Concurrency Control for Conflicting Experiments

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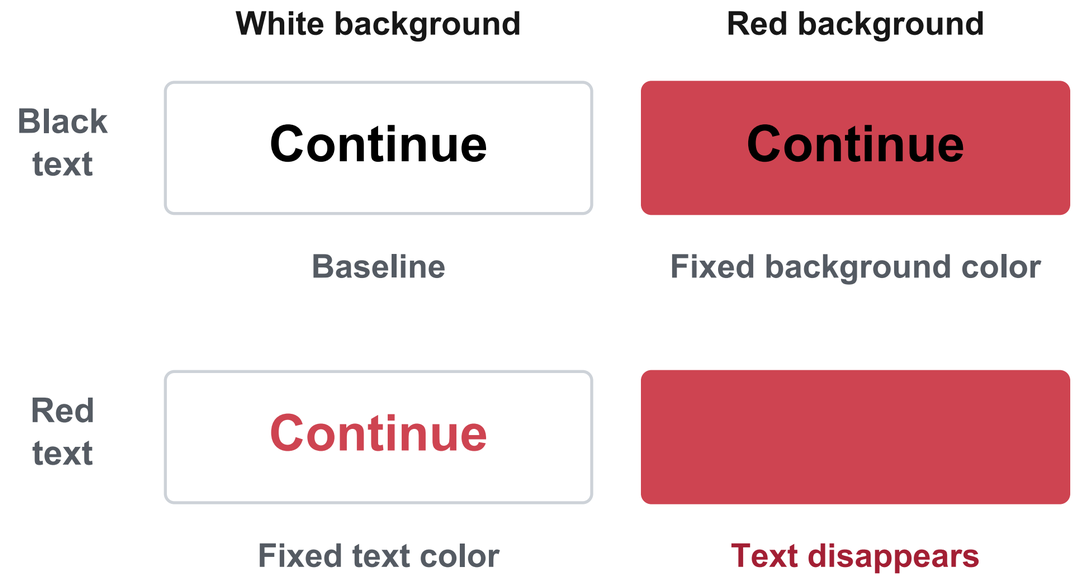
Find an eligible population, then randomize to form an RCT

Conflicting treatments

Two experiments can change the same UI element. Individually, each change is readable. Together, red text on a red background makes the label disappear. [1, §1]



A change to either fixed color locks both colors. Size and Font remain independent.

An RCT on the eligible population

P contains units where every desired intervention is feasible. Randomization within P creates an RCT on P. Locks keep the interventions available. [1, §2]

1 Find the eligible population P

Every desired intervention must be feasible on every unit in P.

2 Randomize within P

Sample from P and assign treatment or control. The RCT targets P.

3 Acquire all required locks

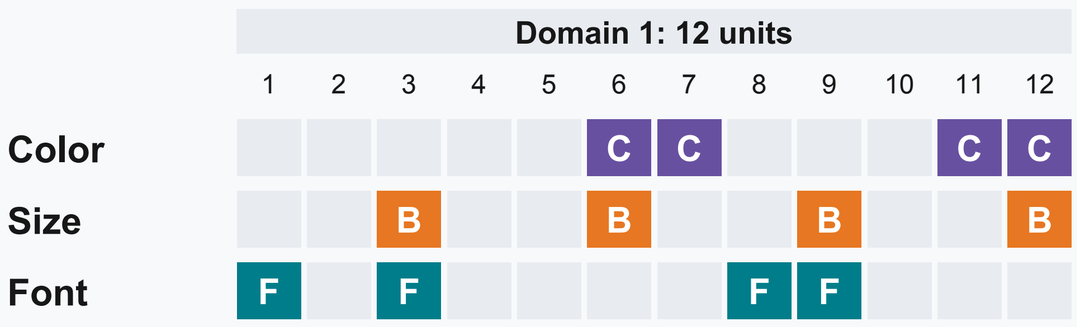
Lock each (unit, resource type) pair needed to preserve the treatment and its dependencies.

One atomic allocation

Identify P and acquire all locks required over the experiment's lifetime atomically. Avoid incremental-lock deadlocks. Release the locks when the cohort ends. [1, §2]

Google's domains and layers

Domains divide traffic. Layers partition parameters. Experiments within a layer use disjoint traffic. Compatible layers share users. [2, §4]



B, C and F share users across independent layers.

When A needs every layer

Each experiment needs 4 units. A needs Color + Size + Font, combining the layers into one. All four then compete for disjoint traffic. [1, §3]

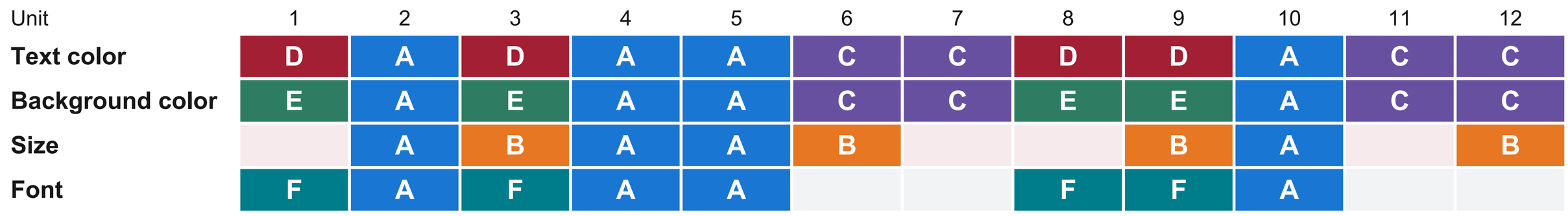


4 × 4 = 16 units > 12. A must wait.

Google can reserve another domain. More resource combinations complicate sizing. [2, §4]

Locks depend on treatment behavior

Fixed color changes lock both colors. Size and Font are independent. A uses all four resources. [1, §2]

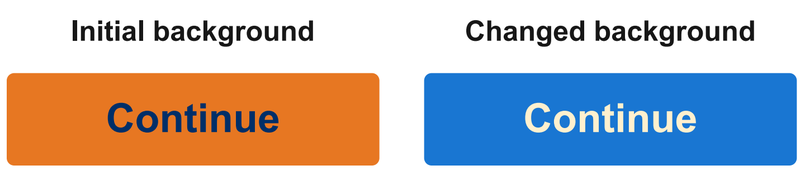


Pink Size cells: eligible P = {1, 7, 8, 11}. Randomize a new Size trial within P.

A Color + size + font
B Size only
C Fixed background
D Adaptive text
E Compatible background
F Font only

Adaptive text follows the background

Adaptive text D locks Text color only. Background treatment E locks Background color only and preserves D's complementary-color policy.



[1] D. Ting and H. Nassif. Concurrency Control for Conflicting Experiments (2026).
[2] D. Tang et al. Overlapping Experiment Infrastructure, KDD (2010), §4. [3] J. N. Gray et al. (1976). [4] R. Kohavi et al. (2009). Full references in notes.