

# CQE $n=1 \rightarrow n=5$ Falsifier Kit (Notebook Version)

## Purpose

Provide a pencil-and-paper protocol that anyone can run to test four falsifiable predictions about the  $n=1..5$  lift, without code or jargon.

## What you need

• Printed 4x4 boards (see Worksheets). • Pencil + eraser. • A watch or phone (to count steps mod 13). • This sheet.

## Four Predictions (Falsifiers)

Code	Prediction
F1	At $n=5$ there are exactly eight inequivalent insertion classes (by rotation/flip with mirrors); exactly one of the ei
F2	At $n=4$ all lawful sequences settle to a single palindromic rest (up to rotation/flip).
F3	Replay determinism: repeating the same choices yields the same final board and the same log hash.
F4	Rotation/flip of an $n=5$ outcome maps within its class orbit (no new classes appear).

## Simple Rules of Play

1. Draw a 4x4 grid. Lightly draw mirror lines between rows B/C and columns 2/3.
2. Moves happen in steps  $t = 1, 2, 3, \dots$ . Commit only when  $t \bmod 13 \in \{0, 5, 8\}$ .
3. Local rule: prefer the move that lowers conflicts with neighbors (same number adjacent) and keeps mirror balance.
4. Mirror rule: if a choice breaks symmetry, try the mirrored spot; pick the lower-defect of the pair.
5. Counters: keep tiny counters that wrap mod 2, 4, and 8; avoid jumps that skip the next expected counter value.
6. Defect score = neighbor conflicts + mirror flip needed + counter nudge (lower is better).

## Protocol A — $n=1..4$ to Palindromic Rest

- Place 1 at a central line cell (any orientation).
- Place 2 with its mirror partner using the rules; commit on an allowed tick.
- Place 3 then 4, always favoring lower-defect options; perform tiny local repairs if they strictly lower the defect score.
- Stop when no local repair lowers defects. Mark this board as  $n=4$  REST. Record a one-line summary of choices (the Step Log).

## Protocol B — $n=5$ Enumeration (16 Trials)

- Make 16 light copies of your  $n=4$  REST board (one per cell).
- For each trial  $k=1..16$ , insert a single '5' at that cell. Allow at most one local repair if it strictly lowers defects.
- Record whether the board re-palindromes. Photograph or sketch the final looks.
- Group the 16 results by rotation/flip look-alikes (use color pens). You should obtain exactly 8 distinct classes; verify exactly one of these canonicalizes to a palindrome.

## **Replay Determinism Check (F3)**

Re-run Protocol A with the same choices and tick schedule. Compute the SHA-256 of your Step Log text; it must match the prior run's hash.

## One-Page Quick Sheet

- Allowed commit ticks: 0, 5, 8 (mod 13).
- Keep counters mod 2, 4, 8 (don't skip).
- Pick the lower defect: conflicts + mirror + counter nudge.
- $n=4$  must settle to a palindromic rest (up to rotation/flip).
- $n=5 \rightarrow$  exactly 8 classes; exactly 1 palindromic.
- Replay must reproduce the same log hash.