

Building User Interfaces

Visual Design

Professor Bilge Mutlu

What we will learn today?

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

Elements of Design

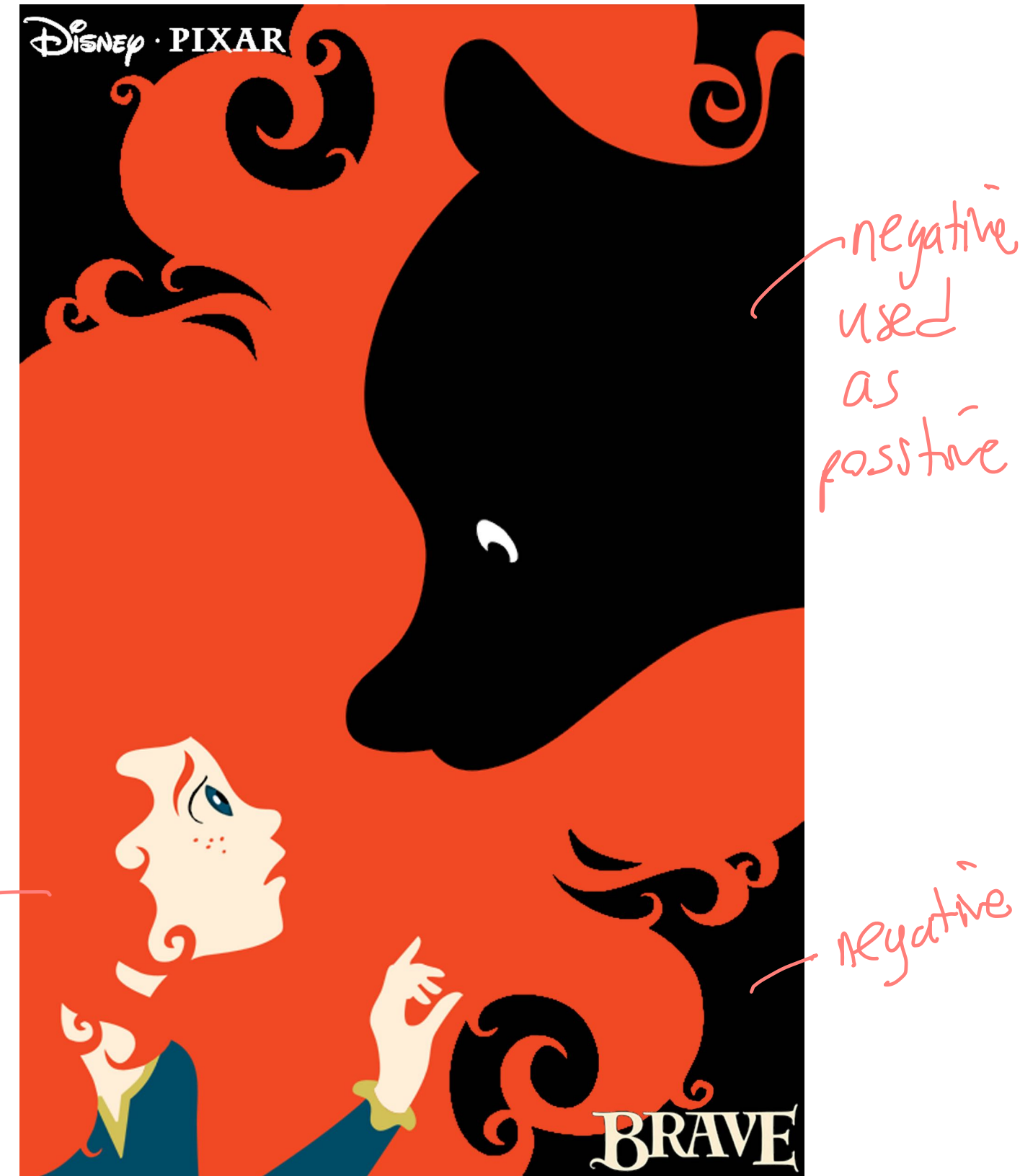
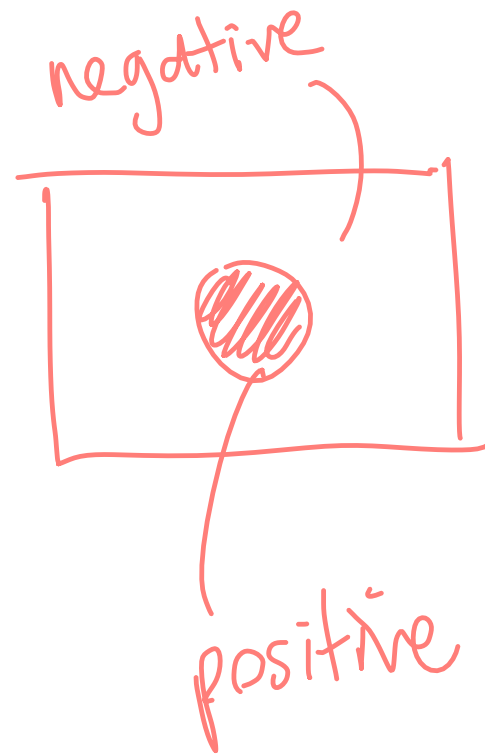
Elements of Design

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



¹ Image 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



Food is now **prepared** for space.

The European Space Agency is using smarter research to turn 100% of an astronaut's junk back into food. ibm.com/smarterplanet

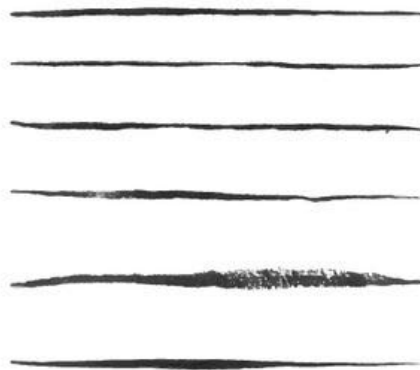


*negative
space
used as
positive*

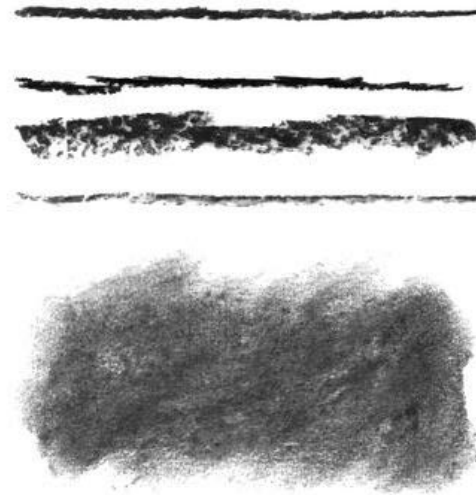
Line²

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

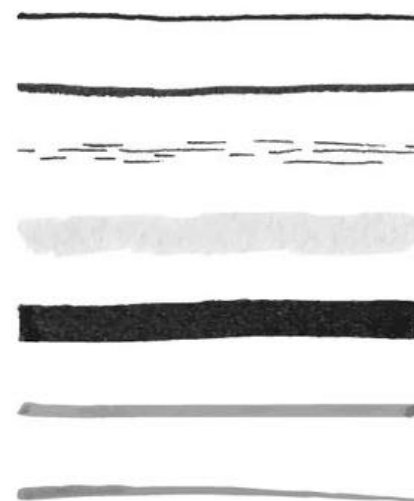
BRUSH PEN BRUSHES



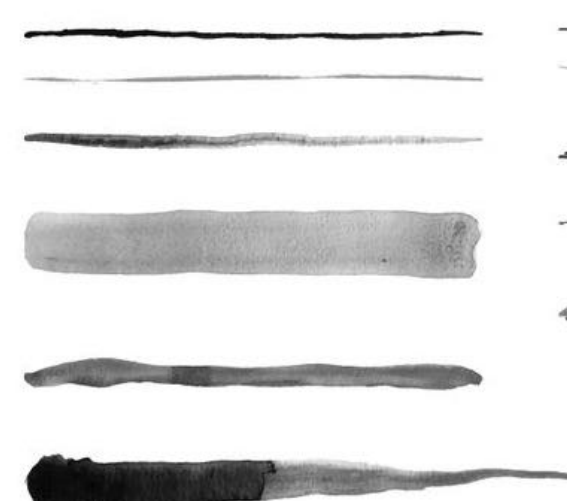
CHARCOAL BRUSHES



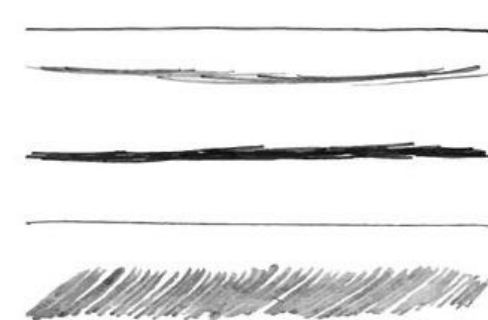
MARKER BRUSHES



WATERCOLOR BRUSHES



PENCIL BRUSHES

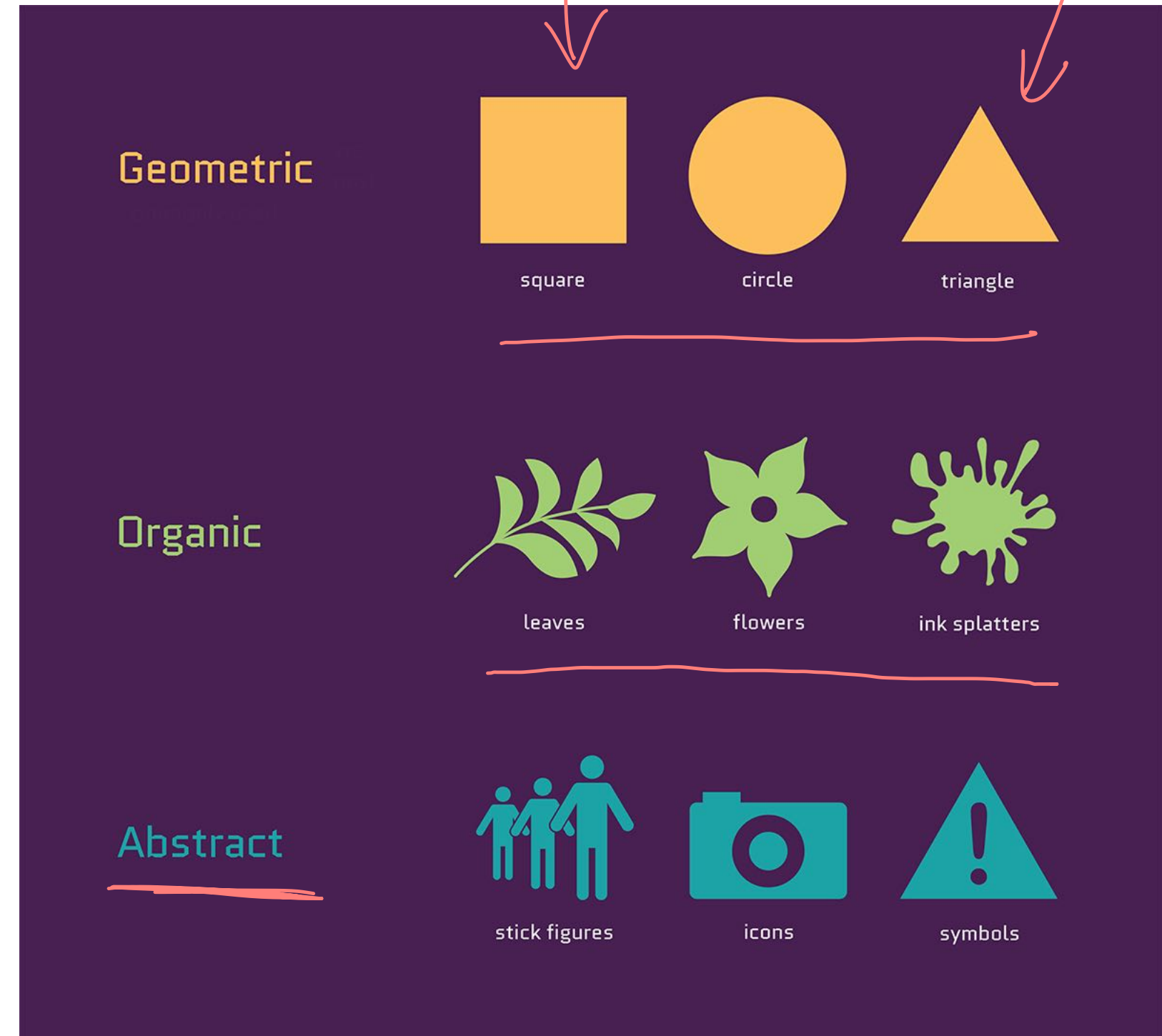
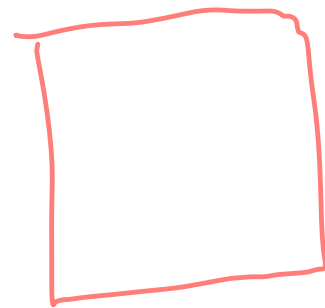


