 8 5 9 2
- ...

Given the Sequence N , your task is to compute the sum of the dance indexes between positions L and R inclusive. Since this sum can be quite large, output it modulo $10^9 + 7$.

Input

The first and only line of the input contains three numbers N ($0 \leq N \leq 62$), the sequence number, and L and R ($0 \leq L \leq R \leq 2^N$), the inclusive range of positions.

Output

The output should contain the sum of all dance indices in Sequence N between positions L and R inclusive modulo $10^9 + 7$.

Example

standard input	standard output
2 1 3	12
3 0 8	45

Explanation

In the first example, Sequence 2 is 1 4 3 5 2, and the sum between position 1 and 3 is $4 + 3 + 5 = 12$.

In the second example, Sequence 3 is 1 6 4 7 3 8 5 9 2, and the sum between position 0 and 8 is $1 + 6 + 4 + 7 + 3 + 8 + 5 + 9 + 2 = 45$.