

Building User Interfaces

Visual Design

Professor Yuhang Zhao

What we will learn today?

- Elements and principles of design
- Color, type, and images

Elements of Design

Elements of Design

1. Space
2. Line
3. Shape
4. Size
5. Pattern
6. Texture
7. Value

Space¹

Definition: Space is the canvas on which visual elements are placed.

- Space can be *positive* or *negative*
- *Positive*: where the subject is positioned
- *Negative*: the space surrounding the subject
- Negative space can be used as positive

¹Image sources: [this slide](#), next slide: [left](#), [right](#)



Now data helps pinpoint more oil.

In Venezuela, IBM deep computing processes seismic data, helping Tricon Geophysics pinpoint new oil and gas using 40% less energy. ibm.com/smarterplanet



A FILM BY
GUY RITCHIE
**SHERLOCK
HOLMES**
A GAME
OF SHADOWS

WARNER BROS. PICTURES PRESENTS
A WOLFGANG PETERSEN PRODUCTION A SILVER PICTURES PRODUCTION IN ASSOCIATION WITH WINDHAM PRODUCTIONS A GUY RITCHIE FILM ROBERT DOWNEY JR., JOSE LAW
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MUSIC BY JAMES NEWTON HOWARD COSTUME DESIGNER PHILIPPE BOUSSOLETTI EXECUTIVE PRODUCERS JACQUES BRASSEUR BRUCE BERMAN STEVE CLARK HALL
PRODUCED BY RACHEL ANADAMS AND KEVIN MURPHY WRITTEN BY JOEL SILVER TONEL WIGRAM SUGAN DOWNEY DAN LIU DIRECTED BY GUY RITCHIE
www.sherlockholmes.com www.paramount.com www.wb.com

Line²

Definition: The most primal design element that can divide space, call attention to, organize, and make up other elements.



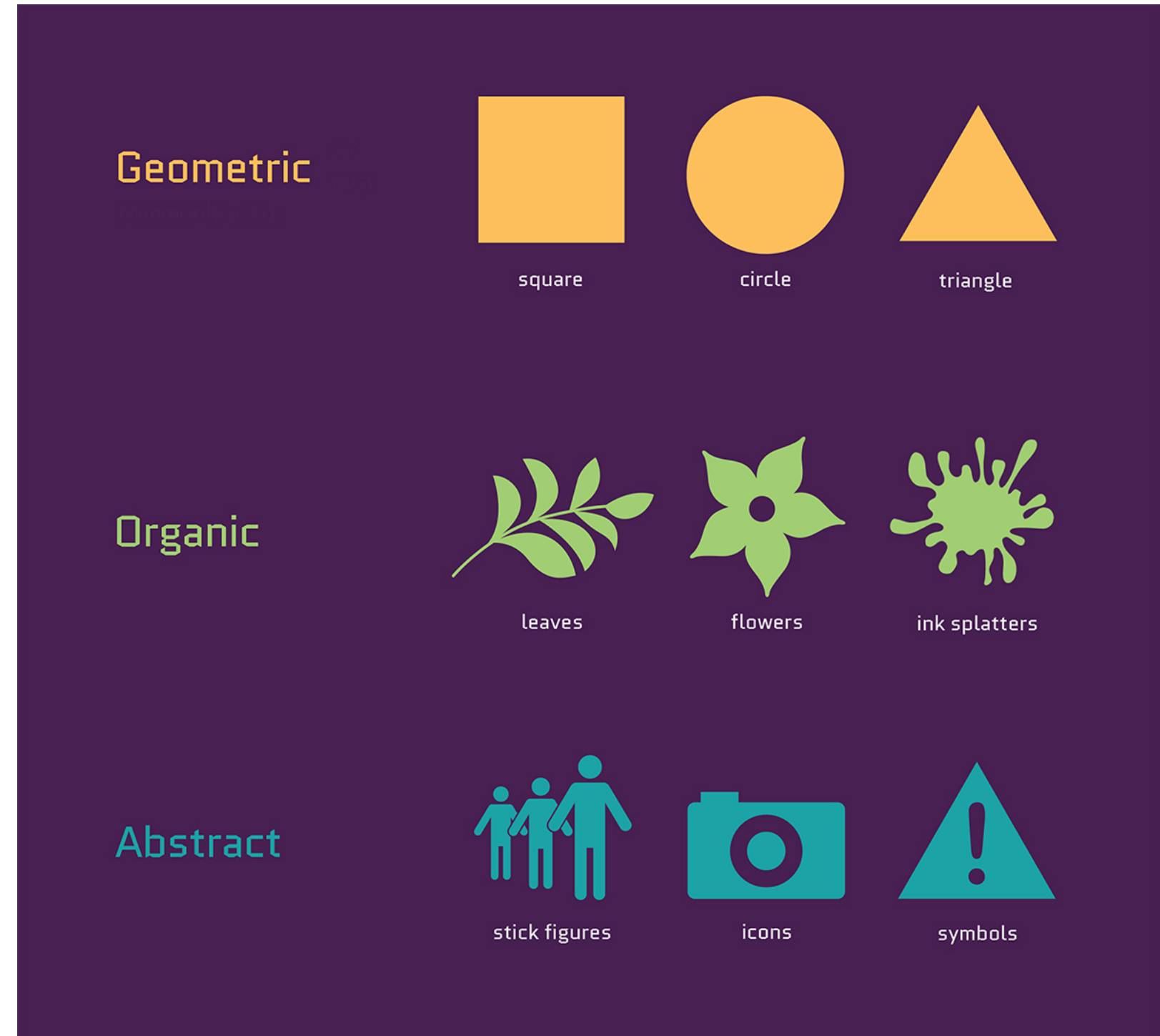
²Image source

Shape³

Definition: Space outlined by a contour.

— *Organic vs. inorganic shapes*

³Image sources: [this & next slides](#)



Triangles we see in everyday life

- The "play" symbol
- The "fast forward" and "reverse" symbols
- Pyramids
- Mountains
- Pennants
- Pizza slices

Some of the ways you can use circles as part of a design

- Solid
- Segmented Ring
- Decorated Ring
- Round Composition
- The Sun

Examples of well-known pentagons, hexagons and octagons

- Pentagons
school crossing
- Hexagons
beehive
- Octagons
stop sign

What do we associate stars with?

Five-pointed stars with the point facing up

- Golden star stickers
- Stars in the sky
- Prizes and Awards
- Hollywood Walk of Fame Stars
- Movie Stars
- Christmas star

Size⁴

Definition: Size, or *scale*, is the relative extent of the design elements such as shapes and lines.

⁴[Image source](#)



Pattern⁵

Definition: Pattern, or *repetition*, systematic duplication of other design elements such as shapes and lines.



⁵Image source

Texture⁶

Definition: Tactile and visual quality of a shape or space made up of different colors, materials, and different structures.

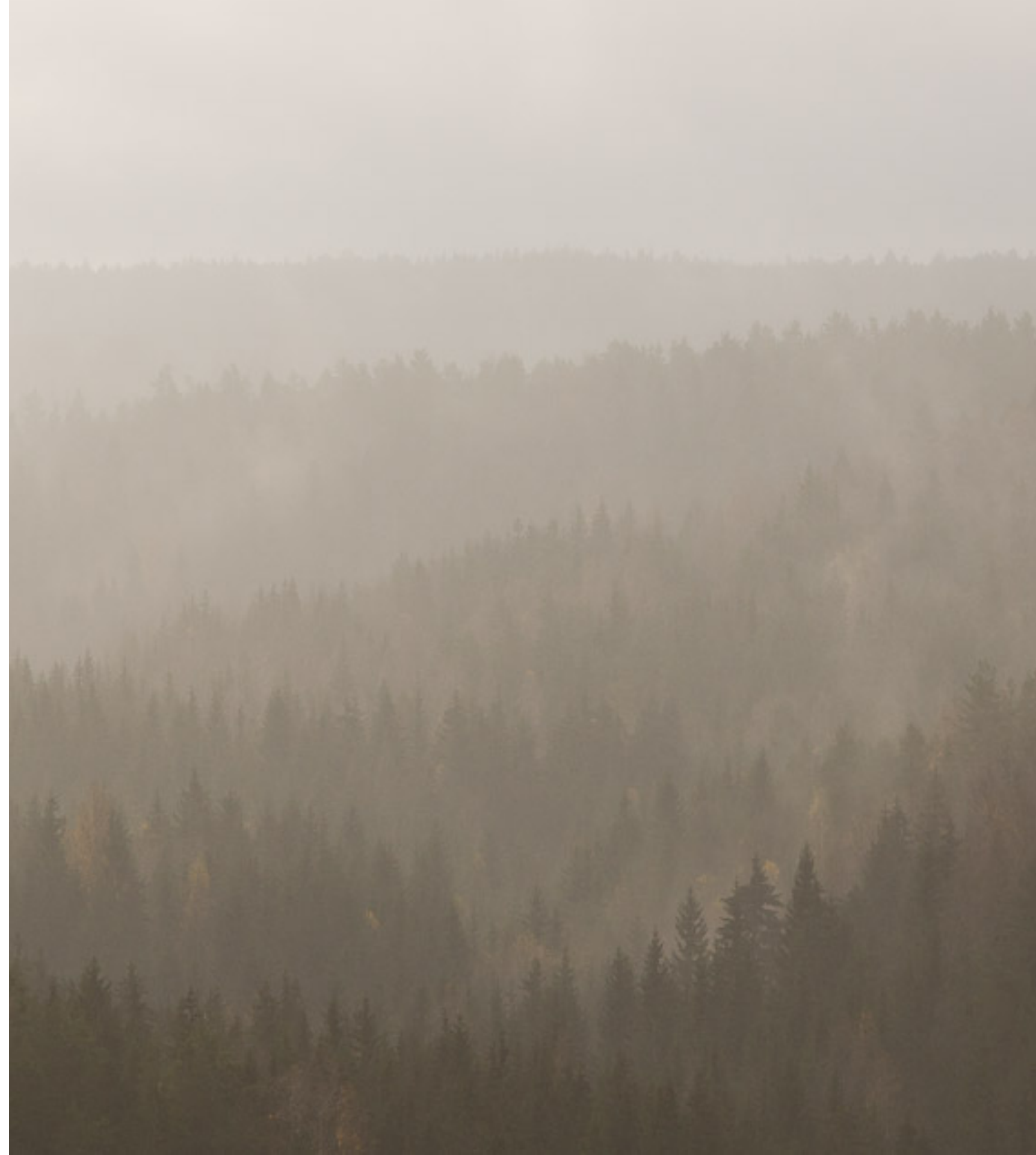
⁶Image source



Value⁷

Definition: The intensity in which a design element is expressed.

⁷Image source



Principles of Design

Principles of Design

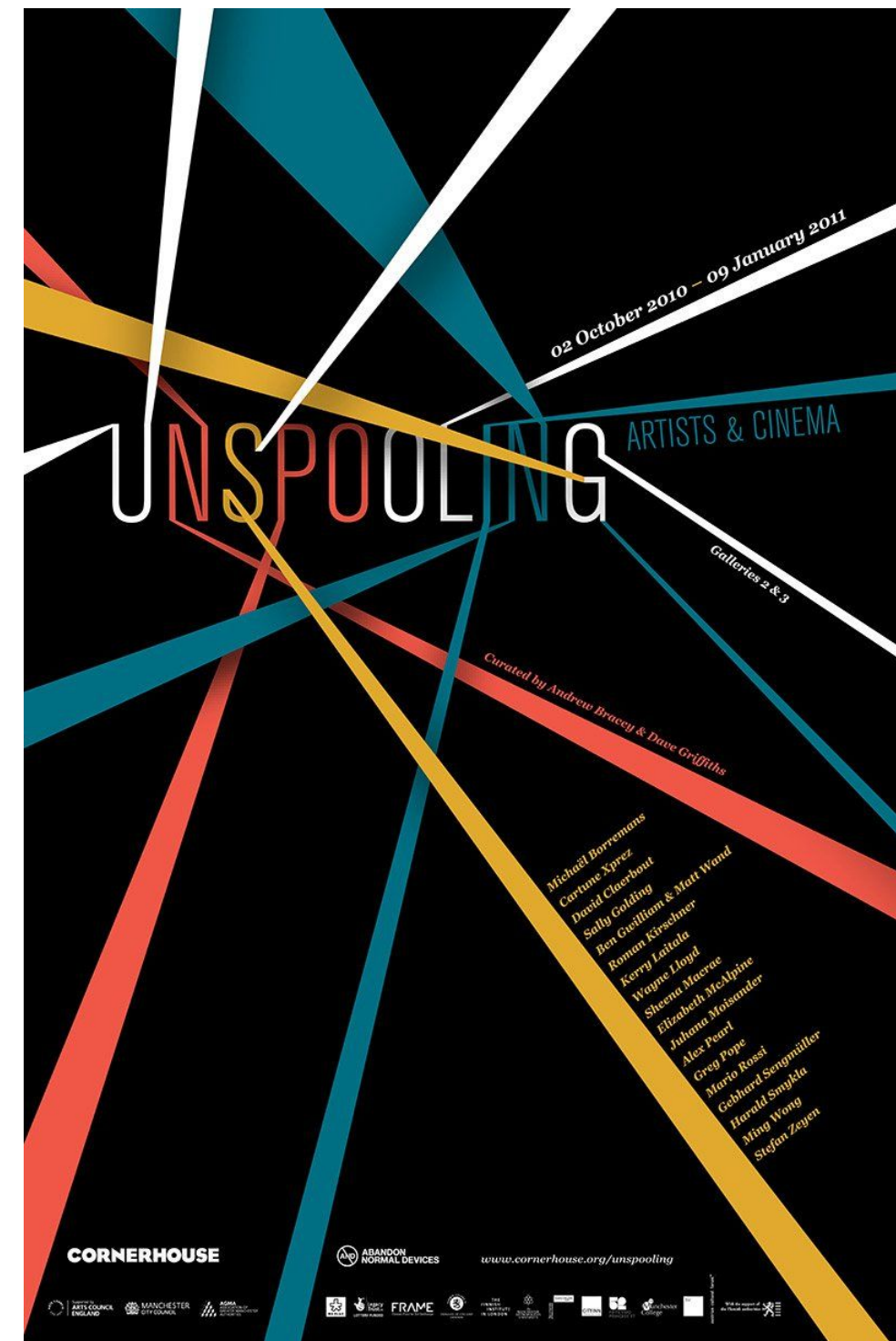
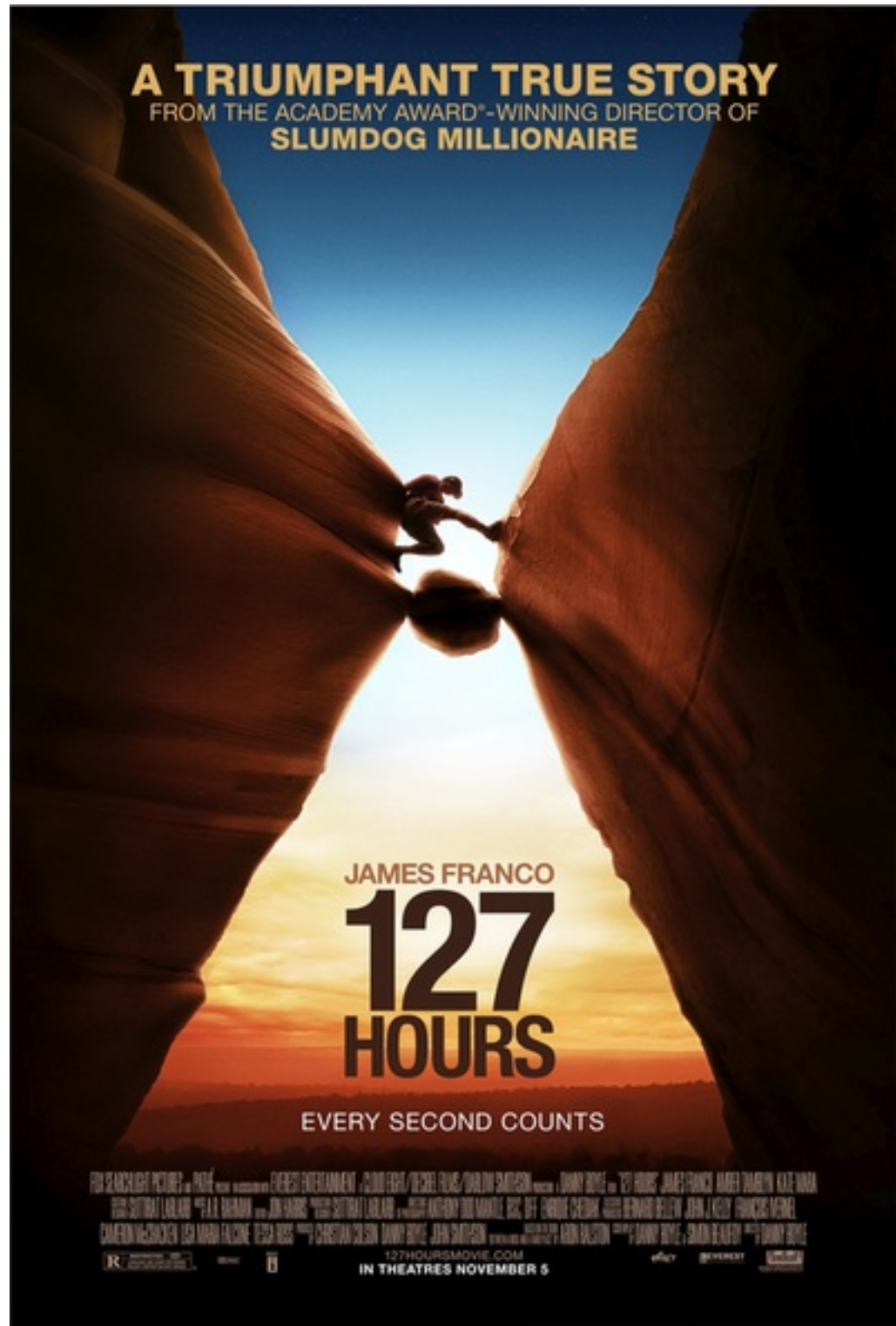
1. Focal Point
2. Contrast
3. Balance
4. Movement
5. Rhythm
6. Perspective
7. Unity

