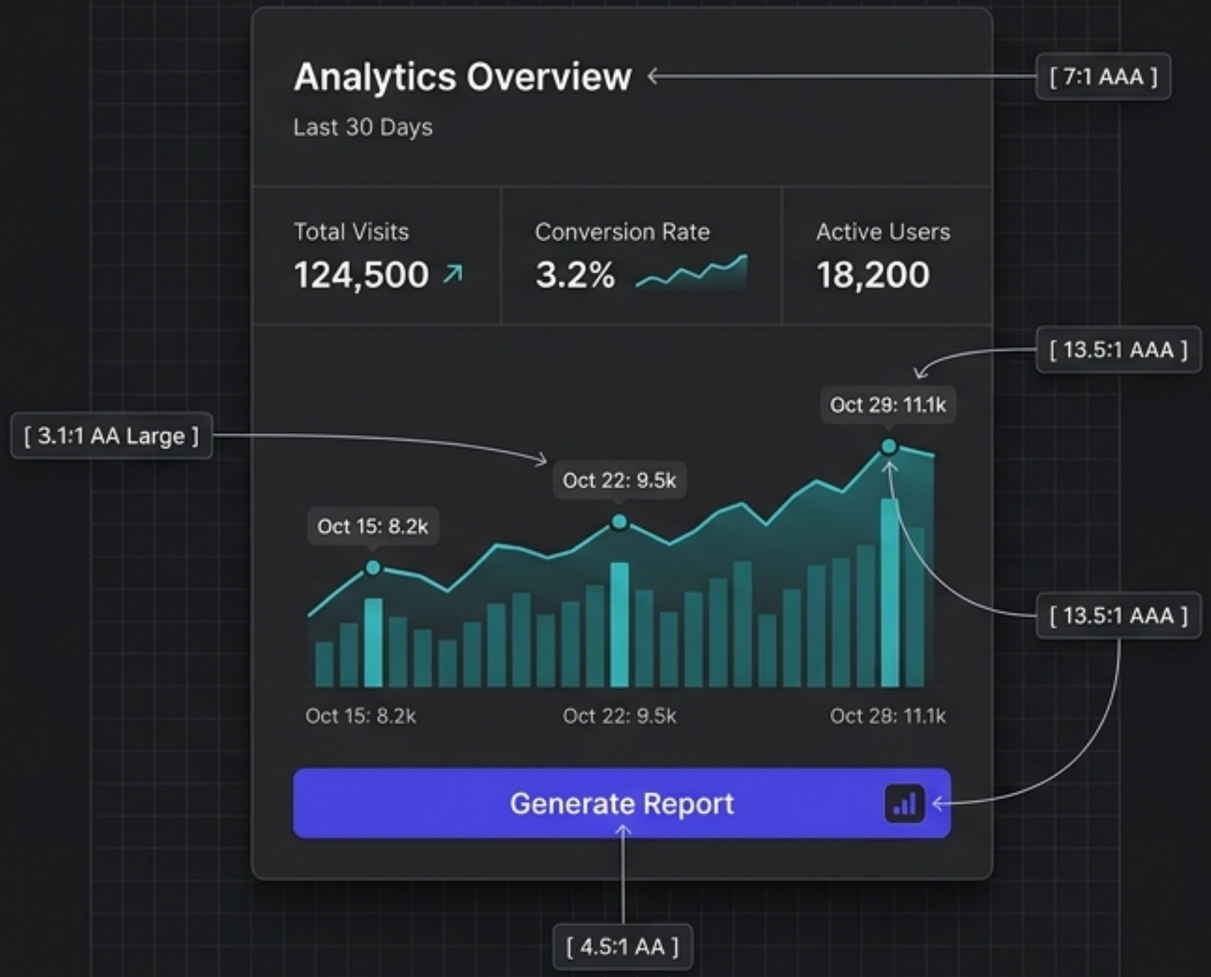



```
{
  "presentationTitle": "Visual Design for the Web: S09E03 – Building a Colour Scheme",
  "presentationSubtitle": "From Perceptual Ramps to Semantic Architectures."
}
```

INFO: Previously in S09E02: We scaled perceptual OKLCH color pairs into full, multi-theme palettes to guarantee uniform lightness and chroma across all hues.

```
// COLOR TOKENS & SEMANTICS
```

```
// NEUTRAL SCALE

$color.neutral.dark.surface.card {
  value: oklch(28% 0.02 258);
  swatch: [ ]; // Dark Charcoal
  role: "Surface", "Background";
  grade: 900;
}
```

```
// DATA VISUALIZATION

$color.dataviz.chart.line {
  value: oklch(65% 0.12 200);
  swatch: [ ]; // Teal
  role: "Visualization", "Trend";
  grade: 400;
}
```

```
// PRIMARY BRAND

$color.primary.action.default {
  value: oklch(55% 0.18 270);
  swatch: [ ]; // Vibrant Indigo
  role: "Action", "Interactive";
  grade: 500;
  contrast: {
    onSurface: 4.5:1 (AA),
    onBackground: 3.1:1 (AA Large)
  };
}
```

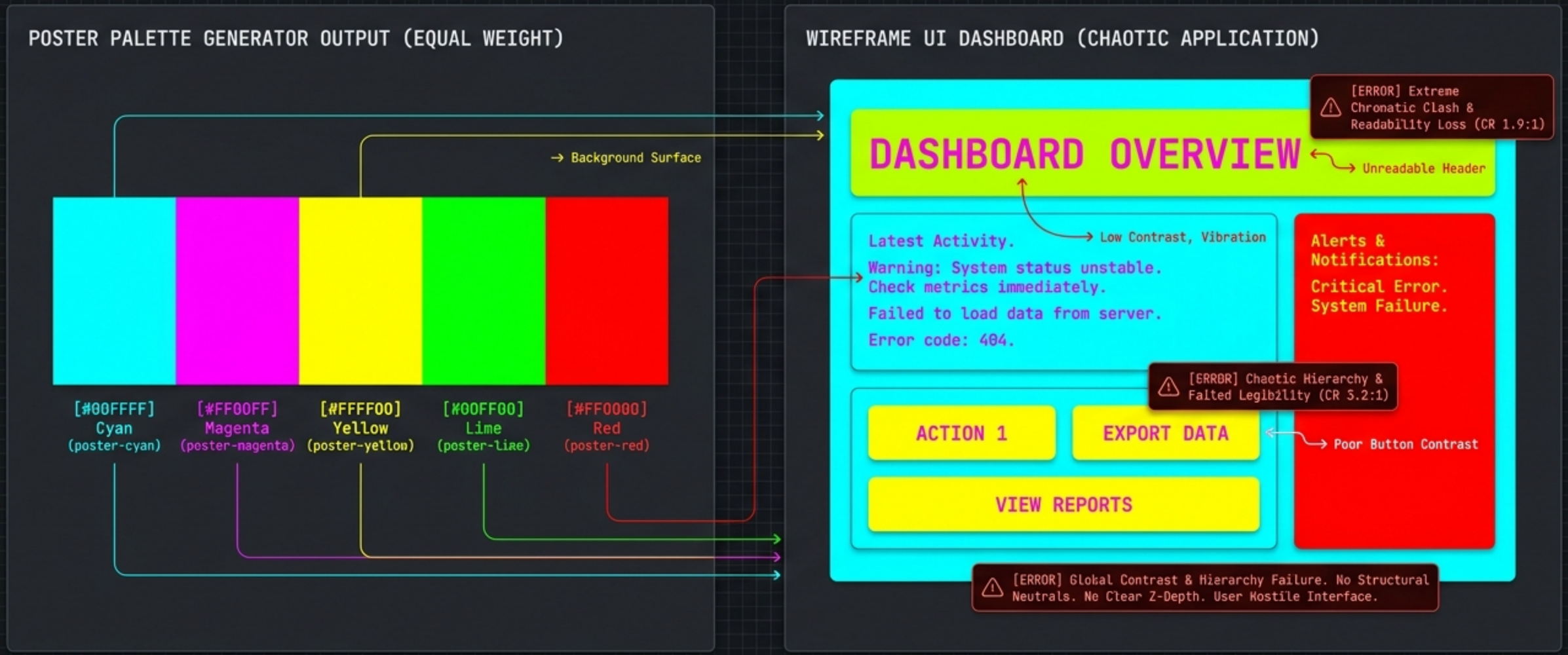
```
// TYPOGRAPHY

$color.text.primary.onDark {
  value: oklch(98% 0.01 250);
  swatch: [ ]; // Crisp White
  role: "Typography", "Content";
  grade: 50;
}
```

Gemini Notebook

1. The Chaos of the 5-Color Poster

Why 5-Color Generators Fail UI Design: They produce poster art palettes with equal weighting. Interfaces are environments, not posters. They require vast expanses of structural neutrals and highly constrained accent colors.