²Image source

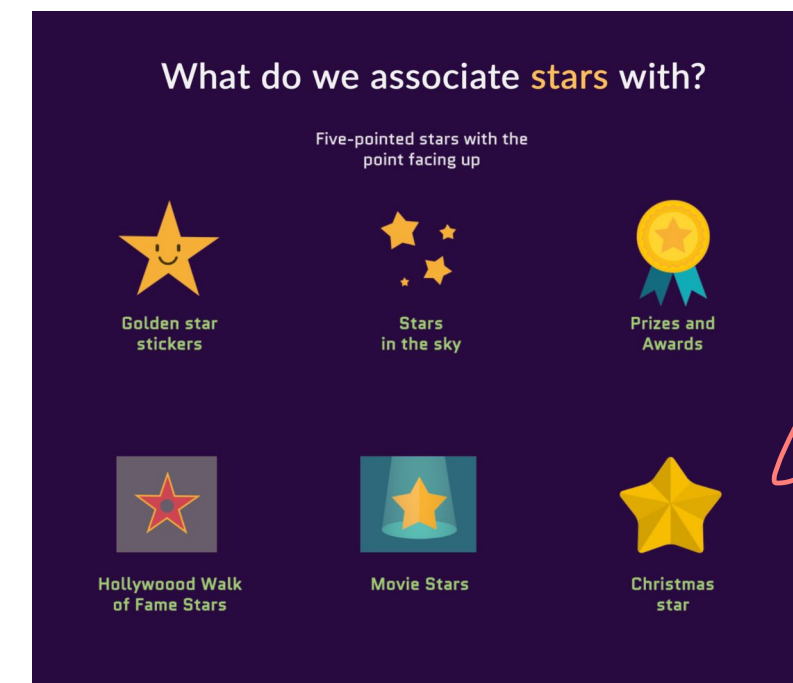
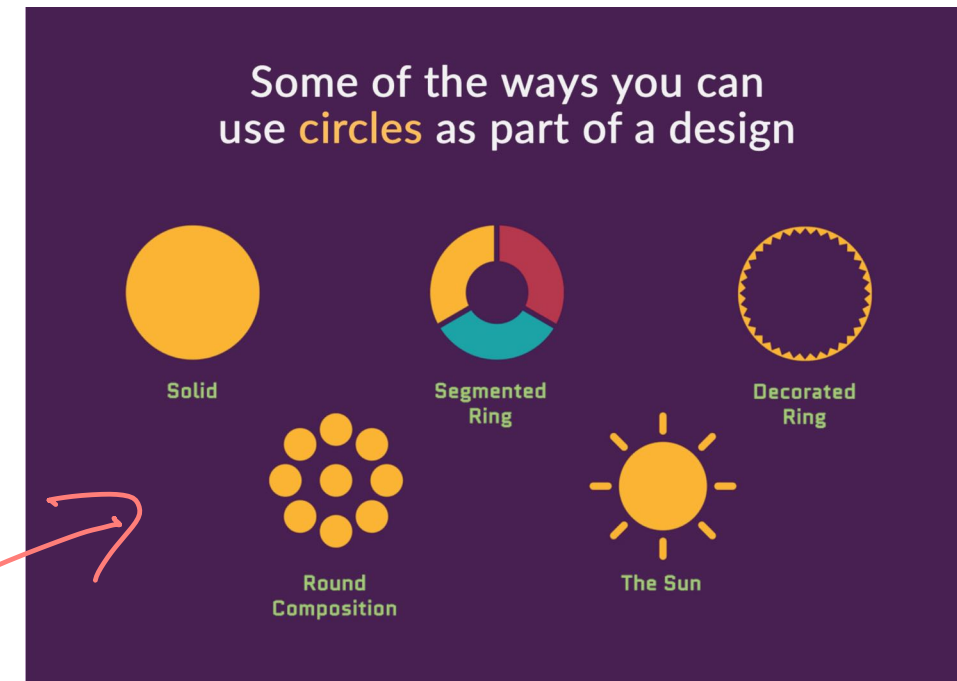
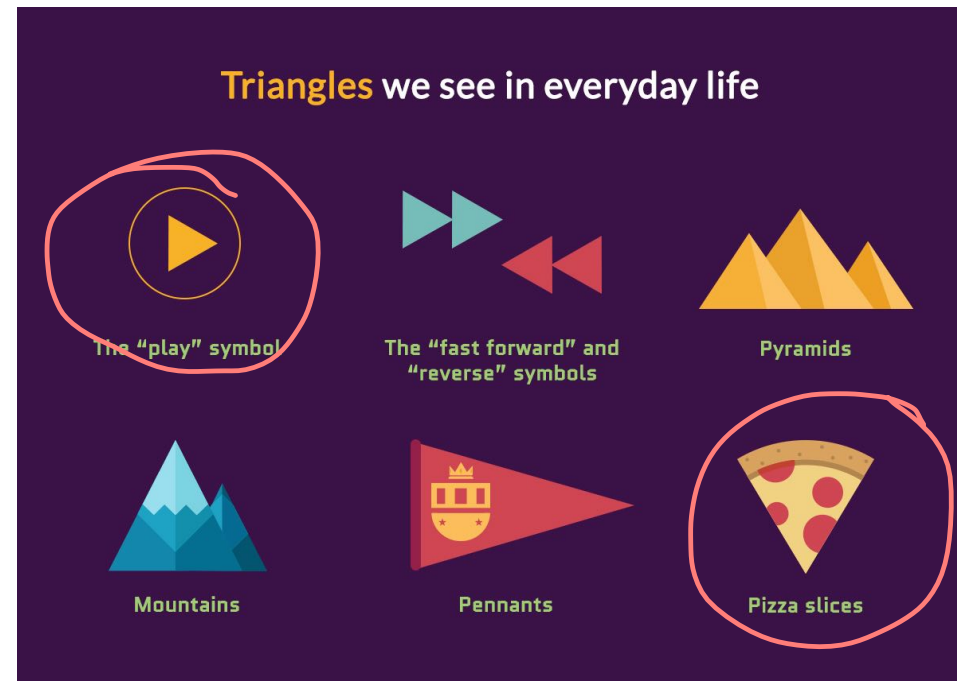
Shape³

Definition: Space outlined by a contour.

- *Organic* vs. *inorganic* shapes



³Image sources: this & next slides



Size⁴

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

⁴Image source

Pattern⁵

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



⁵Image source

↑
abstract flower shape is duplicated in a pattern

Texture⁶

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

⁶Image source

Value⁷

lowest
value

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

⁷Image source

highest
value

Questions about *Design Elements*?

