Counting Pairwise Coprime Triples

A tuple of three numbers (a, b, c) is called a *pairwise coprime triple* if $\gcd(a, b) = 1$, $\gcd(b, c) = 1$, and $\gcd(c, a) = 1$.

Let $C(n)$ be the number of pairwise coprime triples which satisfy $1 \le a, b, c \le n$.

For example, $C(3)$= #{(1, 1, 1), (1, 1, 2), (1, 1, 3), (1, 2, 1), (1, 2, 3), (1, 3, 1), (1, 3, 2), (2, 1, 1), (2, 1, 3), (2, 3, 1), (3, 1, 1), (3, 1, 2), (3, 2, 1)} = 13.

Your task is to find $C(N)$.

Input

First line of Input contains T ($1 \le T \le 500$), the number of test cases.

Each line of the next T lines contains a single number N ($1 \le N \le 100000$).

It is guaranteed that $\sum N \le 100000$ in each input file.

Output

For each number N, output a single line containing $C(N)$.

Example

Input:

```
5
1
2
3
10
100
```

Output:

```
1
4
13
280
282814
```

Information

There are 5 input files.

My C++ solution runs in 3.04 sec. (in the worst case)