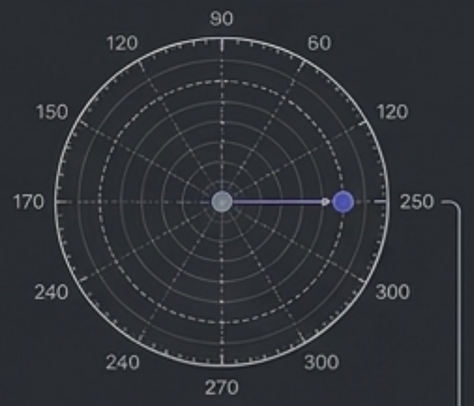


Gemini Notebook

Engineered Harmonies

Don’t guess harmonies. Seed them mathematically using OKLCH degree rotation to maintain uniform perceptual chroma while shifting hues.

Monochromatic



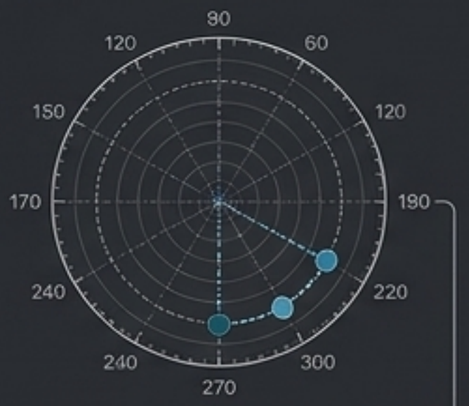
background-surface:
oklch(22% 0 250)
[Grade 200]

text-primary:
oklch(90% 0 250)
[Grade 900]
Contrast badges CR 4.5:1

Primary button

accent-indigo:
oklch(60% 0.12 259)
[Grade 500]
Contrast badges CR 4.5:1

Analogous



surface-teal:
oklch(30% 0.05 200)

surface-blue:
oklch(45% 0.08 220)

primary-teal:
oklch(60% 0.1 200)
[Grade 500]

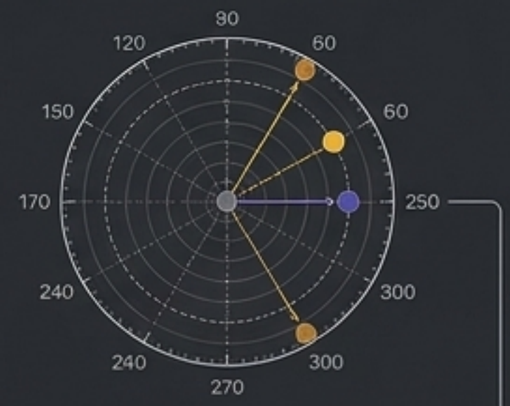
secondary-blue:
oklch(70% 0.12 220)
[Grade 600]

Primary button

secondary-blue:
oklch(70% 0.12 220)

surface-teal:
oklch(30% 0.05 200)

Split-Complementary



background:
oklch(25% 0.02 250)

primary:
oklch(50% 0.15 250)
[Grade 500]

primary-indigo:
oklch(60% 0.15 250)
[Grade 500]

accent-amber:
oklch(75% 0.18 80)
[Grade 700]
Contrast badges C8 4.5:1

Primary indigo

alert-orange:
oklch(70% 0.2 60)
[Grade 600]

secoondary:
oklch(70% 0.2 60)

Gemini Notebook

The 60-30-10 UI Budget Rule

60% Tinted Canvas

The foundational backdrop (e.g., bg-surface-lowest). Sets the ambient temperature.

```
bg-surface-lowest: oklch(98% 0.01 240)          [Grade 50]
```

30% Structural Surfaces & Typography

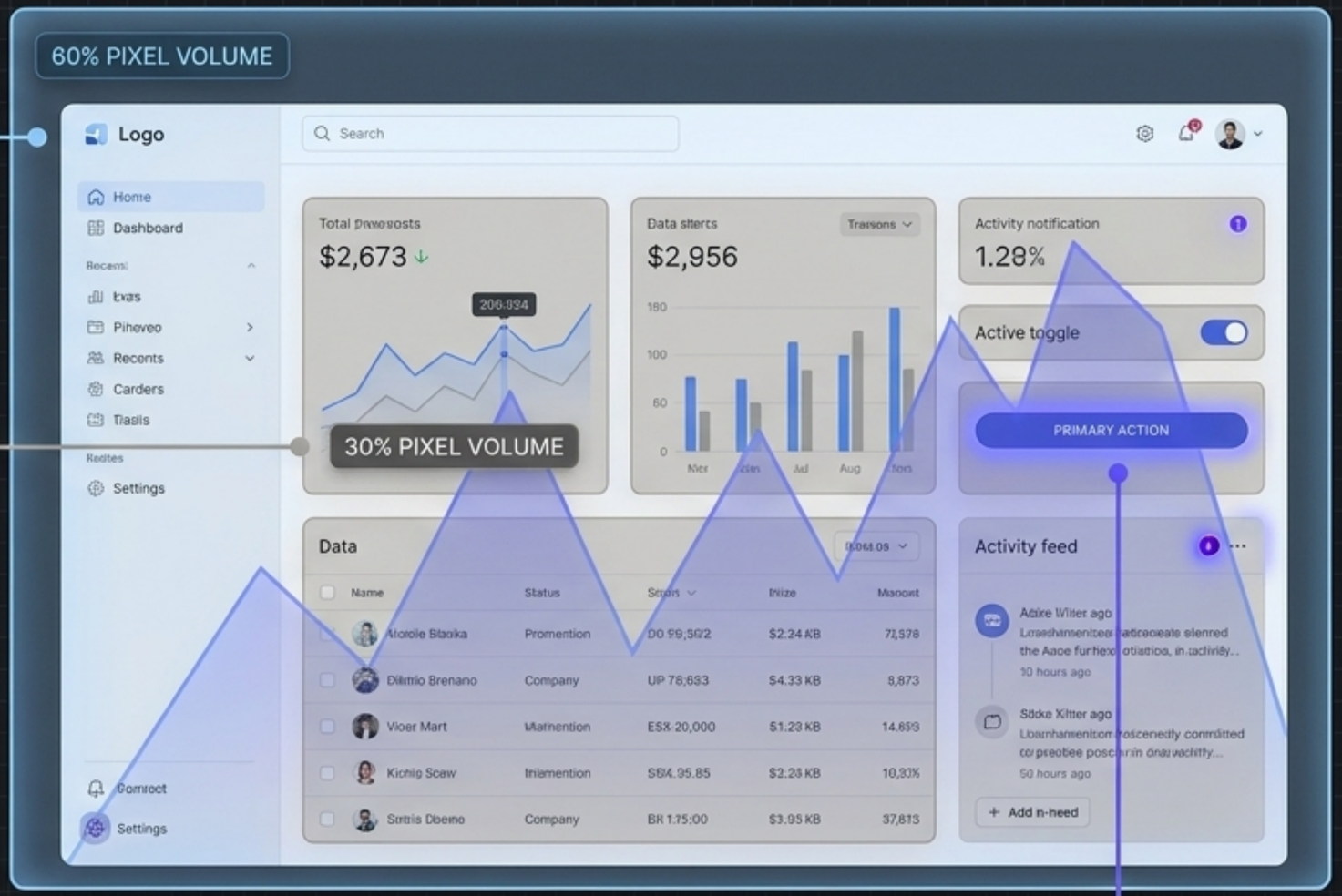
Containers, cards, borders, and high-contrast text. Provides the architectural boundaries.

```
surface-container-highest: oklch(95% 0.02 240) [Grade 100]
text-primary: oklch(20% 0.03 240) [Grade 900]
border-subtle: oklch(85% 0.04 240) [Grade 300]
contrast badge:                                  [CR 7.8:1]
```

≤ 10% Focal Brand Accent

Call-to-actions, primary buttons, and critical states. Restricted usage guarantees visual salience.