Principles of Design

Principles of Design

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

Focal Point⁸

#2

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

#1

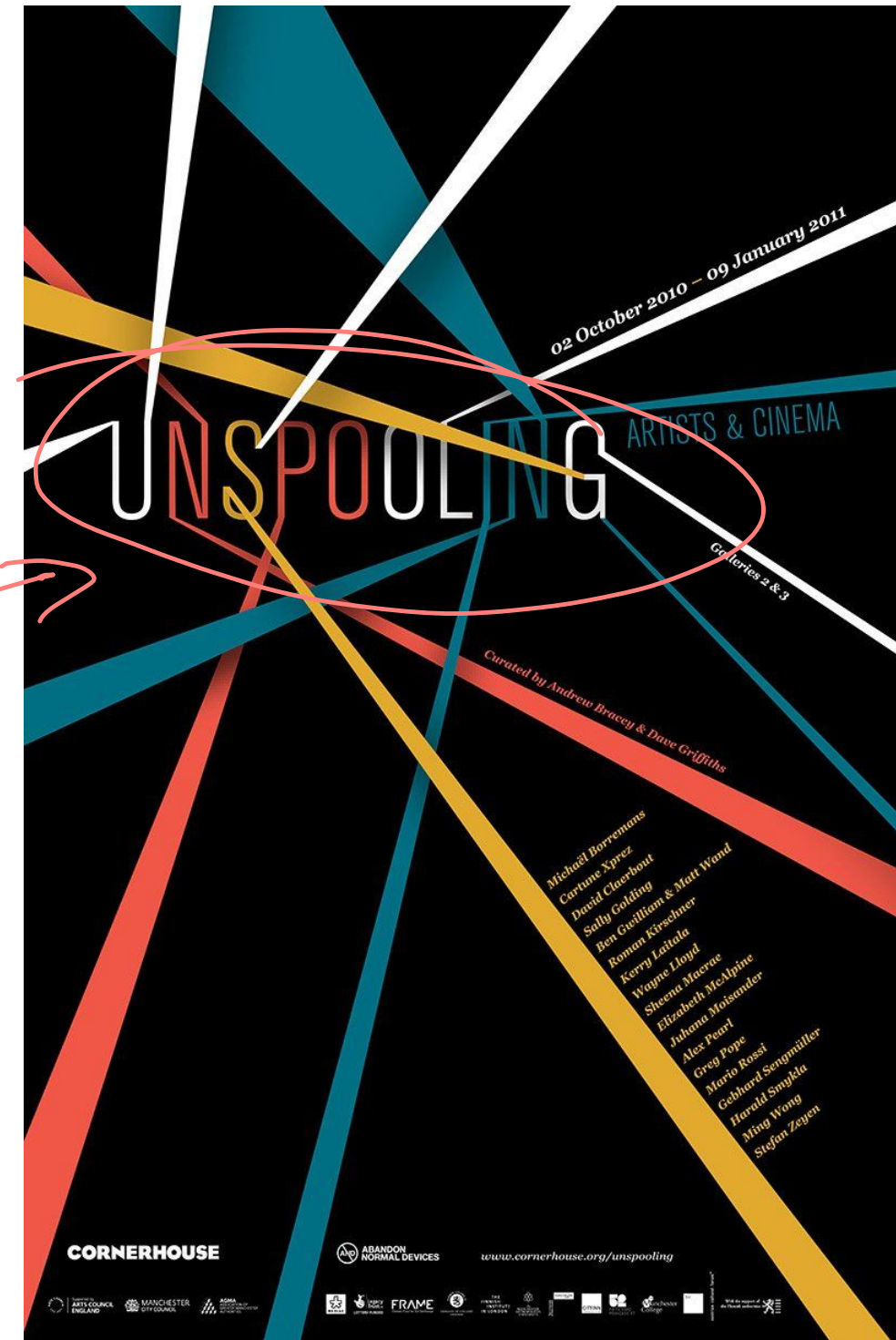
#4

⁸ Images sources: this slide, next slide: left, right





focal points



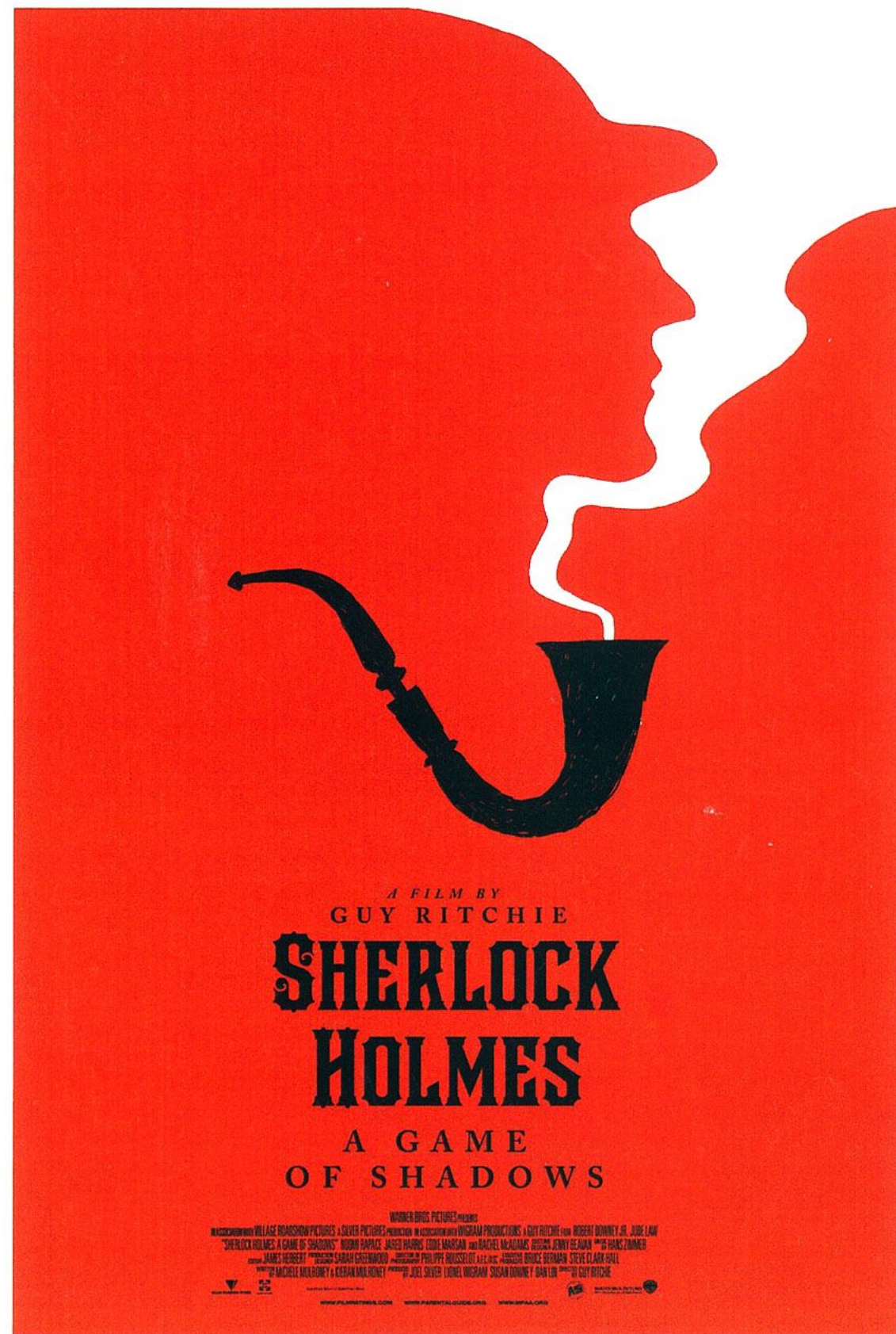
Contrast⁹

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

contrast
visually
and semantically



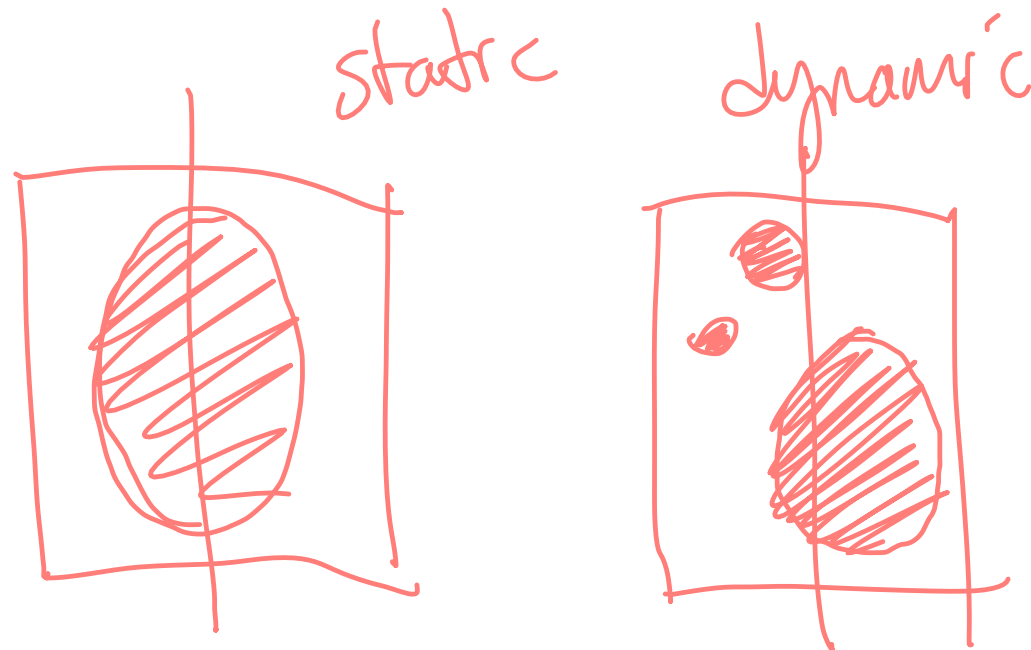
⁹ Image sources: [this slide](#), next slide: [left](#), [right](#)



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 .

