

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, $\varphi(n)$ 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 $\varphi(n)$ is the number of integers k in the range $1 \leq k \leq n$ for which $\gcd(n, k) = 1$

Constraints

$0 < T \leq 50$
 $0 < N \leq 10^4$

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