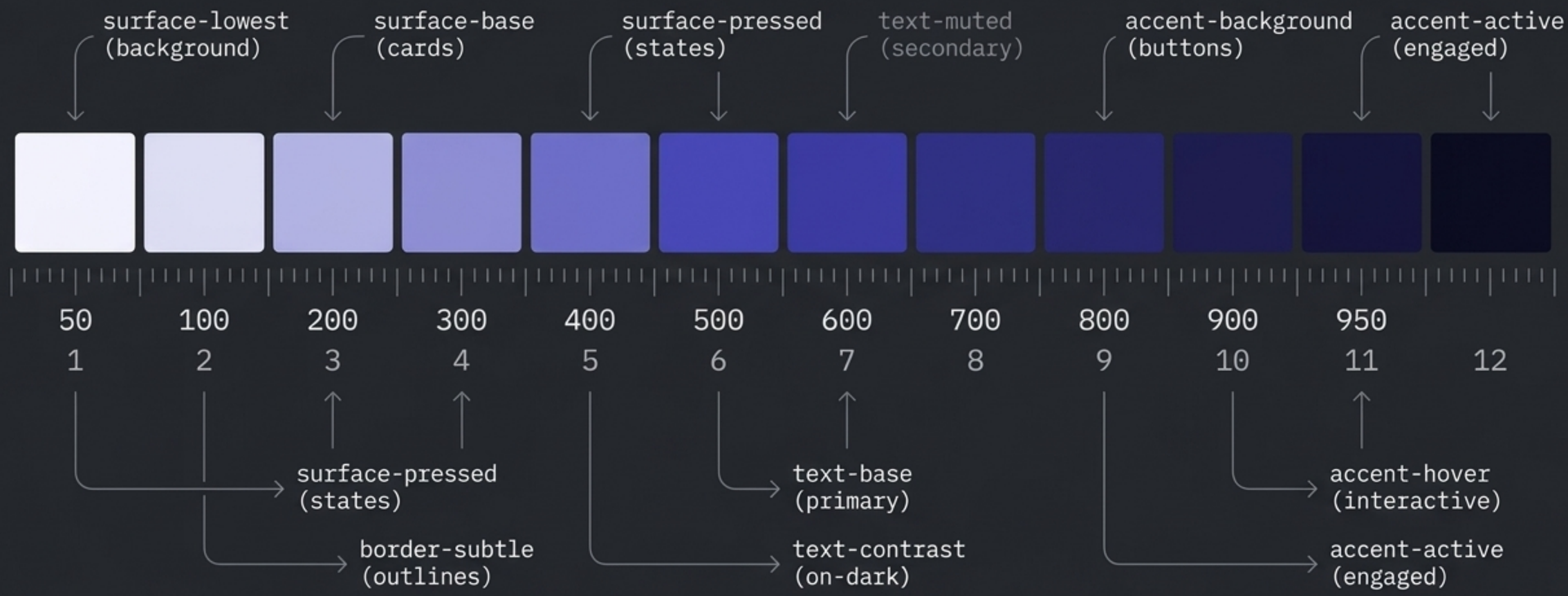
```
accent-primary: oklch(60% 0.18 260) [Grade 600] [CR 4.5:1]
accent-active: oklch(55% 0.18 260) [Grade 700]
```



Gemini Notebook

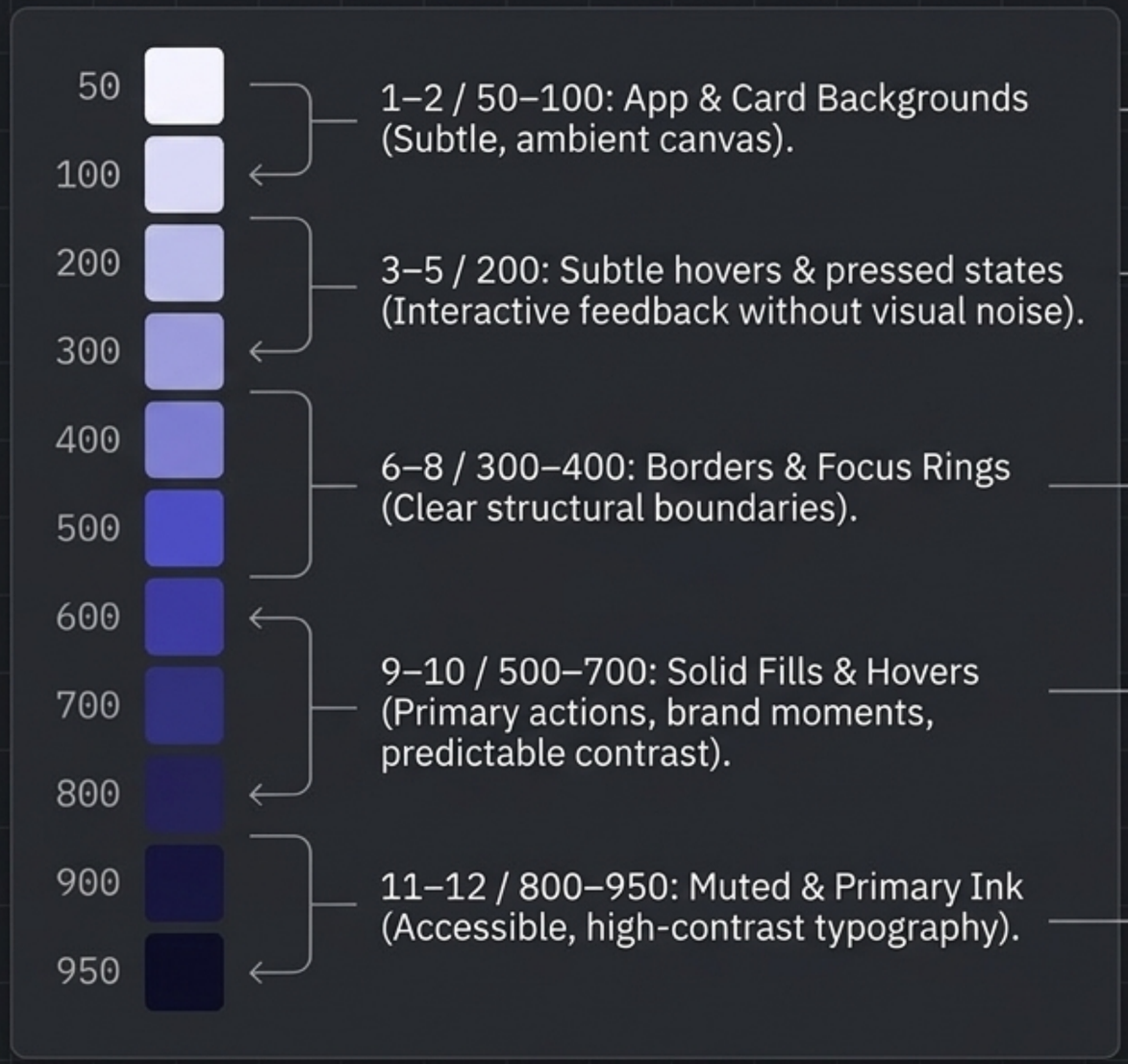
2. The Science of the Perceptual Ramp

A design system palette is not a collection of colors; it is a ladder of specific UI jobs.



Gemini Notebook

Step-by-Step UI Job Mapping



1–2 / 50–100: App & Card Backgrounds (Subtle, ambient canvas).

3–5 / 200: Subtle hovers & pressed states (Interactive feedback without visual noise).

6–8 / 300–400: Borders & Focus Rings (Clear structural boundaries).

9–10 / 500–700: Solid Fills & Hovers (Primary actions, brand moments, predictable contrast).

