Problem B

Population Count

(Time Limit: 1 second)

In Binary City, there are numerous houses. The city government numbered the houses from 1 to n. Amazingly, house k can accommodate up to $c(k)$ persons where $c(k)$ is the number of 1's in the binary representation of k. For example, house 113 can accommodate 4 persons, since 113 in decimal is 1110001_2 in binary numeral system.

After the mayor of Binary City proposed his "Make Big Money!" project, numerous people moved to Binary City, since they want to become the richest people in the world. Now, all houses in Binary City are full of people.

The civil affairs director of Binary City asks you to help the city government to do some statistics for answering inquiries from the city council. Each inquiry consists of two integers b and e, and your task is to compute the population living in houses $b, b+1, \ldots, e-1, e$ which is $\sum_{k=b}^{e} c(k)$.

Input Format

The first line of the input contains an integer m indicating the number of inquiries. Each of the following lines is an inquiry, and there are two numbers b and e separated by blanks.

Output Format

For each inquiry, output the population living in houses $b, b+1, \ldots, e-1, e$ on one line.

Technical Specification

- $1 \le m \le 20$, $1 \le b \le e \le 10^4$, and $e \le n$.

Example

Sample Input:	Sample Output:
3 1 10 113 113 1 10000	17 4 64613