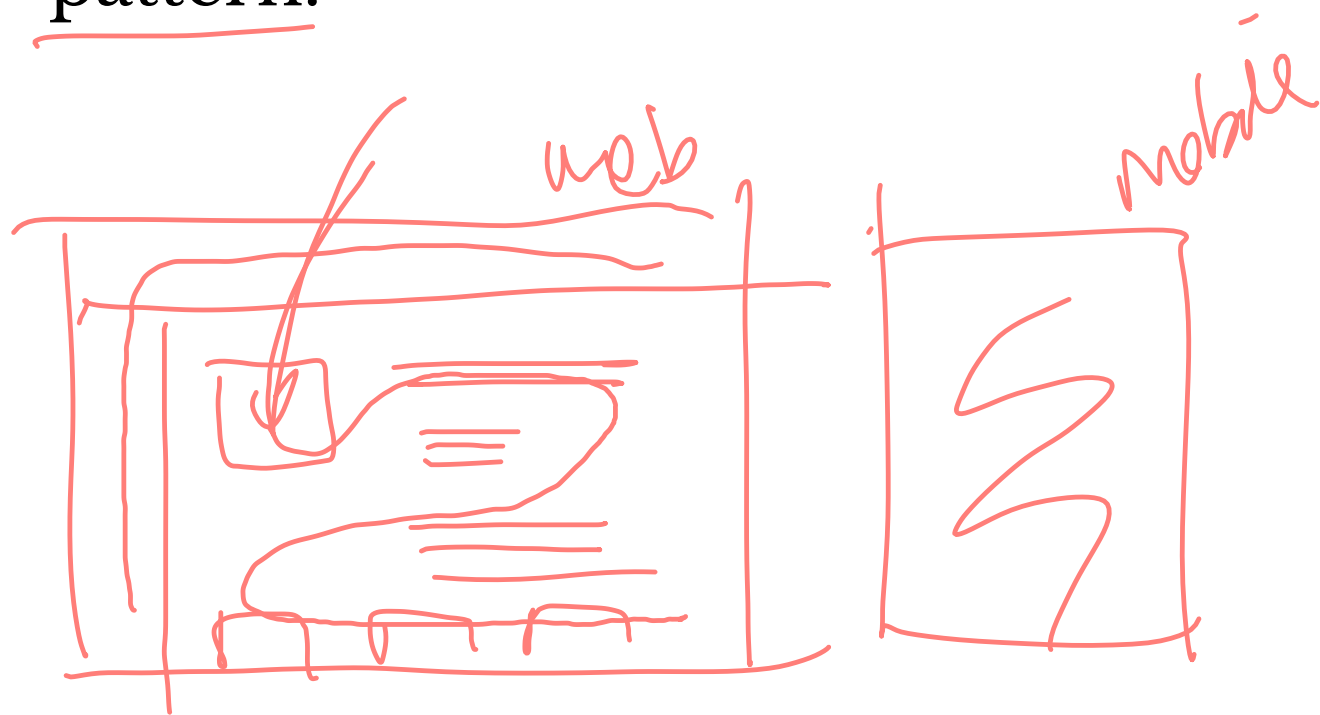
Austin 850



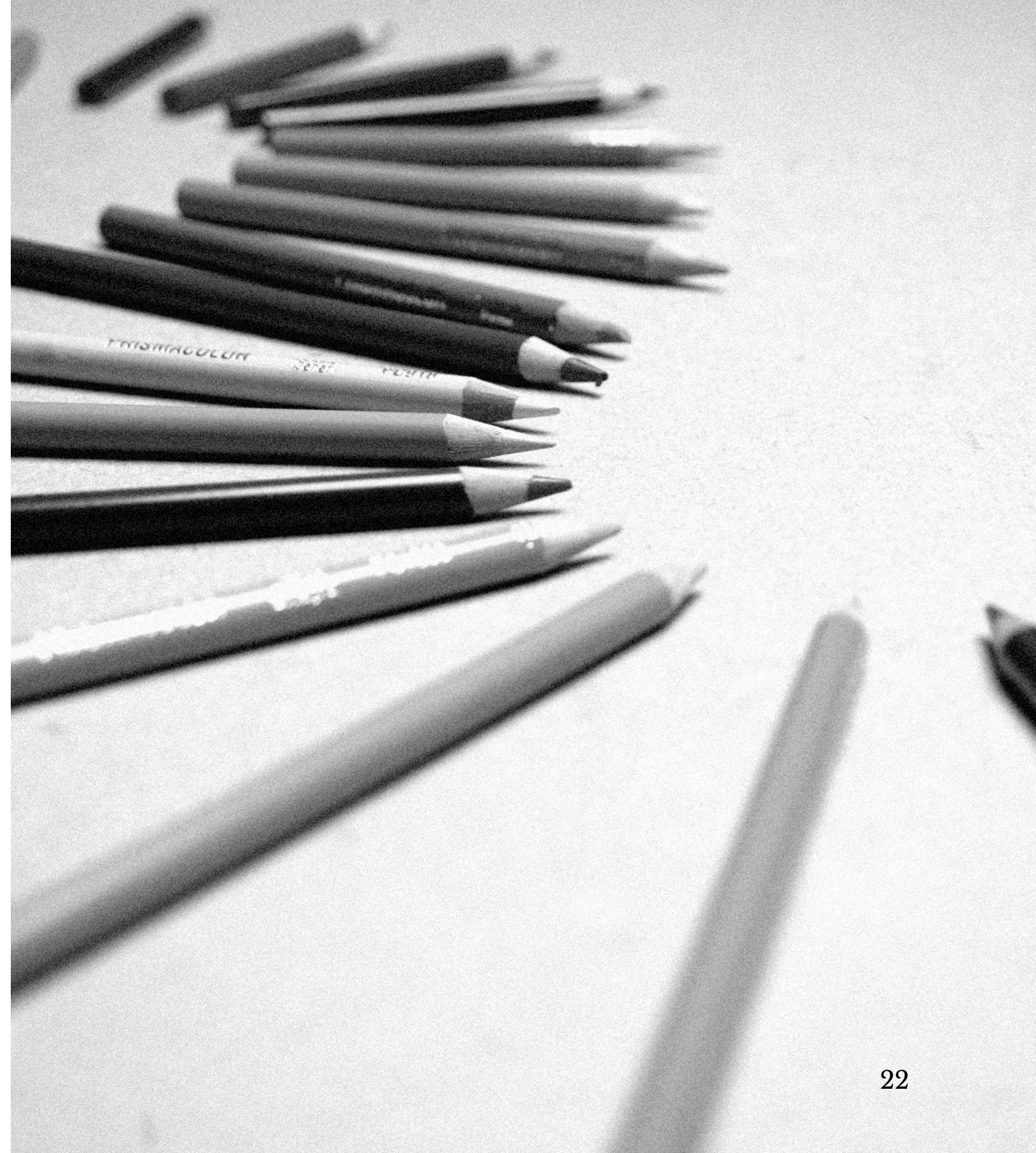
Movement¹¹



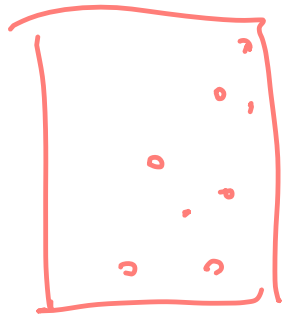
Definition: The organization of design elements in a way that suggests a particular flow on the canvas to direct the user's attention in a particular pattern.



¹¹ Image source



Rhythm¹²



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



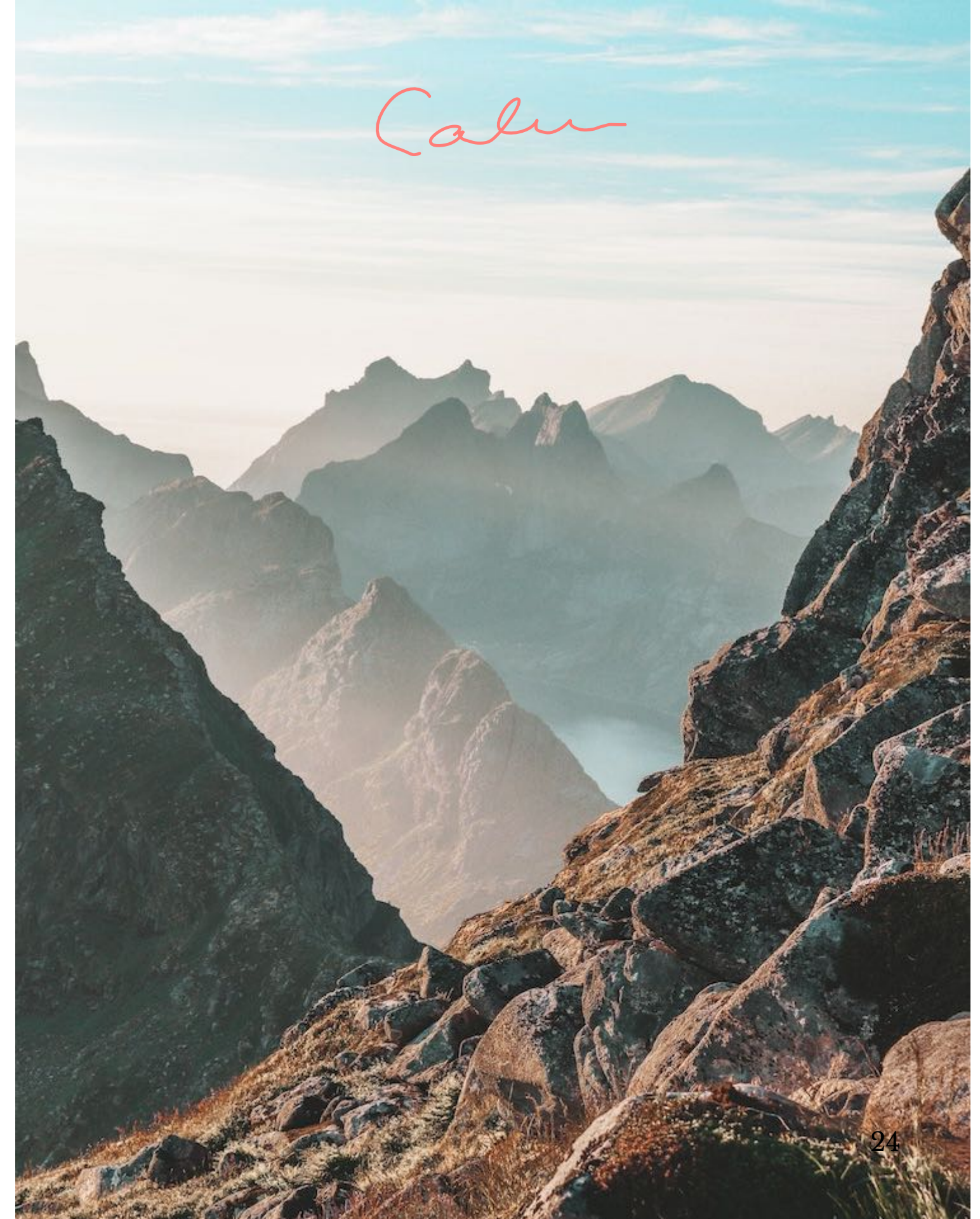
rhythmic use of the
element conveys
movement upwards

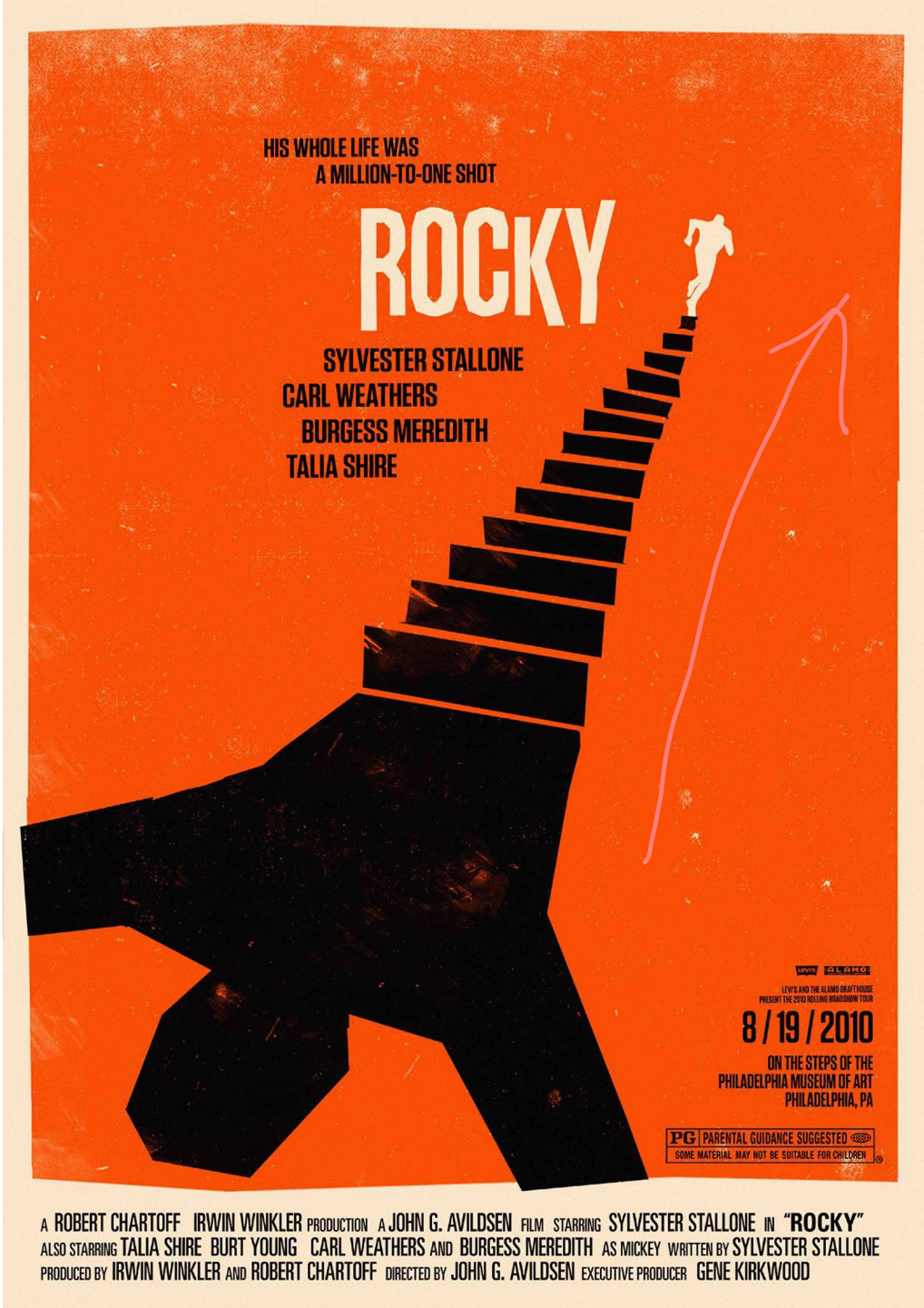
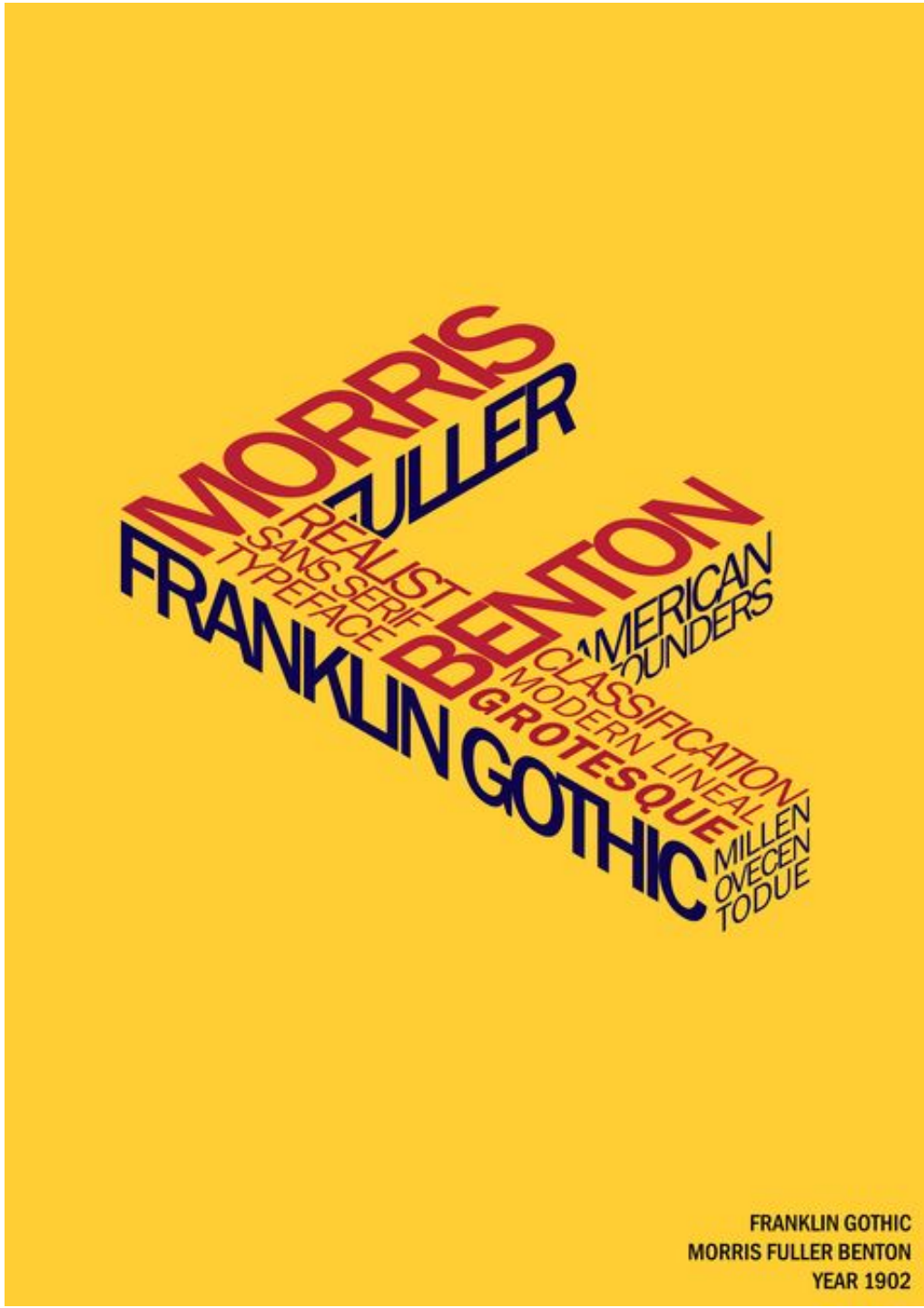
¹² Image source

