The depth of *phi* value of a number is denoted by the number of steps required before it reaches 1. An example will make it very clear.

$\phi(13) = 12 \ldots step1$
$\phi(12) = 4 \ldots step2$
$\phi(4) = 2 \ldots step3$
$\phi(2) = 1 \ldots step1$

So the depth of $phi(13)$ is 4. We name this function as depthphi. So we can write $depthphi(13) = 4$. The sum of depthphi function (SODF) takes two integers as parameter and its definition is given below:

$$\text{SODF}(m, n) = \sum_{i=m}^{n} depthphi(i), \quad m \leq n$$

Given the value of m and n your job is to find the value of SODF(m, n).

The following paragraph is extracted from Mathworld to inform you about phi function.

The totient function $\phi(n)$ or $phi(n)$, also called Euler's totient function, is defined as the number of *positive integers* $\leq n$ that are *relatively prime* to (i.e., do not contain any factor in common with) n, where 1 is counted as being relatively prime to all numbers. Since a number less than or equal to and *relatively prime* to a given number is called a *totative* the totient function $\phi(n)$ can be simply defined as the number of *totatives* of n. For example, there are eight *totatives* of 24 (1, 5, 7, 11, 13, 17, 19, and 23), so $\phi(24) = 8$. The totient function is implemented in *Mathematica* as `EulerPhi[`n`]`.

Input

The first line of the input file contains an integer N $(0 < N < 2001)$ which indicates how many sets of inputs are there. Each of the next N lines contains two integers m and n $(2 \leq m \leq n \leq 2000000)$.

Output

For each line of input produce one line of output. This line contains an integer S, which actually denotes the value of SODF(m, n).

Sample Input

```
2
2 10
100000 200000
```

Sample Output

```
22
1495105
```