6.1040: Software Design

Visual Design

Mitchell Gordon & Daniel Jackson
Slides by Arvind Satyanarayan

What is good visual design?

Make things look aesthetically pleasing?

Yes! But also help

guide users by conveying structure, relative importance, relationships

pace users by drawing them into your app, orienting them, and showing where to go.



Based on slides by Scott Klemmer and Philip Guo.

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https://twitter.com/RobGriffinIADT/status/734723300593700864

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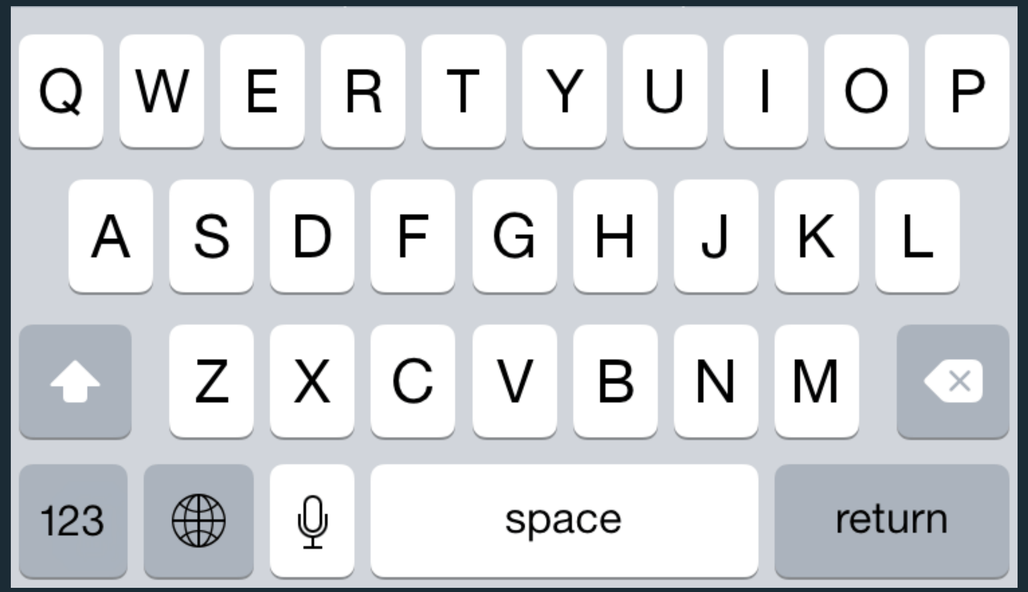
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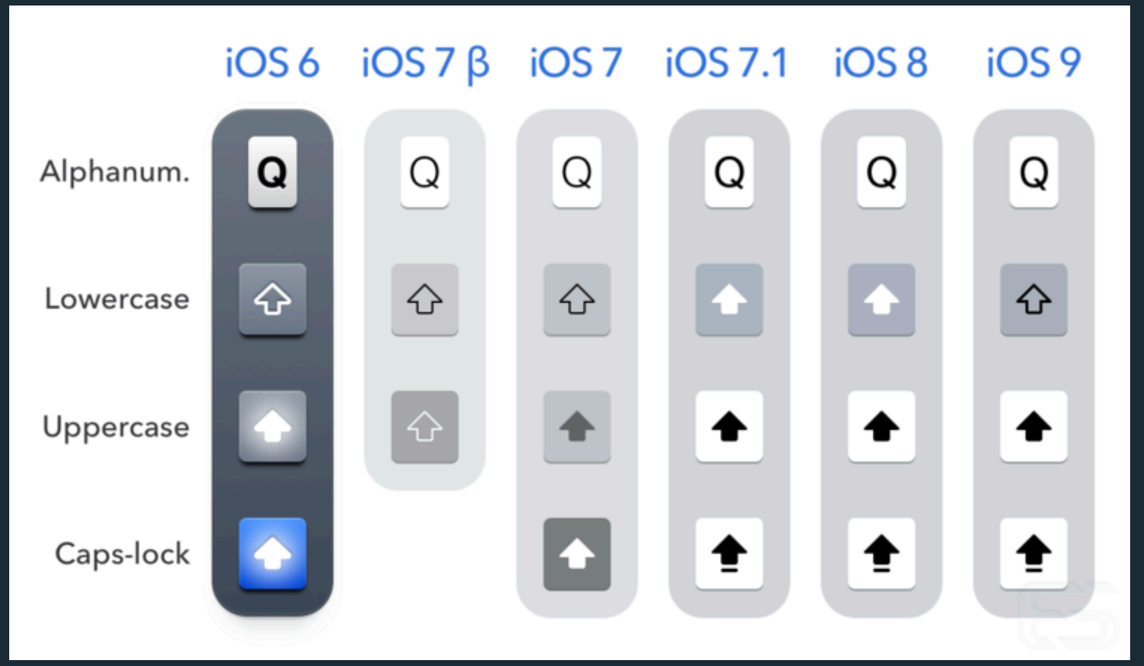


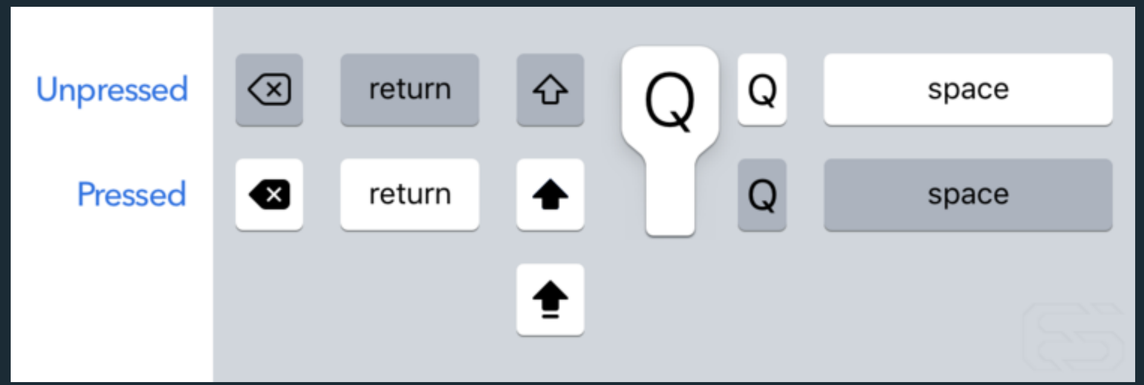
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From Eli Schiff

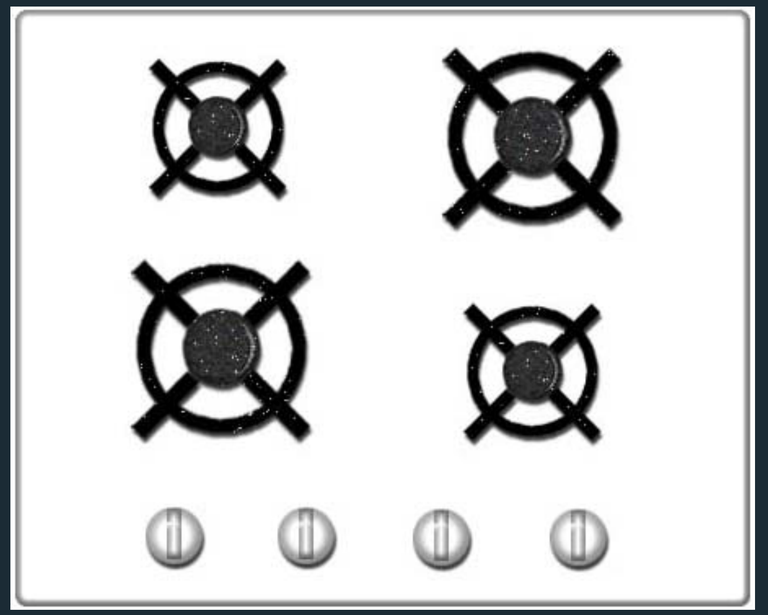
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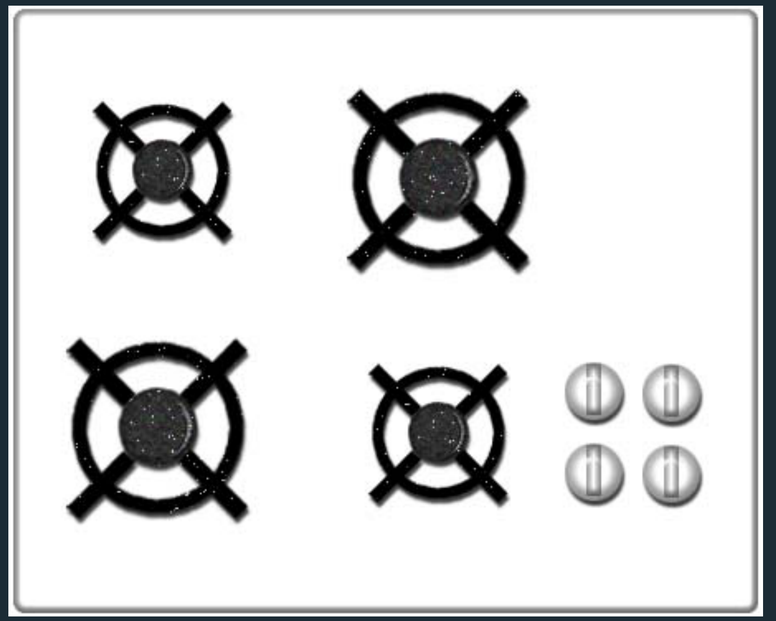
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Gestalt Principles

Prägnanz: we favor the simplest and most stable interpretations

Figure / Ground

Proximity

Similarity

Symmetry

Connectedness

Continuity

Closure

Common Fate

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Ambiguous – vase or faces?



Unambiguous (?)

http://visual-memory.co.uk/daniel/Modules/FM21820/vispero7.html

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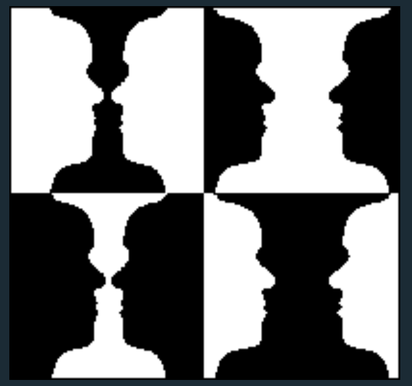
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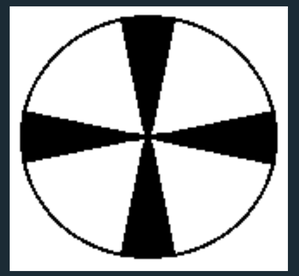
Ambiguous – vase or faces?



Unambiguous (?)



Principle of *surroundedness*.



Principle of *relative size*.

http://visual-memory.co.uk/daniel/Modules/FM21820/vispero7.html

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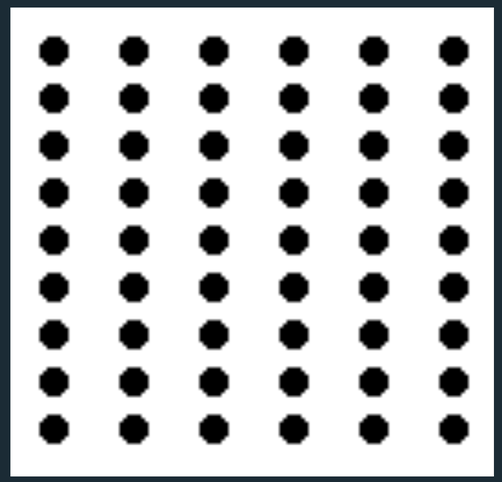
Symmetry

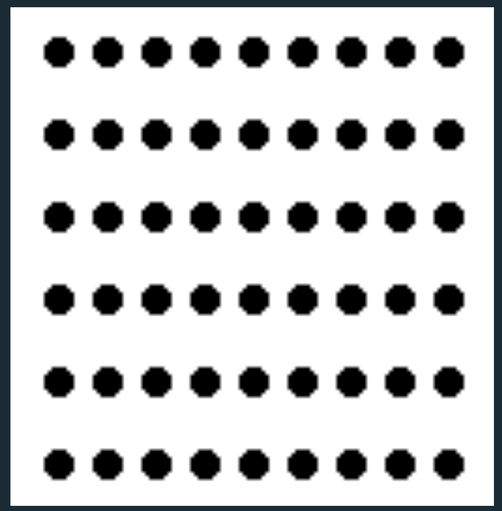
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Continuity

Closure

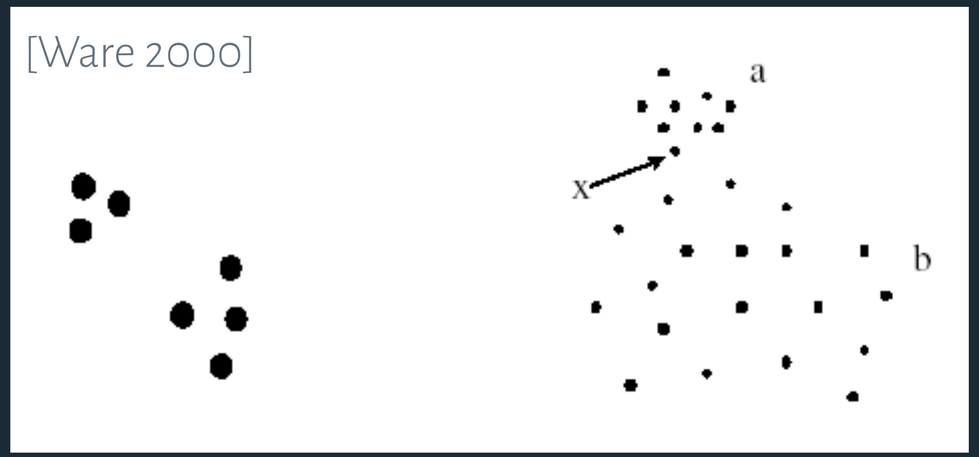
Common Fate







[Ware 2000]



Principle of *concentration*.

http://visual-memory.co.uk/daniel/Modules/FM21820/vispero7.html

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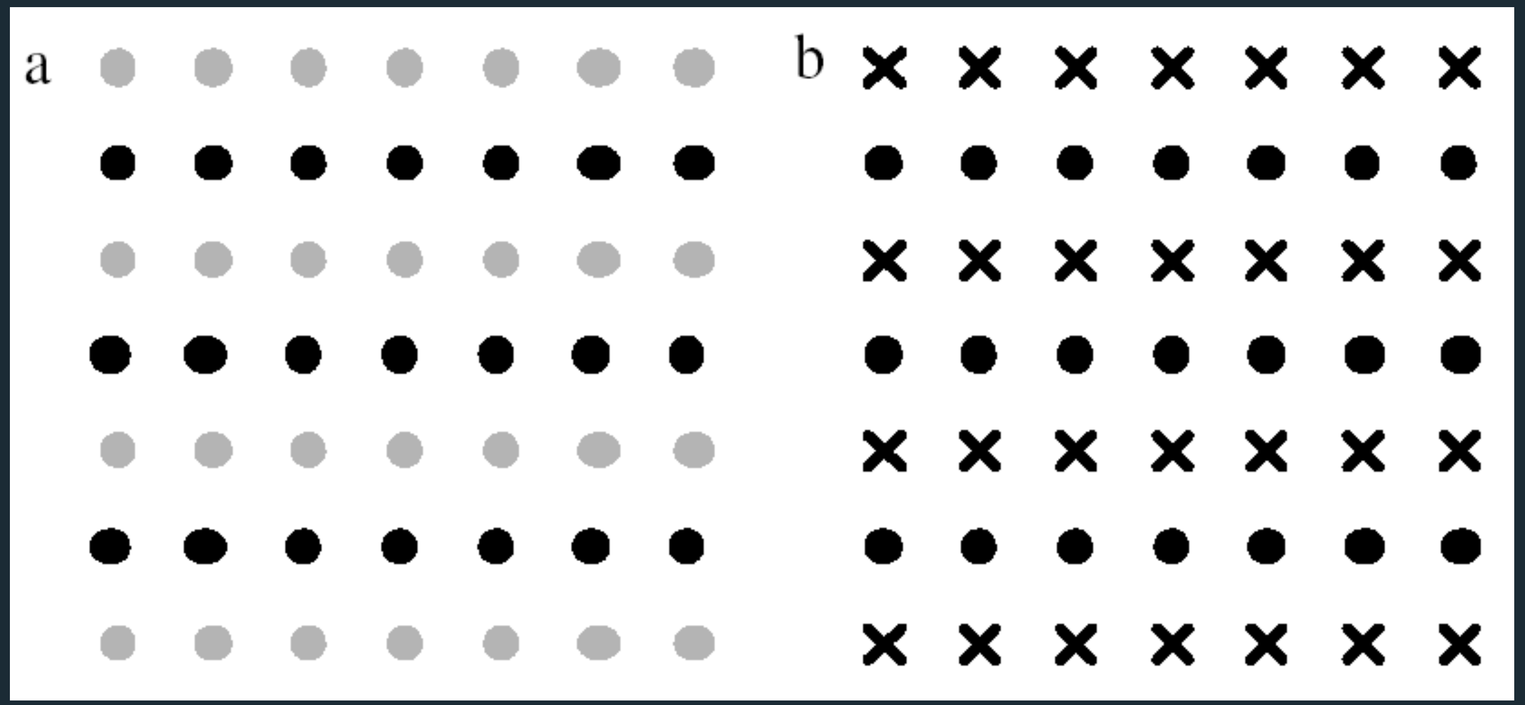
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Rows dominate due to similarity. [Ware 2004]