Perspective¹³

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

¹³ Image sources: this slide, next slide: left, right

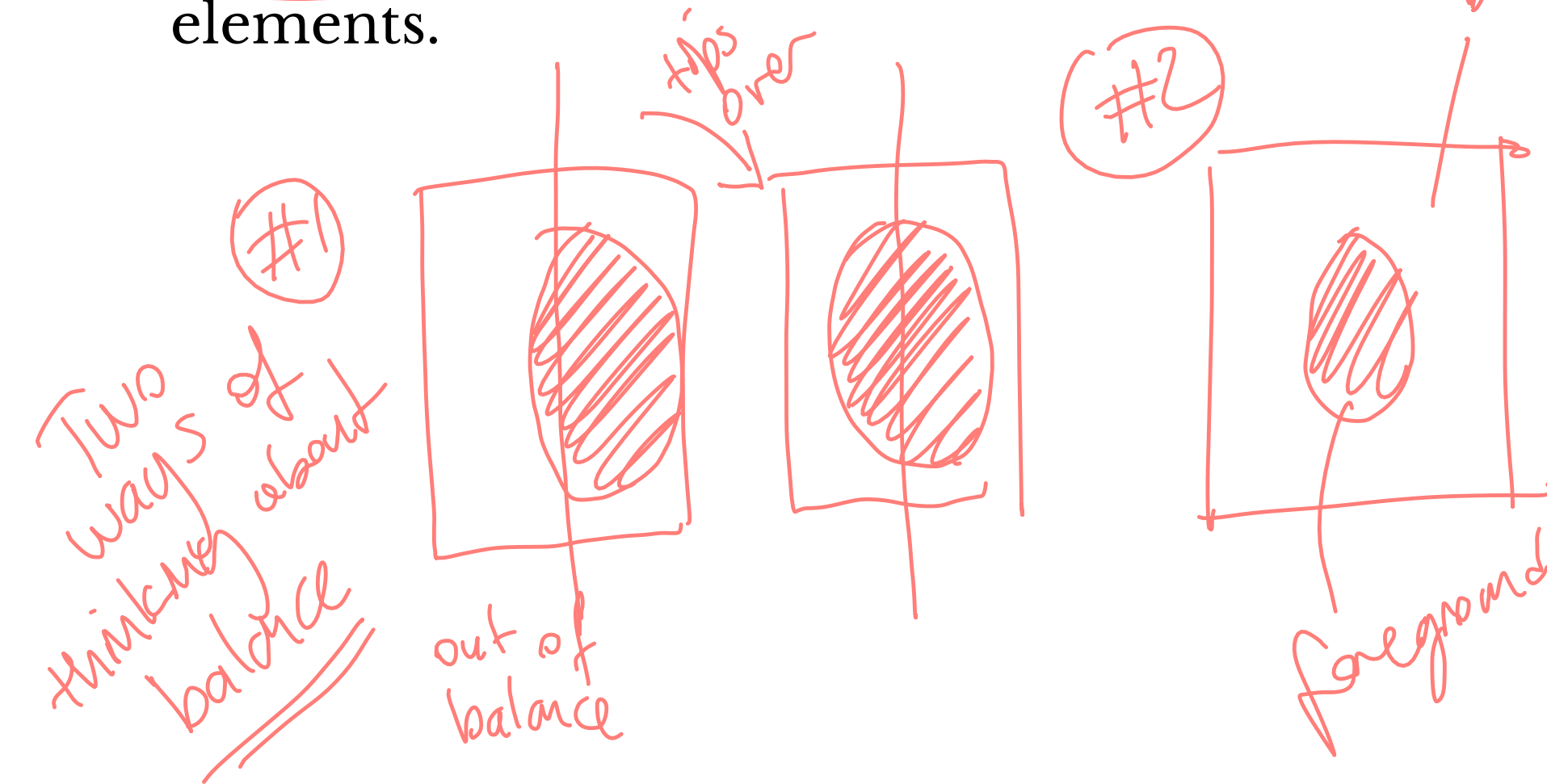




movement
in this
direction

Unity¹⁴

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



¹⁴ Image sources: this slide, next slide: left, right

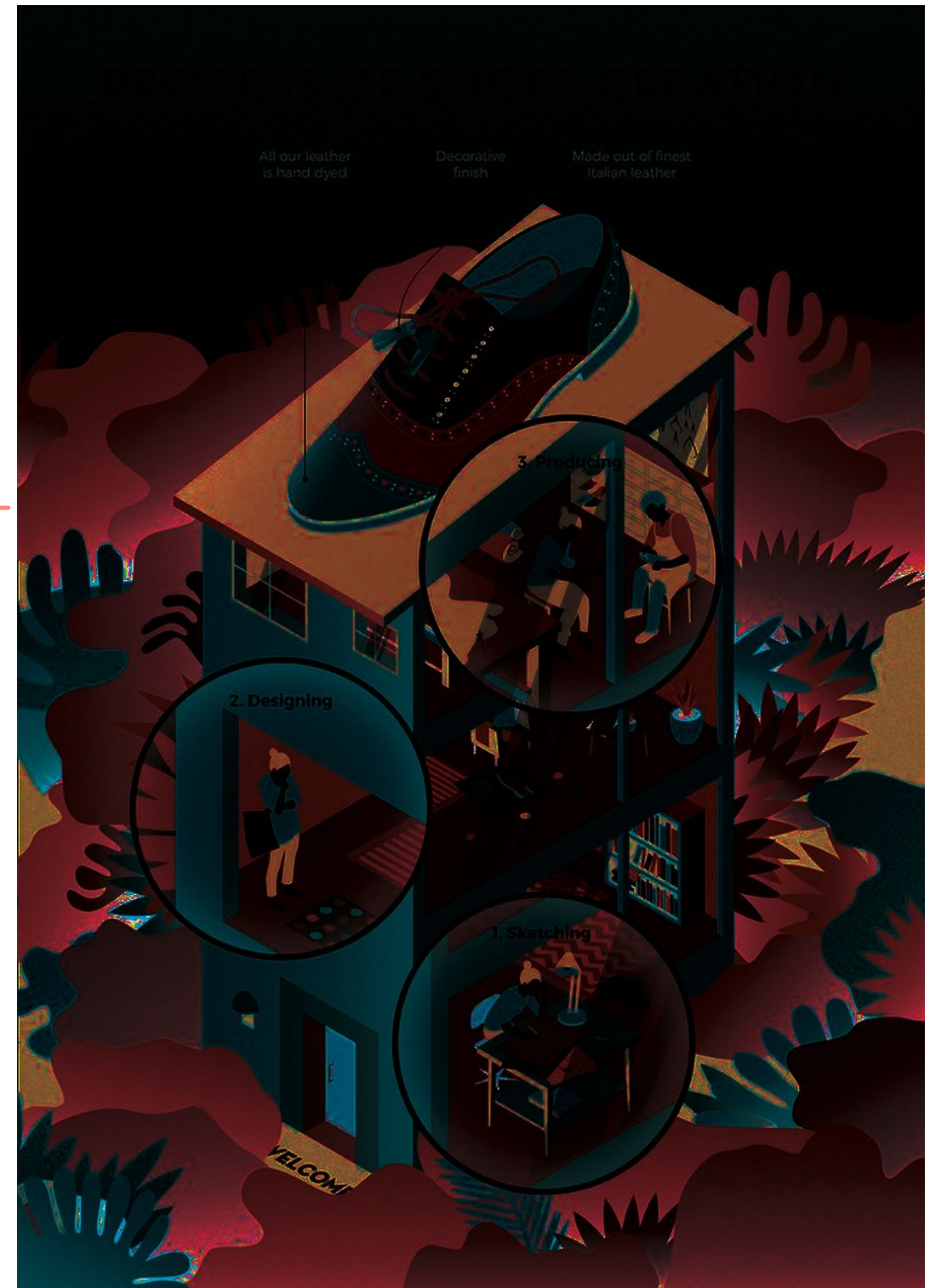




1930s
design

internally
consistent

2010s
design



Quiz 1

Complete the Canvas quiz.