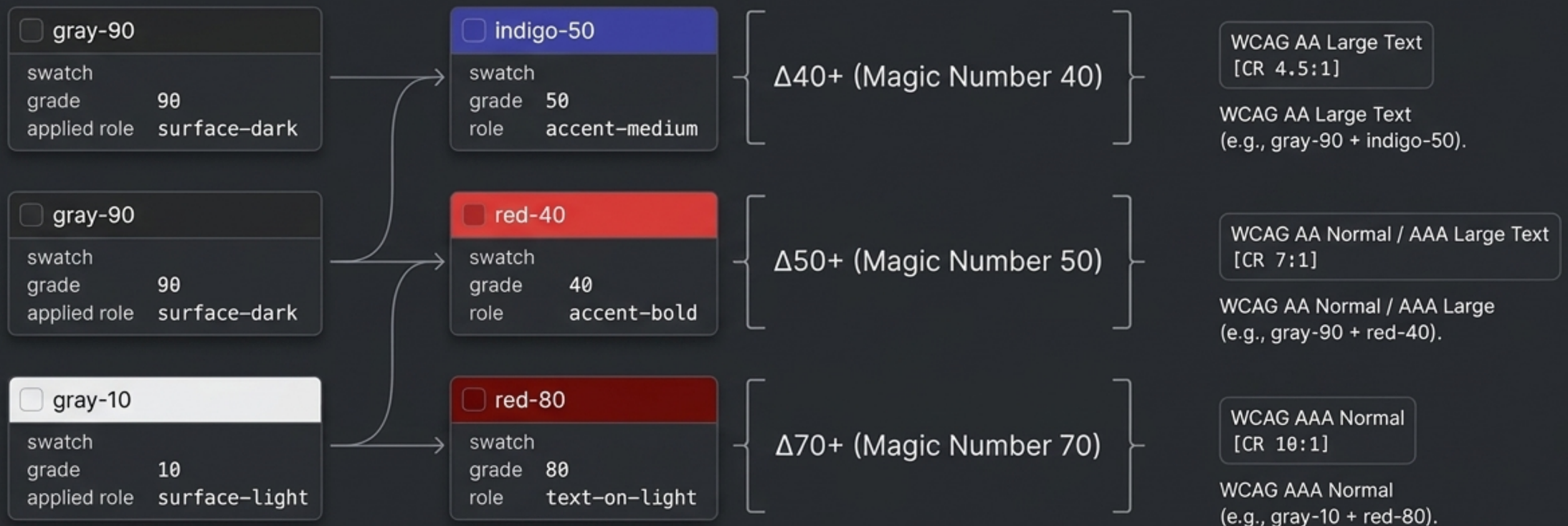
11–12 / 800–950: Muted & Primary Ink (Accessible, high-contrast typography).



Gemini Notebook

USWDS & Leonardo Contrast Magic Numbers

Contrast mathematically guaranteed by grade math, popularized by USWDS and Adobe Leonardo.



Gemini Notebook

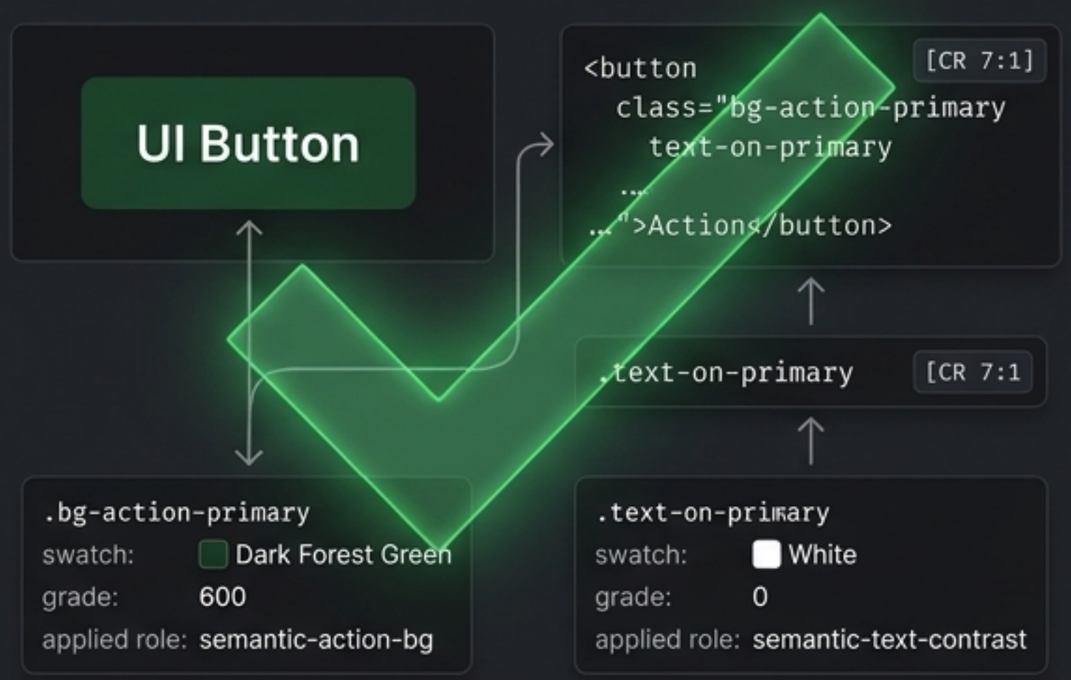
3. Escaping the Primitive Trap

Primitives define what a color is. Semantics define how a color is used. Never wire UI directly to primitive values.

Incorrect Architecture



Correct Architecture



Gemini Notebook

The Three-Tier Semantic Architecture

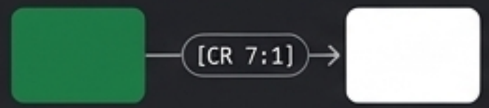
Raw Values (Source)

hex: #1E8C4B
oklch: 0.42 0.18 145

hex: #FFFFFF
oklch: 1.0 0.0 0

Primitive Token
(forest-600)

swatch: Dark Forest Green
grade: 600
applied role: primitive-color



Semantic Role
(action-primary)

swatch: Dark Forest Green
grade: 600
applied role: semantic-action-bg

Semantic Role
(text-on-primary)

swatch: White
grade: 0
applied role: semantic-text-contrast

Component Token
(button-primary-bg)

swatch: Dark Forest Green
grade: 600
applied role: component-button-bg

Action

Component Token
(button-primary-text)

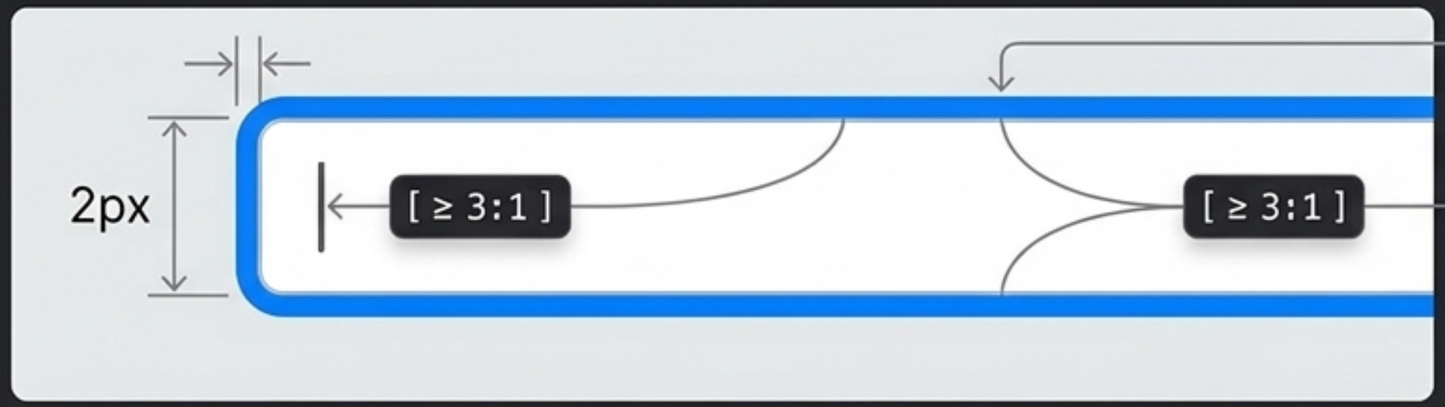
applied role: component-button-text

Backgrounds:	Foregrounds:	Actions:	Reference:
bg-canvas surface-1 surface-2 (stacking contexts).	text-primary text-secondary border-subtle.	action-primary on-primary.	Material 3, Carbon, and Polaris role structures.