THE ELEMENTS OF VISUAL DESIGN

Layout

Typography

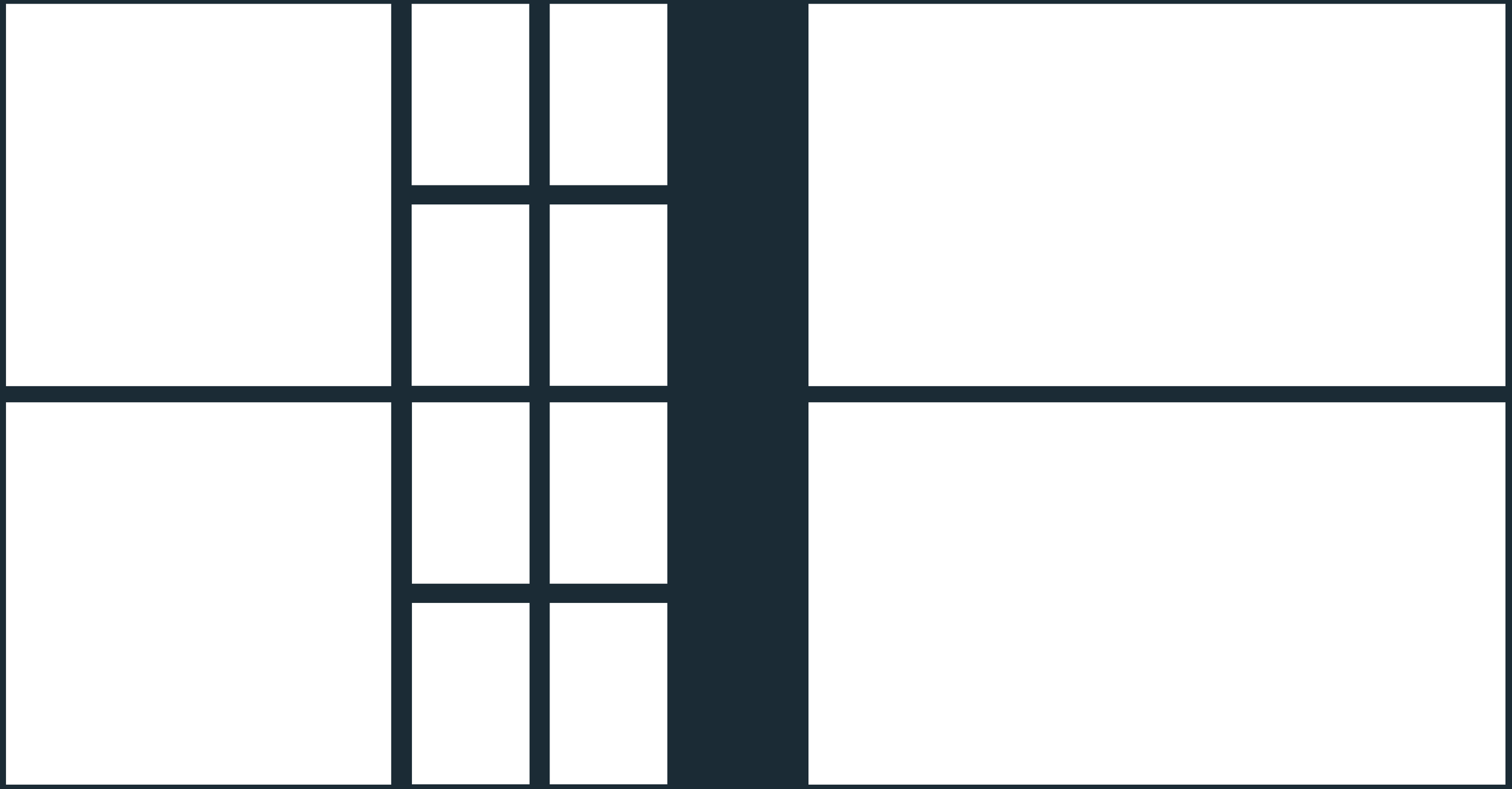
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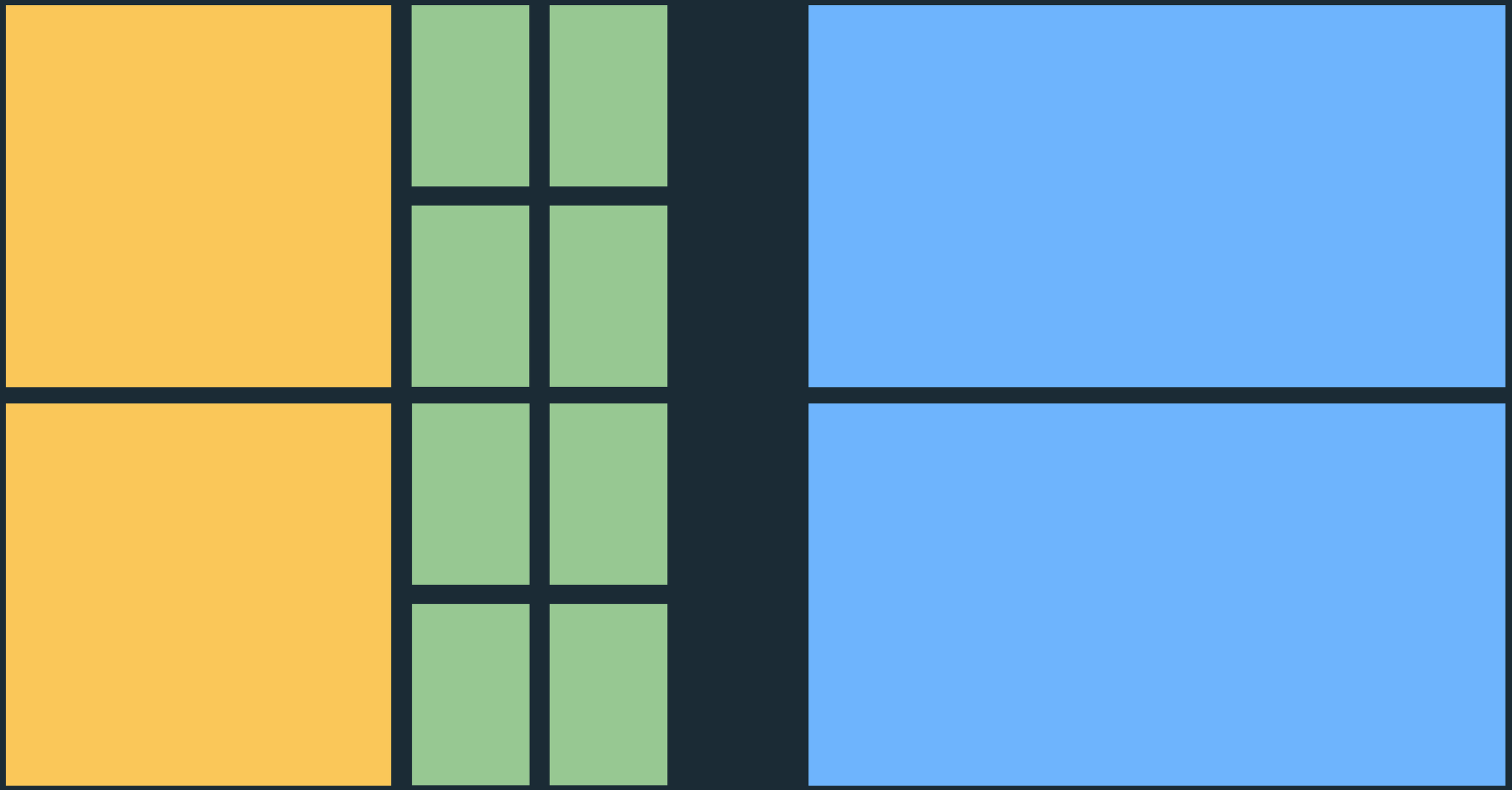
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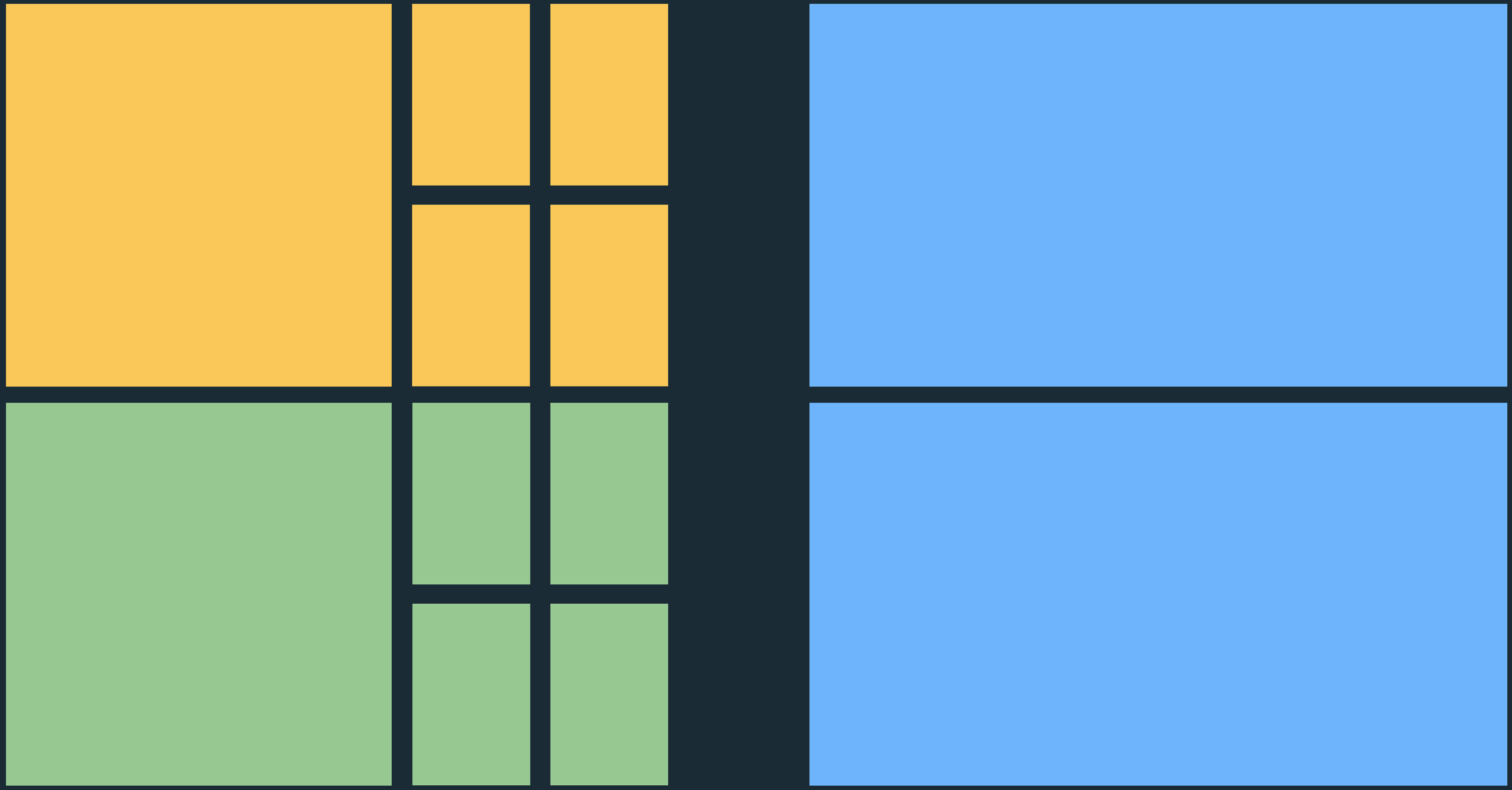
Typography

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Based on slides by James Landay.