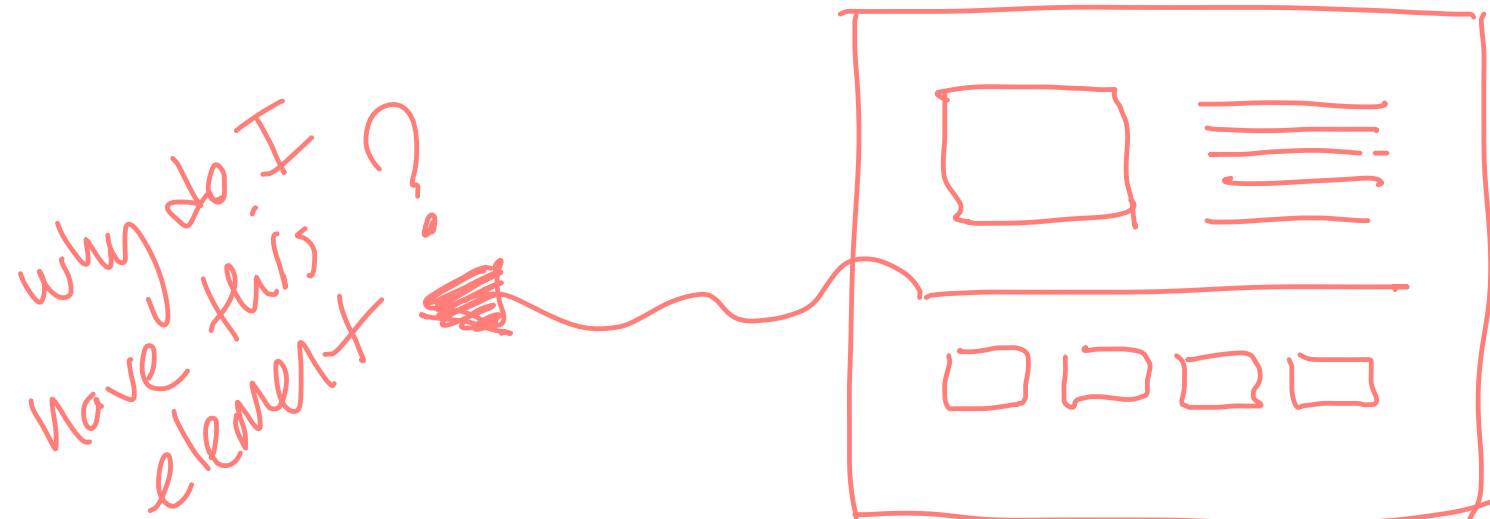
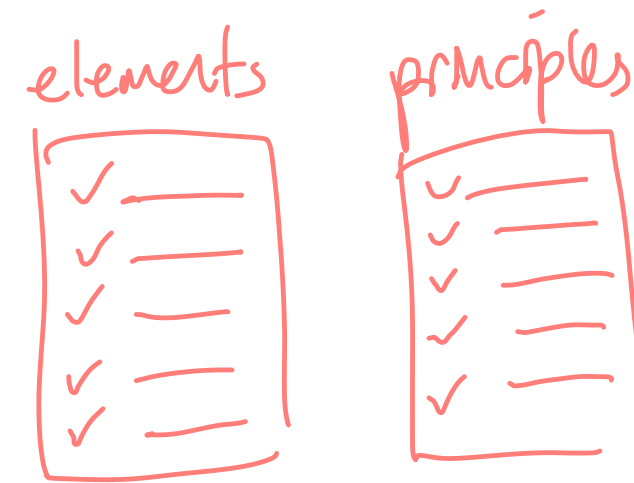


Questions about *Design Principles*?

**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

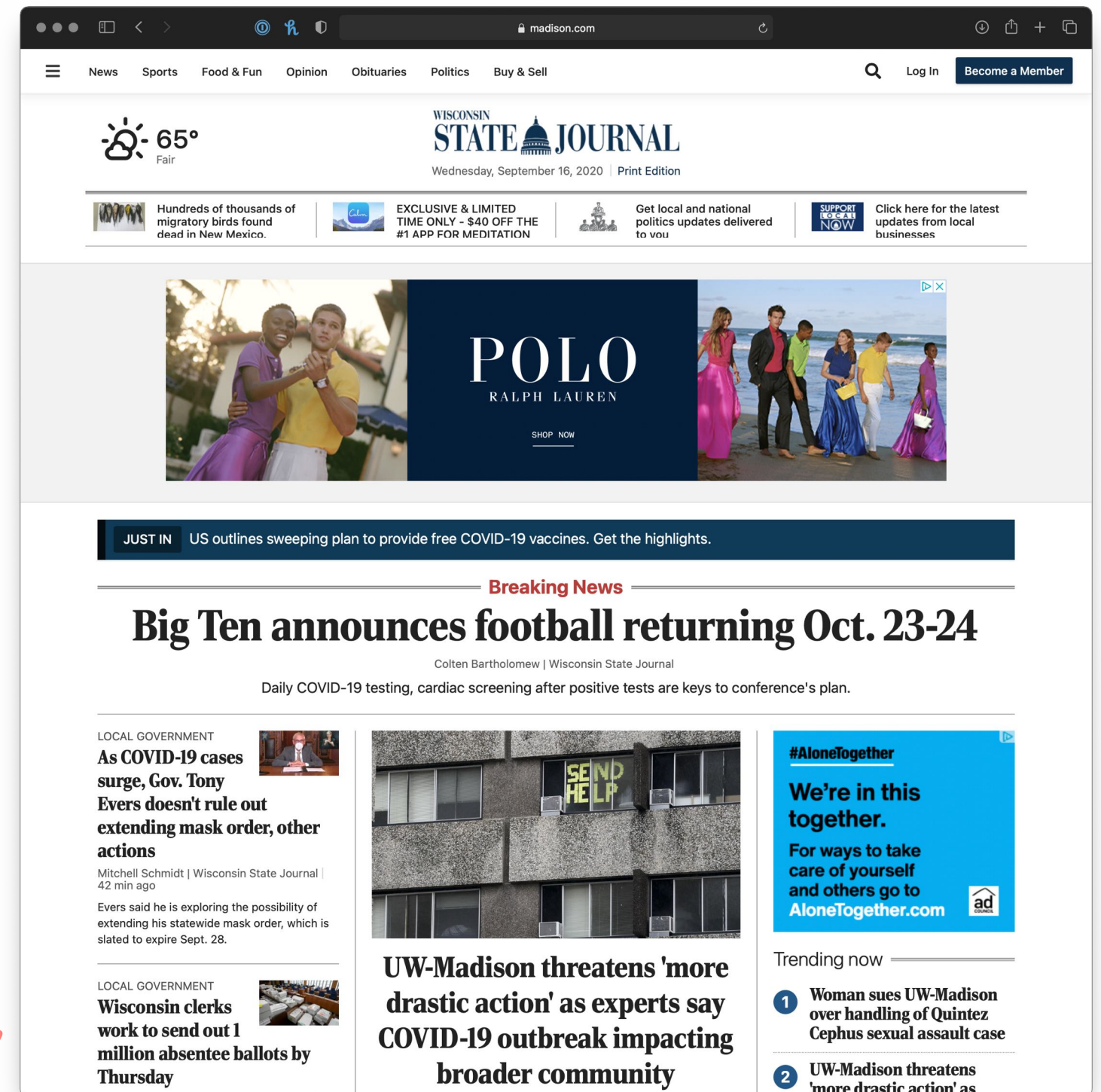


In-class Design Exercise 1

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 4*.



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).

ELEMENTS OF DESIGN

quick reference sheet

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

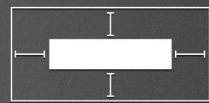


Texture relates the to surface of an object; the look or feel of it. Concrete has a rough texture; drywall has a smooth and subtle texture. Using texture in design is a great way to add depth and visual interest. Printed material has actual, textile texture while screen material has implied texture.

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.



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

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.

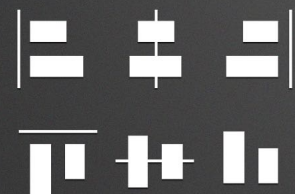
CONTRAST



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.

ALIGNMENT



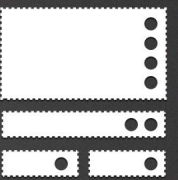
Proper alignment in a design means that every element in it is visually connected to another element. Alignment allows for cohesiveness; nothing feels out of place or disconnected when alignment has been handled well.

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.



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.



Quiz 2

Complete the Canvas quiz.



Key Components for UX Design

Key Components for UX Design


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

Type — anything you can read

Definition: Printed letters and characters of language.



Associated Concepts

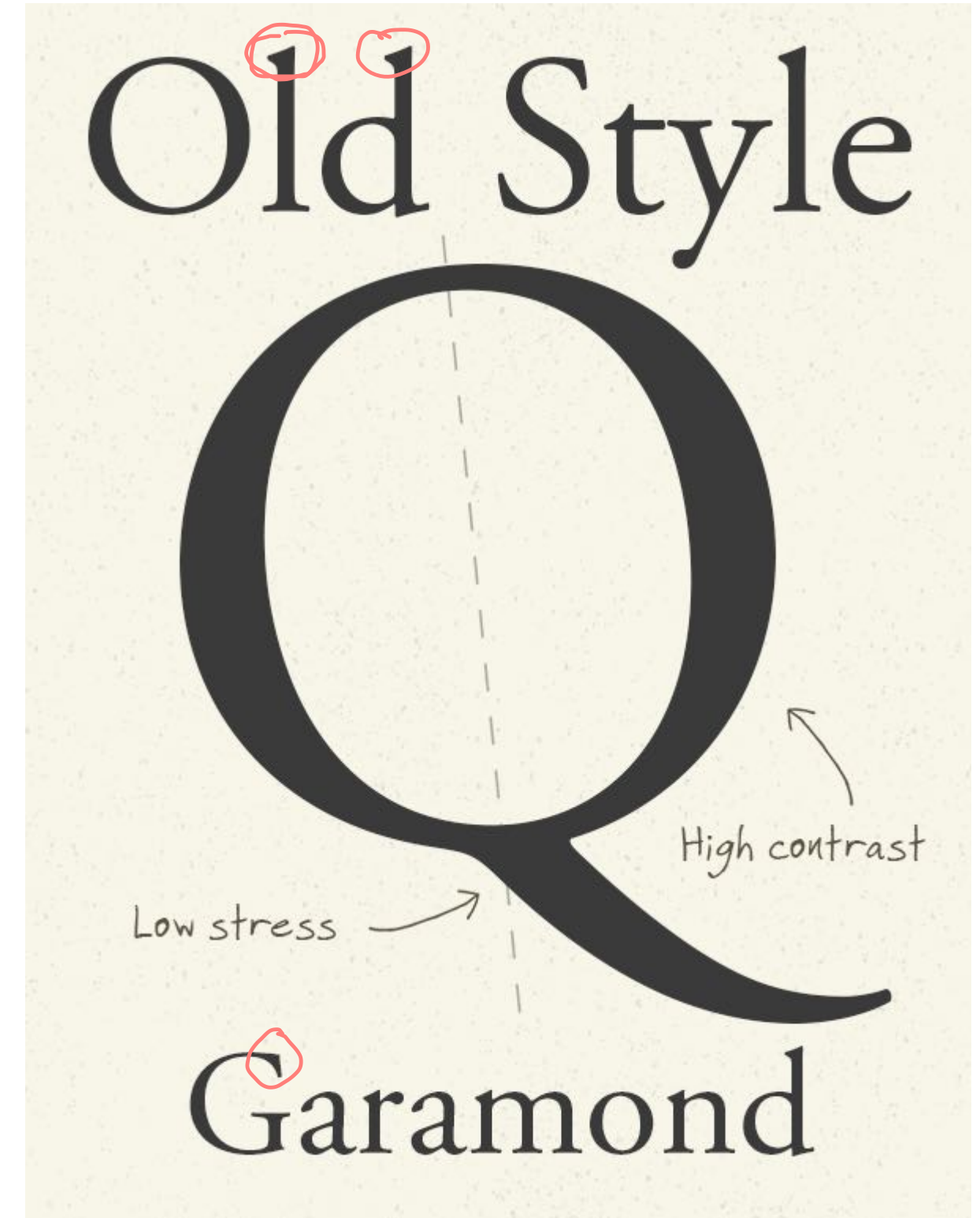
- A font is the style in which type is created.
- A typeface is a font family that includes fonts of different variations that follow the same style.
- A glyph is a particular character.