Gemini Notebook

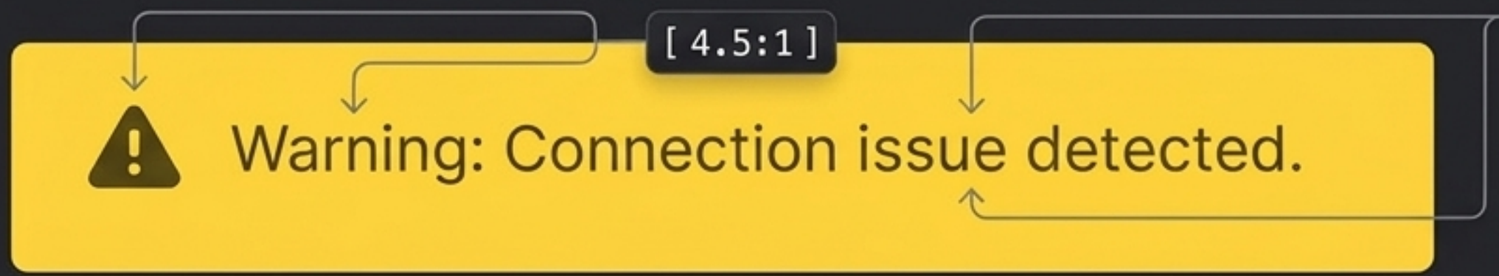
Accessible Status & Focus Contracts

WCAG 2.4.13 Focus Appearance: GOV.UK & Primer standard



Minimum 2px solid boundary, with a strict ≥ 3:1 contrast ratio against the adjacent background and the element itself.

Status Contracts



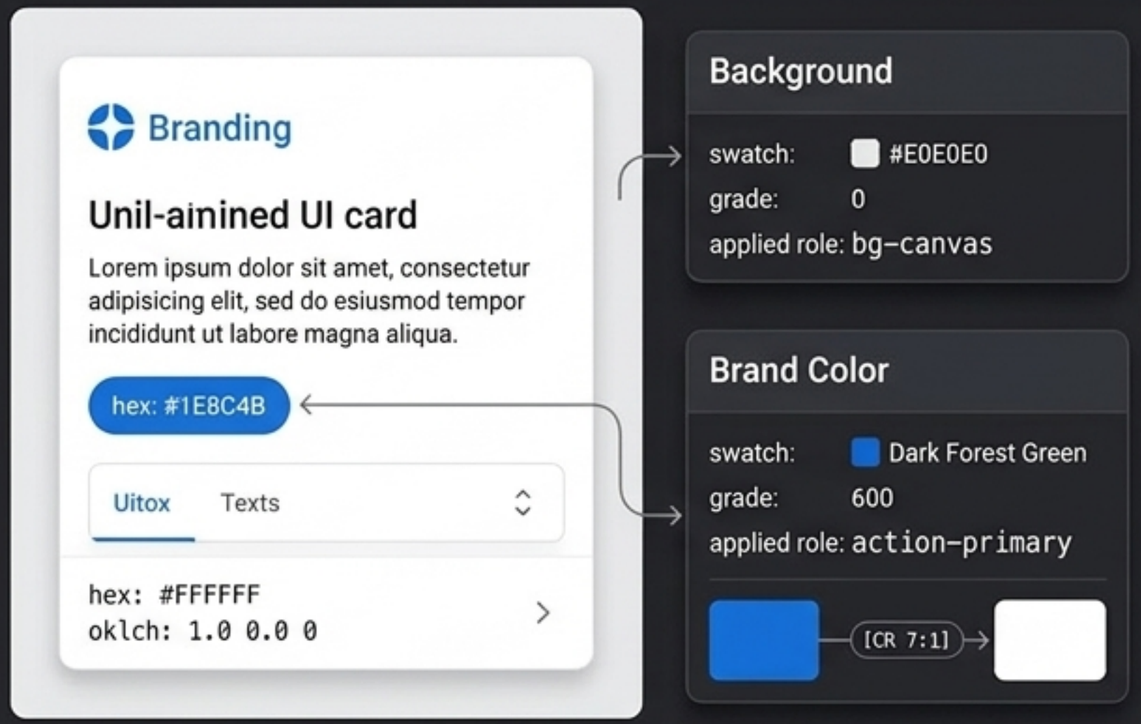
Never use red/green/yellow alone. Map icon-paired success/warning/danger semantic ramps that guarantee 4.5:1 contrast for text to ensure colorblind accessibility.

Gemini Notebook

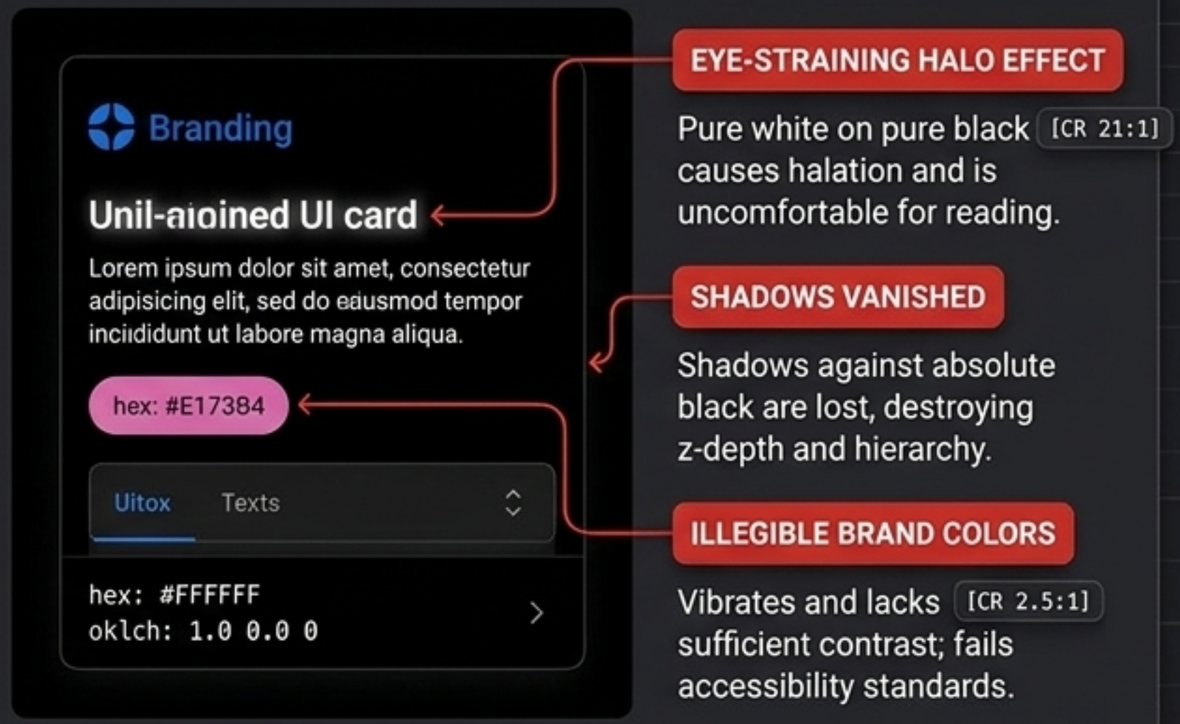
4. The Hex Inversion Disaster

You cannot mathematically invert Hex values to build Dark Mode. Human perception doesn't work that way.

Beautifully Balanced Light Mode



Naive Dark Mode Inversion



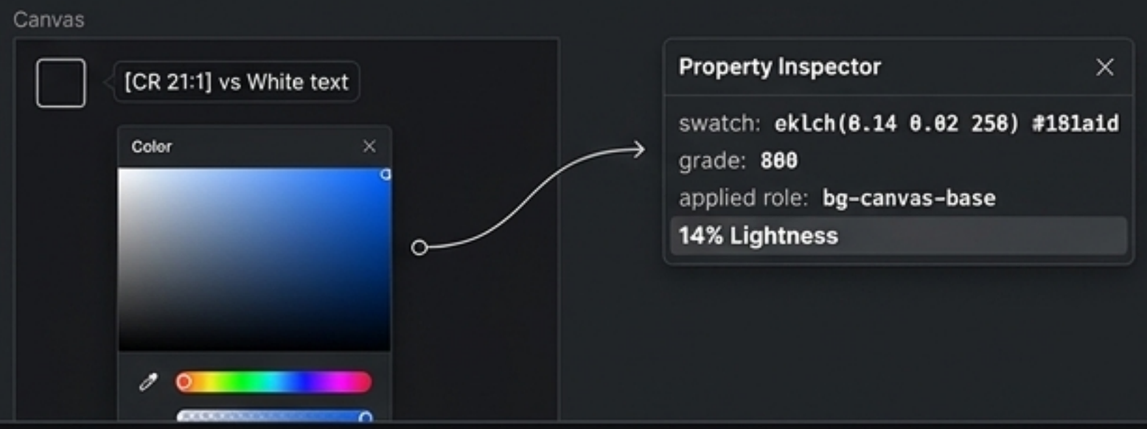
⚠ Warning: Mathematical inversion ignores human perception of lightness and color saturation. Always build Dark Mode using a separate, human-designed token set.

