DCEPCA03 - Totient Extreme

Given the value of N, you will have to find the value of H. The meaning of H is given in the following code:

```
H=0;
For (i=1; i<=n; i++) {
    For (j=1; j<=n; j++) {
        H = H + totient(i) * totient(j);
    }
}
```

Totient or phi function, φ(n) is an arithmetic function that counts the number of positive integers less than or equal to n that are relatively prime to n. That is, if n is a positive integer, then φ(n) is the number of integers k in the range 1 ≤ k ≤ n for which gcd(n, k) = 1

Constraints

0 < T <= 50
0 < N <= 10^4

Input

The first line contains T, the number of test cases. It is followed by T lines each containing a number N .

Output

For each line of input produce one line of output. This line contains the value of H for the corresponding N.

Example

```
Input:
2
3
10

Output:
16
1024
```