Project Euler #155: Counting Capacitor Circuits.

This problem is a programming version of Problem 155 from projecteuler.net

An electric circuit uses exclusively identical capacitors of the same value C.

The capacitors can be connected in series or in parallel to form sub-units, which can then be connected in series or in parallel with other capacitors or other sub-units to form larger sub-units, and so on up to a final circuit.

Using this simple procedure and up to n identical capacitors, we can make circuits having a range of different total capacitances. For example, using up to $n = 3$ capacitors of $60\mu F$ each, we can obtain the following 7 distinct total capacitance values:

: 180 μF

: 120 μF

: 90 μF

: 60 μF

: 40 μF

: 30 μF

: 20 μF
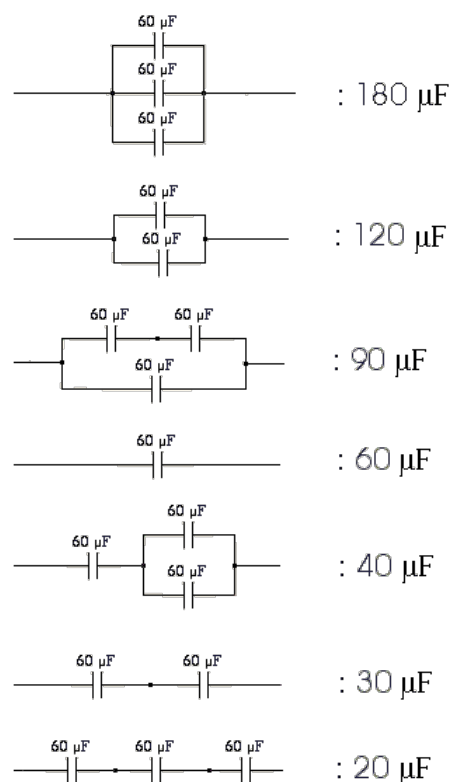
If we denote by $D(n)$ the number of distinct total capacitance values we can obtain when using up to n equal-valued capacitors and the simple procedure described above, we have:
$$D(1) = 1, D(2) = 3, D(3) = 7\ldots$$

Find $D(n)$.

Reminder : When connecting capacitors C_1, C_2 etc in parallel, the total capacitance is $C_T = C_1 + C_2 + \ldots$, whereas when connecting them in series, the overall capacitance is given by:
$\frac{1}{c_T} = \frac{1}{C_1} + \frac{1}{C_2} + \ldots$

Input Format

Each test file contains a single integer n.

Constraints

- $1 \leqslant n \leqslant 18$

Output Format

Output a single number i.e. $D(n)$

Sample Input

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3
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Sample Output

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7
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