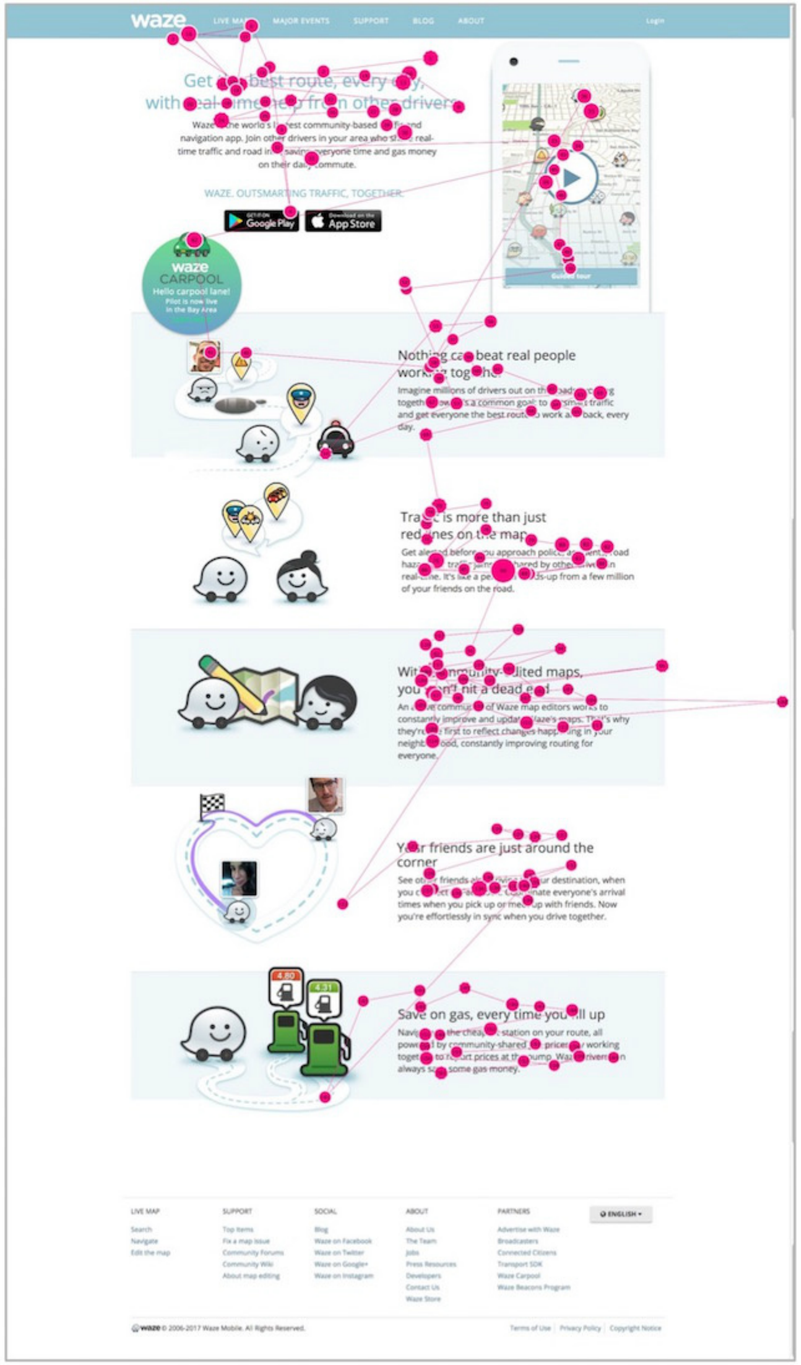


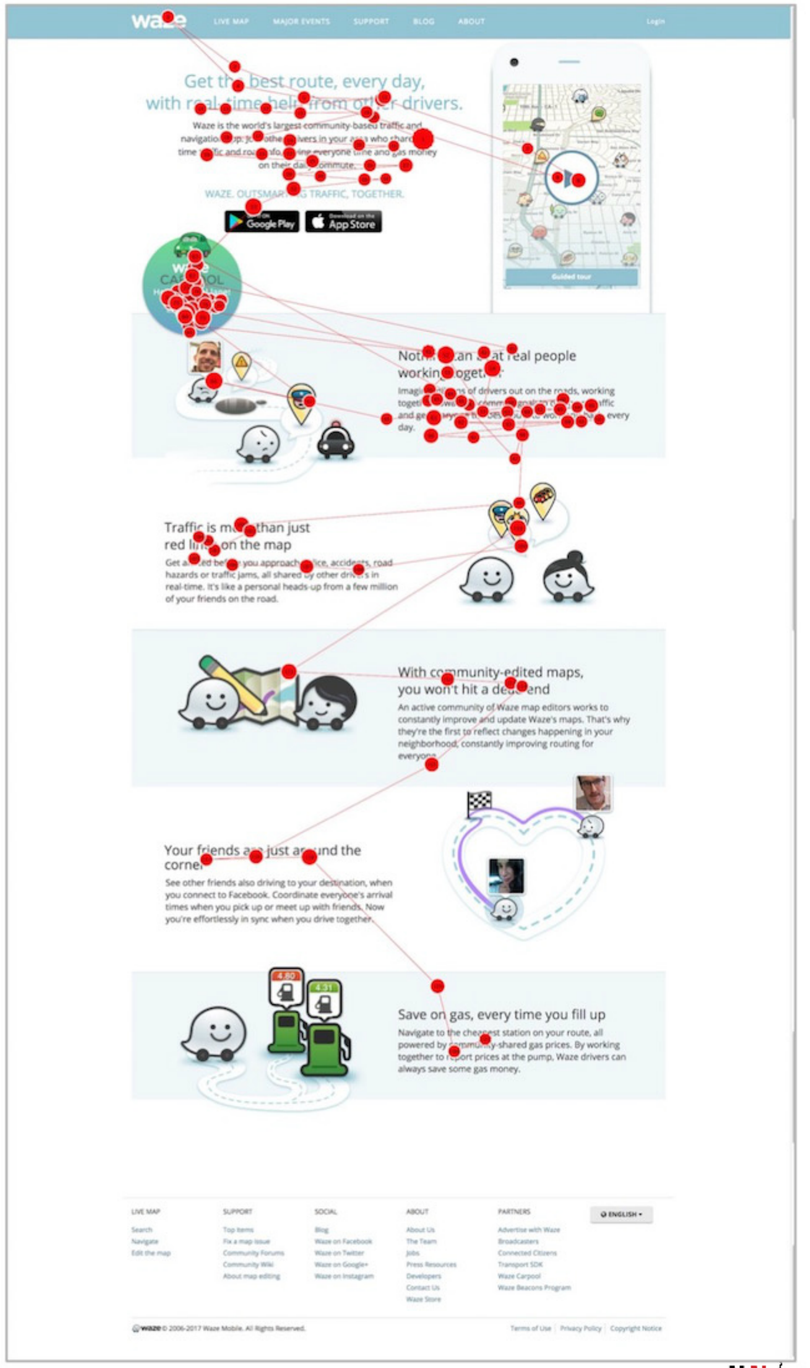
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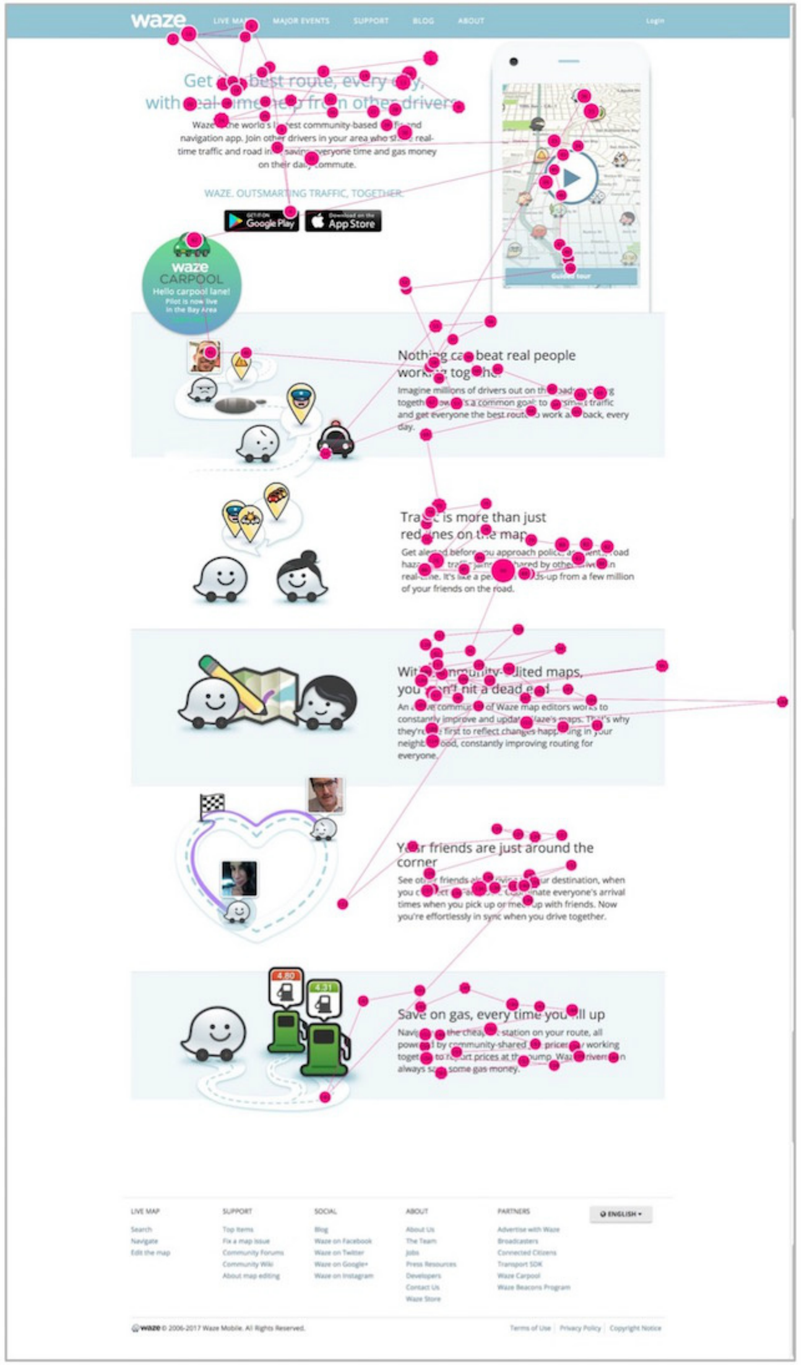


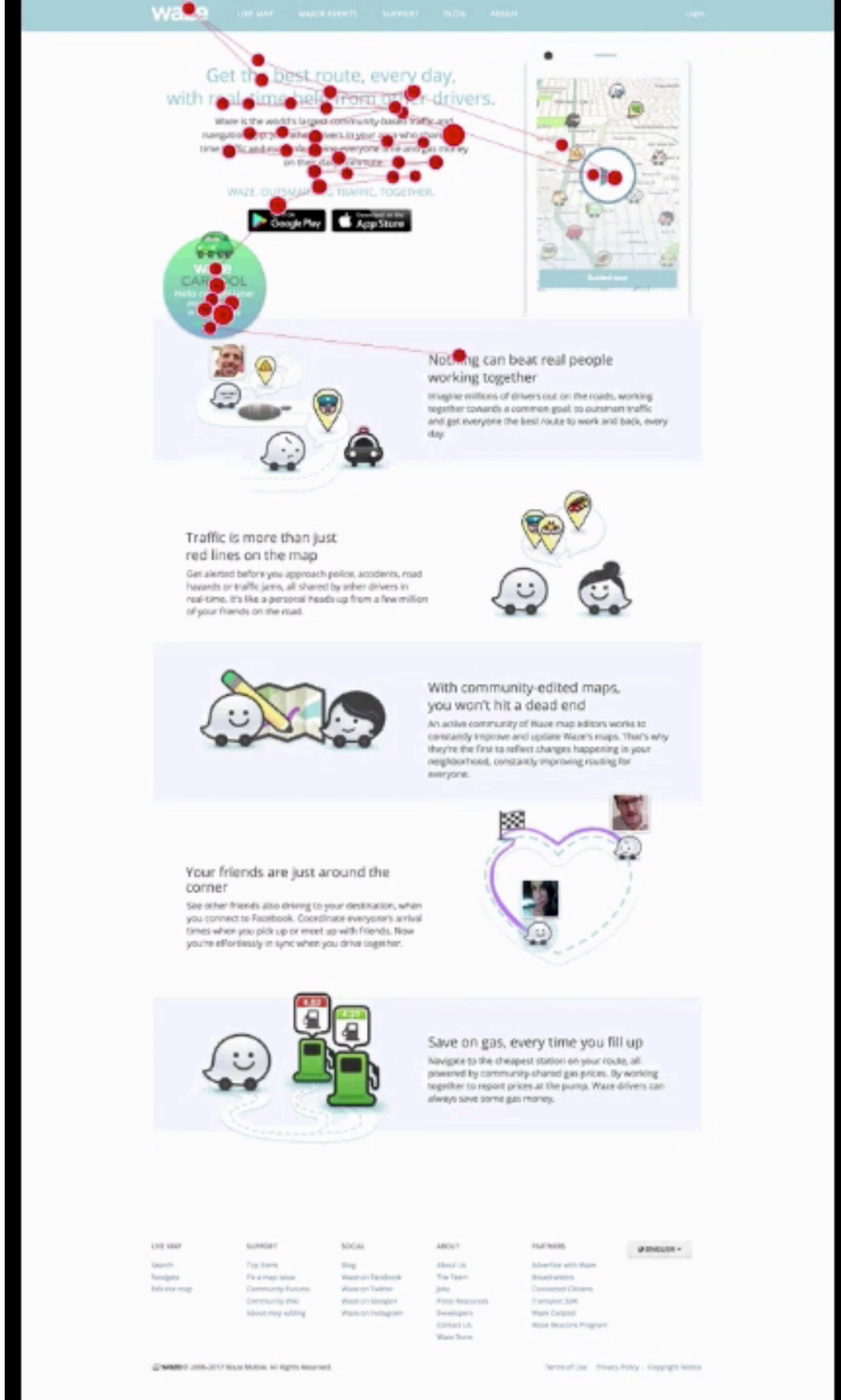
Information Architecture

What is the structure of your application?
How do elements relate to each other?
How do users navigate it?


waze
LIVE MAP
MAJOR EVENTS
SUPPORT
BLOG
ABOUT
Login
Get the best route, every day,
with real-time help from other drivers.
Waze is the world's largest community-based traffic and navigation app. Join other drivers in your area who share real-time traffic and road info, saving everyone time and gas money on their daily commute.
WAZE. OUTSMARTING TRAFFIC, TOGETHER.
GET IT ON Google Play
Download on the App Store
waze CARPOOL
Hello carpool lane!
Pilot is now live in the Bay Area
Nothing can beat real people working together
Imagine millions of drivers out on the road working together in a common goal to outsmart traffic and get everyone the best routes to work and back, every day.
Traffic is more than just red lines on the map
Get ahead before you approach police, accidents, road hazards or traffic jams, all shared by other drivers in real-time. It's like a personal heads-up from a few million of your friends on the road.
With community-edited maps, you won't hit a dead end
An active community of Waze map editors works to constantly improve and update Waze's maps. That's why they're the first to reflect changes happening in your neighborhood, constantly improving routing for everyone.
Your friends are just around the corner
See other friends also driving to your destination, when you connect to Facebook. Coordinate everyone's arrival times when you pick up or meet up with friends. Now you're effortlessly in sync when you drive together.
4.80
4.31
Save on gas, every time you fill up
Navigate to the cheapest station on your route, all powered by community-shared gas prices. By working together to report prices at the pump, Waze drivers can always save some gas money.
LIVE MAP
Search
Navigate
Edit the map
SUPPORT
Top Items
Fix a map issue
Community Forums
Community Wiki
About map editing
SOCIAL
Blog
Waze on Facebook
Waze on Twitter
Waze on Google+
Waze on Instagram
ABOUT
About Us
The Team
Jobs
Press Resources
Developers
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Waze Carpool
Waze Beacons Program
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Waze Beacons Program
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Eyetracking by Nielsen Norman Group nngroup.com NN/g

Gutter/Alley

12 **Columns** = easy division (1, 2, 3, 4, 6, 12)

Margin

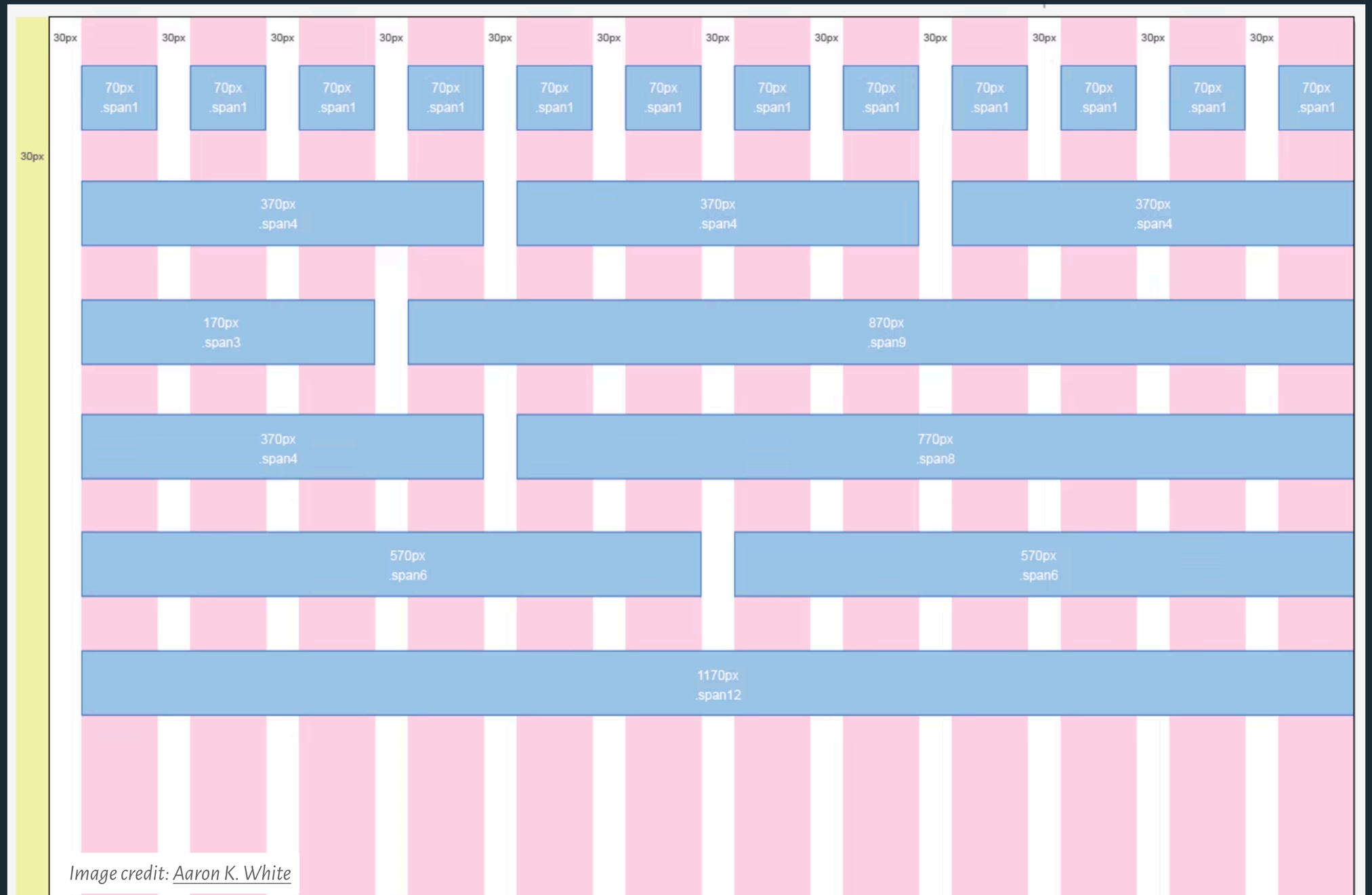


Image credit: Aaron K. White

BY THE WAY

The Washington Post

Democracy Dies in Darkness

There's more to see.

September 29, 2019

Edition: U.S. & World | Regional

State Dept. questions more than 100 former Clinton aides about emails



Investigators have spoken to as many as 130 people in recent weeks, including senior officials who reported directly to Hillary Clinton while she was secretary of state, as well as others whose emails were at some point relayed to her inbox, according to current and former officials.

By Greg Miller, Greg Jaffe and Karoun Demirjian

Pelosi turns to Schiff to lead House Democrats' impeachment inquiry

Democrats facing tough reelection bids privately told House Speaker Nancy Pelosi that Intelligence Committee Chairman Adam Schiff needs to be the face of the probe.

By Rachael Bade and Mike DeBonis · 2 hours ago

Staring down impeachment, Trump sees himself as a victim of historic proportions

President Trump is not the first U.S. leader facing impeachment to nurse a sense of persecution and self-pity. But he is the first to broadcast that mentality to the world.

By Philip Rucker



Hunter Biden attends the vice-presidential debate in 2012. (AP)

A gas tycoon and the vice president's son: Hunter Biden's foray into Ukraine

More than five years after Joe Biden's son become involved with a Ukrainian firm, the decision has become the backdrop of an inquiry

Video



(Joy Sharon Yi/The Washington Post)

Opinion | Facing gentrification, D.C. residents fight to preserve historic neighborhood

UP NEXT



Rudy Giuliani's wild week of television interviews

▶ **Play Video** 2:35



From earbuds to eyeglasses, Amazon wants Alexa to be everywhere you are

▶ **Play Video** 2:30



The impeachment inquiry: What happens next

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By Philip Rucker

Elections chief says GOP colleague barred wider distribution of foreign activity memo

After the digest of the Federal Election Commission was withheld from its weekly posting, the chair spread it on twitter.