Focal Point⁸

Definition: Focal point, or the area of visual interest, is where the design directs the attention of the viewer first.



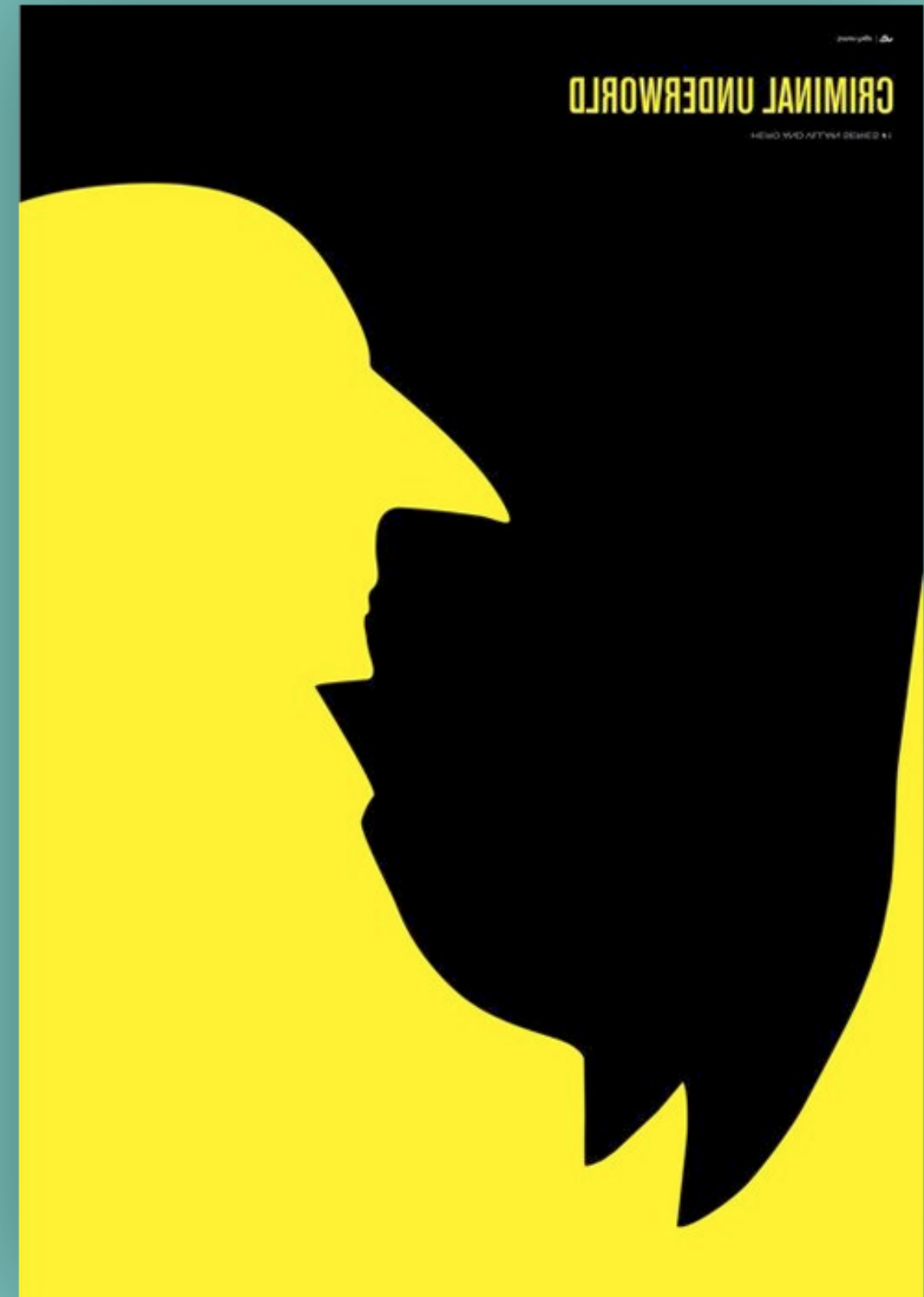
⁸ Images sources: [this slide](#), next slide: [left](#), [right](#)



Contrast⁹

Definition: Contrast, is the juxtaposition of design elements that strikingly differ from each other to guide user attention and action.

⁹ Image sources: [this slide](#), next slide: [left](#), [right](#)





Balance¹⁰

Definition: The organization of design elements on a canvas to provide a sense of visual balance or imbalance.

Pro Tip: Balance can be achieved through *symmetry* or *asymmetry*.

¹⁰ Image source



lively! Goes like a greyhound with a hotfoot . . . curves 'round corners like a sports car . . . packs more power than you'll ever expect! No other small car gives you such terrific performance—up to 60 miles per gallon—and seats 4 in such easy comfort .

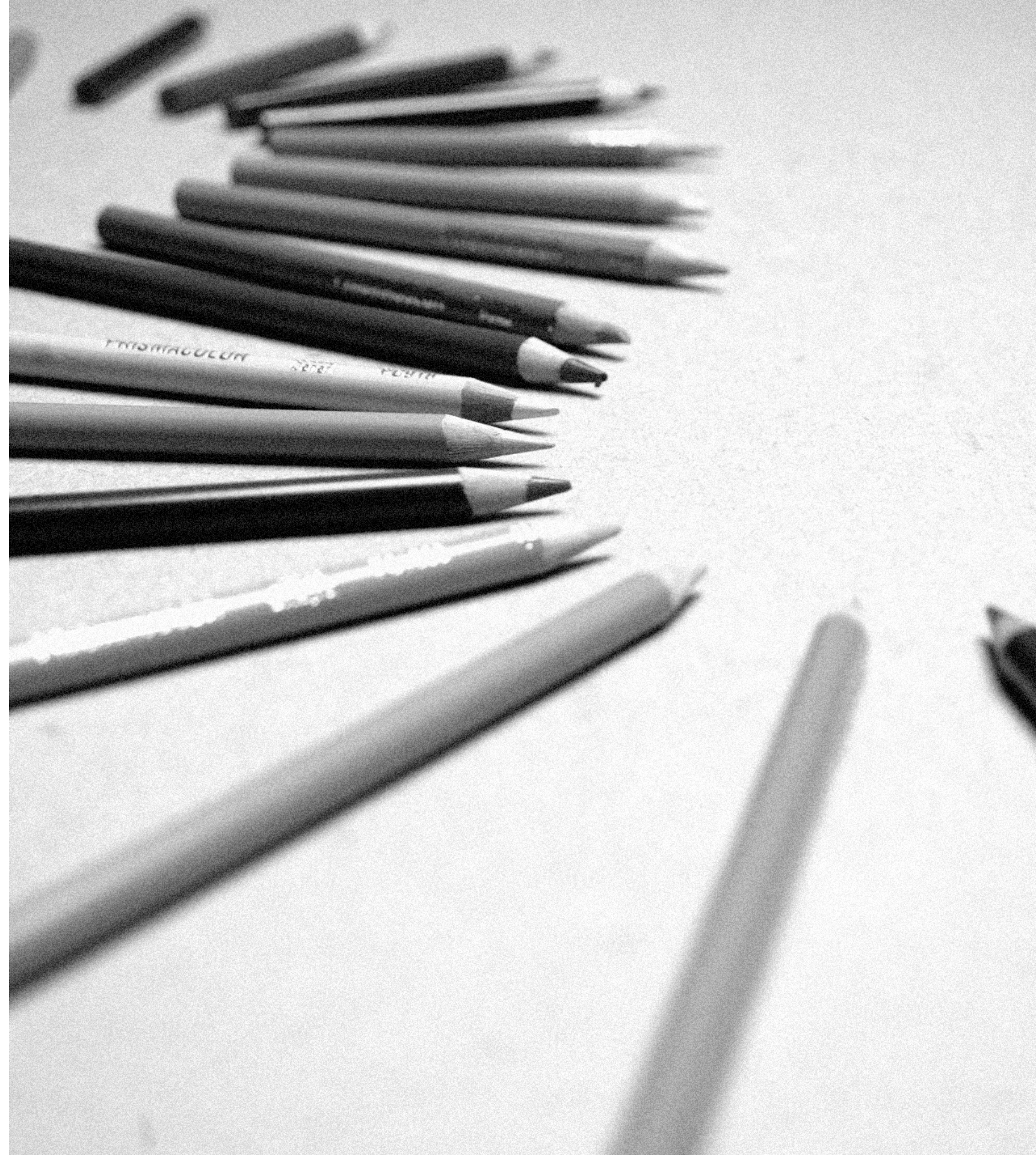
Austin 850



Movement¹¹

Definition: The organization of design elements in a way that suggests a particular flow on the canvas to direct the user's attention in a particular pattern.

¹¹ Image source



Rhythm¹²

Definition: Patterned use of design elements in a way that communicates movement or order.