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

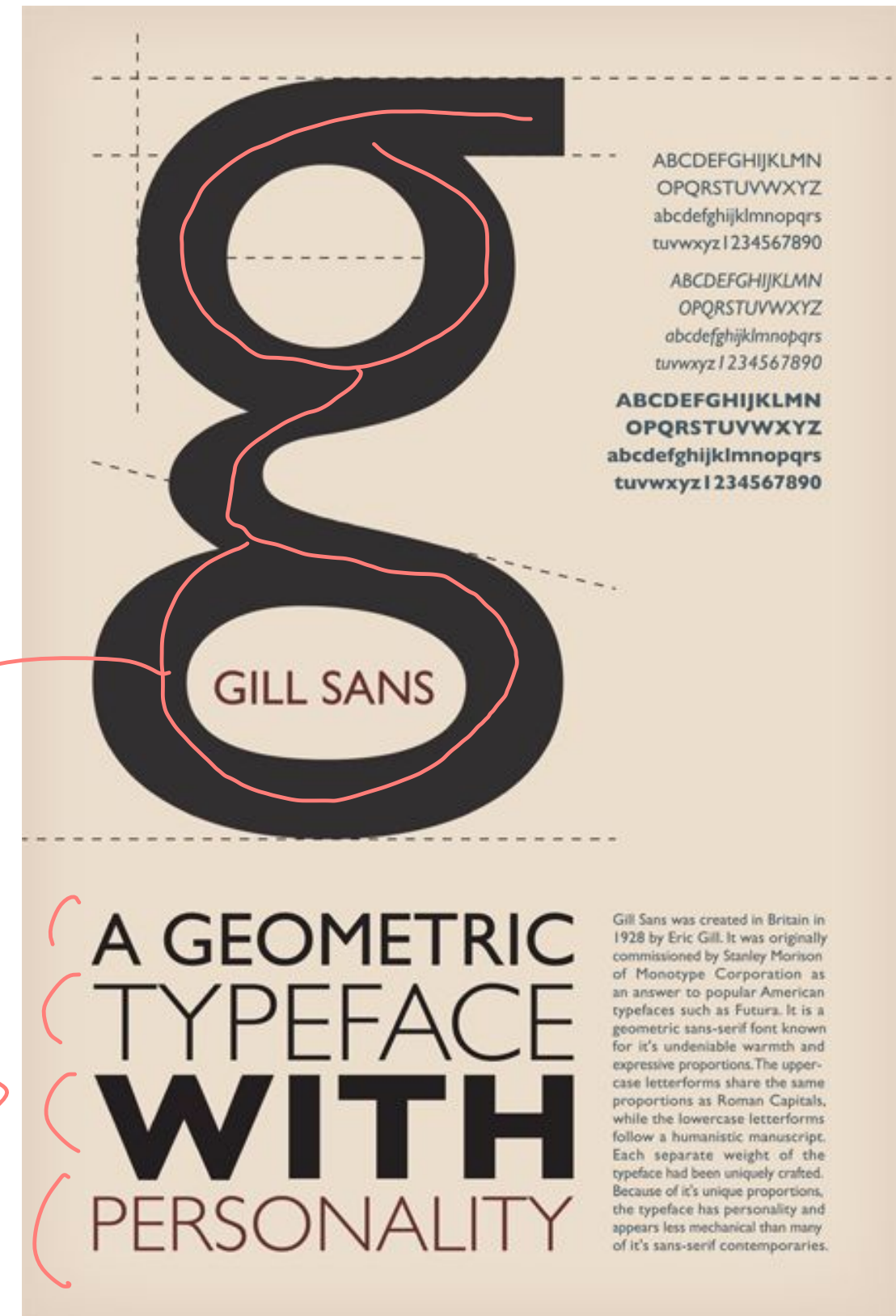
Definition: Modern and slab-serif fonts have very thin or very thick serifs.



Sans-serif fonts

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

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."

gothic
example



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

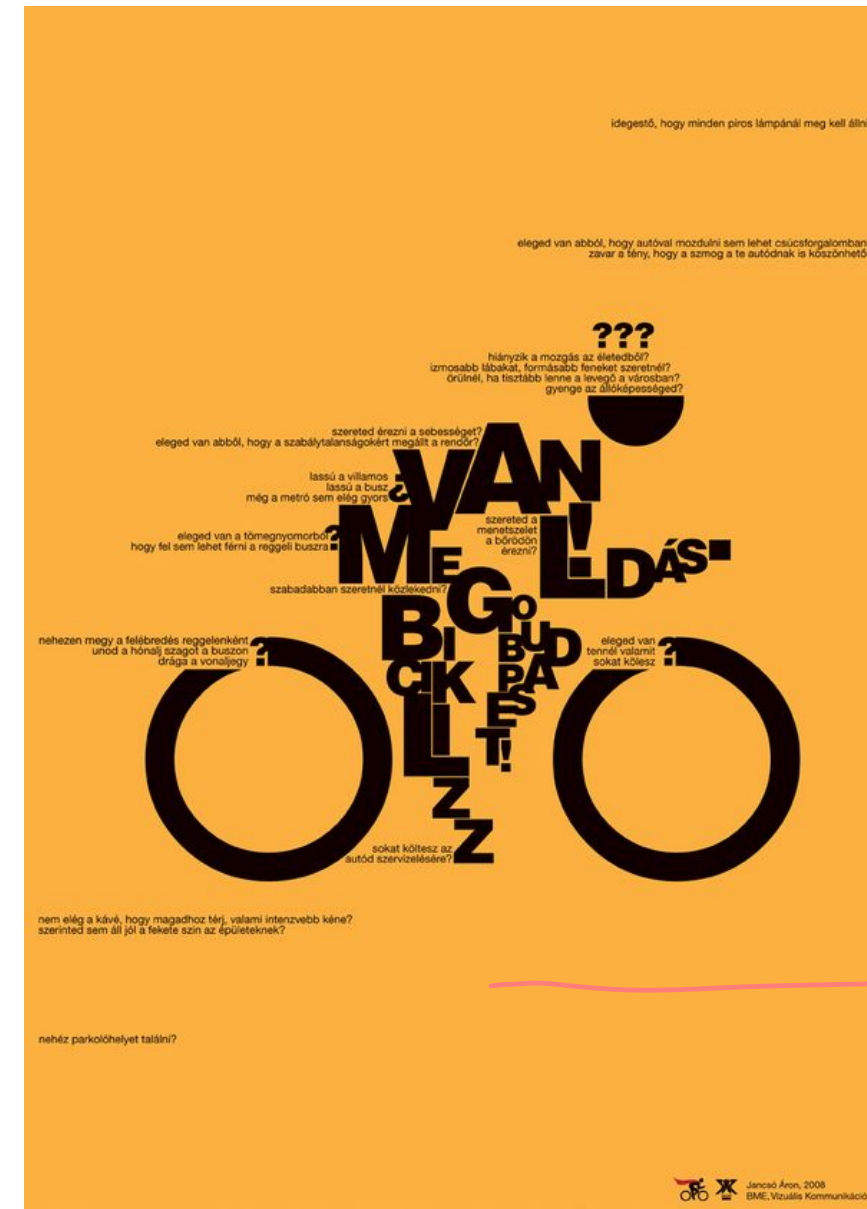
Pro Tip: Type alone can be used to achieve design principles, such as *hierarchy* and *movement*.

You'll probably see this last.

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

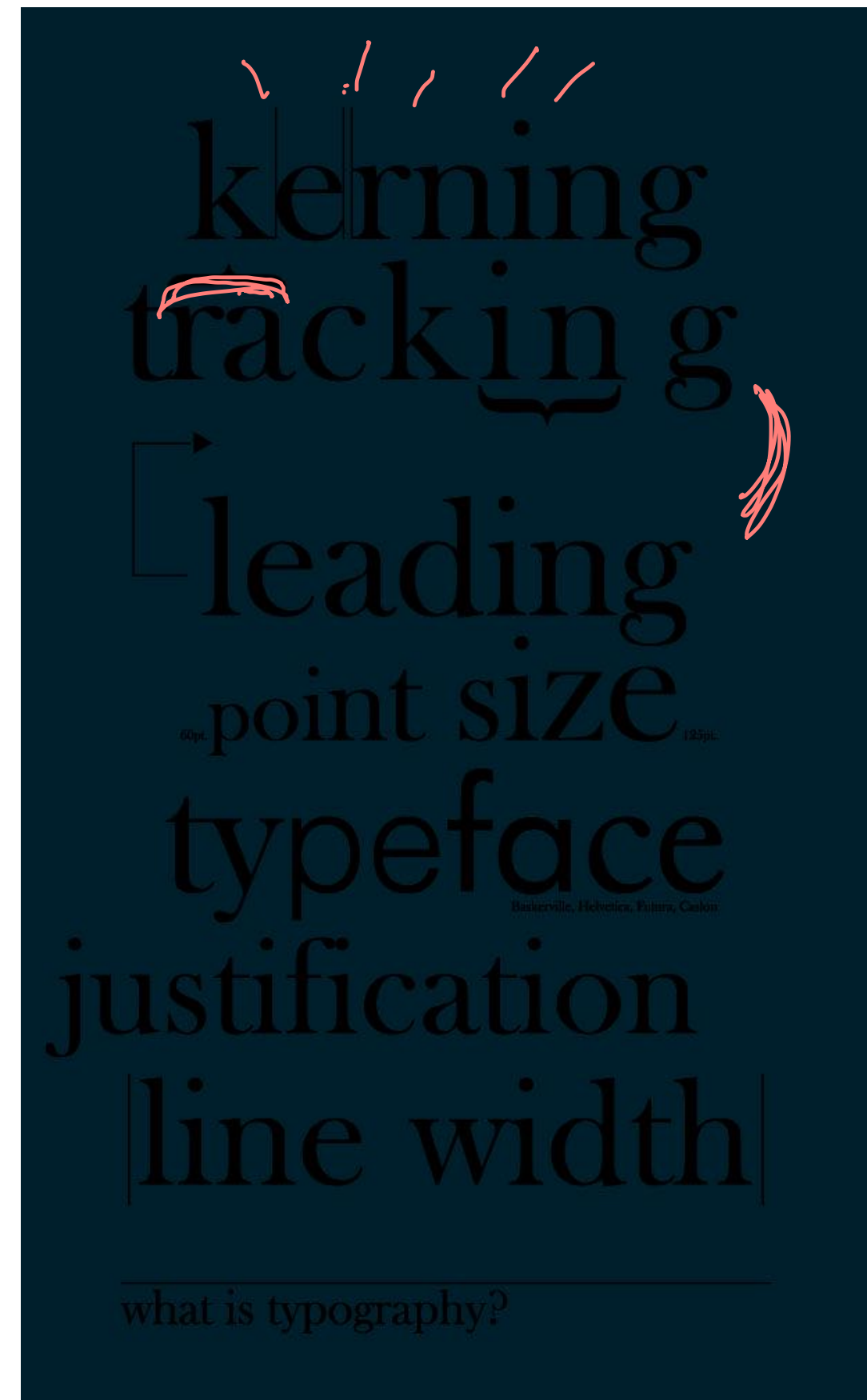
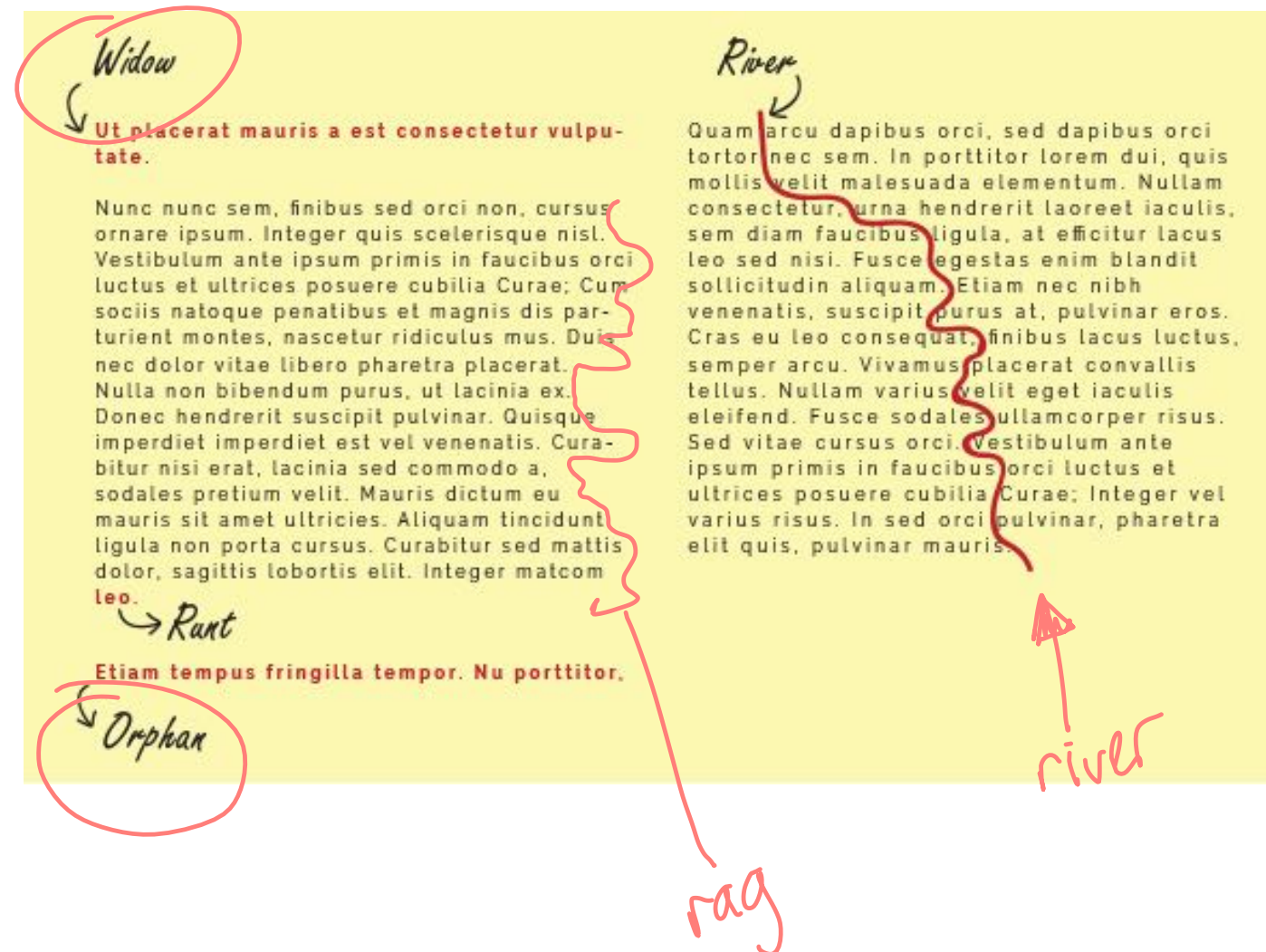
Then, you'll read this.