Gemini Notebook

The 4 Laws of Dark Mode

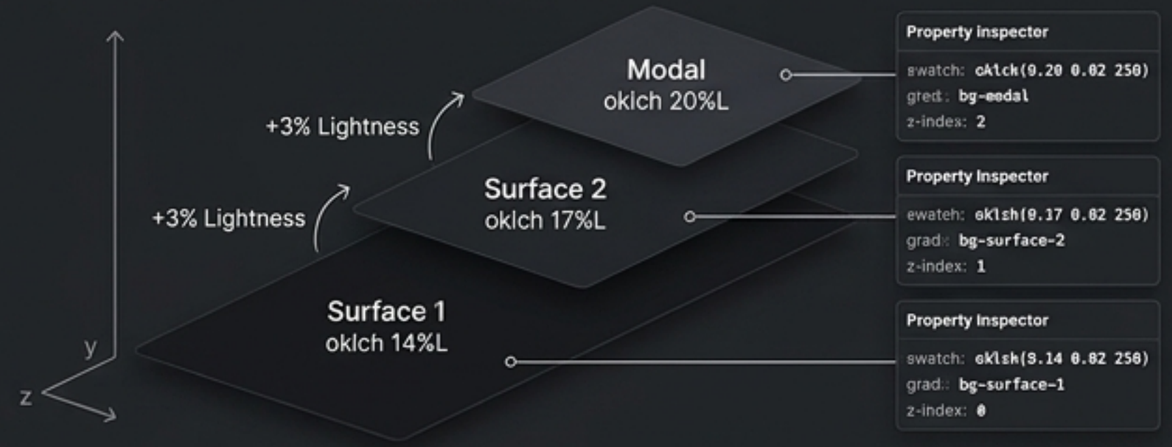
1. Tinted Charcoal Base: Never pure #000000.

Use an OKLCH tinted base with 12–16% Lightness to reduce eye strain (NN/g standard).



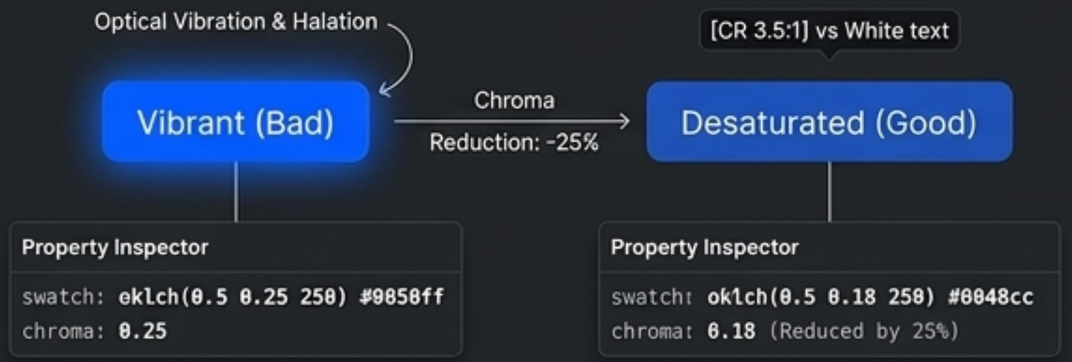
2. Lighter = Closer: Reverse the shadow logic.

Add +3% Lightness for every step up the z-axis (Surface 1 → 2 → Modal).



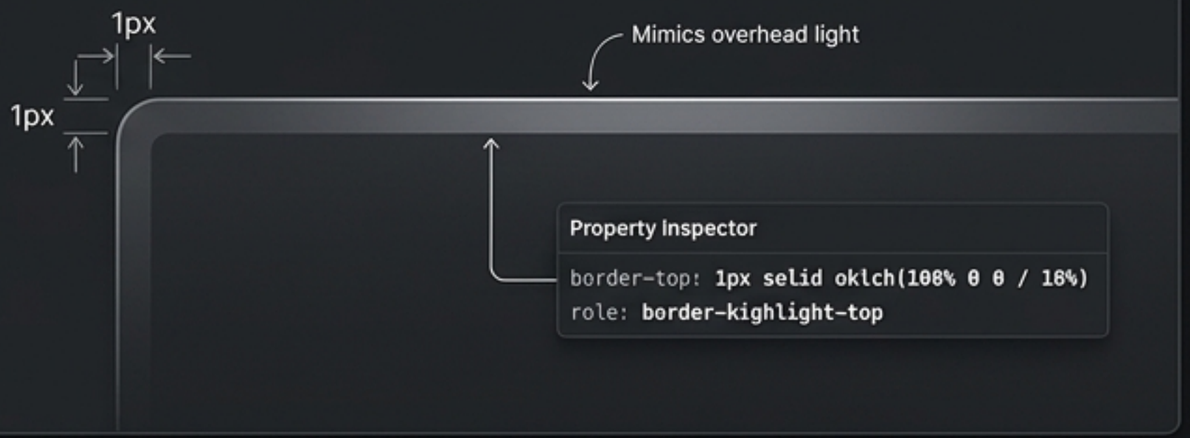
3. Desaturate Vivid Fills: Reduce Chroma.

Reduce Chroma by -15% to -25% on vibrant buttons to prevent optical vibration and halation.



4. Inner Highlights Replace Shadows: Dark shadows disappear.

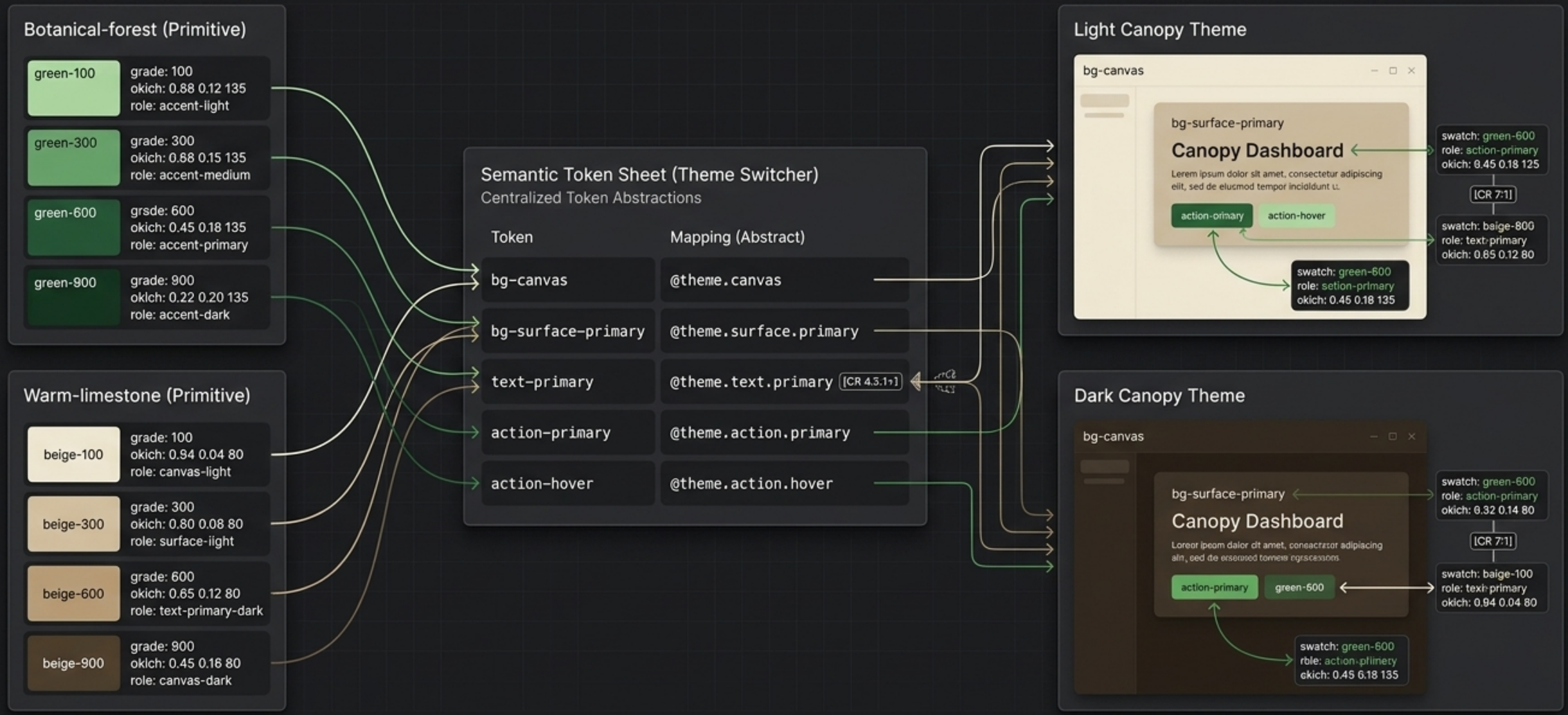
Add a 1px oklch(100% 0 0 / 8–12%) top inner-border to define card edges.