¹² Image source

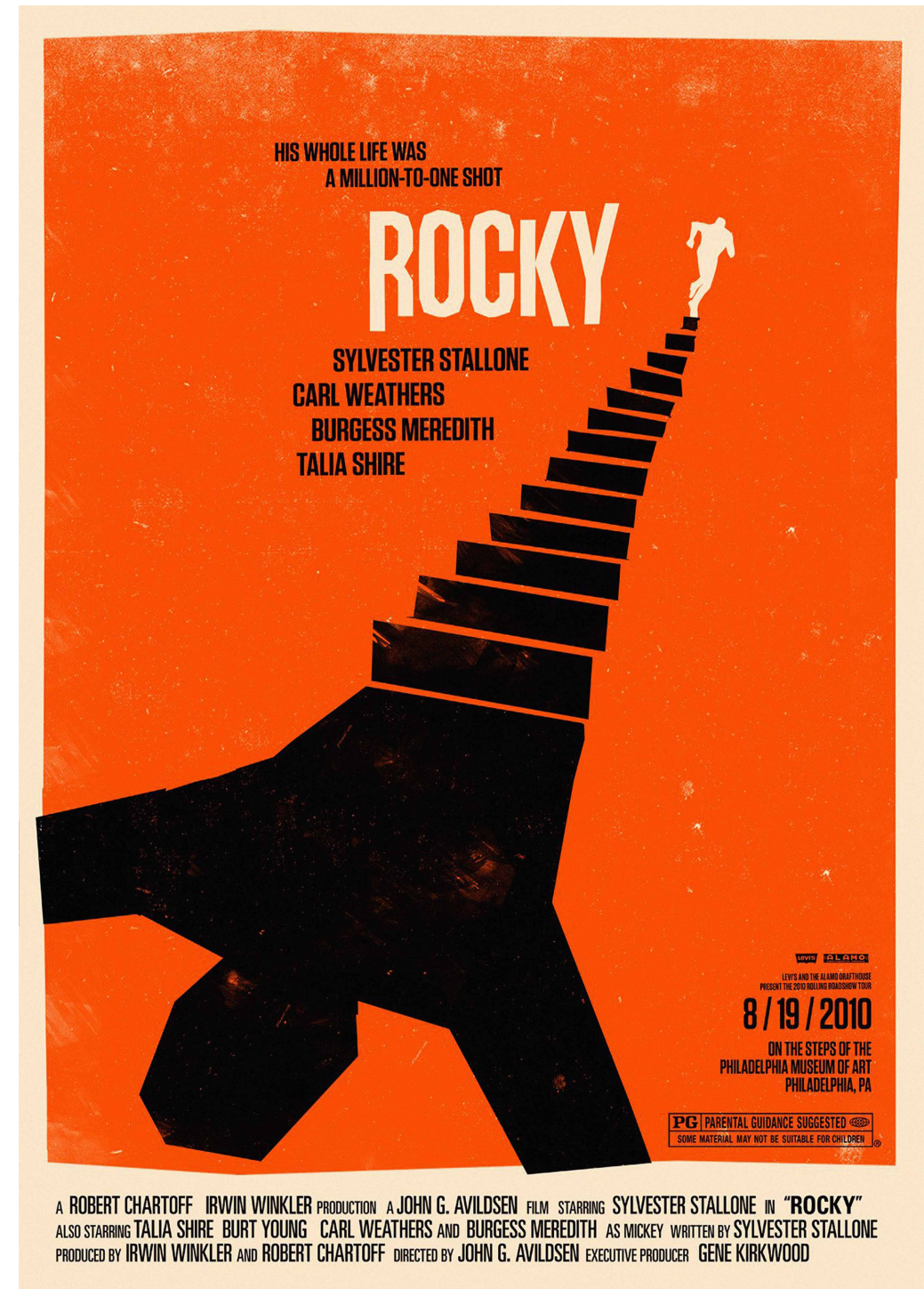
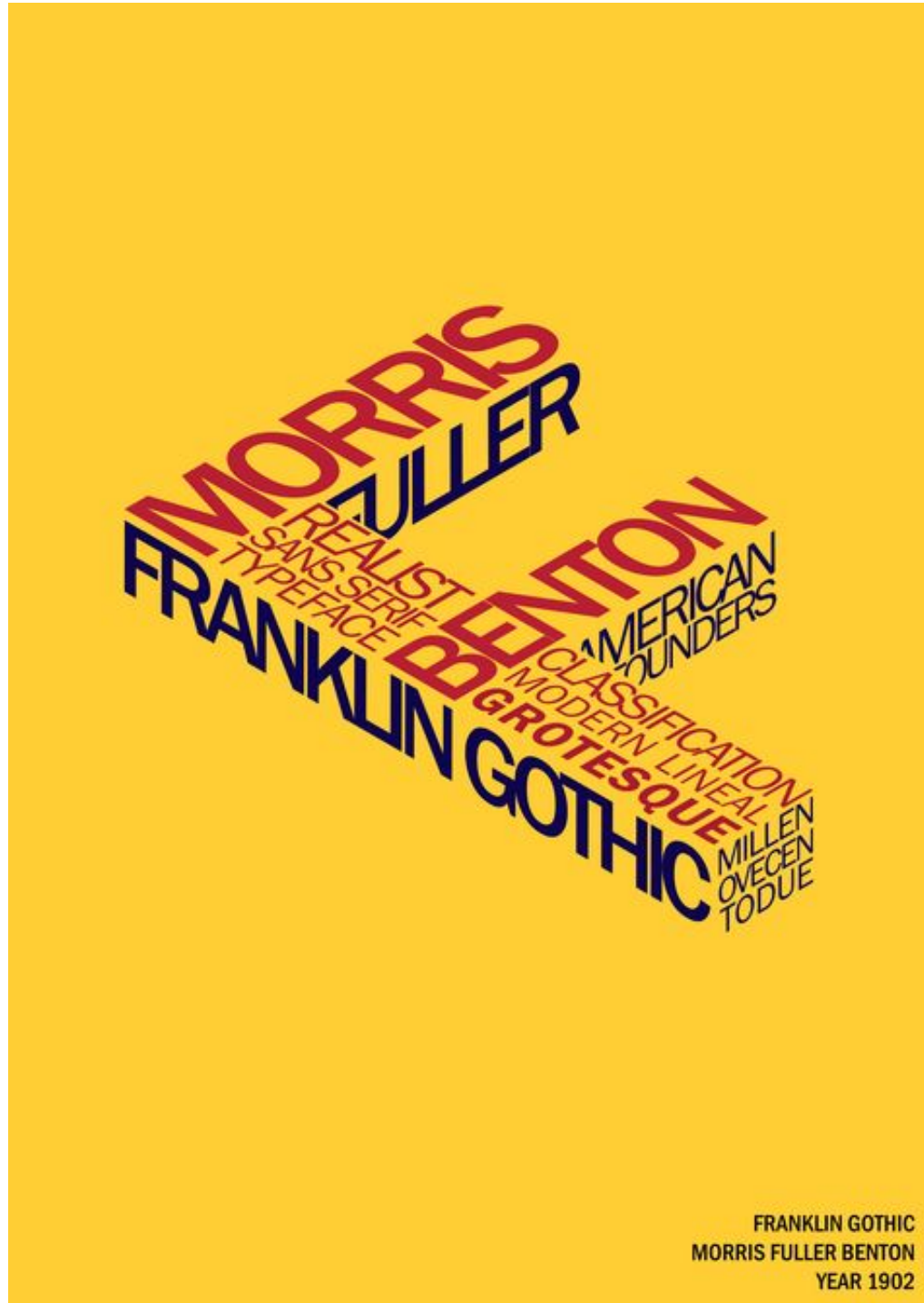


Perspective¹³

Definition: Creating a sense of horizon and movement along the depth axis of canvas.

¹³ Image sources: [this slide](#), next slide: [left](#), [right](#)





Unity¹⁴

Definition: Unity reflects the holistic consistency in the use of design elements.

¹⁴ Image sources: [this slide](#), next slide: [left](#), [right](#)





This all sounds good. But how do we actually use these?

Some Strategies

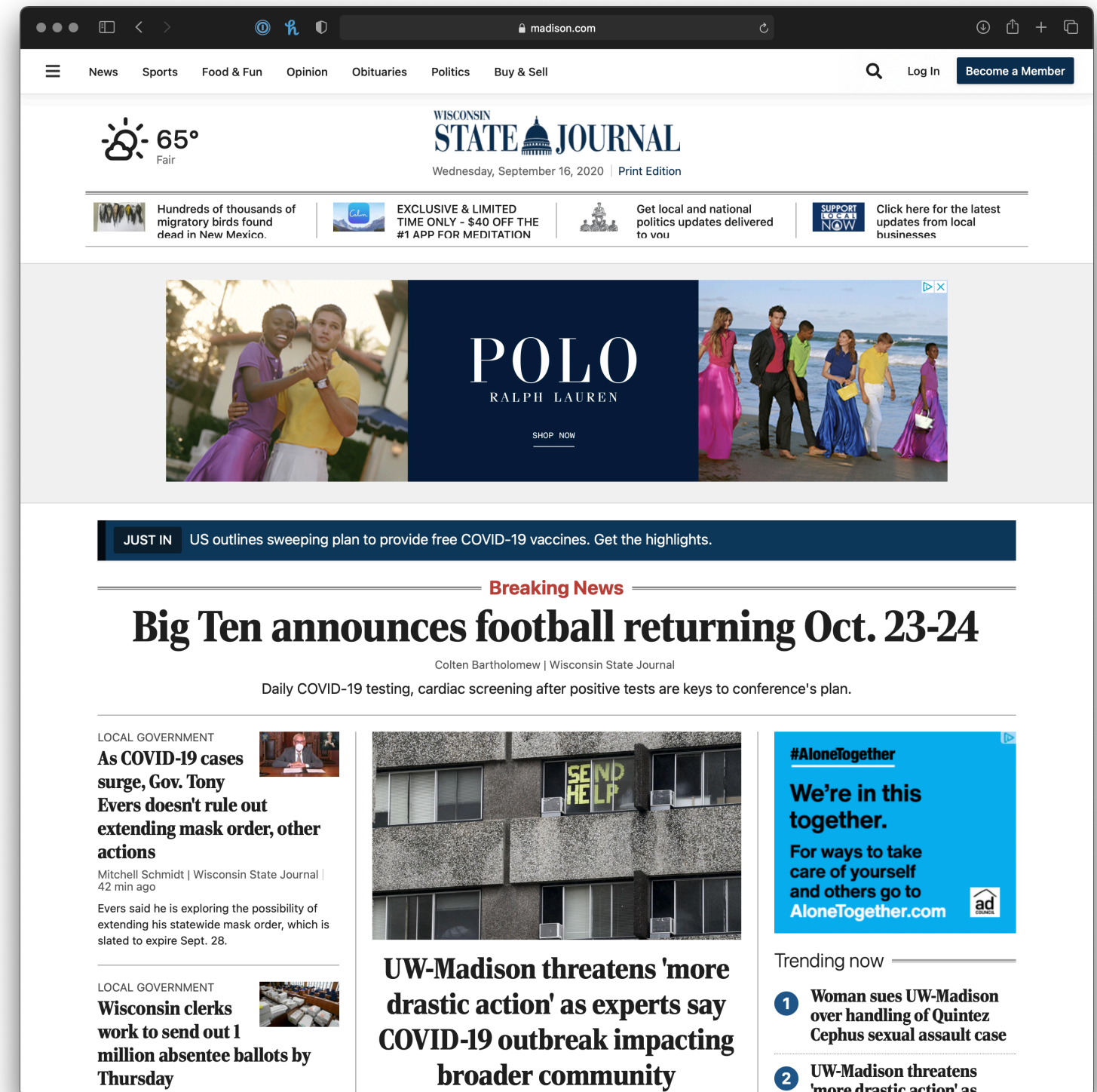
- Create *cheat sheets*, and *checklists*
- Analyze existing designs using these tools to build visual analysis skills
- *Practice* designing using the principles
 - *Pro Tip*: Your canvas should have no elements that do not follow an overall principle

In-class Design Exercise 1

Analyze an existing page using the design elements and principles

- What elements, principles can you see in use?
- What problems do you see that can be addressed using design principles?

Make a copy of the Google Drawings template, annotate, and submit a PDF within 24 hours as *Quiz 3*.



65° Fair

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Advertisement for 'the Y Collaborative Learning Program' featuring a 'Register Now!' button and images of children.

JUST IN US outlines sweeping plan to provide free COVID-19 vaccines. Get the highlights.

Breaking News

Big Ten announces football returning Oct. 23-24

Colten Bartholomew | Wisconsin State Journal

Daily COVID-19 testing, cardiac screening after positive tests are keys to conference's plan.

LOCAL EDUCATION

Lake Mills Area School District stops in-person school, activities for rest of week due to COVID-19

Jeff Richgels | 42 min ago

The COVID-19 pandemic continues to affect the start of school, with the Lake Mills Area School District the latest to halt in-person school an...



LOCAL GOVERNMENT

As COVID-19 cases surge, Gov. Tony Evers doesn't rule out extending mask order, other actions

Mitchell Schmidt | Wisconsin State Journal | 47 min ago

Evers said he is exploring the possibility of extending his statewide mask order, which is slated to expire Sept. 28.



UW-Madison threatens 'more drastic action' as experts say COVID-19 outbreak impacting broader community

David Wahlberg | Wisconsin State Journal | 2 hrs ago

UW-Madison threatened "more drastic action" Tuesday if quarantines in two large dorms don't greatly reduce COVID-19 infections, as health experts said a campus coronavirus outbreak is putting the general public at risk with flu season nearing.

Advertisement for 'Global Connectivity' featuring a large cargo ship and text: '9 International Airports and 12 Seaports'.



Learn More

In-class Design Exercise 2¹⁵

Consider the *last* product you purchased online. Design a product page with the following elements:

- Product photo
- Product description, reviews, similar items
- Action buttons: choose color, add to cart, add to wishlist

Make a copy of the template, place elements & annotate with your decisions, and submit a PDF as *Quiz 4*.








¹⁵ Image sources: this slide, elements/principles: first, second














The Elements of Design

(the tools to make art)

Line		Horizontal, vertical, diagonal, straight, curved, dotted, broken thick, thin.
Shape		2D (two dimensional)/ flat Geometric (square, circle, oval, triangle) Organic (all other shapes)
Form		3D (three dimensional), Geometric (cube, sphere, cone), Organic (all other forms such as: people, animals, tables, chairs, etc).
Colour		Refers to the wavelengths of light. Refers to hue (name), value (lightness/darkness), intensity (saturation, or amount of pigment), and temperature (warm and cool). Relates to tint, tone and shade.
Value		The lightness or darkness of an image (or part of an image).
Texture		The feel, appearance, thickness, or stickiness of a surface (for example: smooth, rough, silky, furry).
Space		The area around, within, or between images or parts of an image (relates to perspective). Positive and negative space.

The Principles of Design

(how to use the tools to make art)

Pattern		A regular arrangement of alternated or repeated elements (shapes, lines, colours) or motifs.
Contrast		The juxtaposition of different elements of design (for example: rough and smooth textures, dark and light values) in order to highlight their differences and/or create visual interest, or a focal point.
Emphasis		Special attention/importance given to one part of a work of art (for example, a dark shape in a light composition). Emphasis can be achieved through placement, contrast, colour, size, repetition... Relates to focal point.
Balance		A feeling of balance results when the elements of design are arranged symmetrically or asymmetrically to create the impression of equality in weight or importance.
Scale		The relationship between objects with respect to size, number, and so on, including the relation between parts of a whole.
Harmony		The arrangement of elements to give the viewer the feeling that all the parts of the piece form a coherent whole.
Rhythm/Movement		The use of recurring elements to direct the eye through the image; the way the elements are organized to lead the eye to the focal area. The eye can be directed, for example, along edges and by means of shape and colour.
Unity		All parts of an image work together to be seen as a whole.
Variety		Using different elements in an image to create visual interest.

LINE



A line is a mark between two points. There are various types of lines, from straight to squiggly to curved and more. Lines can be used for a wide range of purposes: stressing a word or phrase, connecting content to one another, creating patterns and much more.

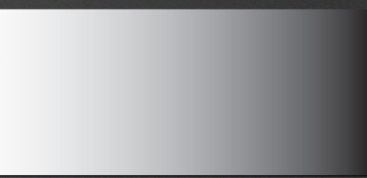
SHAPE



Height + width = shape. We all learned basic shapes in grade school - triangles, squares, circles and rectangles. Odd or lesser seen shapes can be used to attract attention.

There are three basic types of shape: **geometric** (triangles, squares, circles etc), **natural** (leaves, animals, trees, people), and **abstracted** (icons, stylizations, graphic representations etc).

VALUE



Value is how light or how dark an area looks. A gradient, shown above, is a great way to visualize value - everything from dark to white, all the shades in-between, has a value. Use value to create depth and light; to create a pattern; to lead the eye; or to emphasize.

CONTRAST



Unique elements in a design should stand apart from one another. One way to do this is to use contrast. Good contrast in a design - which can be achieved using elements like color, tone, size, and more - allows the viewer's eye to flow naturally.

To the left, you can see 4 ways to create contrast in your design.

REPETITION

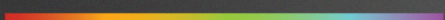
Repetition breeds cohesiveness in a design. Once a design pattern has been established - for example, a dotted border or a specific typographic styling - repeat this pattern to establish consistency.

The short version?

Establish a style for each element in a design and use it on similar elements.



COLOR

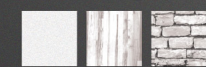


Color is used to generate emotions, define importance, create visual interest and more. CMYK (cyan/magenta/yellow/black) is subtractive; RGB (red/green/blue) is additive.

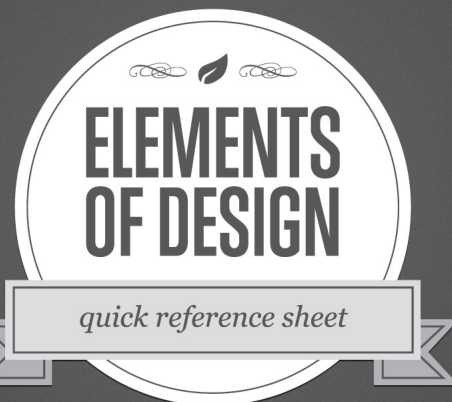
Some colors are warm and active (orange, red); some are cool and passive (blue, purple).

There are various color types (primary to analogous) and relationships (monochromatic to triad) worth learning more about as well.

