

Combinatorial Sequence

Your task is to evaluate the following series for a given n

$$2^n - ((n-1)C(1)) * 2^{(n-2)} + ((n-2)C(2)) * 2^{(n-4)} - ((n-3)C(3)) * 2^{(n-6)} + \dots$$

$(n)C(r)$ denotes n choose r.

Power of 2 is always non-negative. (i.e. series terminates when either power of 2 goes negative or combinatorics becomes undefined.)

Input

First line of input contains the number of test cases ($t \leq 100000$), then follows t lines, each containing the value of n ($n \leq 100000$.)

Output

You should output t lines, ith line contains answer of the ith test case

Example

Input:

2
1
2

Output:

2
3

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