By Alex Horton



Hunter Biden attends the vice-presidential debate in 2012. (AP)

A gas tycoon and the vice president's son: Hunter Biden's foray into Ukraine

More than five years after Joe Biden's son become involved with a Ukrainian firm, the decision has become the backdrop of an inquiry that is reshaping the political landscape. No evidence of criminal wrongdoing by the Bidens has surfaced.

By Paul Sonne, Michael Kranish and Matt Viser



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The Washington Post

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Opinions



Impeachment isn't mandatory — even if Trump committed impeachable acts

By Keith E. Whittington



I listened to dozens of Obama's calls. Trump knows that's perfectly normal.

By Joel Willett



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The impeachment inquiry: What happens next

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3. State Dept. intensifies email probe of Hillary Clinton's former aides



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5. Staring down impeachment, Trump sees himself as a victim of historic proportions



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Today's print stories





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By Hugh Hewitt



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By Evelyn N. Farkas



Five myths about Ukraine

By Nina Jankowicz



The Ukraine facts are clear. But does truth still matter?

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By Eli Saslow



Hong Kong police smash anti-China demonstration, creating chaos in downtown

Police hit hard against protesters in a likely effort to deter demonstrations on the upcoming anniversary of the People's Republic of China.

By Shibani Mahtani and Timothy McLaughlin · 13 minutes ago

- **Here are some of the new weapons China will unveil at Tuesday's military parade**



Analysis

Alec Baldwin returns for SNL's cold

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Market Watch

Dow 26,820.25	Today ↓ 0.26%
S&P 2,961.79	Today ↓ 0.53%
NASDAQ 7,939.63	Today ↓ 1.13%

Last Updated:09/27/2019

By The Way

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A guide to local favorites on Fabric Row



Design Critique

Structure:

- "I like..."
- "I wish..."
- "What if?"



Design Critique

Structure:

- "I like..."
- "I wish..."
- "What if?"



THE ELEMENTS OF VISUAL DESIGN

Layout

Typography

Color

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Typography

Color

Basic Typographic Definitions

Basic Typographic Definitions

B} Font Size (also called point size)



B} Font Size



Gill Sans Courier New Calibri

Six} x-height



Gill Sans

Lucida Grande
high x-height

Baskerville
low x-height



Lucida Grande
high x-height

Baskerville
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B} Font Size



Gill Sans Courier New Calibri

Six} x-height



Gill Sans

Lucida Grande
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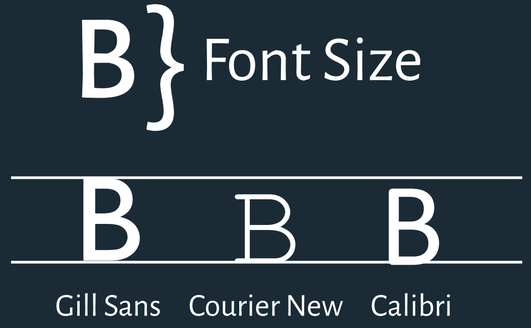
Lucida Grande
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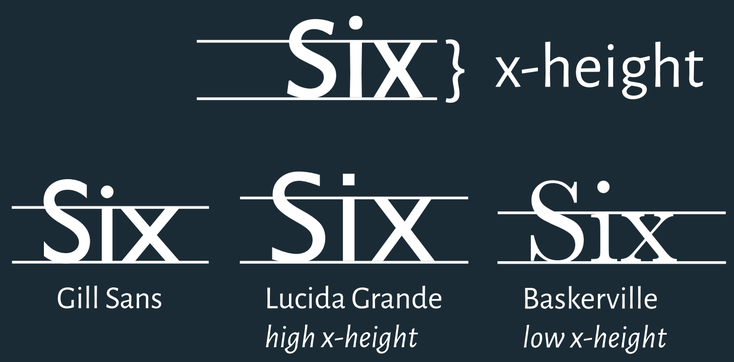
Baskerville
low x-height

Weight

light regular **bold**

semi-bold **extra-bold** **black**

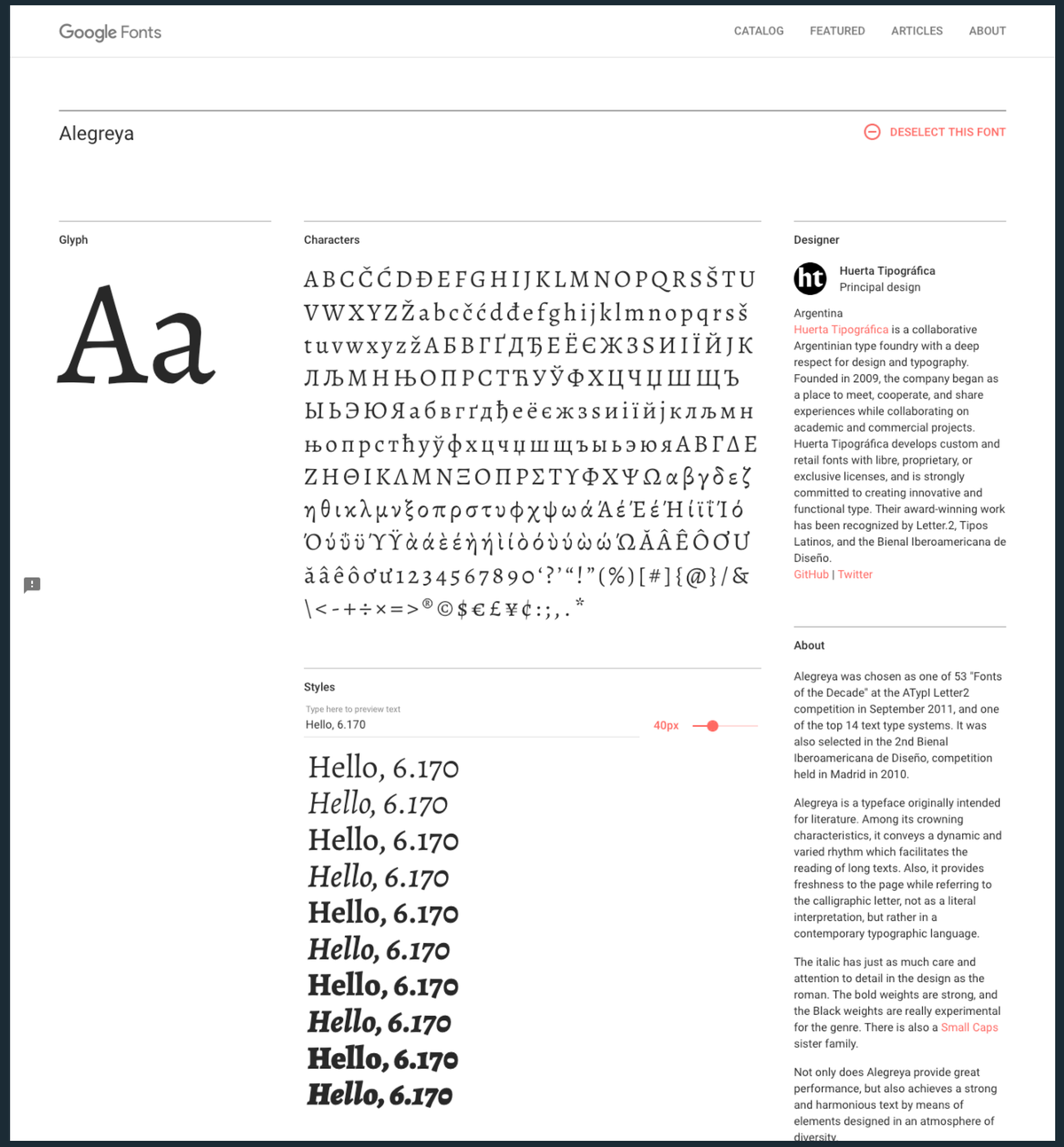


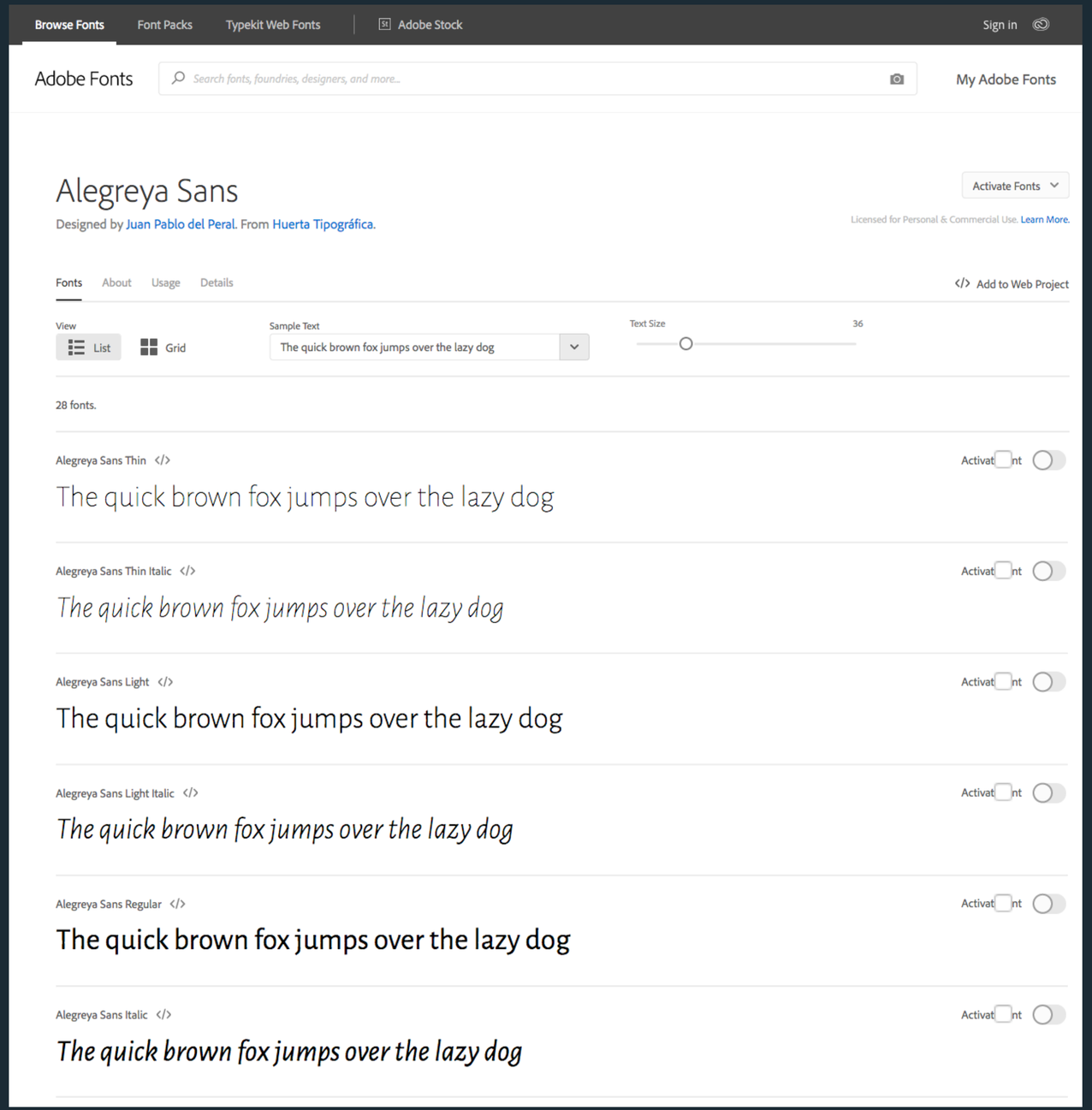


Alegreya (Serif)

Alegreya Sans

Based on slides by Scott Klemmer


Google Fonts
CATALOG
FEATURED
ARTICLES
ABOUT
Alegreya
DESELECT THIS FONT
Glyph
Aa
Characters
A B C Č Ć D Đ E F G H I J K L M N O P Q R S Š T U
V W X Y Z Ž a b c č ć d đ e f g h i j k l m n o p q r s š
t u v w x y z ž А Б В Г Ґ Д Ђ Е Ё Є Ж З Ѕ И І Ї Й Ј К
Л Љ М Н Њ О П Р С Т Ћ У Ў Ф Х Ц Ч Џ Ш Щ Ъ
Ы Ь Э Ю Я а б в г ґ д ђ е ё є ж з ѕ и і ї й ј к л љ м н
њ о п р с т ћ у ў ф х ц ч џ ш щ ъ ы ь э ю я А В Г Δ Е
Z Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω α β γ δ ε ζ
η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω ά Ά έ Έ ή Ή ί ΐ Ί ό
Ό ύ ΰ ϋ Ύ Ÿ à á è é ὴ ή ì í ò ó ù ú ὼ ώ Ώ Ă Â Ê Ô Ơ Ư
ă â ê ô ơ ư 1 2 3 4 5 6 7 8 9 0 ‘ ? ’ “ ! ” (%) [#] { @ } / &
\ < - + ÷ × = > ® © $ € £ ¥ ¢ : ; , . *
Styles
Type here to preview text
Hello, 6.170
40px
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Hello, 6.170
Designer
Huerta Tipográfica
Principal design
Argentina
Huerta Tipográfica is a collaborative Argentinian type foundry with a deep respect for design and typography. Founded in 2009, the company began as a place to meet, cooperate, and share experiences while collaborating on academic and commercial projects. Huerta Tipográfica develops custom and retail fonts with libre, proprietary, or exclusive licenses, and is strongly committed to creating innovative and functional type. Their award-winning work has been recognized by Letter.2, Tipos Latinos, and the Bienal Iberoamericana de Diseño.
GitHub | Twitter
About
Alegreya was chosen as one of 53 “Fonts of the Decade” at the ATypI Letter2 competition in September 2011, and one of the top 14 text type systems. It was also selected in the 2nd Bienal Iberoamericana de Diseño, competition held in Madrid in 2010.
Alegreya is a typeface originally intended for literature. Among its crowning characteristics, it conveys a dynamic and varied rhythm which facilitates the reading of long texts. Also, it provides freshness to the page while referring to the calligraphic letter, not as a literal interpretation, but rather in a contemporary typographic language.
The italic has just as much care and attention to detail in the design as the roman. The bold weights are strong, and the Black weights are really experimental for the genre. There is also a Small Caps sister family.
Not only does Alegreya provide great performance, but also achieves a strong and harmonious text by means of elements designed in an atmosphere of diversity


Browse Fonts
Font Packs
Typekit Web Fonts
Adobe Stock
Sign in
Adobe Fonts
Search fonts, foundries, designers, and more...
My Adobe Fonts
Alegreya Sans
Activate Fonts
Designed by Juan Pablo del Peral. From Huerta Tipográfica.
Licensed for Personal & Commercial Use. Learn More.
Fonts
About
Usage
Details
Add to Web Project
View
List
Grid
Sample Text
The quick brown fox jumps over the lazy dog
Text Size
36
28 fonts.
Alegreya Sans Thin
The quick brown fox jumps over the lazy dog
Alegreya Sans Thin Italic
The quick brown fox jumps over the lazy dog
Alegreya Sans Light
The quick brown fox jumps over the lazy dog
Alegreya Sans Light Italic
The quick brown fox jumps over the lazy dog
Alegreya Sans Regular
The quick brown fox jumps over the lazy dog
Alegreya Sans Italic
The quick brown fox jumps over the lazy dog

Software Studio..... 6.170
Engineering Interactive Technologies..... 6.810
Principles and Practice of Assistive Technology..... 6.811
Intelligent Multimodal User Interfaces..... 6.835
Interactive Data Visualization & Society.....6.C35/C85
Advanced Identity Representation..... CMS.628.828
Imagination, Computation, and Expression Studio.....CMS.627/827

6.170	Software Studio
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6.811	Principles and Practice of Assistive Technology
6.835	Intelligent Multimodal User Interfaces
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Based on slides by Scott Klemmer

6.170	**Software Studio** *Jackson & Satyanarayan*
6.810	**Engineering Interactive Technologies** *Mueller*
6.811	**Principles and Practice of Assistive Technology** *Miller, Greenberg, Keane*
6.835	**Intelligent Multimodal User Interfaces** *Davis*
6.C35/C85	**Interactive Data Visualization** *Satyanarayan*
CMS.628.828	**Advanced Identity Representation** *Harrell*
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Commons