TEXTURE



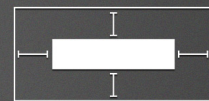
Texture relates to the surface of an object; the look or feel of it. Concrete has a rough texture; drywall has a smooth and subtle texture. Using texture in design is a great way to add depth and visual interest. Printed material has actual, tactile texture while screen material has implied texture.



SIZE



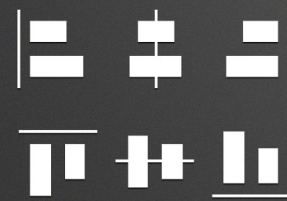
Size is how small or large something is: a small shirt vs. an extra large shirt, for example. Use size to define importance, create visual interest in a design (via contrasting sizes), attract attention and more.



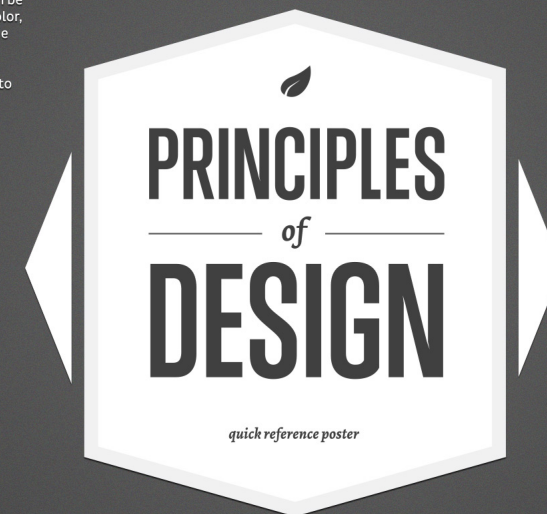
Space is the area around or between elements in a design. It can be used to separate or group information. Use it effectively to: give the eye a rest; define importance; lead the eye through a design and more.

SPACE

ALIGNMENT



Proper alignment in a design means that every element in it is visually connected to another element. Alignment allows for cohesiveness; nothing feels out of place or disconnected when alignment has been handled well.



PROXIMITY



Proximity allows for visual unity in a design. If two elements are related to each other, they should be placed in close proximity to one another. Doing so minimizes visual clutter, emphasizes organization, and increases viewer comprehension.

Imagine how ridiculous it would be if the proximity icons on this graphic were located on the other side of this document.



Key Components for UX Design

Key Components for UX Design

We will focus on *type*, *color*, and *images*.

Type

Definition: Printed letters and characters of language.



Associated Concepts

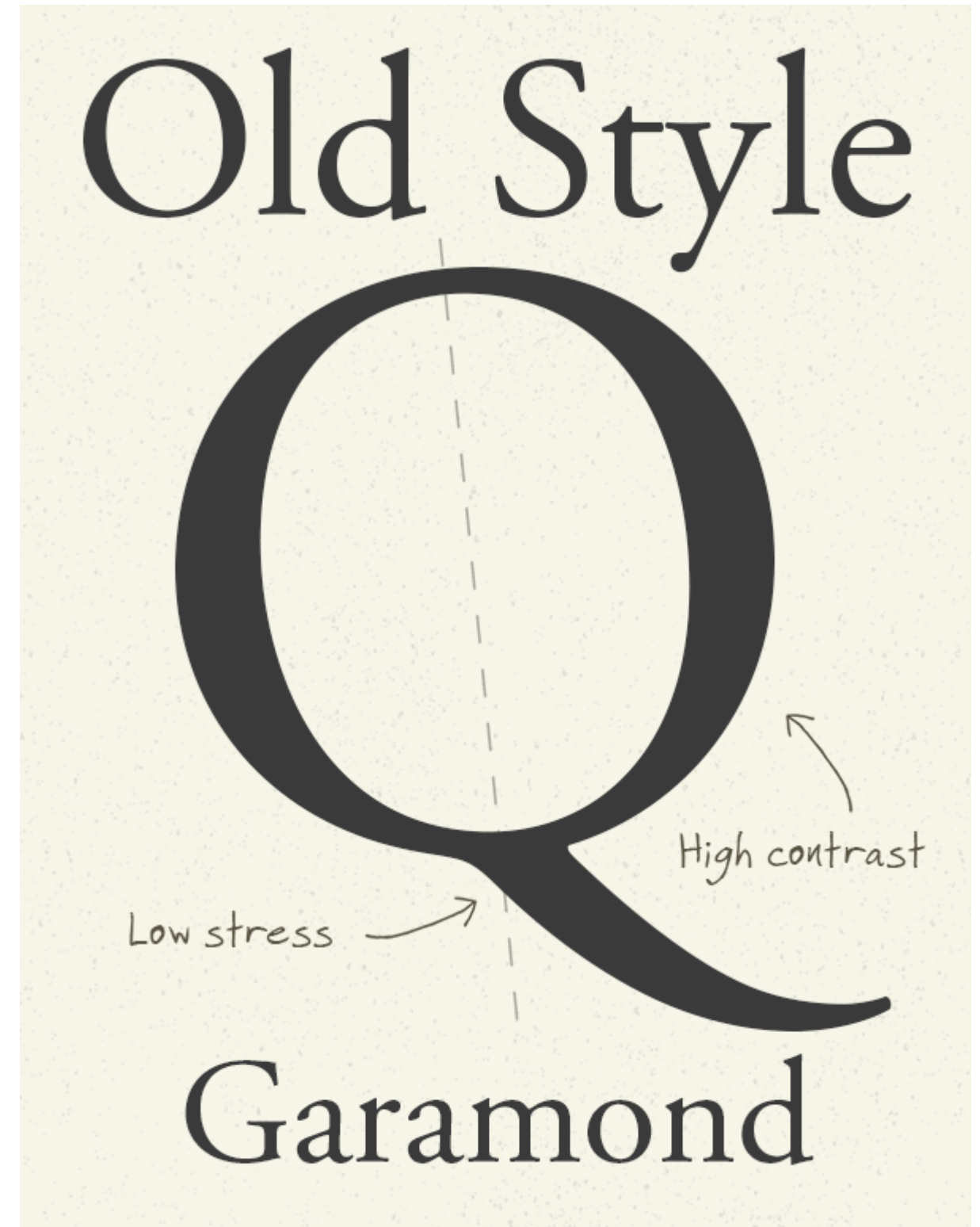
- A **font** is the style in which type is created.
- A **typeface** is a font family that includes fonts of different variations that follow the same style.
- A **glyph** is a particular character.

Categories of Typefaces

1. Old style
2. Modern
3. Slab serif
4. Sans serif
5. Script
6. Decorative

Old-style fonts

Definition: Old-style fonts have "serifs" at the tips of a glyph that taper closer to the tip.



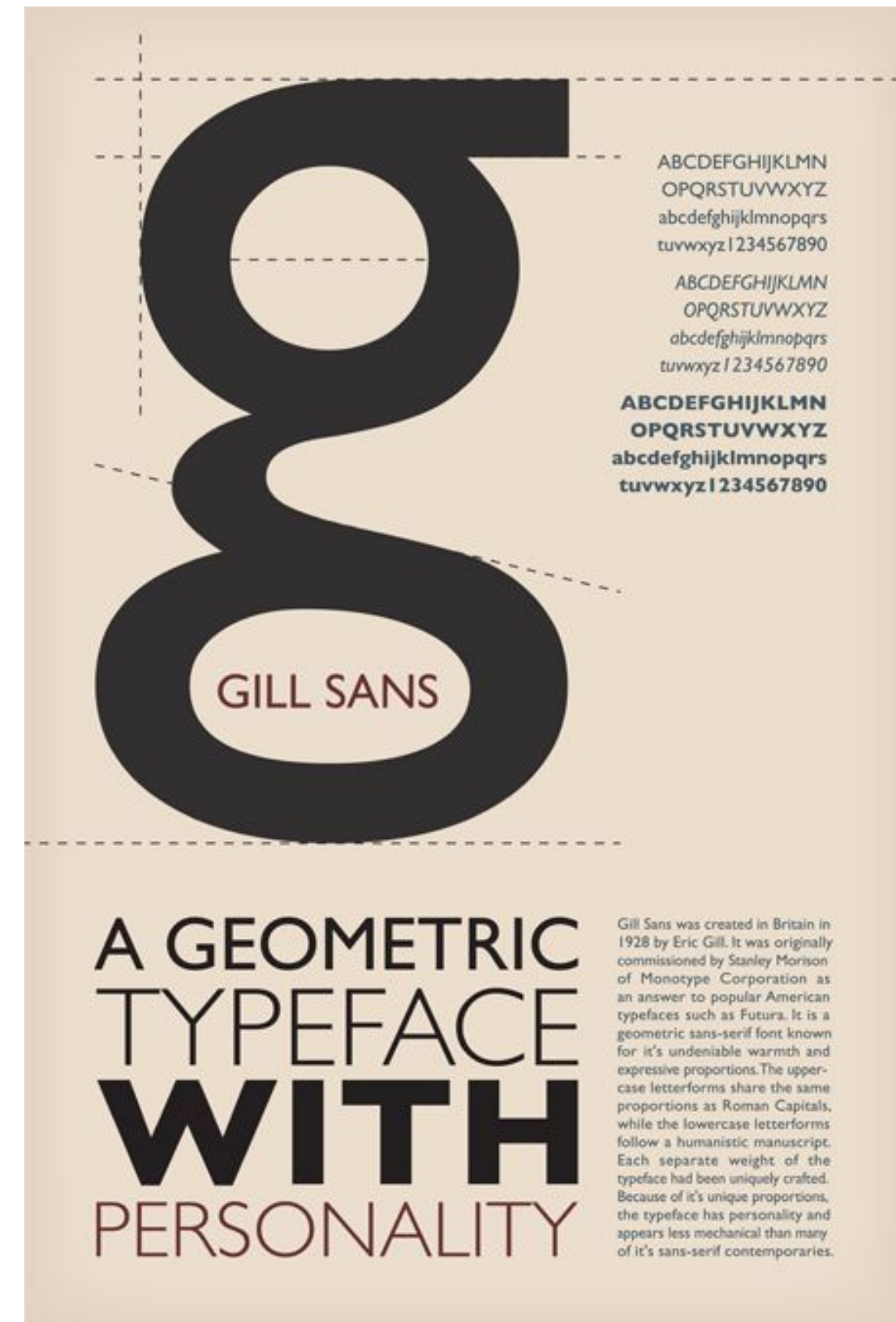
Modern & slab-serif fonts

Definition: Modern and slab-serif fonts have very thin or very thick serifs.



Sans-serif fonts

Definition: Sans-serif fonts lack the serif at the tips of the glyphs, and their strokes follow uniform weight.



Script fonts

Definition: Script fonts simulate cursive writing where glyphs connect with each other at the downstroke.



Decorative fonts

Definition: Decorative fonts are designed specifically to convey a particular context or elicit a particular feeling, e.g., "gothic."



Font parameters

- **Style variations:** bold, italic, oblique
- **Caps:** all caps, small caps
- **Weight:** extra light, light, medium, bold

Müller™ Styles Overview
Weights

Hairline & Hairline Italic
Antimon

Thin & Thin Italic
Beryllium

UltraLight & UltraLight Italic
Californium

Light & Light Italic
Sauerstoff

Regular & Italic
Dysprosium

Medium & Medium Italic
Unununium

Bold & Bold Italic
Quecksilber

ExtraBold & ExtraBold Italic
Kohlenstoff

Black & Black Italic
Wolfram

Heavy & Heavy Italic
Seaborgium

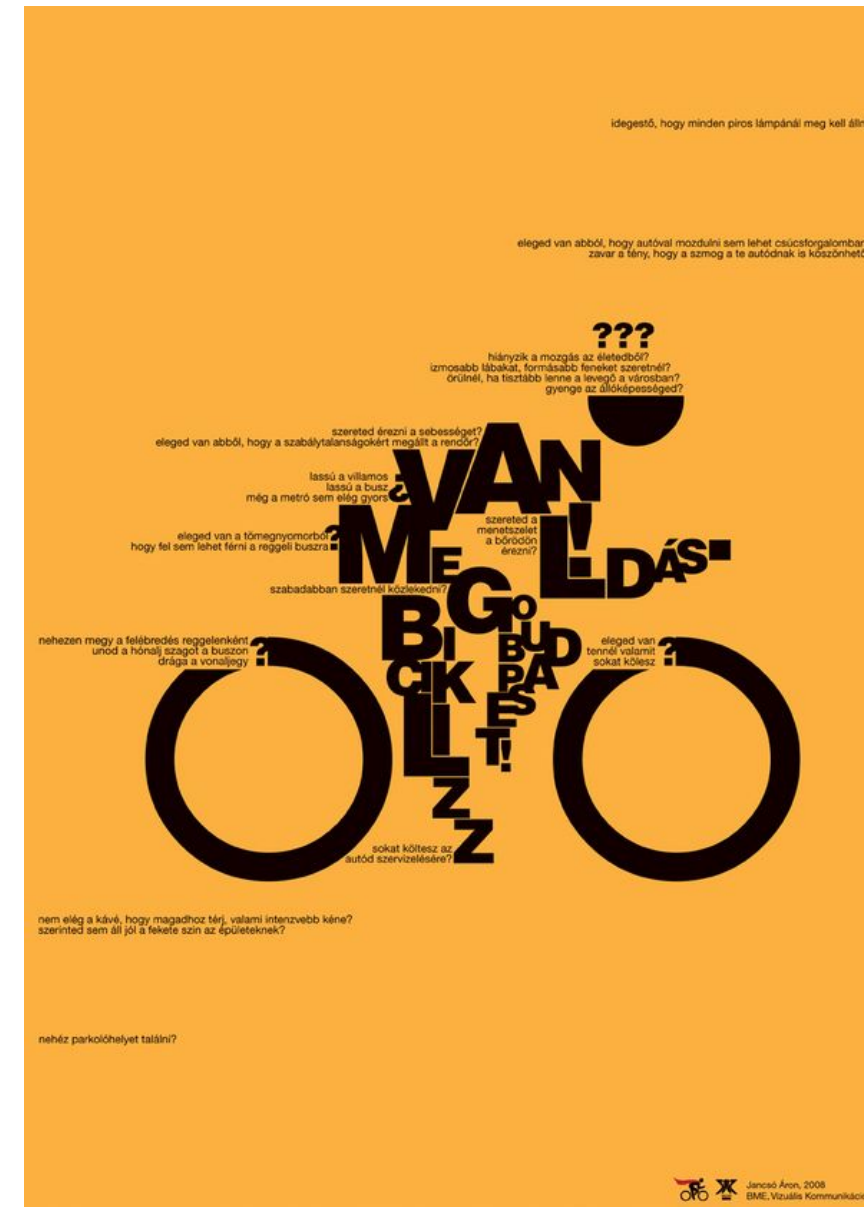
Pro Tip: Type alone can be used to achieve design principles, such as *hierarchy* and *movement*.

You'll probably see this last.

**First, you'll
read this.**

Then, you'll read this.

And then this.



Pro tip: For good typography, become familiar with *leading*, *tracking*, *kerning*, *widows*, *orphans*, *rags*, *ivers*.

Widow
Ut placerat mauris a est consectetur vulputate.

