1007 – Mathematically Hard

Mathematically some problems look hard. But with the help of the computer, some problems can be easily solvable.

In this problem, you will be given two integers **a** and **b**. You have to find the summation of the scores of the numbers from **a** to **b** (inclusive). The score of **a** number is defined as the following function.

score (x) = n², where **n** is the number of relatively prime numbers with **x**, which are smaller than **x**

For example,

For 6, the relatively prime numbers with 6 are 1 and 5. So, score (6) = 2^2 = 4.

For 8, the relatively prime numbers with 8 are 1, 3, 5 and 7. So, score (8) = 4^2 = 16.

Now you have to solve this task.

Input

Input starts with an integer **T (≤ 10^5)**, denoting the number of test cases.

Each case will contain two integers **a** and **b (2 ≤ a ≤ b ≤ 5 * 10^6)**.

Output

For each case, print the case number and the summation of all the scores from **a** to **b**.

Sample Input	Output for Sample Input
3 6 6 8 8 2 20	Case 1: 4 Case 2: 16 Case 3: 1237

Note

Euler's totient function $\phi(n)$ applied to a positive integer **n** is defined to be the number of positive integers less than or equal to **n** that are relatively prime to **n**. $\phi(n)$ is read **"phi of n."**

Given the general prime factorization of $n = p_1^{e_1} p_2^{e_2} \cdots p_m^{e_m}$, one can compute $\phi(n)$ using the formula

$$\phi(n) = n\left(1 - \frac{1}{p_1}\right)\left(1 - \frac{1}{p_2}\right)\cdots\left(1 - \frac{1}{p_m}\right).$$