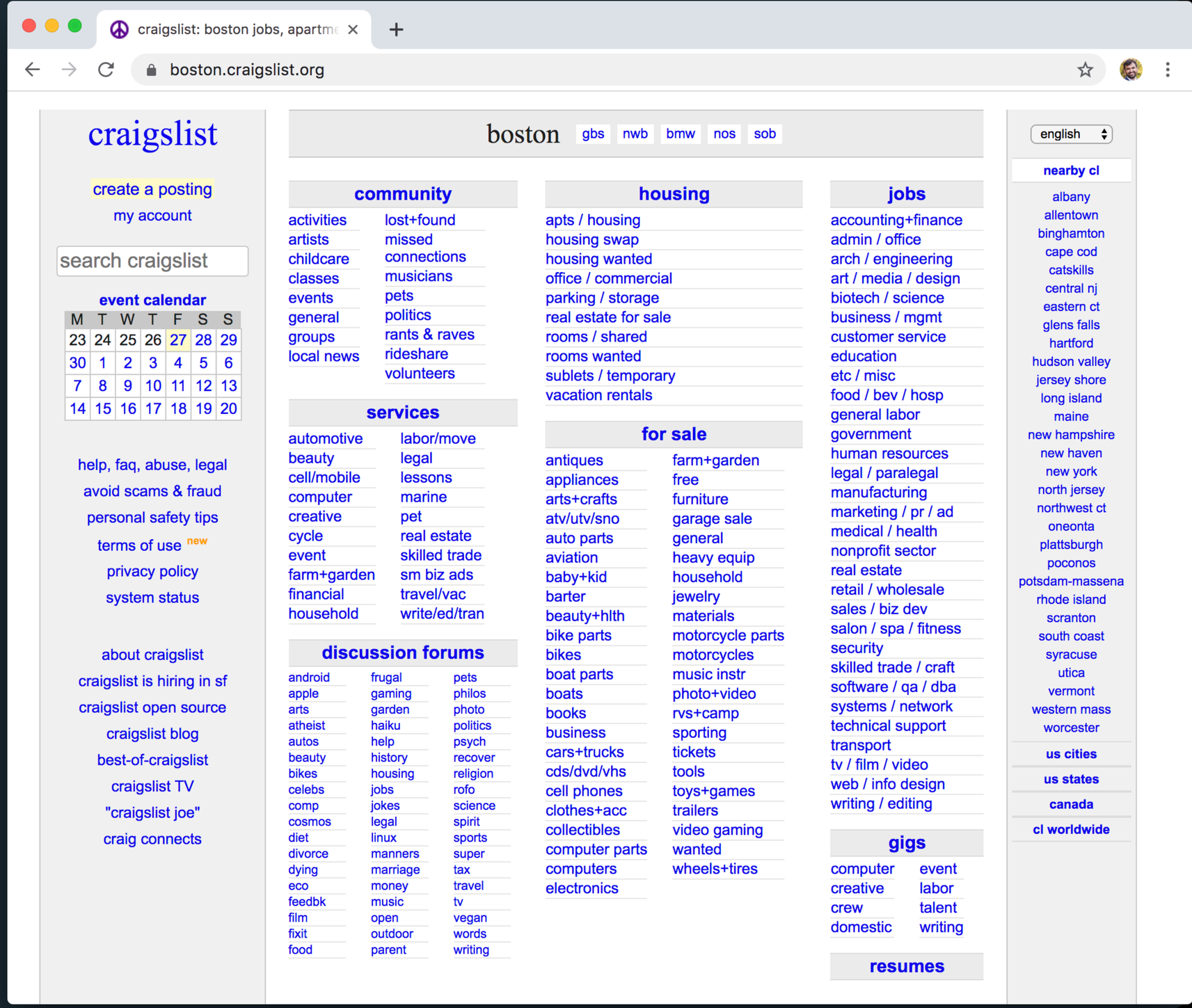
You want to find a used bicycle on this page.

What change to the layout or typography would make that easier? Explain why.

Discuss with a neighbor, then submit in Commons.

7MKHJH

https://class.mit-sdg.dev/join



THE ELEMENTS OF VISUAL DESIGN

Layout

Typography

Color

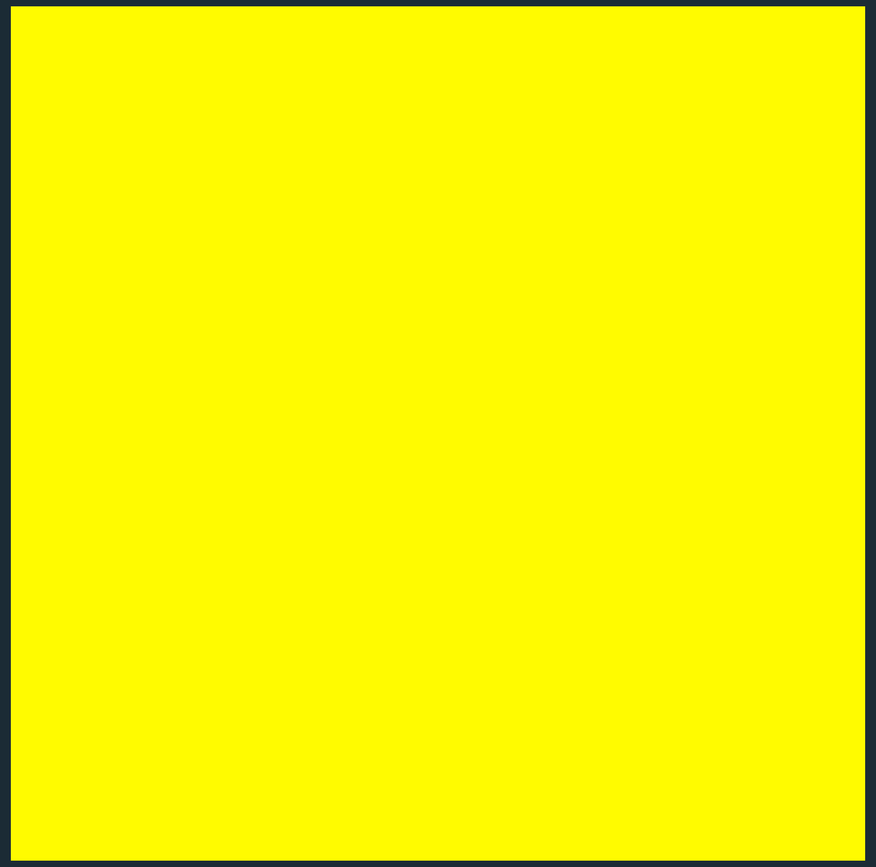
THE ELEMENTS OF VISUAL DESIGN

Layout

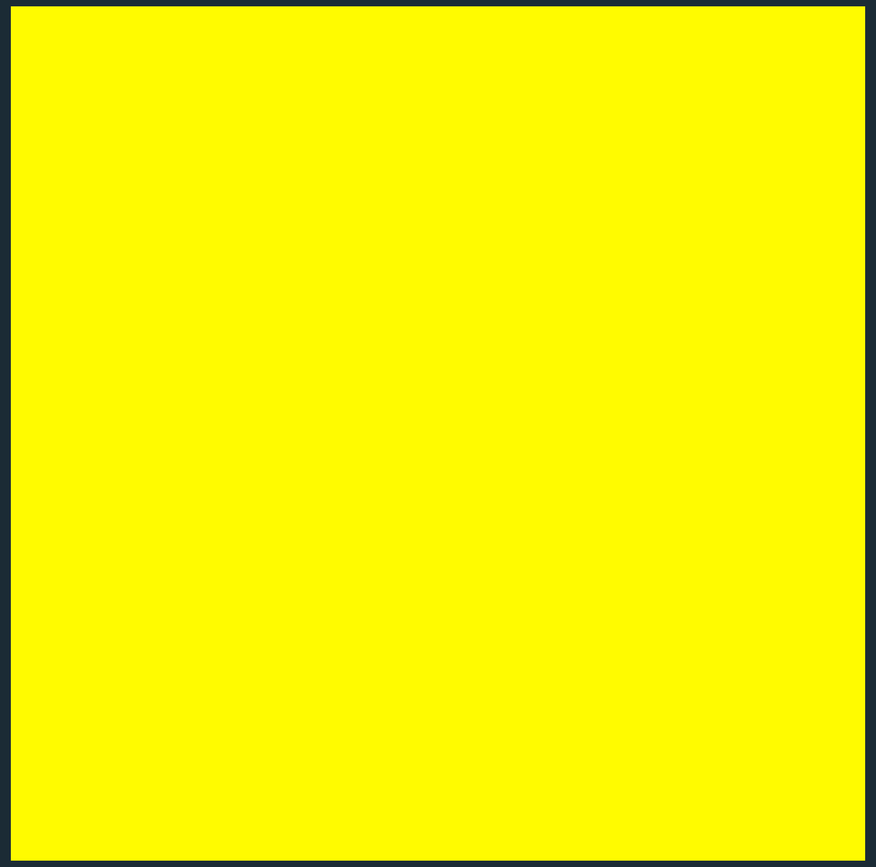
Typography

Color

What color is this?

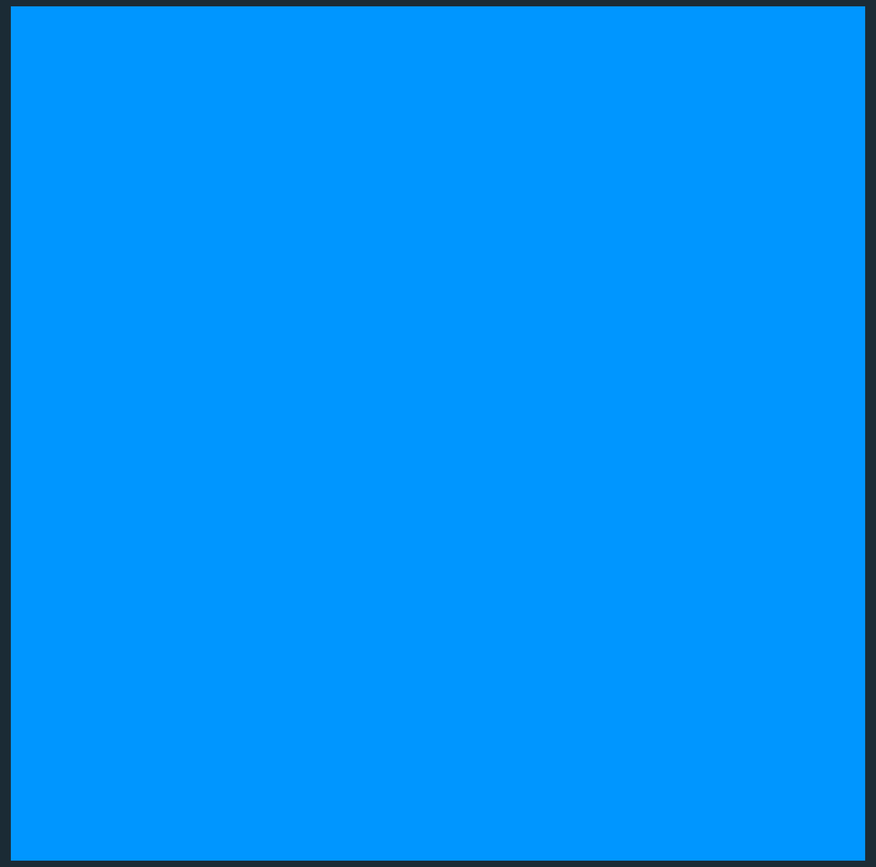


What color is this?

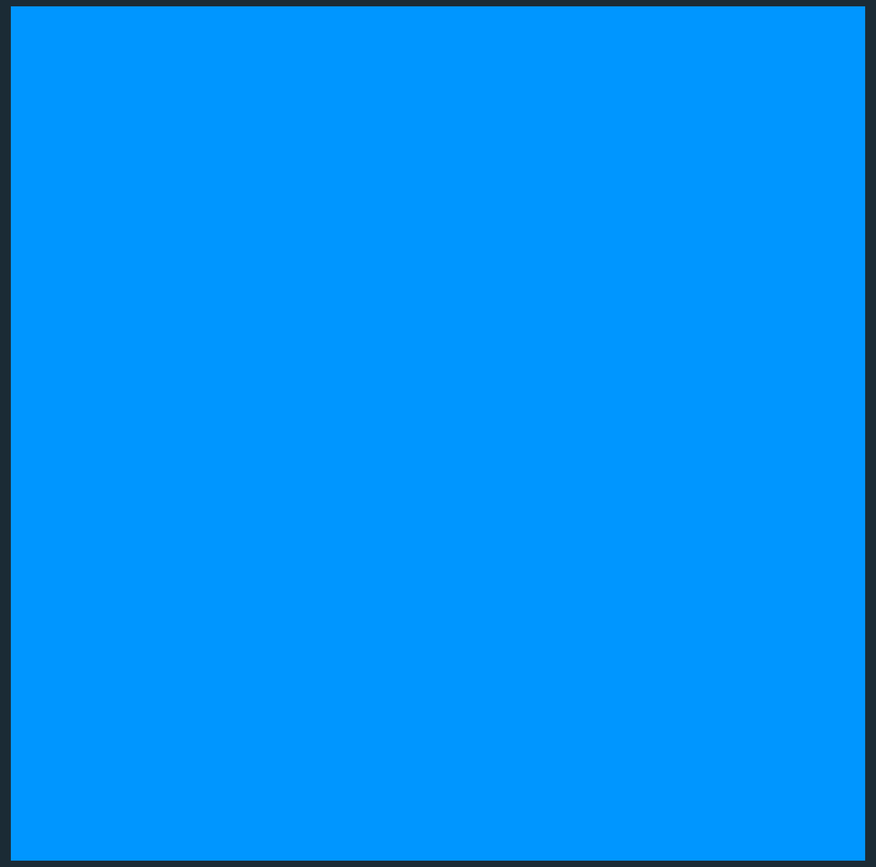


“Yellow”

What color is this?

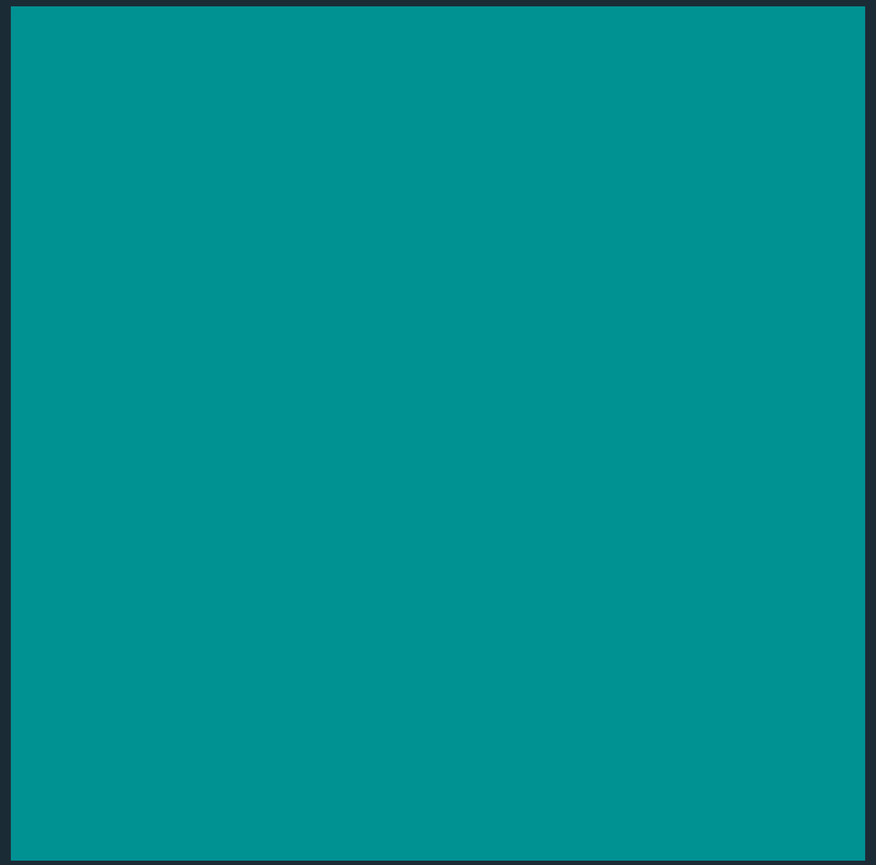


What color is this?