Nunc nunc sem, finibus sed orci non, cursus ornare ipsum. Integer quis scelerisque nisl. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Duis nec dolor vitae libero pharetra placerat. Nulla non bibendum purus, ut lacinia ex. Donec hendrerit suscipit pulvinar. Quisque imperdiet imperdiet est vel venenatis. Curabitur nisi erat, lacinia sed commodo a, sodales pretium velit. Mauris dictum eu mauris sit amet ultricies. Aliquam tincidunt ligula non porta cursus. Curabitur sed mattis dolor, sagittis lobortis elit. Integer matcom

River
Quam arcu dapibus orci, sed dapibus orci tortor nec sem. In porttitor lorem dui, quis mollis velit malesuada elementum. Nullam consectetur, urna hendrerit laoreet iaculis, sem diam faucibus ligula, at efficitur lacus leo sed nisi. Fusce egetas enim blandit sollicitudin aliquam. Etiam nec nibh venenatis, suscipit purus at, pulvinar eros. Cras eu leo consequat, finibus lacus luctus, semper arcu. Vivamus placerat convallis tellus. Nullam varius velit eget iaculis eleifend. Fusce sodales ullamcorper risus. Sed vitae cursus orci. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Integer vel varius risus. In sed orci pulvinar, pharetra elit quis, pulvinar mauris.

Rant
Etiam tempus fringilla tempor. Nu porttitor.

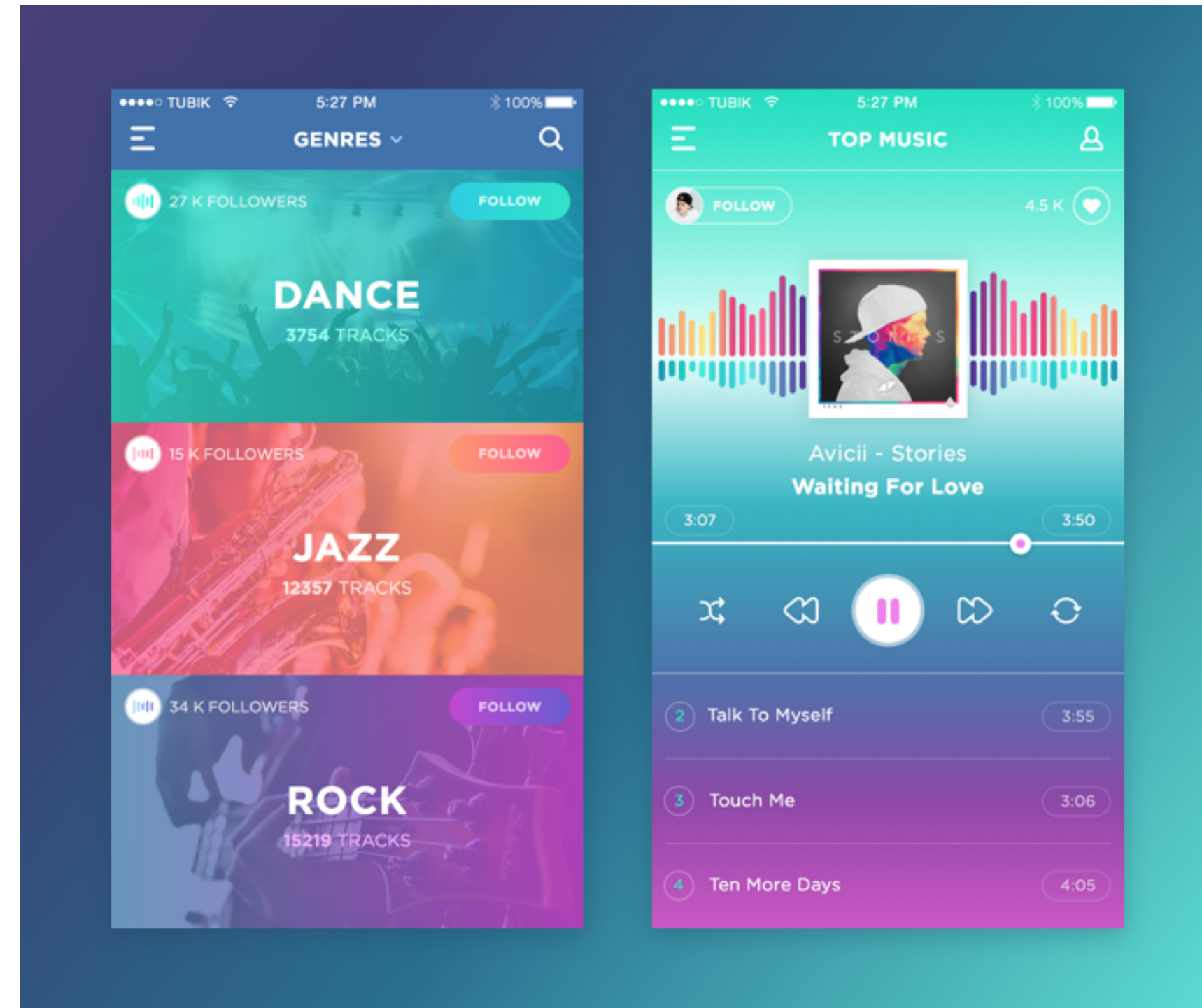
Orphan

kerning
tracking
leading
point size
typeface
justification
line width
what is typography?

Color

Definition: Human visual perception of light reflecting from an object.

- Creates emphasis
- Organizes content
- Evokes emotion





Marketing Proposal

Digital Content Team

Client: UNIVERSITY OF WATERLOO

Presented by: GEORGE ZANDER

Our Objectives

- ✓ To develop creative, high-impact executions that reach large groups of consumers and maximize viewership.
- ✓ To deliver cost effective business to consumer communications that builds a strong consumer relationship.

“ Don't settle: Don't finish crappy books. If you don't like the menu, leave the restaurant. If you're not on the right path, get off it. ”

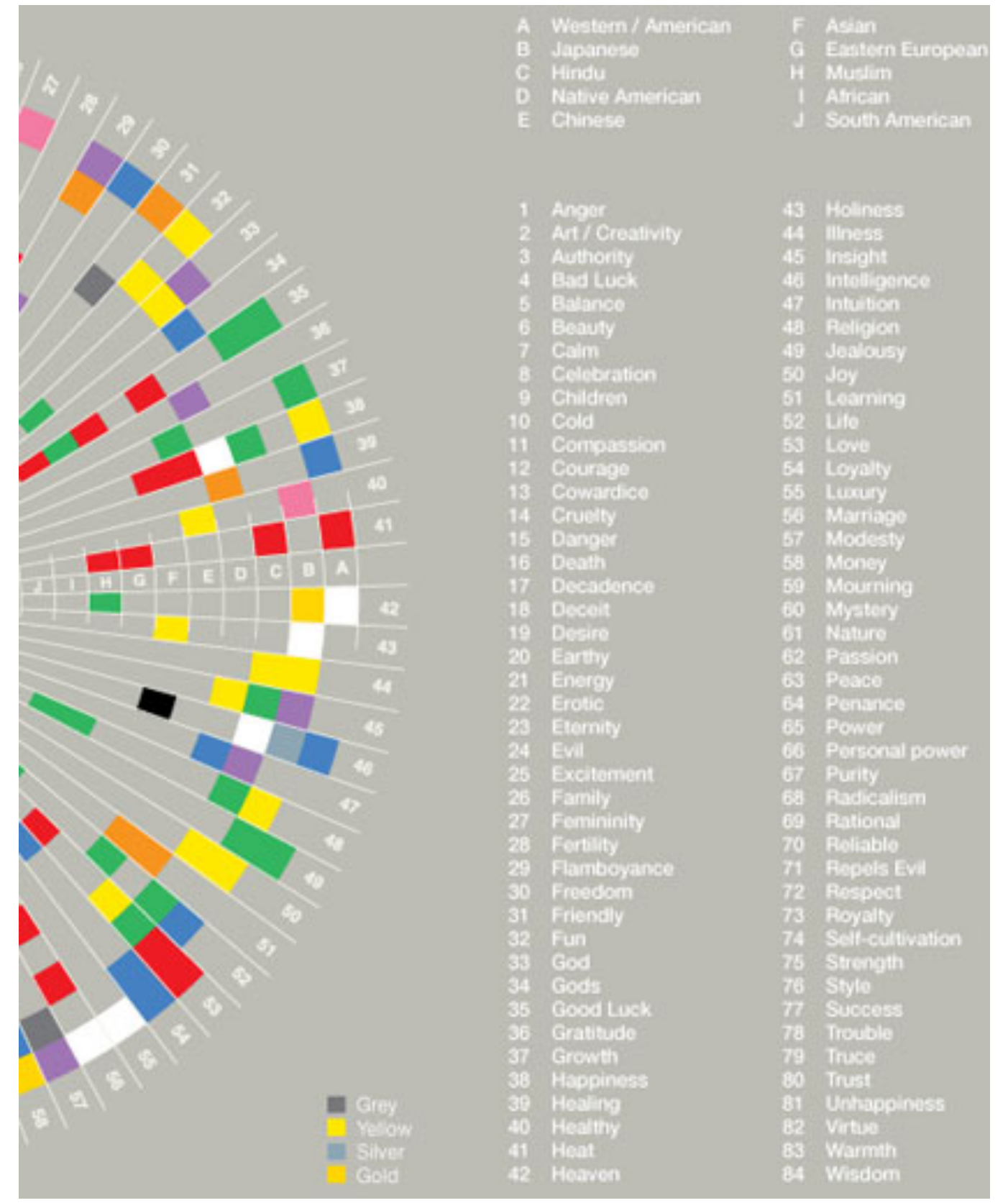
Our Overview

Your marketing plan should start with an executive summary. The summary gives a quick overview of the main points of the plan.

Although the executive summary appears at the beginning of the plan, you should write it last. Writing the summary is a good opportunity to check that your plan makes sense and that you haven't missed any important points.

COLORS CONVEY
Emotions

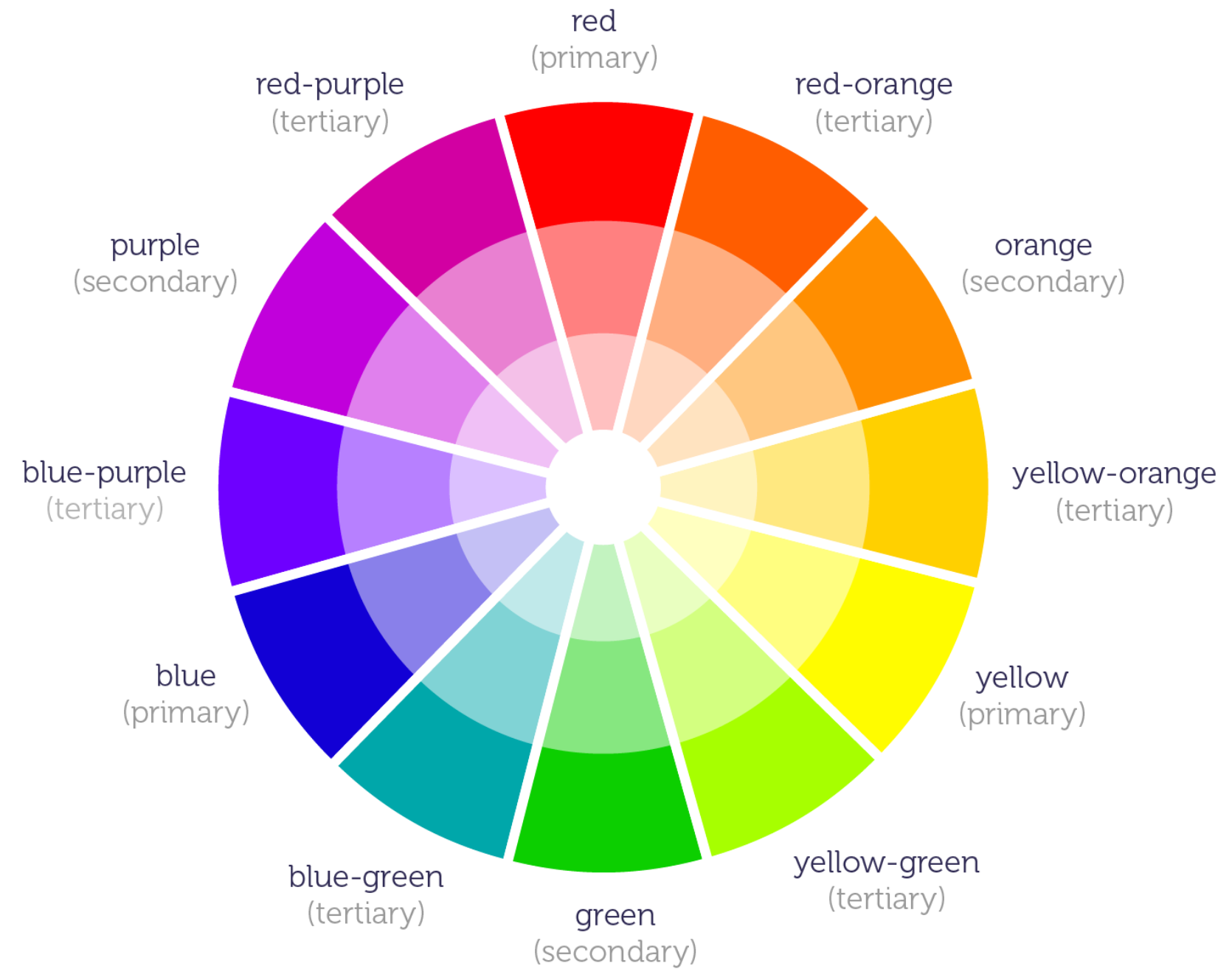
BLUE	TURQUOISE	GREEN	YELLOW
<ul style="list-style-type: none"> TRANQUILITY, SECURITY, INTEGRITY, PEACE, LOYALTY, TRUST, INTELLIGENCE COLDNESS, FEAR, MASCULINITY 	<ul style="list-style-type: none"> SPIRITUAL, HEALING, PROTECTION, SOPHISTICATED ENVY, FEMININITY 	<ul style="list-style-type: none"> FRESHNESS, ENVIRONMENT, NEW, MONEY, FERTILITY, HEALING, EARTH ENVY, JEALOUSY, GUILT 	<ul style="list-style-type: none"> BRIGHT, SUNNY, ENERGETIC, WARM, HAPPY, PERKY, JOY, INTELLECT IRRESPONSIBLE, UNSTABLE
PURPLE	PINK	RED	ORANGE
<ul style="list-style-type: none"> ROYALTY, NOBILITY, SPIRITUALITY, LUXURY, AMBITION, WEALTH MYSTERY, MOODINESS 	<ul style="list-style-type: none"> HEALTHY, HAPPY, FEMININE, SWEET, COMPASSION, PLAYFUL WEAK, FEMININITY, IMMATURITY 	<ul style="list-style-type: none"> LOVE, PASSION, ENERGY, POWER, STRENGTH, HEAT, DESIRE ANGER, DANGER, WARNING 	<ul style="list-style-type: none"> COURAGE, CONFIDENCE, FRIENDLINESS, SUCCESS IGNORANCE, SLUGGISHNESS
BROWN	TAN	GOLD	SILVER
<ul style="list-style-type: none"> FRIENDLY, EARTH, OUTDOORS, LONGEVITY, CONSERVATIVE DOGmatic, CONSERVATIVE 	<ul style="list-style-type: none"> DEPENDABLE, FLEXIBLE, CRISP, CONSERVATIVE DULL, BORING, CONSERVATIVE 	<ul style="list-style-type: none"> WEALTH, WISDOM, PROSPERITY, VALUABLE, TRADITIONAL EGOTISTICAL, SELF-RIGHTEOUS 	<ul style="list-style-type: none"> GLAMOROUS, HIGH TECH, GRACEFUL, SLEEK INDECISIVE, DULL, NON-COMMITTAL
WHITE	GRAY	BLACK	
<ul style="list-style-type: none"> GOODNESS, INNOCENCE, PURITY, FRESH, EASY, CLEAN ISOLATION, PRISTINE, EMPTINESS 	<ul style="list-style-type: none"> SECURITY, RELIABILITY, INTELLIGENCE, SOLID GLOOMY, SAD, CONSERVATIVE 	<ul style="list-style-type: none"> PROTECTION, ELEGANCE, DRAMATIC, CLASSY, FORMALITY DEATH, EVIL, MYSTERY 	

