LEET CODE #89: Gray Code

- Gray code: binary nums where 2 successive values differ by only 1 bit
- Input: N: total number of bits → N ≥ 0
- Output: sequence of gray code
  - must start with 0 (00, 000, ...)
  - there may be more than one valid sequence.

N=2 → 00, 01, 11, 10 ✓ ; 00, 01, 10, 11 ✓ ; 00, 10, 11, 01 ✗ (2 bits difference)

2 valid sequences → return either one

N=0 → 0

N=1 → 0, 1 — 1 sequence total (valid)

N=3 → 000 — 010 — 011 — 001 — X (no more 0s); 000 — 010 — 110 — 111 — 101 — X

- change 1 bit every time
- keep track of ancestors (seen)
- stop when result length = 2^N

N=3

Levels

dup

1	000
2	100
3	110
4	010
5	011
6	001
7	101
$N^2 = 3^2 = 8$	111

Stop here

Backtrack

CORRECTION

Actually it's ok to stop on level 8, because we only care about finding one valid sequence.

N=2

00
10
11
01

$N^2 = 2^2 = 4$

N=4

Stop at 16

0000, 1000, 1100, 0100, 0110, 1110, 1010, 0010, 0011, 1011, 1111, 0111, 0101, 0001, 1001, 1101, 0100, 1100

Gave up doing it by hand at this point...

X's are from backtracking (no valid children)