Out of Sync

Filename: *outofsync*
Time Limit: *8 seconds*

In class, Arup often describes two relatively prime integers as "out of sync." His crazy definition comes from the fact that if a windshield wiper cycles every *a* seconds and another one cycles every *b* seconds, and gcd(*a*, *b*) = 1, the wipers will be completely in sync once every *ab* seconds. Arup is considering possible cycle lengths for windshield wipers and has a related number theoretic query:

The Problem

Given an integer *n* and a range of possible integers from 1 to *r*, inclusive, determine the number of integers, *x*, in the range [1, ***r***] such that gcd(*n*, *x*) = 1.

The Input

The first line of input will consist of a single positive integer, *c* ($c \leq 50$), representing the number of input cases to process. The input cases follow, one per line. On each of these lines are two space separated integers: *n* ($2 \leq n \leq 10^6$) and *r* ($1 \leq r \leq 10^{18}$).

Partial Credit Input (40%)

The maximum end of the range, *r*, will be bounded by $1 \leq r \leq 10^6$. All other bounds are the same.

The Output

For each input case, output on a line by itself, the number of integers from 1 to *r*, inclusive that are relatively prime to *n*.

Sample Input

```
3
10 15
37 100
12 87
```

Sample Output

```
6
98
29
```