Gemini Notebook

5. Wiring the Canopy System

Injecting a non-indigo botanical-forest + warm-limestone primitive system into a centralized, theme-switching semantic architecture.



Gemini Notebook

Technical Implementation: The Modern Pipeline

```css
/* Baseline CSS: Light/Dark Mode Switching */
:root {
  --surface-light: oklch(0.98 0.02 120);
  --surface-dark: oklch(0.14 0.02 250);
}

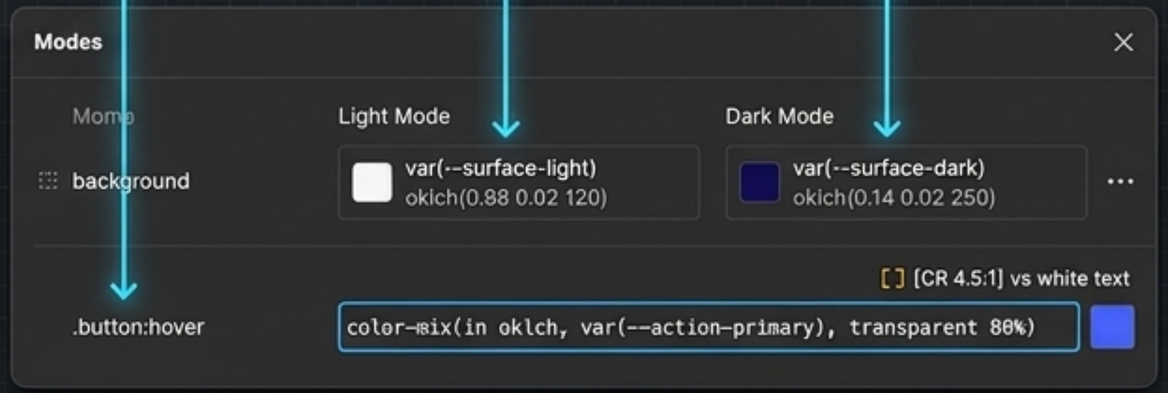
body {
  background: light-dark(var(--surface-light), var(--surface-dark));
}

/* Dynamic Opacity: Runtime Alpha without Gamut Breakage */
.button {
  --action-primary: oklch(0.52 0.22 240);
}

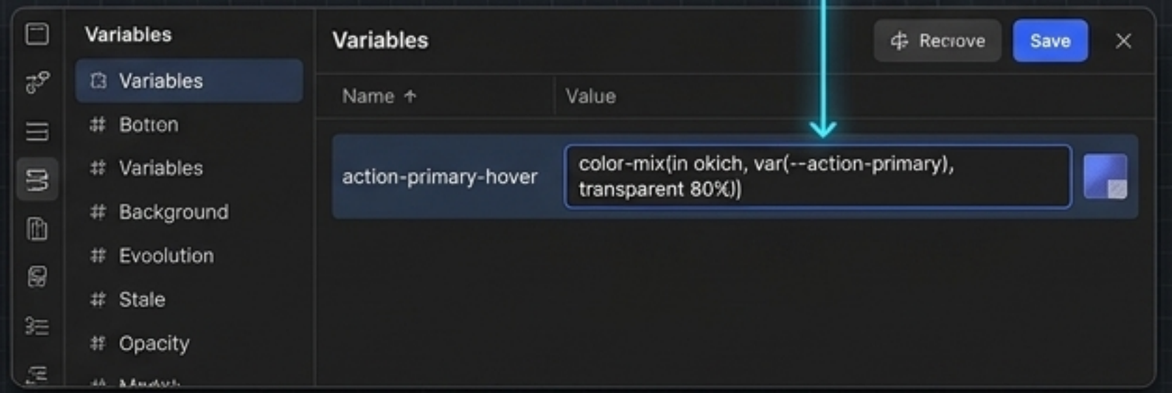
.button:hover {
  /* 20% opacity, preserving gamut */
  background: color-mix(in oklch, var(--action-primary), transparent 80%);
}
```

var(--surface-light)

transparent 80%



Figma Variable Modes (Tokens)



Webflow Variables (CSS Integration)

Gemini Notebook

The Live Swap Matrix

True semantic aliasing means swapping the brand identity requires zero changes to the UI component code.

Theme 1: Warm Editorial



[CR 12:1]

bg-canvas
oklch 0.94 0.04 80
role: canvas-light

text-primary
oklch 0.22 0.03 80
role: text-primary

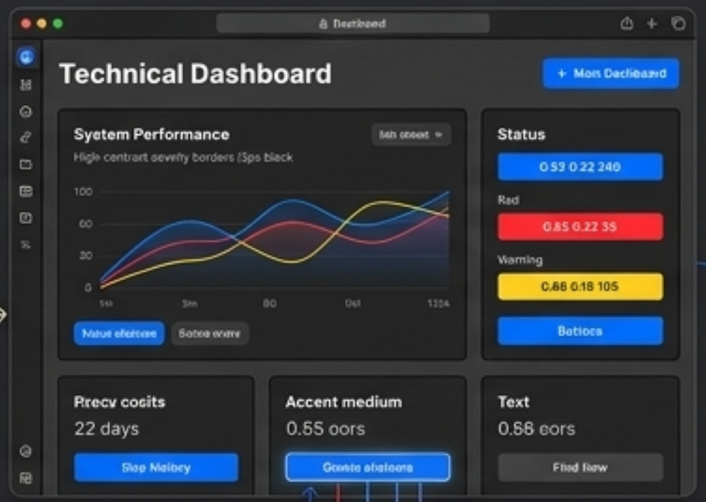
[CR 7:1]

bg-canves
oklch 0.94 0.04 80
role: canvas-light

accent-gold
oklch 0.80 0.05 80
role: accent-medium

accant-elive
oklch 0.65 0.12 80
role: accent-primary

Theme 2: Crisp Swiss / Technical Utility



[ER 7:1]

bg-canvas
oklch 0.14 0.02 250
role: canvas-dark

text-priaary
oklch 0.98 0.02 250
role: text-priaary

[CR 7:1]

bg-canves
oklch 0.14 0.02 250
role: canvas-dark

accent-klue
oklch 0.52 0.22 240
role: accent-primary

status-error
oklch 0.55 0.22 35
role: status-error

Theme 3: Tactile Craft Brand



[CR 4.5:1]

