Relatively Prime

Filename: relprime

The Problem

Given a single integer, *n*, determine the number of integers in between 1 and *n*, inclusive, that do not share any common factors (other than 1). For example, for $n = 15$, there are 8 integers: 1, 2, 4, 7, 8, 11, 13, and 14 that don't share any common factors with 15. (Note that 3, 6, 9 and 12 share a factor of 3 and 5 and 10 share a factor of 5 with 15.)

Input Format

The first line of the input will contain a single positive integer, *c* $(c \leq 10000)$, representing the number of input cases. The following *c* lines will each contain a single positive integer, *n* $(2 \leq n \leq 10^{12})$ for which you are find the number of values from 1 to *n*, inclusive, that do not share any common factors with n. You may assume that the input cases are fairly randomly distributed. Namely, that they are not all primes in between 10^{11} and 10^{12}, but that for all values in that range, each one was equally likely to be chosen.

Output Format

For each input case, output the desired value on a line by itself.

Sample Input

```
5
2
10000000000000
420107
2147483648
69984
```

Sample Output

```
1
400000000000
403200
1073741824
23328
```