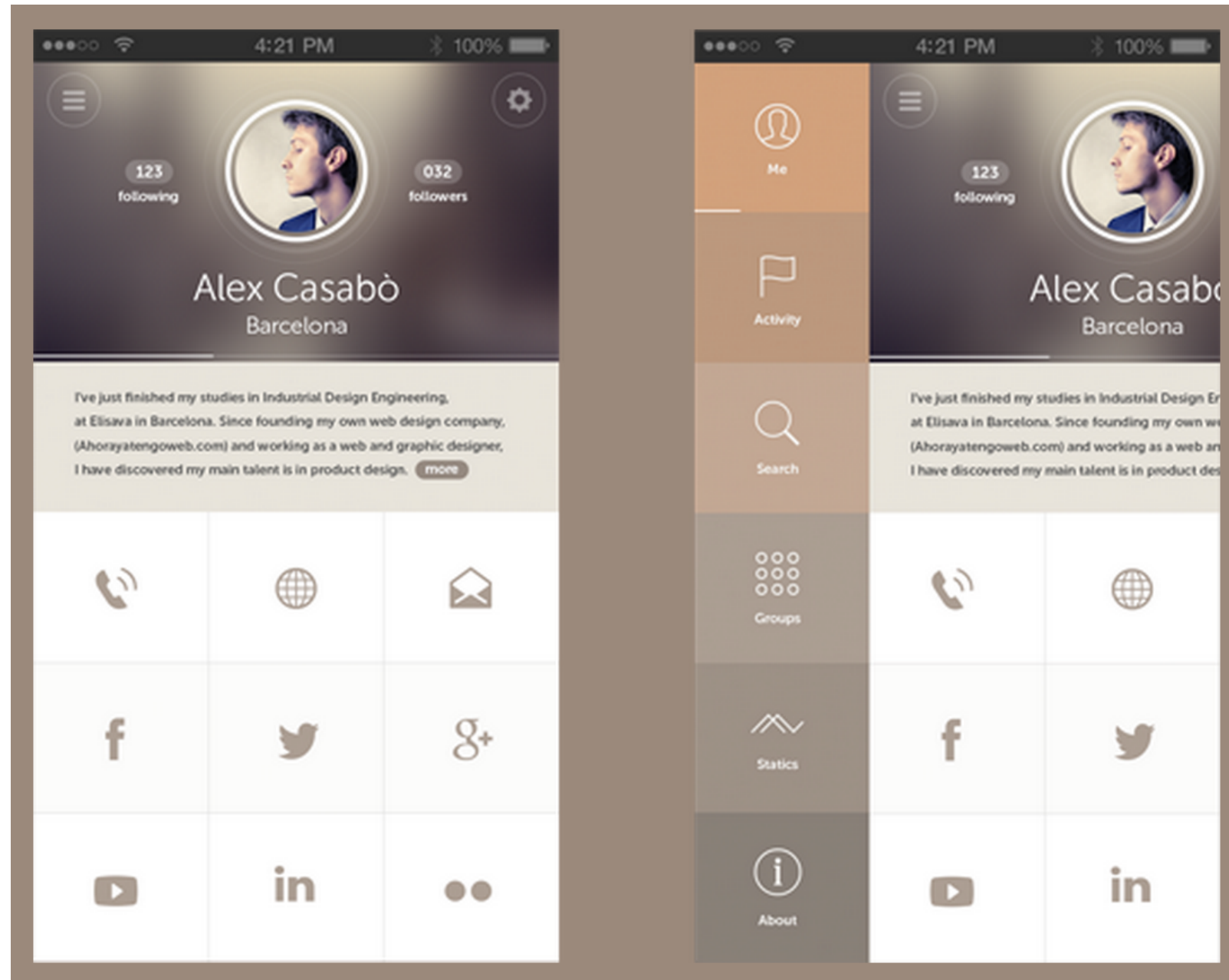
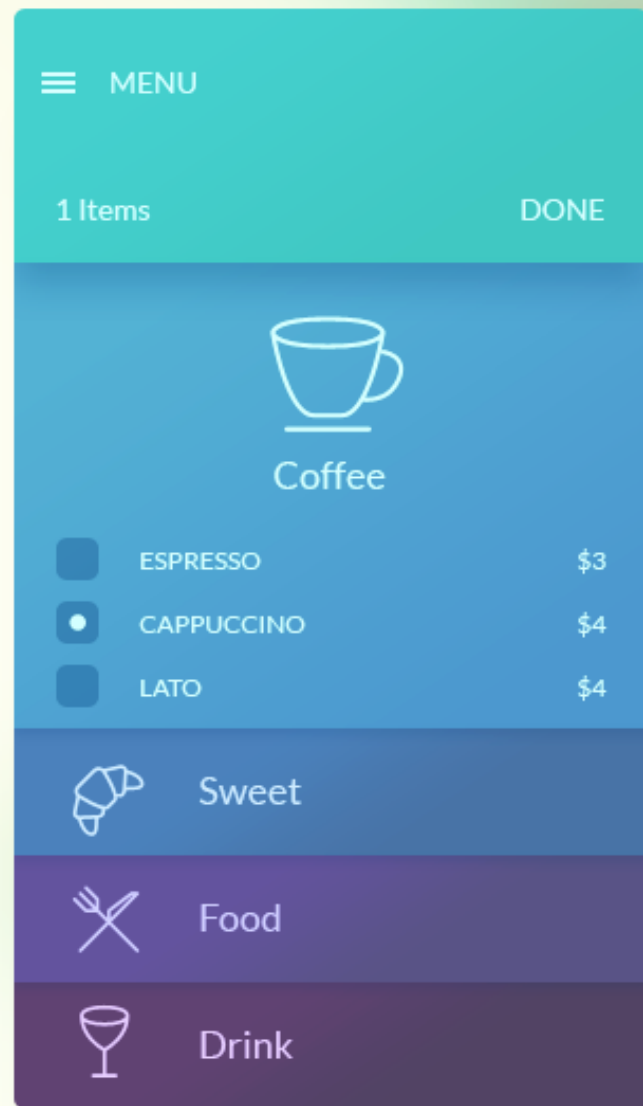


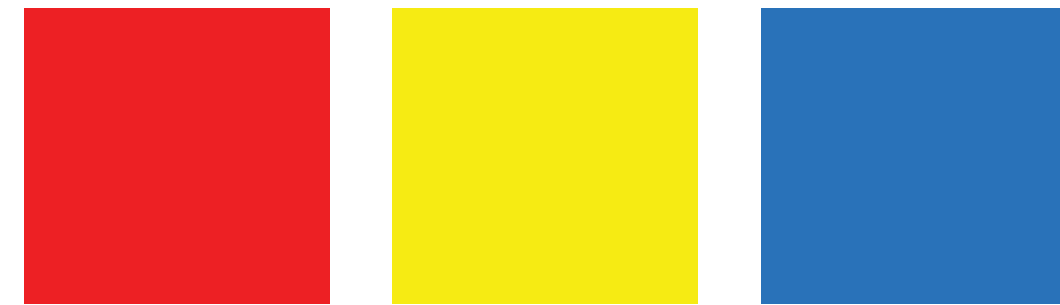
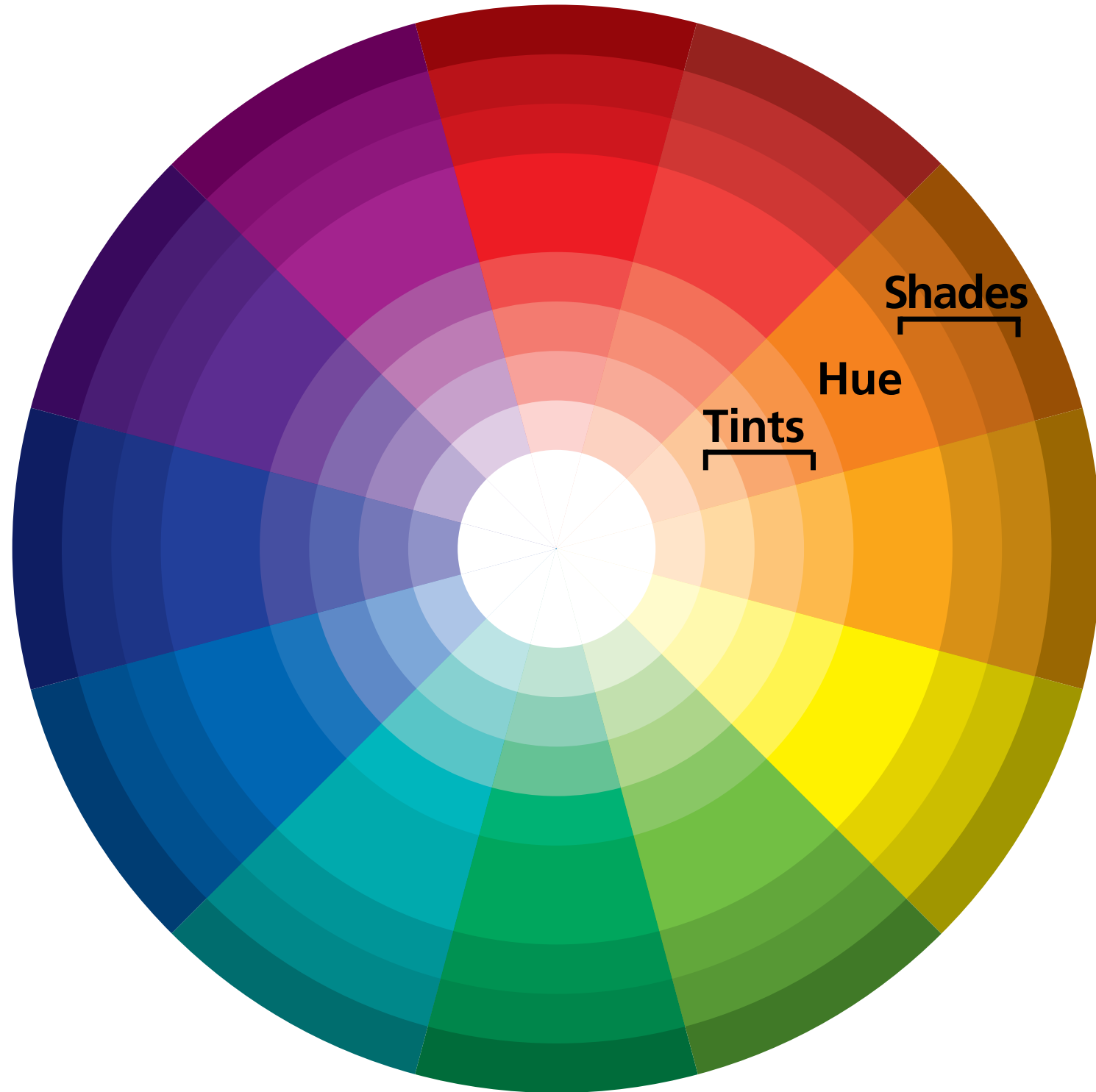
The Color Wheel

- *Primary, secondary, tertiary* colors
- *Tints, shades, tone*
- *Complementary* colors
- *Warm, cool* colors

