CRACK A HACK

Diwali Lights

Course: ALGORITHMIC PROBLEM SOLVING

Course code: 17ECSE309

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• Problem

On the eve of Diwali, Hari wants to decorating his house with a serial light bulb set. The serial light bulb set has N bulbs placed sequentially on a string which is programmed to change patterns every second. If at least one bulb in the set is on at any given instant of time, how many different patterns of light can the serial light bulb set produce?

• Examples

Case 1:

If there are 2 bulbs then

2 bulbs can be lit in -*, *-, ** i.e. 3 ways.

Case 2:
If there are 3 bulbs then
3 bulbs can be lit in --*, -*-, -**, *--, *-*, **-, *** i.e. 4 ways.

Lighting two bulbs *-* is different from **-

- ## Code in python 3

```python
T = int(input())

def exp_mod(a, n, p):
    if n == 0:
        return 1
    temp = ((exp_mod(a, n // 2, p)) ** 2) % p
    if n % 2 == 0:
        return temp
    else:
        return (temp * a) % p

for t in range(T):
    N = int(input())
    print(exp_mod(2, N, 100000) - 1)
```