

Totient function

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[English version](#)

In number theory $\varphi(n)$ is defined to be the number of positive integers less than or equal to n that are coprime to n .

Input

The first line of the standard input contains one integer t ($t < 101$) which is the number of test cases.

In each of the next t lines there is one integer n ($n < 2 \cdot 10^9$).

Output

For each test, print $\varphi(n)$.

Example

Input:

3
1
6
100

Output:

1
2
40