The basic colors







Hue

Low



High

Saturation

Light



Dark

Value

Color Palettes

1. Analogous
2. Complementary
3. Split Complementary
4. Triadic
5. Monochromatic
6. Achromatic

UNDERSTANDING COLOR THEORY



ANALOGOUS

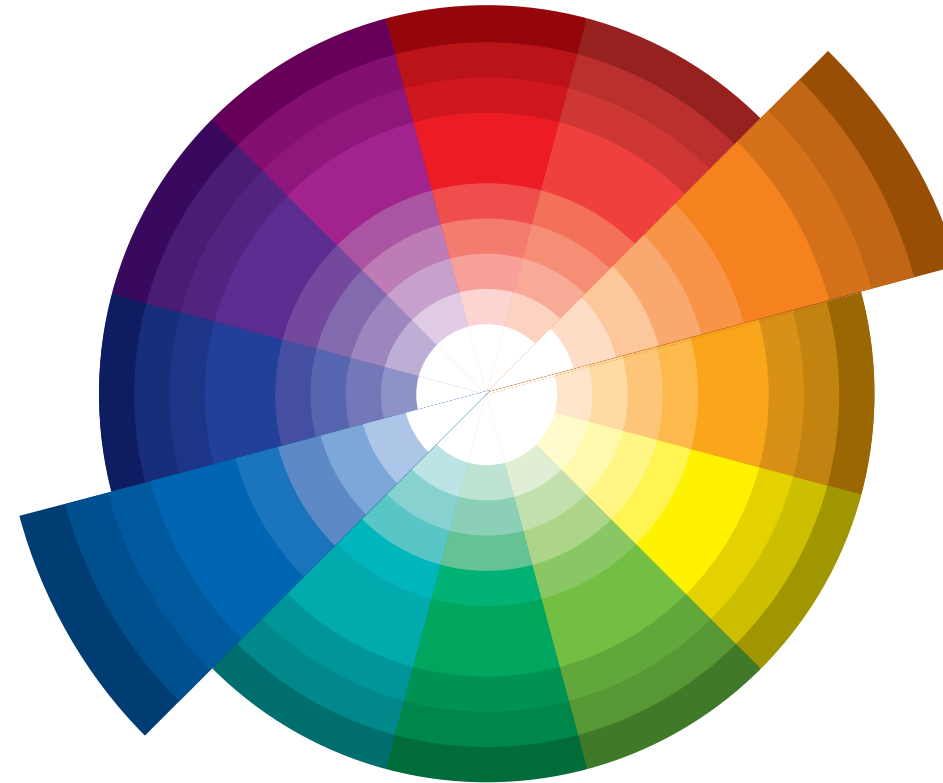


#1b75bb #00a9ac #8ccfb6



#adc5e6 #00888a #00888a

COMPLEMENTARY

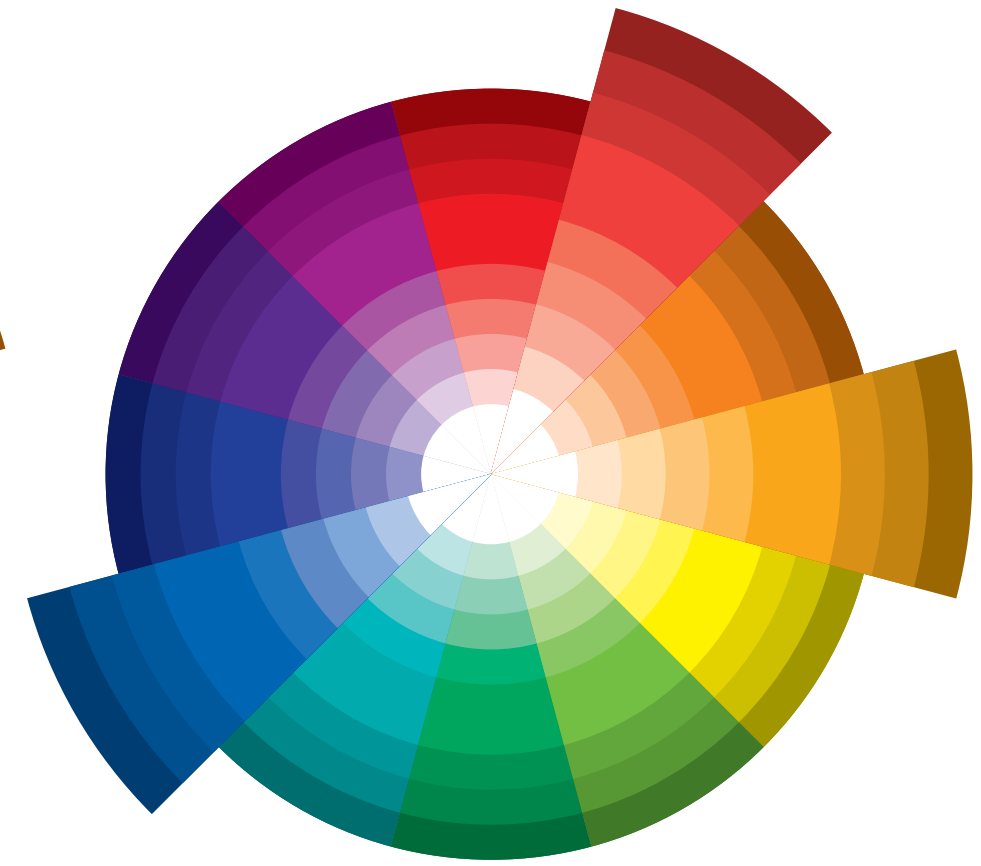


#1b75bb #fcc69a #c06615

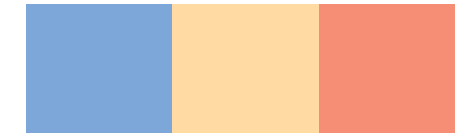


#004f8f #1b75bb #f5821f

SPLIT-COMPLEMENTARY



#004f8f #fcb94c #bb302d



#7da7d8 #ffd9a1 #f58d76

TRIADIC



#f5821f #5c2d91 #65c194

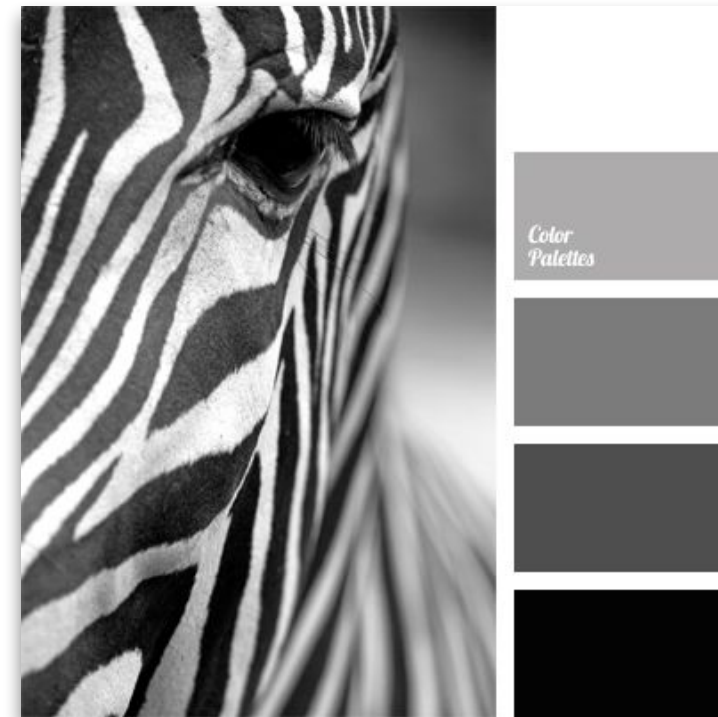


#f79447 #bbaed5 #009252

MONOCHROMATIC

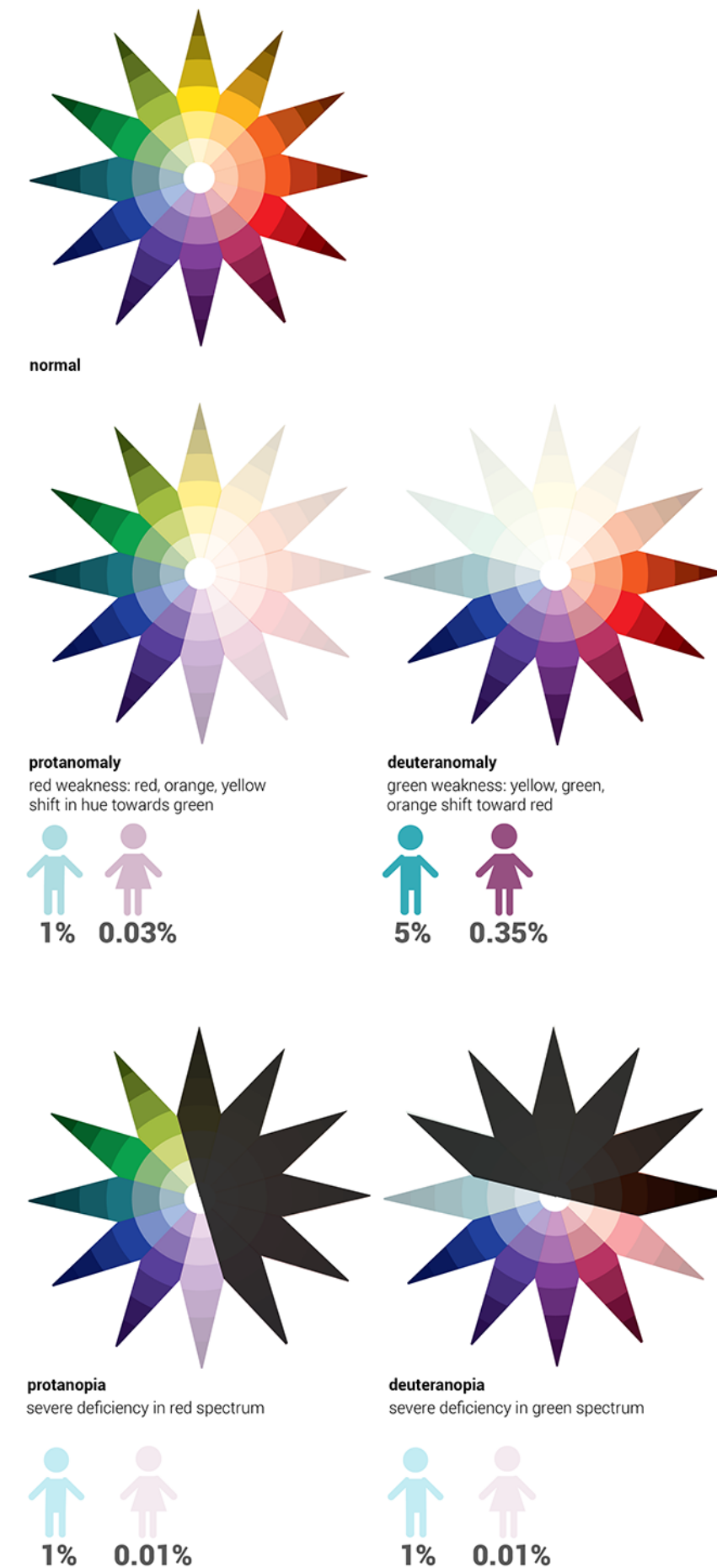


ACHROMATIC



Color Vision Deficiencies

- Affects 8% of males, 0.5% of females
- Consider alternatives
 - *Intensity* vs. *hue* for emphasis
 - *Size* of colored elements
 - *Proximity* of similar colors
- Use tools to check designs



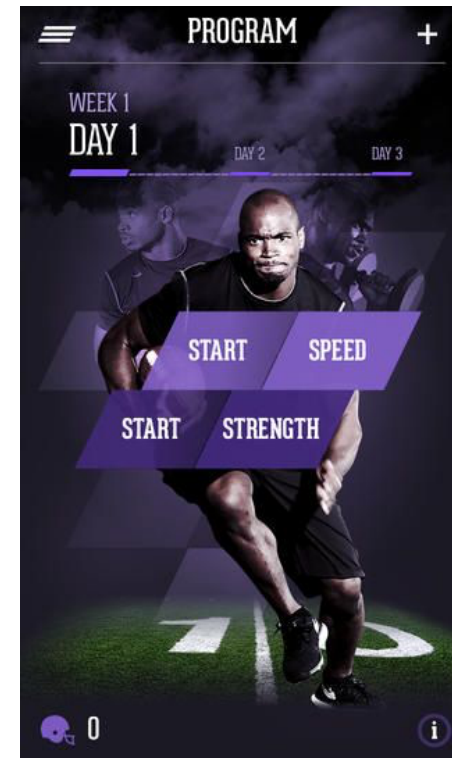
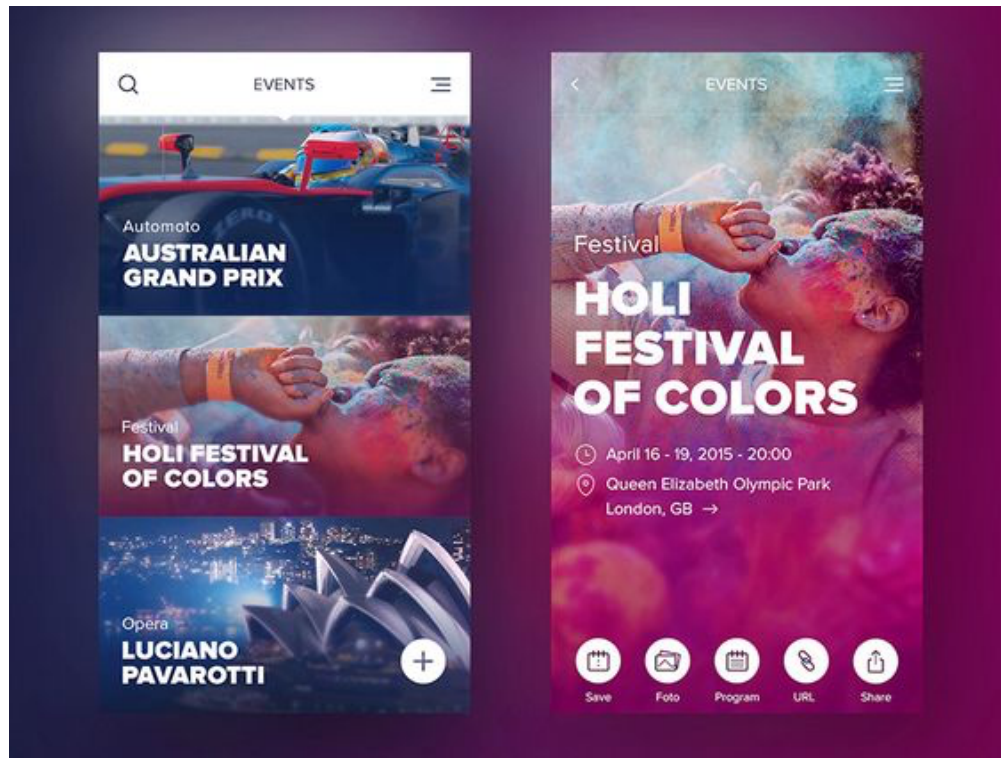
Images

Definition: Photographs, illustrations, three-dimensional art, silhouettes, icons, dingbats, infographics, and simpler shapes that convey rich information or context.

