Irreducible polynomials over GF2

Find the number of degree **n** irreducible polynomials over GF(2). For example: for n=1 there are two such polynoms: x and x+1. For **n**=2 there is only one: x^2+x+1. Note that in R[x] the polynom x^2 +1 is irreducible, but not over GF(2), because x^2+1=(x+1)*(x+1)

Input

A single positive integer **n**, where **n**<500000

Output

Output the answer for **n.**

Example

Input:
201
Output:
1598943327620885846310410042130510052260825081399500494
6218

Input:
1
Output:
2

Input:
2
Output:
1

Input:
3
Output:
2