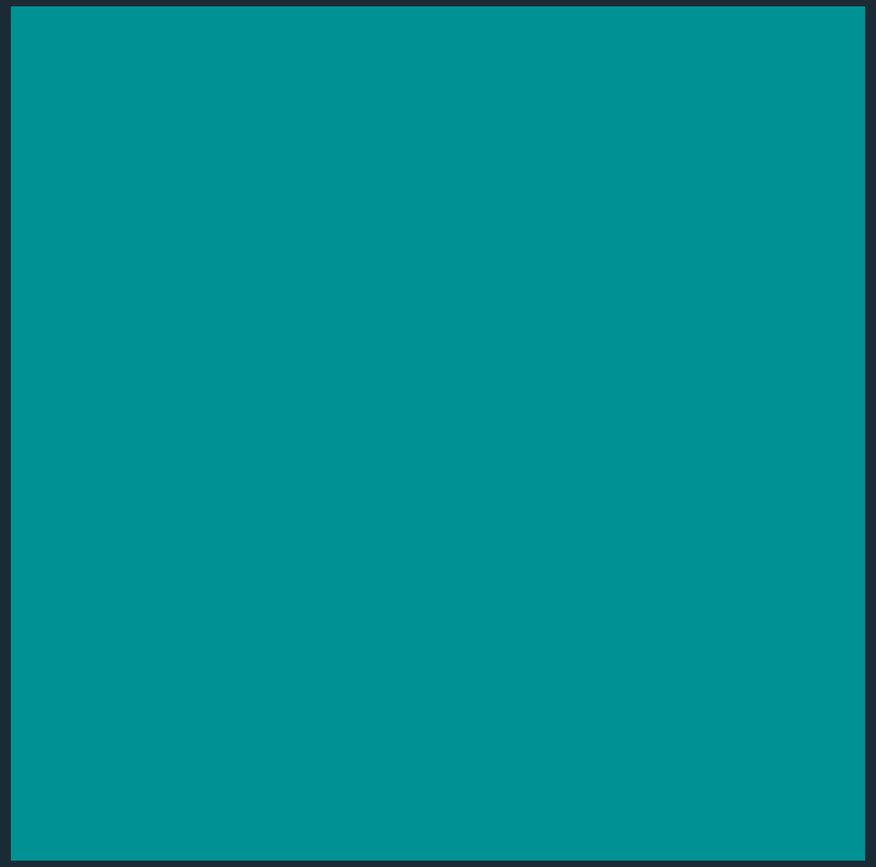


“Blue”

What color is this?



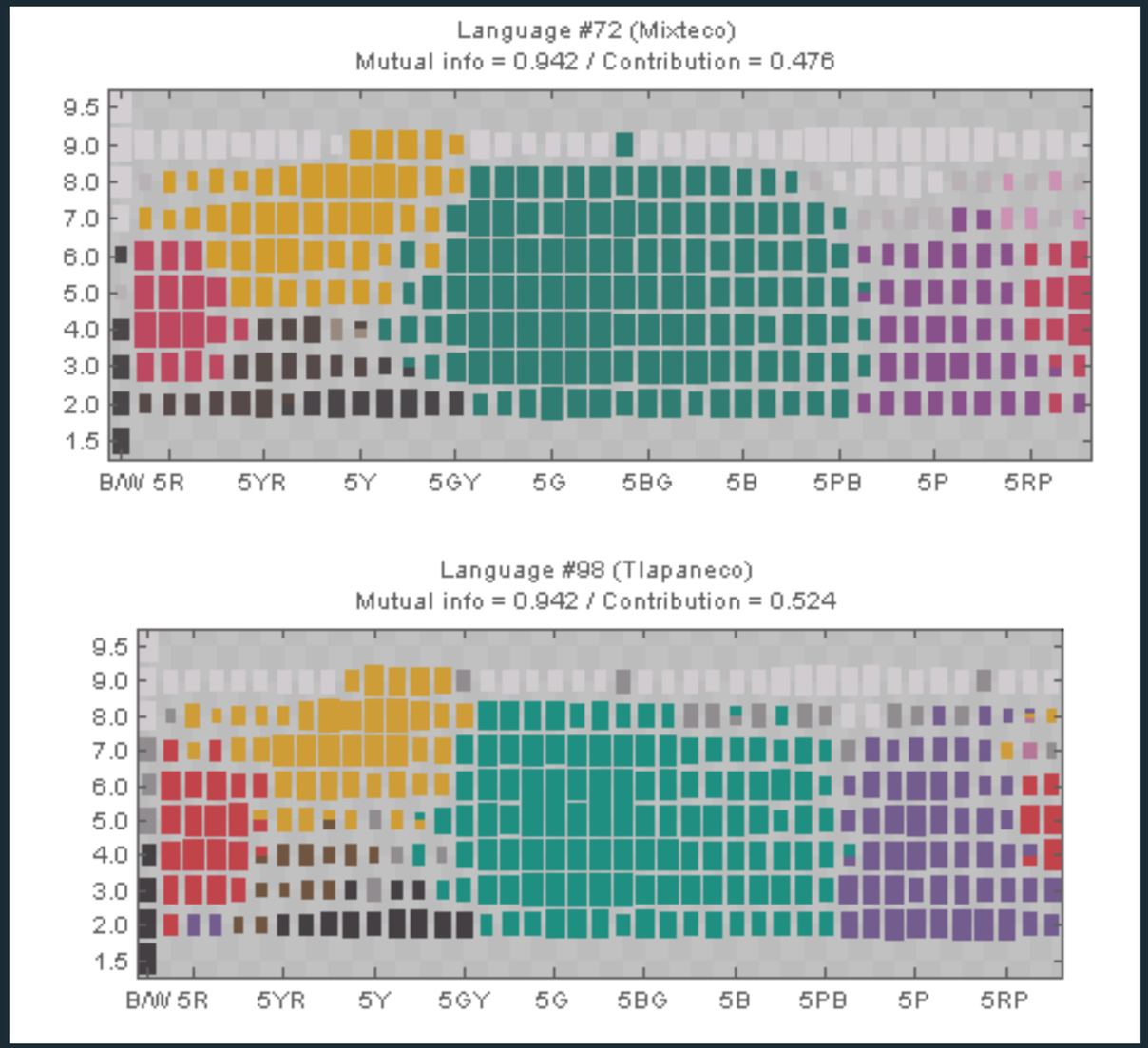
What color is this?

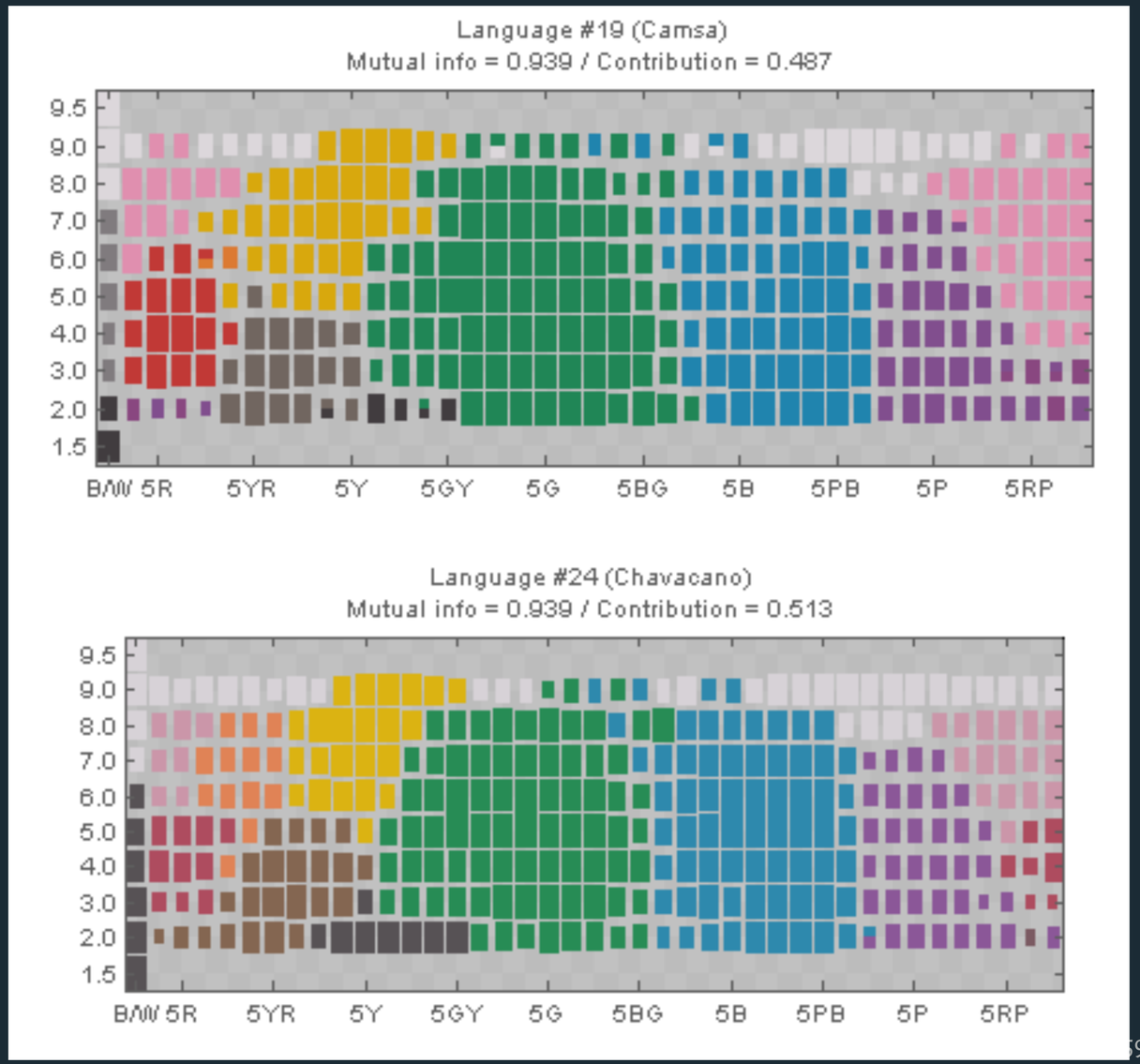


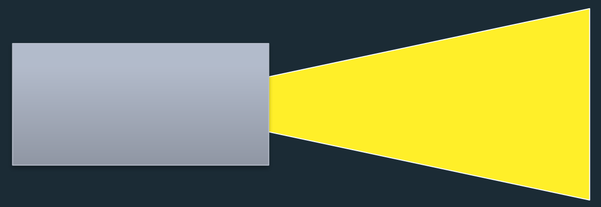
“Teal”? “Aqua”?

Color Naming

Is color naming universal? Do languages evolve color terms in similar ways?

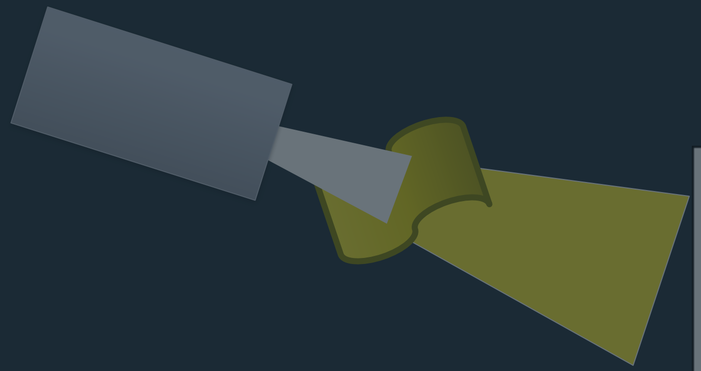






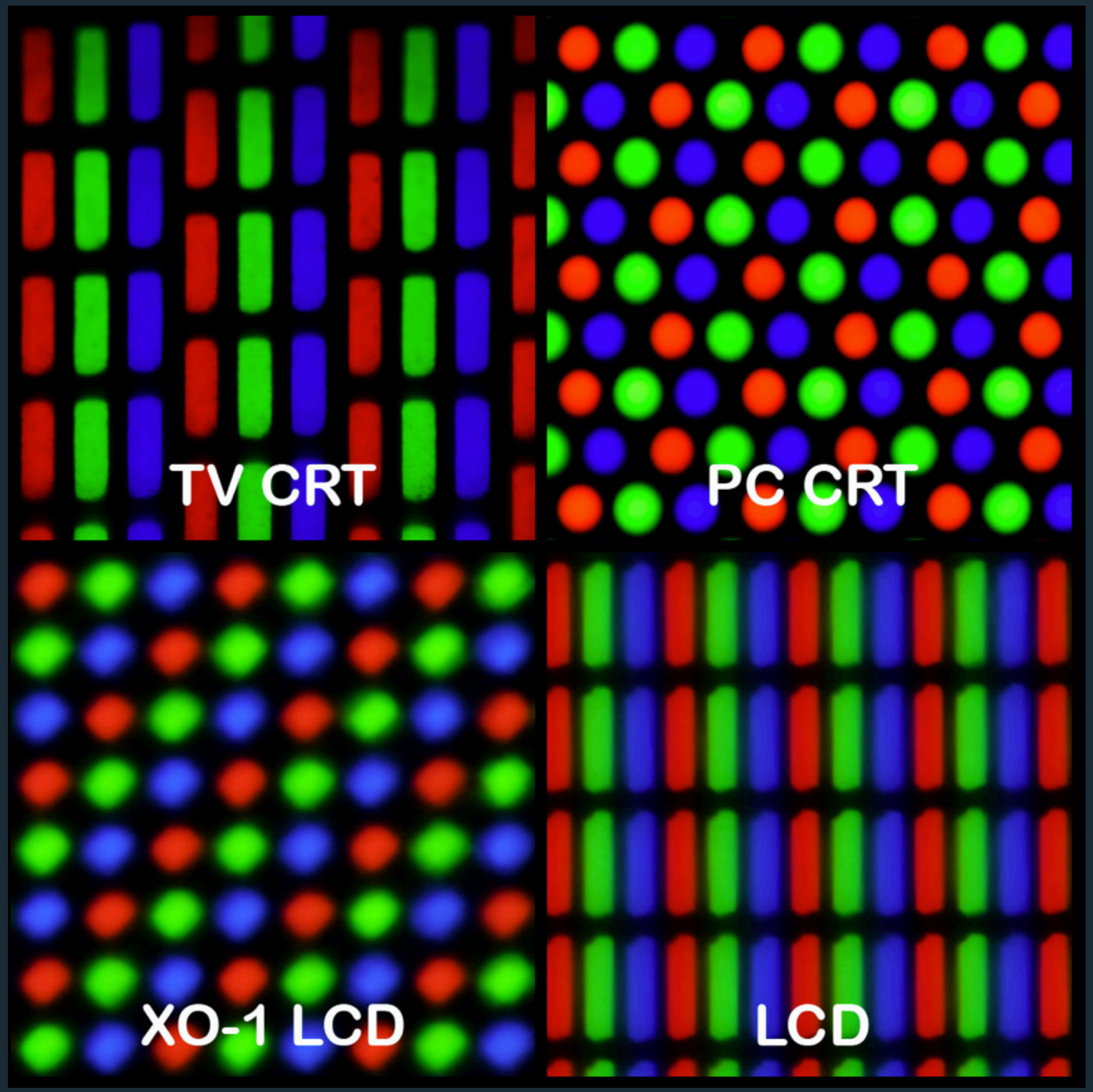
Additive
(digital displays)





Subtractive
(print, e-paper)





24-bit Color

8 bits to describe amounts of red, green, blue.

$2^8 = 256$ possible states

rgb(231, 69, 82)

rgb(60%, 78%, 57%)

#6eb4fd

So what's wrong with RGB?