bg-canvas
oklch 0.90 0.05 135
role: canvas-light

text-priaary
oklch 0.45 0.12 135
role: text-priaary

[CR 4.5:1

bg-canvas
oklch 0.90 0.12 135
role: canvas-light

accent-green
oklch 0.65 0.18 135
role: accent-medium

accent-terracetta
oklch 0.55 0.15 35
role: accent-primary

Gemini Notebook

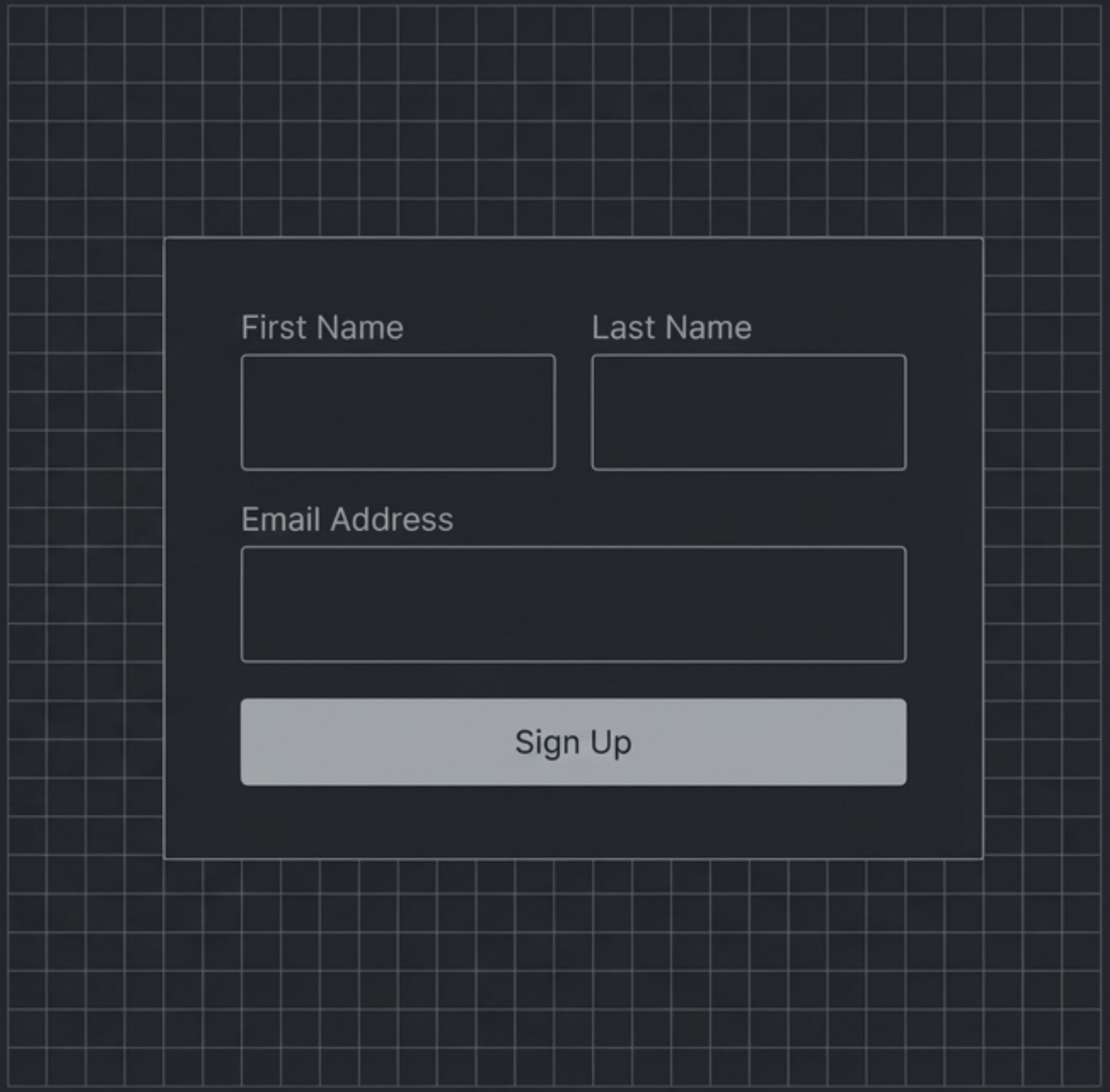
6. The 10-Token Challenge

1: Choose one non-purple primary hue (Select an `OKLCH` Hue outside 255°–305°).

2: Generate a 12-step perceptual ramp maintaining steady chroma.

3: Alias the 10 Core Semantics: `bg-canvas`, `surface-1`, `surface-2`, `text-primary`, `text-secondary`, `border-subtle`, `border-focus`, `action-primary`, `on-primary`, `action-hover`.

4: Verify Light + Dark parity using the 4 Dark Mode Laws.



Gemini Notebook

7. The System Architect's Cheat Sheet

Samplexity reference table (e.eg., oklch OKLCH, Hue, chorta, 250°), 8px structural grid.

Budget:

60% Canvas /

30% Surface /

10% Accent.

Perceptual Map:

Steps 1–2 (Bg):	bg-canvas, surface-1, surface-2
Steps 3–5 (Hover):	surface-3, surface-4, surface-5
Steps 6–8 (Borders):	border-subtle, border-strong, border-focus
Steps 9–10 (Solid Fills):	action-primary, action-secondary, action-destructive
Steps 11–12 (Text):	text-primary, text-secondary, text-tertiary

USWDS Magic Numbers:

Δ40 = AA Large. ← 4.5:1

Δ50 = AA Normal / AAA Large. ← 7:1

Dark Mode Specs:

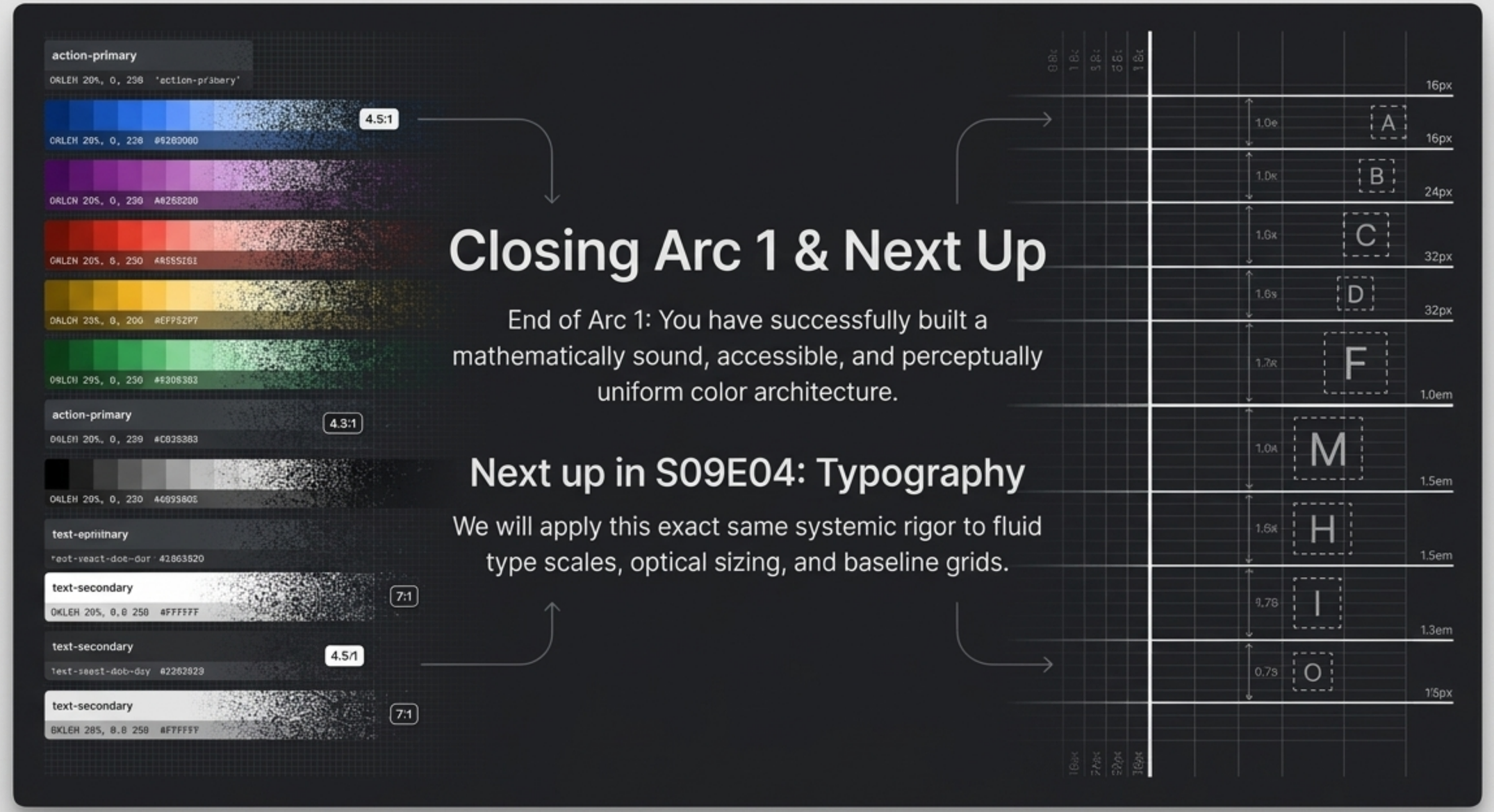
Base L: 12–16%. (e.g., oklch 0.12 L 0.02 C 250 H)

Z-index: +3% L per layer. ←

Chroma: -15–25%. →

Highlights: 1px 8–12% White. →

Gemini Notebook



Gemini Notebook