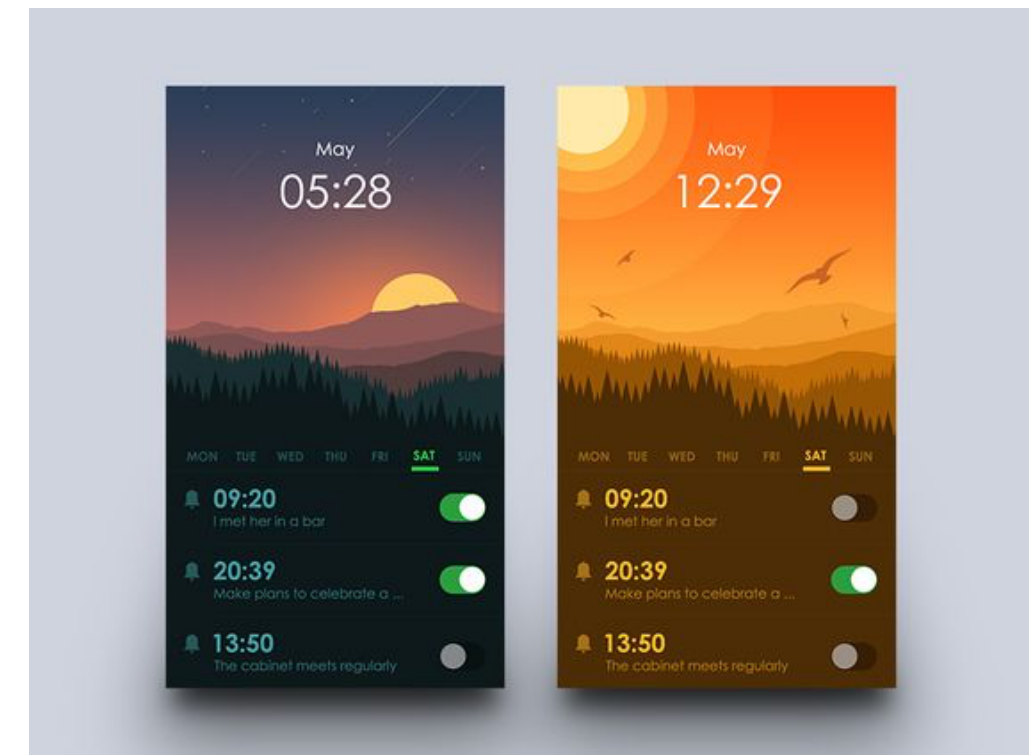
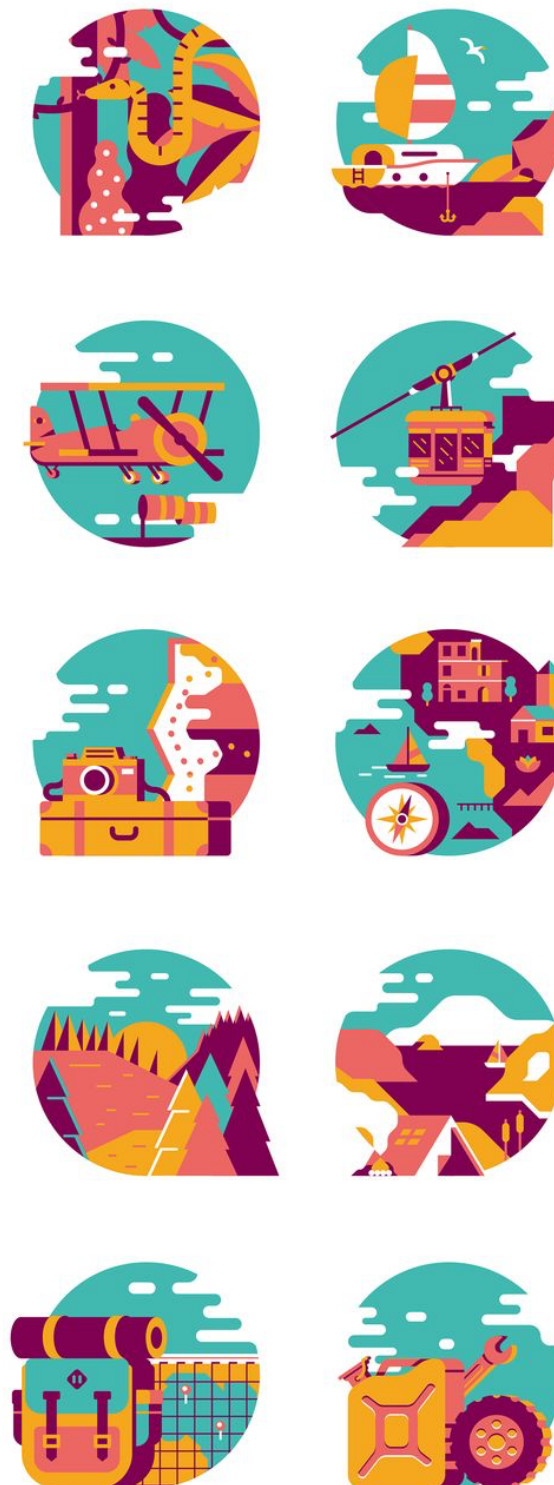
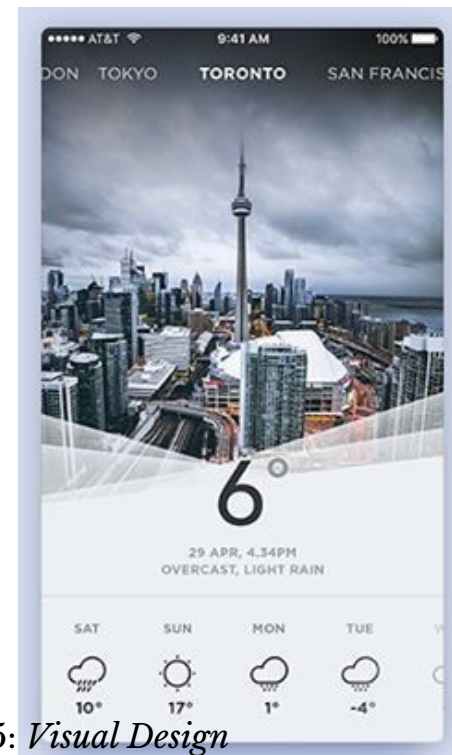
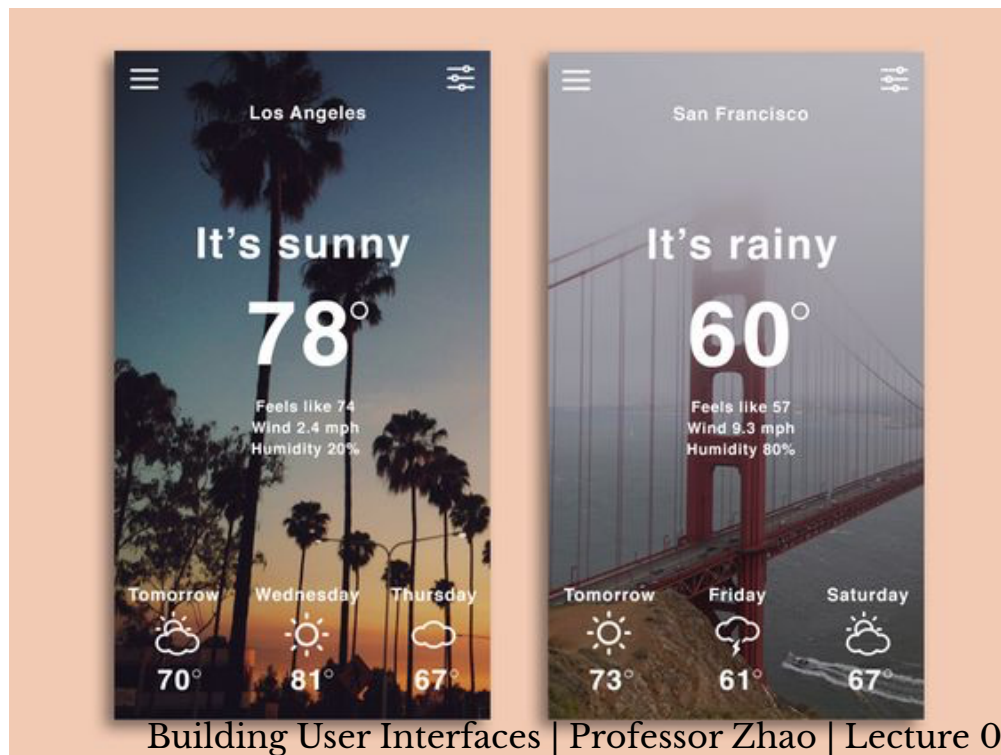
TABLE 5.1. Graphic types to use for varied goals.

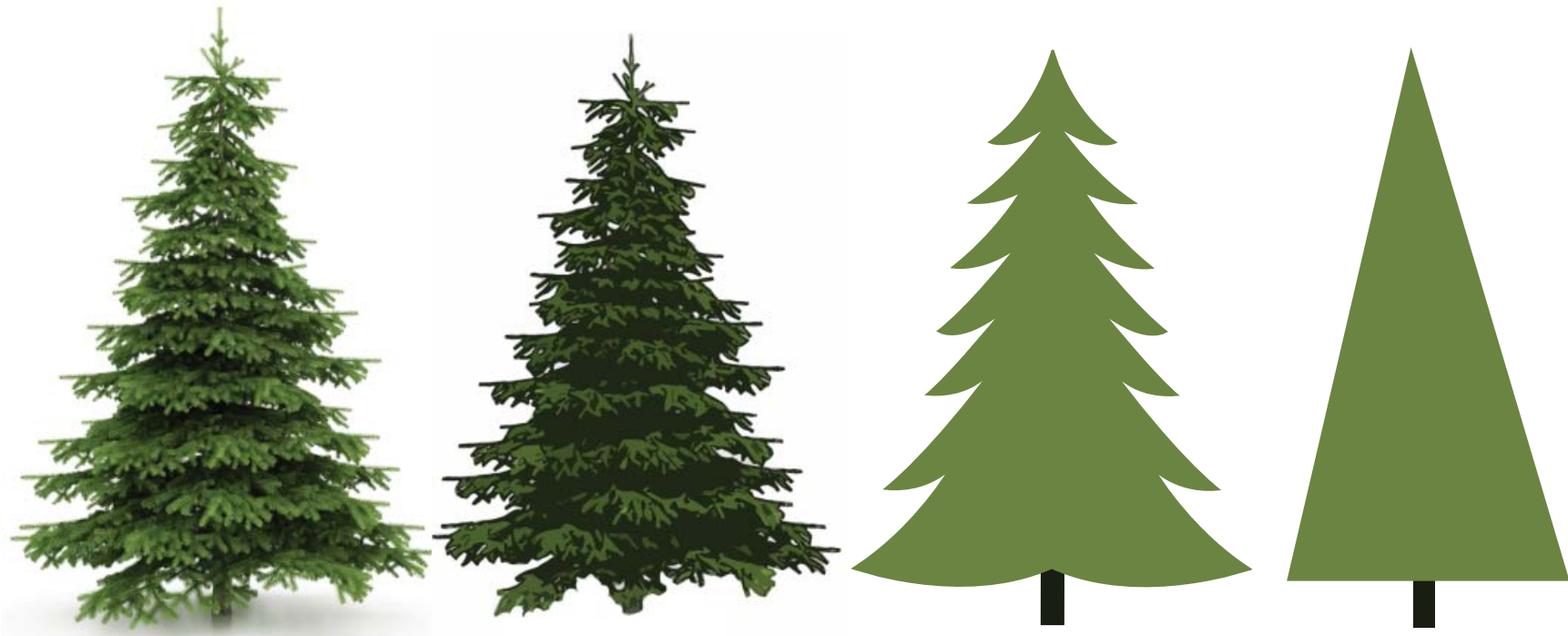
Instructional or Communication Purpose	Consider These Graphic Types
Depict concrete objects	Photograph 3-D graphic Illustration Clip art (particularly in diagrams and as game elements)
Tell a story or provide a scenario	Sequence of photographs Sequence of illustrations Timeline
Persuade an audience	Sequence of photos or illustrations to tell a story Photographs that evoke emotions Visualization of statistics and data
Explain unfamiliar or complex concepts and theories	Visual metaphor Diagram showing connections
Demonstrate a procedure	Show the steps in a sequence of photos or illustrations Flow chart Series of screen captures for software simulation
Explain a process	Diagram the stages or operations of the process Icons or simple illustrations to represent each component
Point out something specific	Arrow or pointed shape Highlight Outline of a circle
Depict components of a system	Illustrated object with labels Diagram of the structure
Make comparisons	Bar graph Pictograph Line graph with multiple lines Table (when specific values are important)
Demonstrate trends in data	Line graph Scatter plot
Organization of information	Various chart types (hierarchical, radial, etc.) Concept map
Demonstrate motion without animation	Show object moving along a path Illustrations with motion lines Illustrations with arrows or dashed lines depicting movement
History or changes over time	Timeline (these don't have to be arrows) Sequence of photos or illustrations

RASTER GRAPHICS

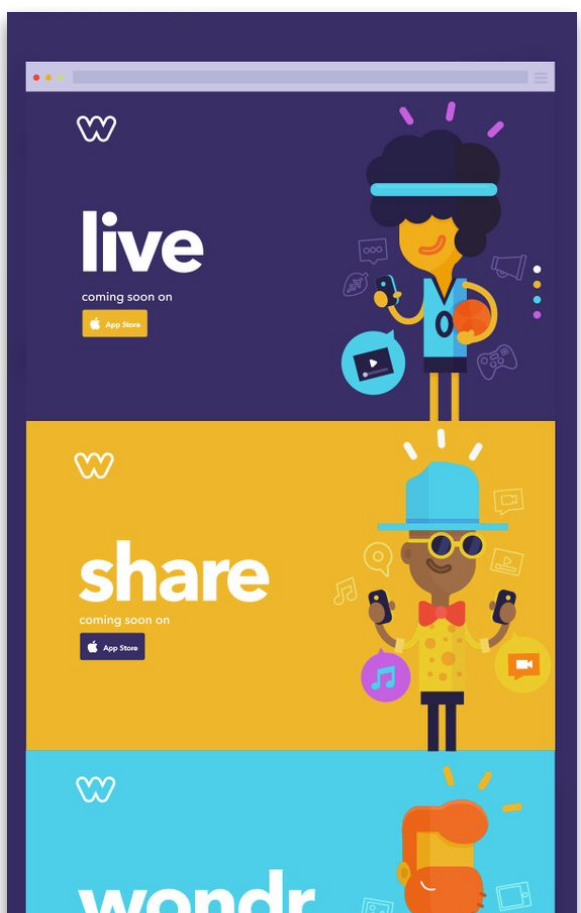
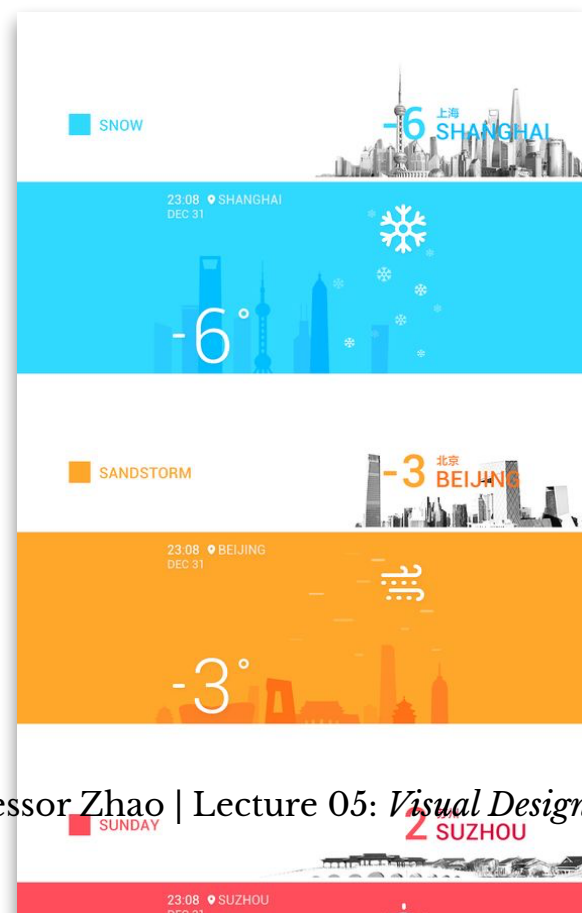
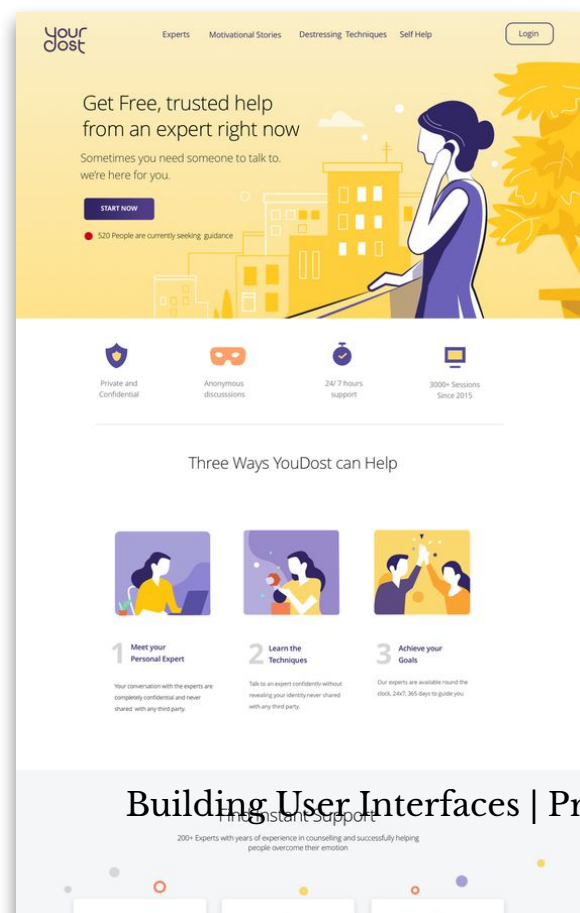


VECTOR GRAPHICS





◀ More Realistic Less Realistic ▶



4 Quiz Questions

Complete the quizzes within 24 hours



canvas