1. Not how we naturally express or think about color.
2. Not perceptually uniform



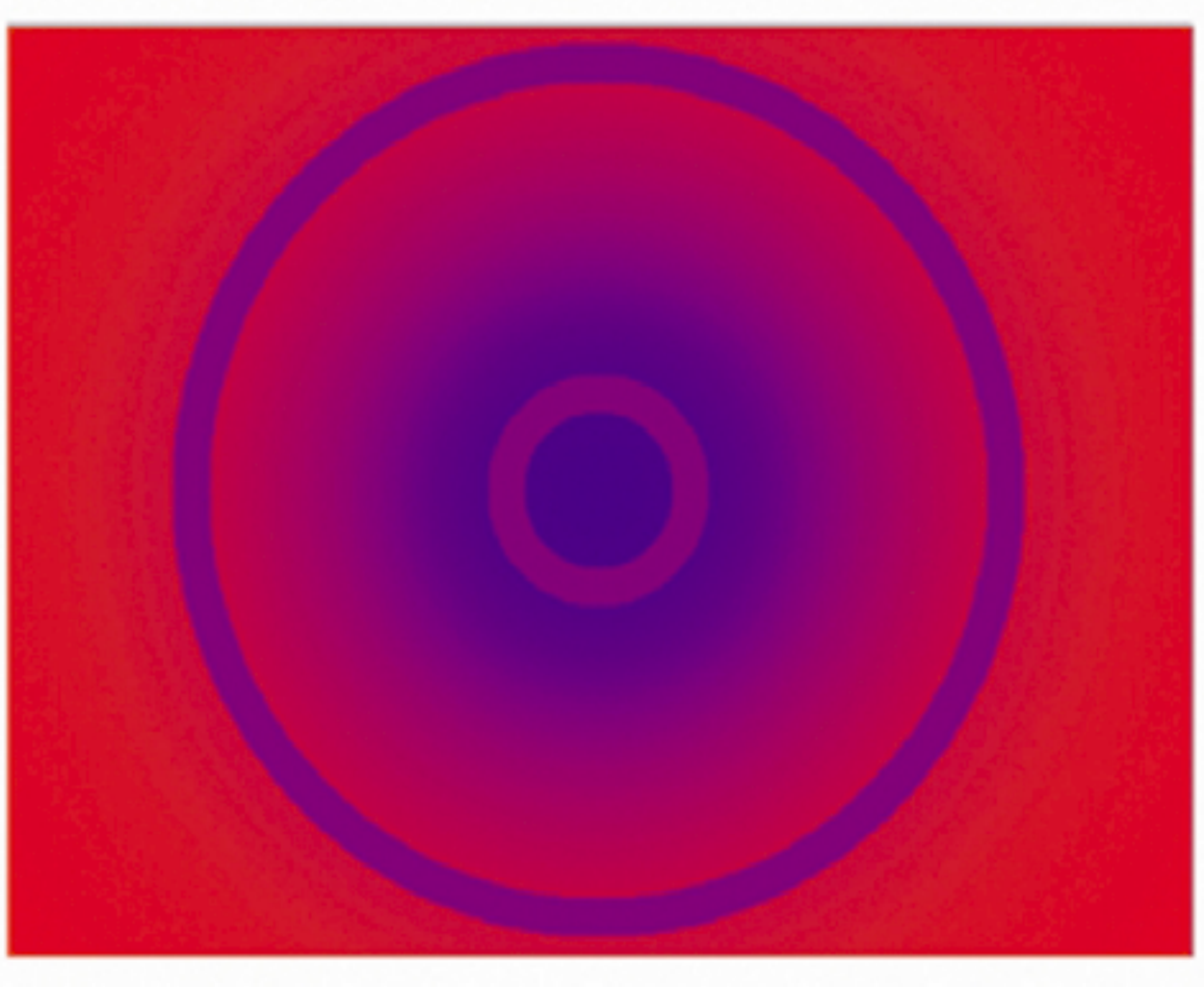




Simultaneous Contrast

When two colors are side-by-side,
they interact and affect our perception

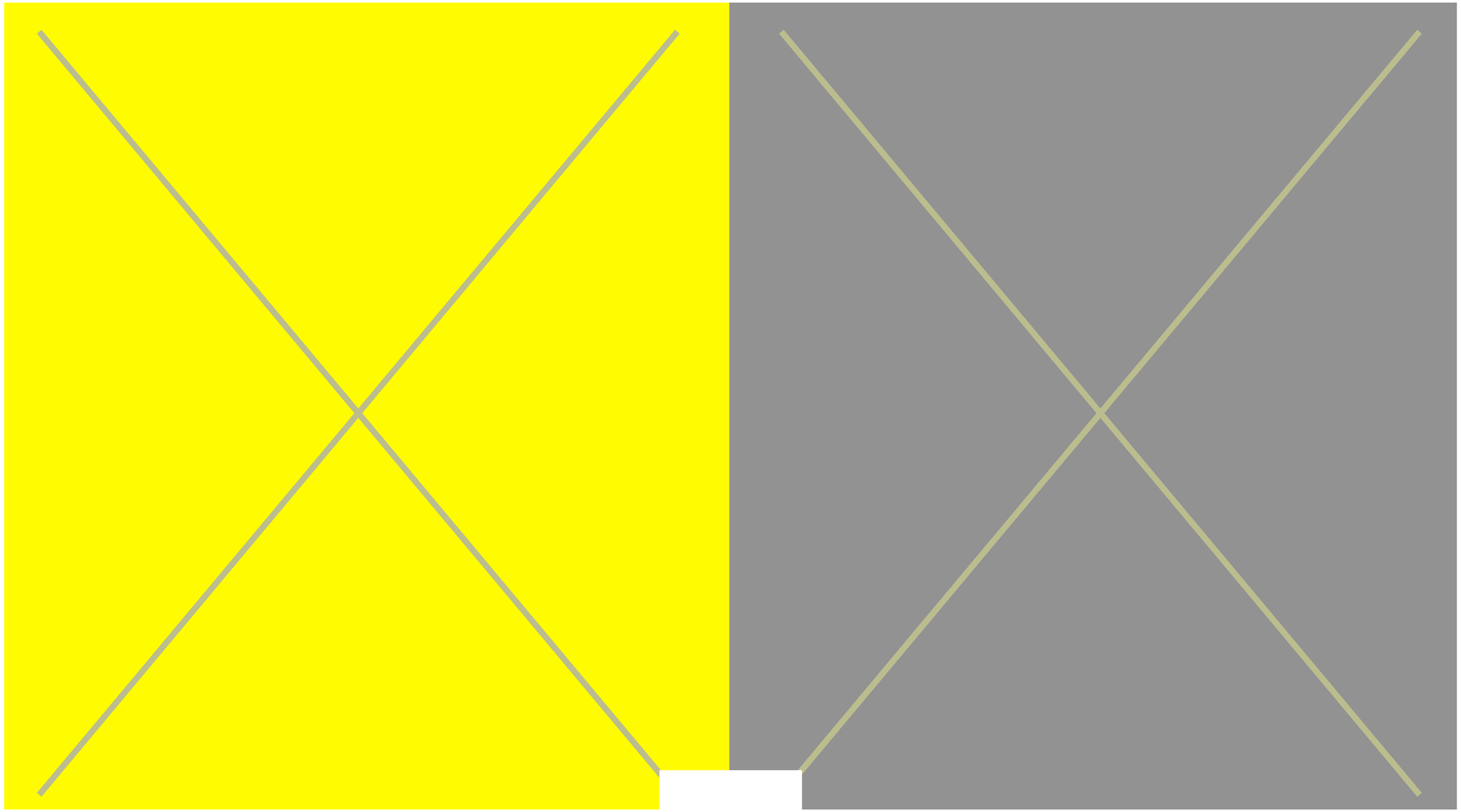
The inner and outer thin rings are,
in fact, the same physical purple!



Donald Macleod

Simultaneous Contrast

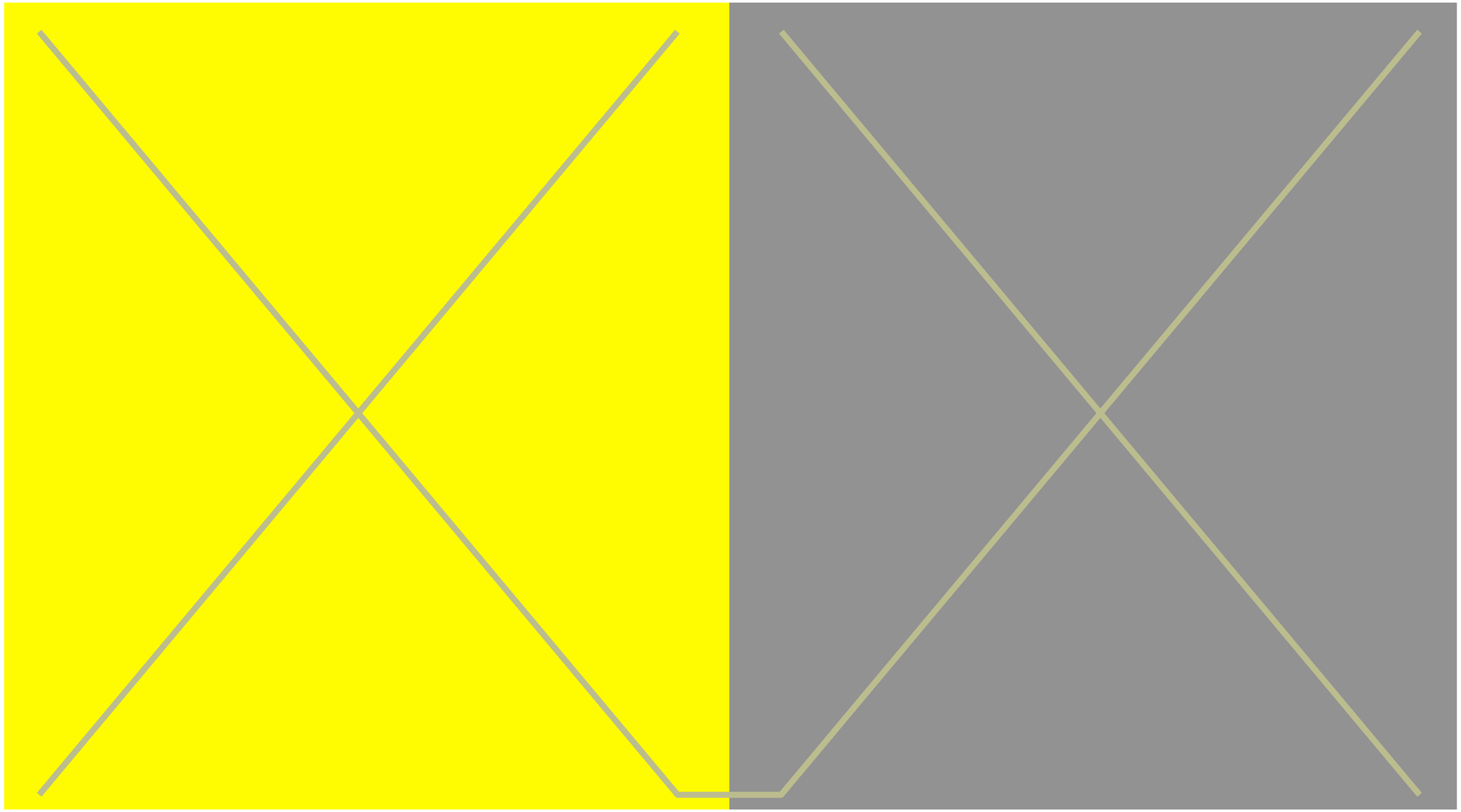
When two colors are side-by-side,
they interact and affect our perception



Josef Albers

Simultaneous Contrast

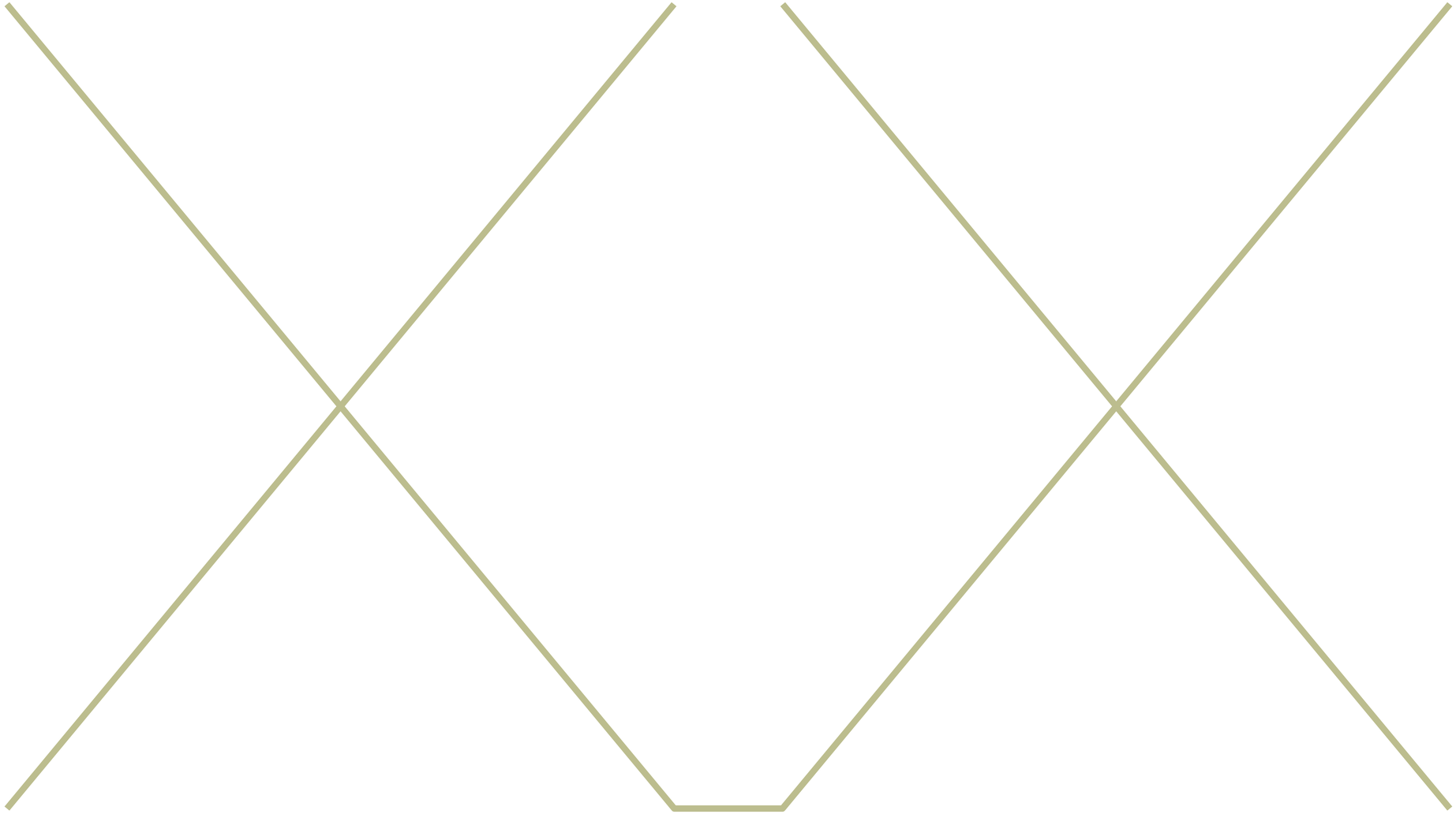
When two colors are side-by-side,
they interact and affect our perception



Josef Albers

Simultaneous Contrast

When two colors are side-by-side,
they interact and affect our perception

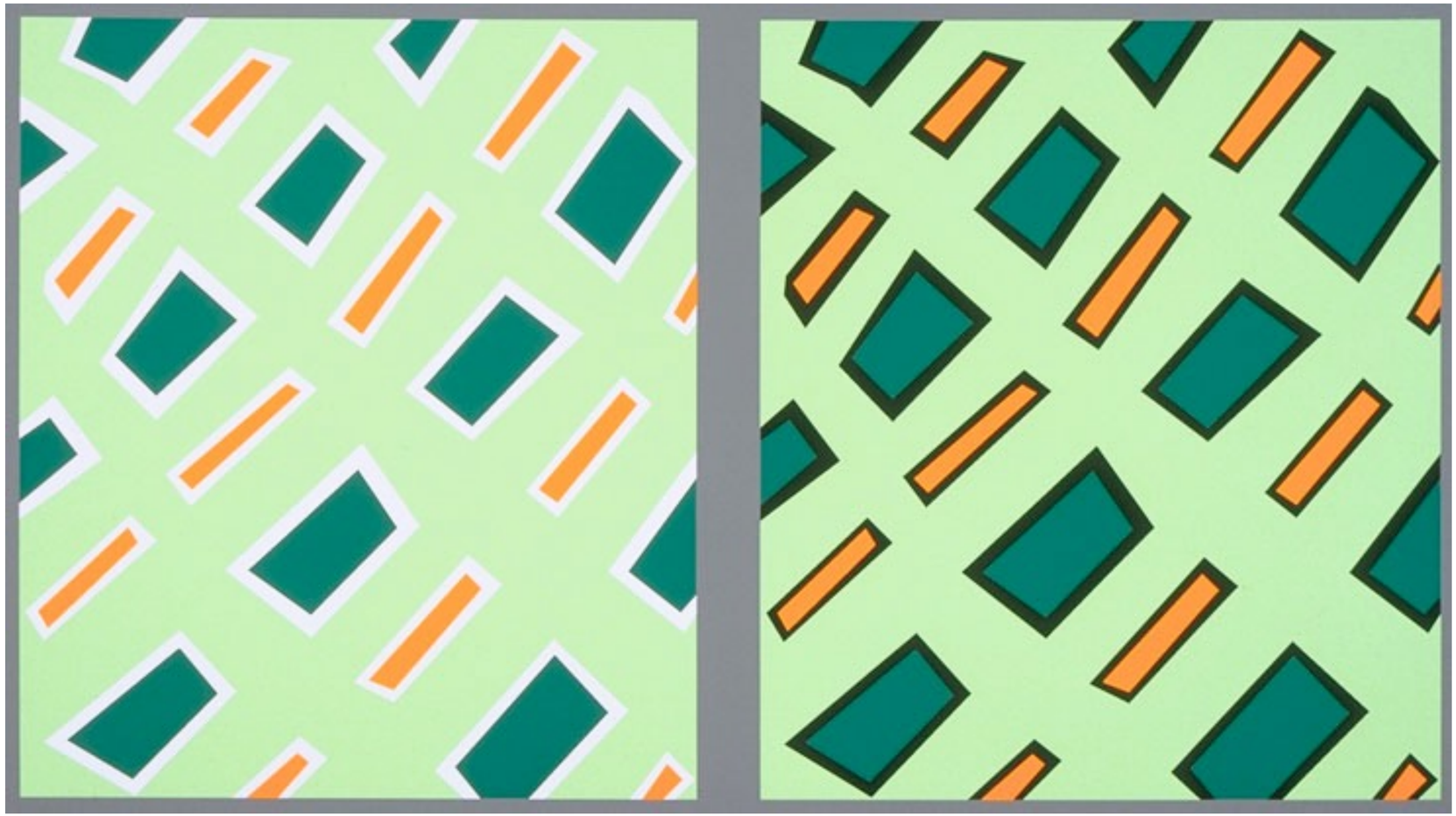


Josef Albers

Bezold Effect

Color appearance depends on adjacent colors

Changing repeated borders can change the appearance of the whole pattern.

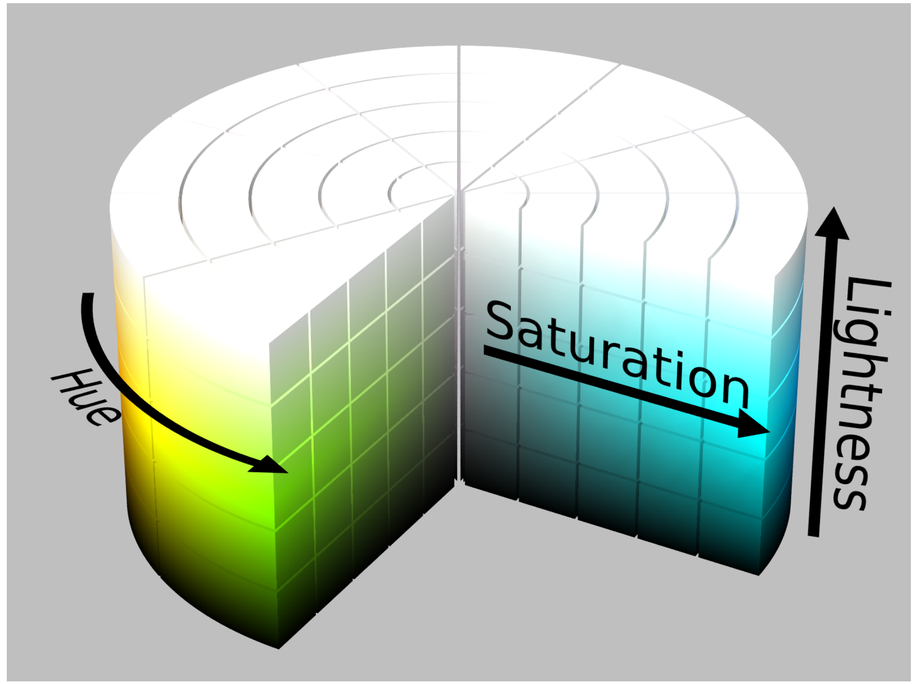


Basic Color Terms

Hue: what we typically think of as "color"

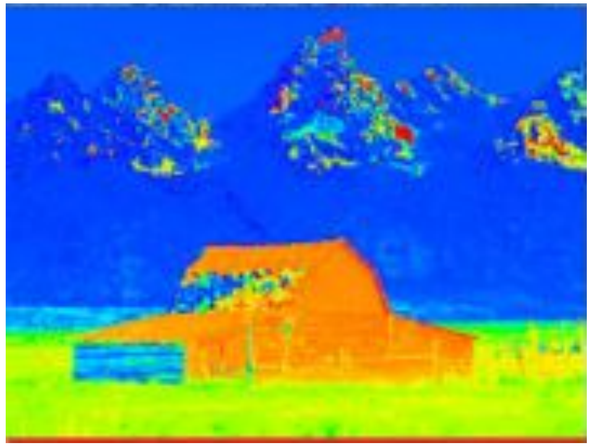
Saturation: the "colorfulness" of the hue (~how much gray does it contain).

Lightness: the light-to-dark dimension of a color model





Photo



Hue



Saturation

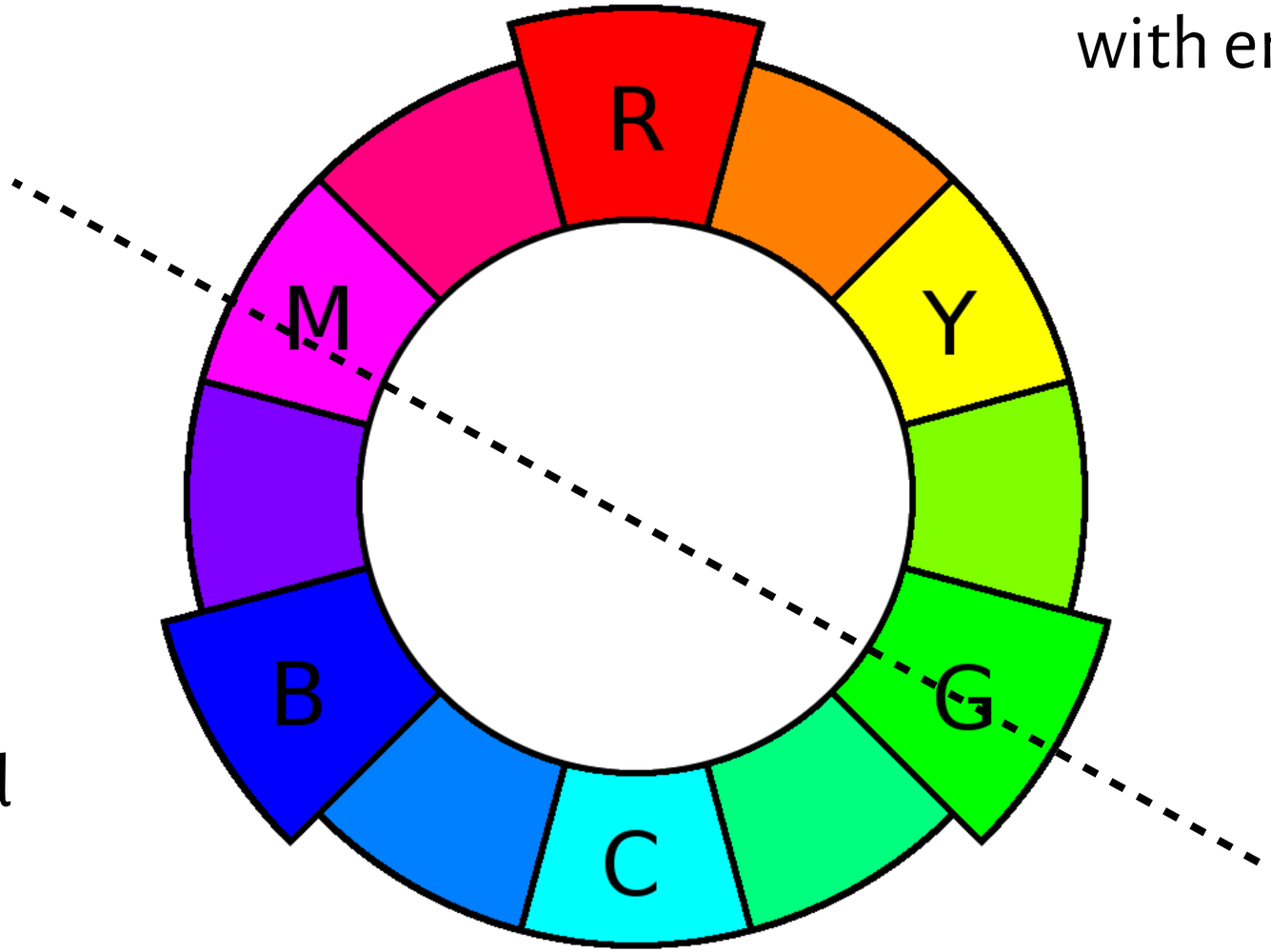


Lightness

The Color Wheel

Warm

Often associated with energy



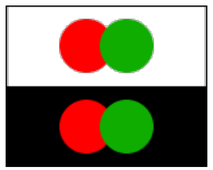
Cool

Often associated with calm

Color "Harmonies"

Complementary





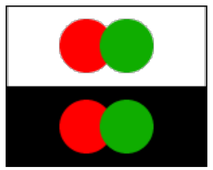
- ✓ Opposing hues can stand out.
- ✓ Check text–background contrast.

https://www.tigercolor.com/color-lab/color-theory/color-theory-intro.htm

Color "Harmonies"

Complementary

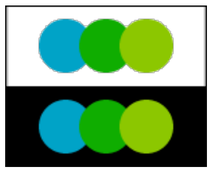




- ✓ Opposing hues can stand out.
- ✓ Check text–background contrast.

Analogous



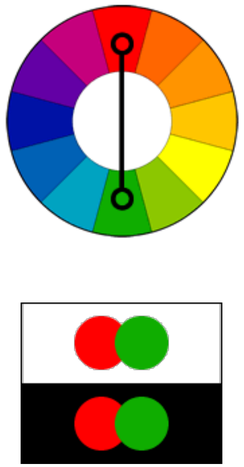


- ✓ Neighboring hues.
- ✓ Choose one main color, others to support/accent.
- ✓ Make sure you have sufficient contrast.

https://www.tigercolor.com/color-lab/color-theory/color-theory-intro.htm

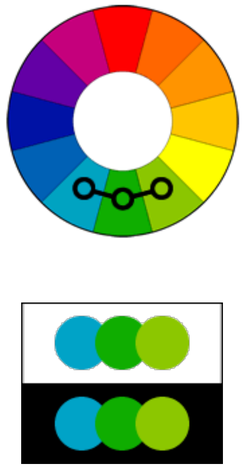
Color "Harmonies"

Complementary



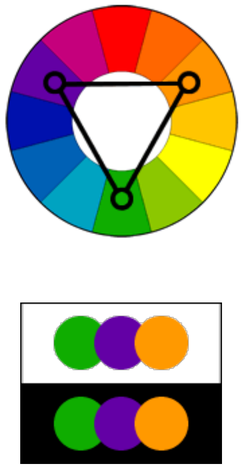
- ✓ Opposing hues can stand out.
- ✓ Check text–background contrast.

Analogous

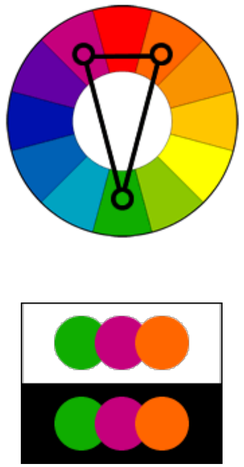


- ✓ Neighboring hues.
- ✓ Choose one main color, others to support/accent.
- ✓ Make sure you have sufficient contrast.

Triadic

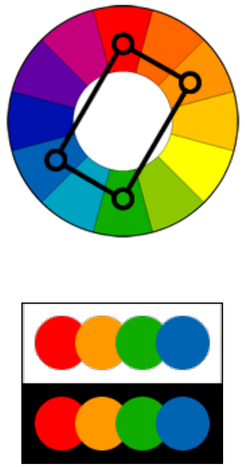


Split Complementary

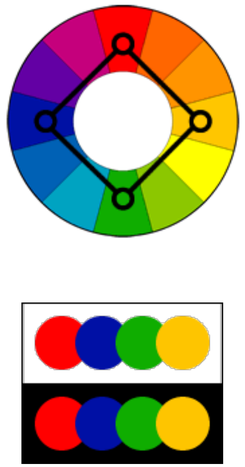


- ✓ Base hue plus two hues adjacent to its complement.

Rectangle (Tetradic)



Square



https://www.tigercolor.com/color-lab/color-theory/color-theory-intro.htm

color.adobe.com/create/color-wheel

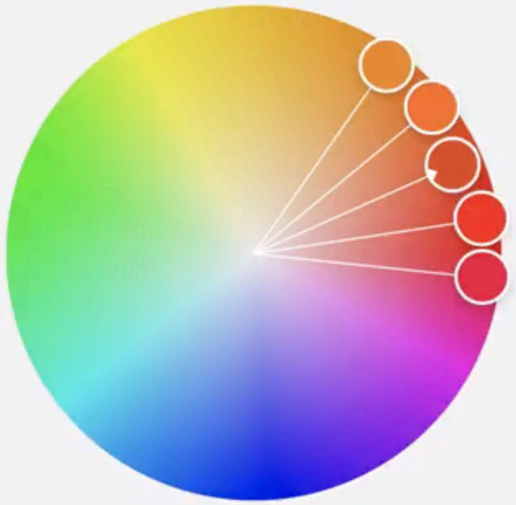
Color wheel, a color palette generator | Adobe Color

Adobe Color CREATE EXPLORE TRENDS MY LIBRARIES Sign In

Color Wheel | Extract Theme | Extract Gradient | Accessibility Tools | New

Apply Color Harmony Rule

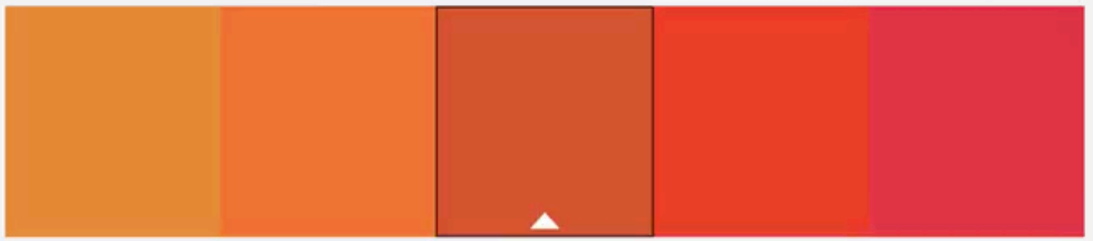
- (•) Analogous
- ( ) Monochromatic
- ( ) Triad
- ( ) Complementary
- ( ) Split Complementary
- ( ) Double Split Complementary
- ( ) Square
- ( ) Compound
- ( ) Shades
- ( ) Custom



Sign into Creative Cloud to save this Color Theme, created from color wheel or image.

You can then use your saved color themes, in Adobe products (Photoshop, Illustrator, Fresco etc.), via Adobe color theme panel or CC Libraries.

Save

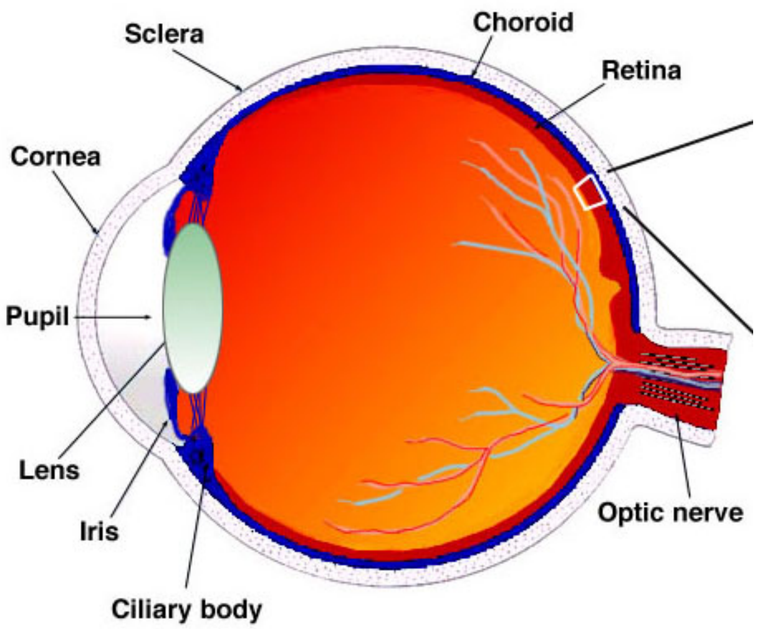


	A	B	C	D	E
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R	245	255	232	255	245
G	137	108	75	39	17

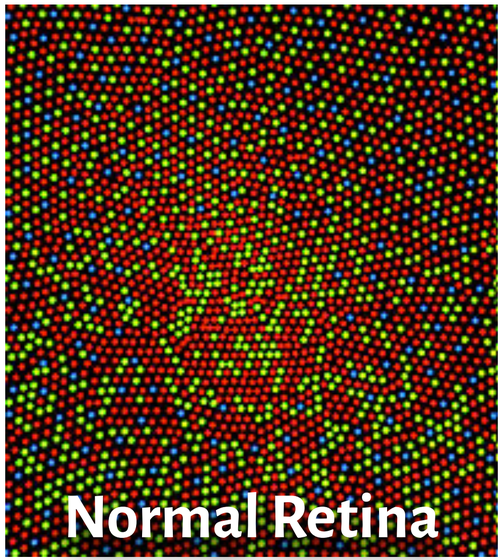
Color Mode

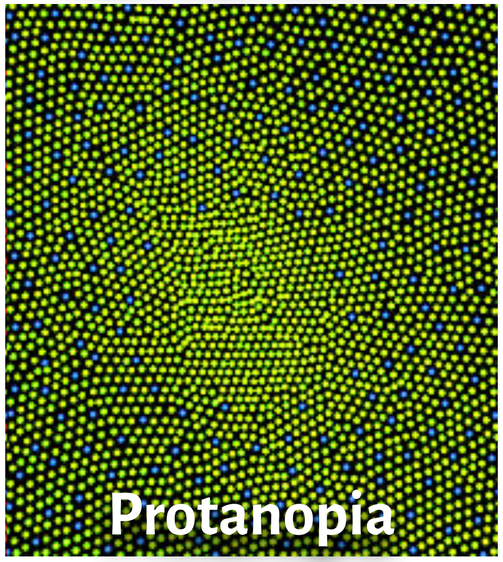
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The Retina



[Helga Kolb *Simple Anatomy of the Retina*]







Protanope Deuteranope Luminance