And then this.



movement

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



Questions about *Type*?

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.

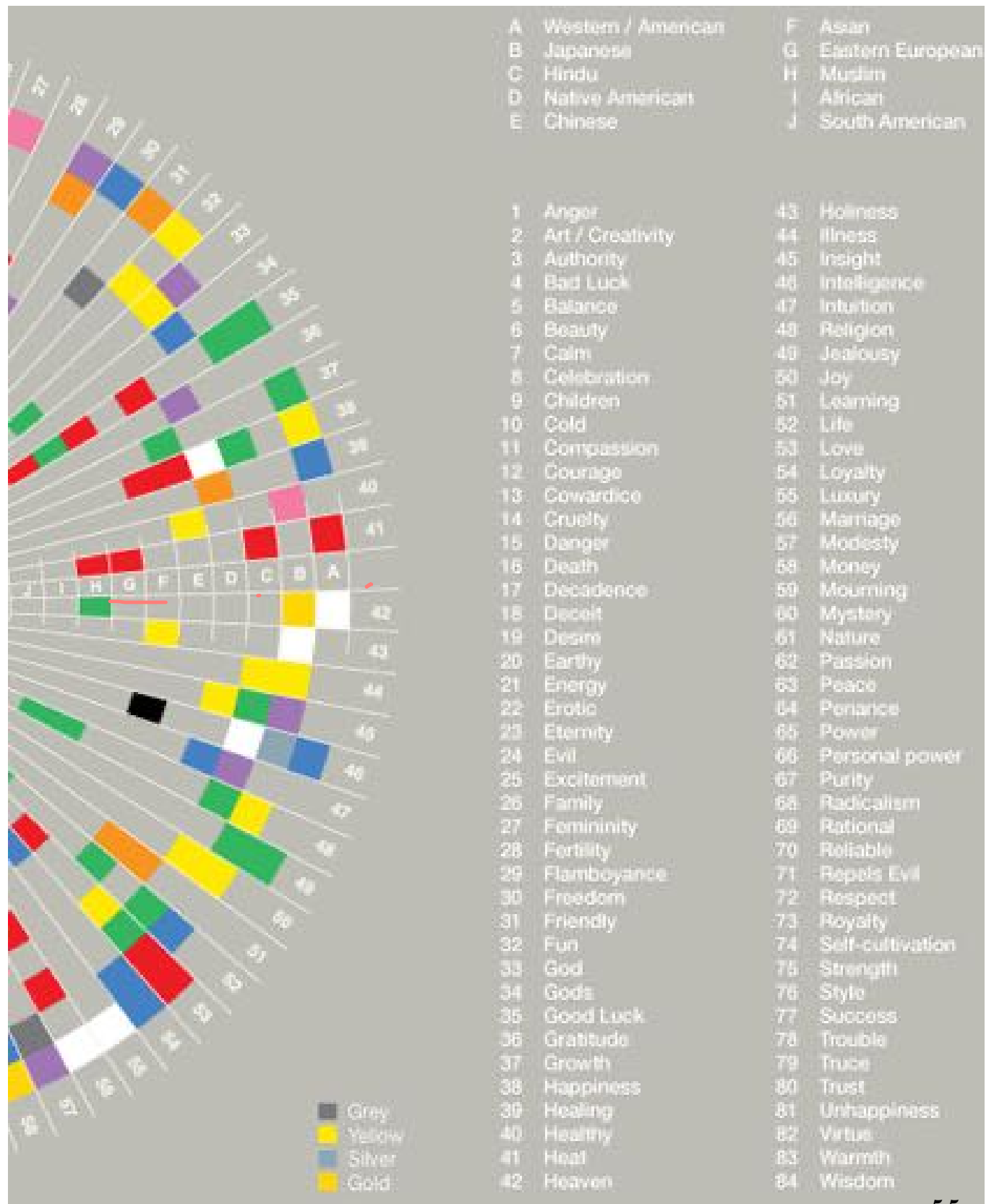
Although the executive summary appears at the beginning of the plan, you should write it last. Writing the summary is a good opportunity to check that your plan makes sense and that you haven't missed any important points.

← use of color to evoke emotion

emotions elicited by colors

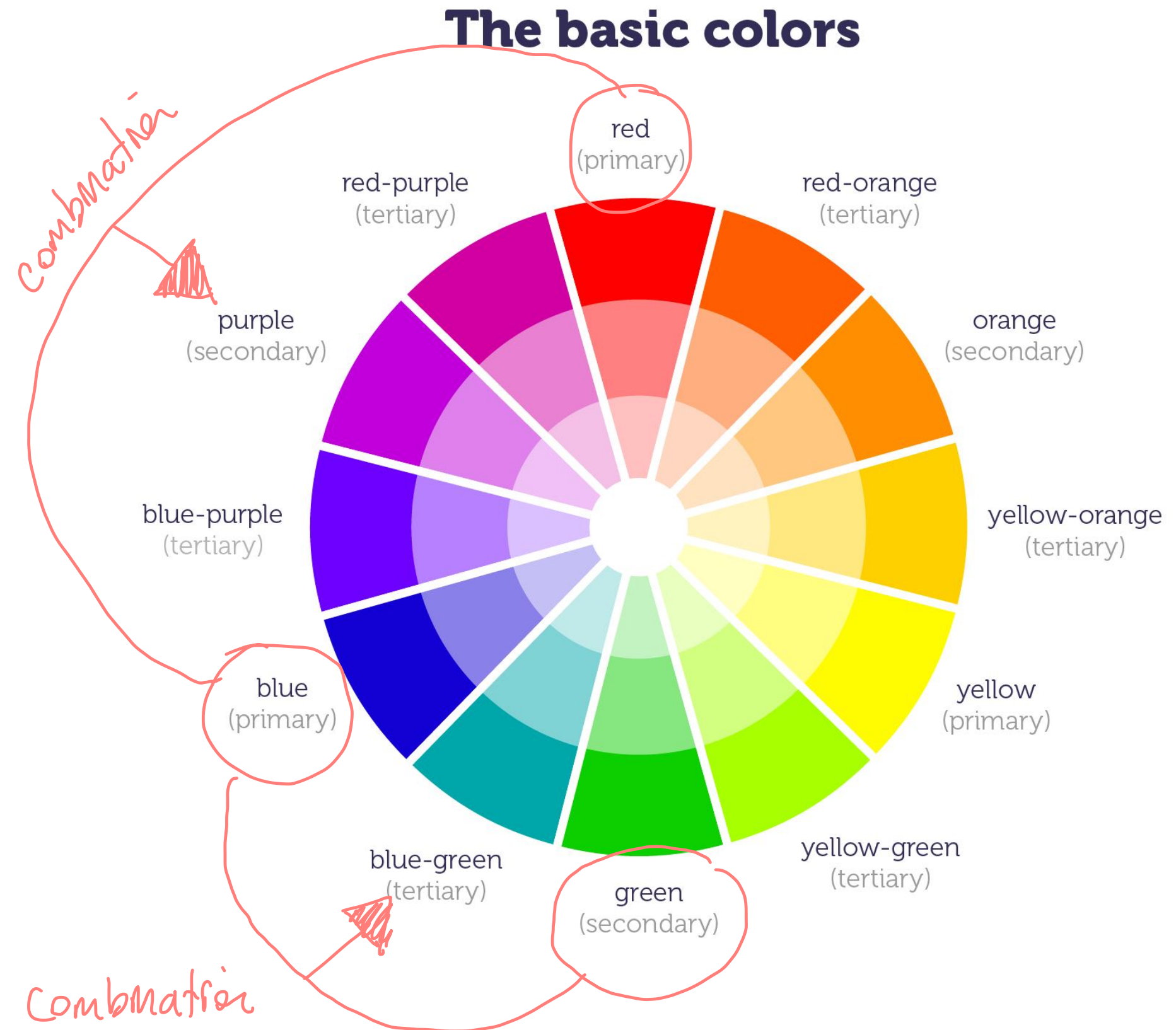


how the color-emotion mapping changes across cultures



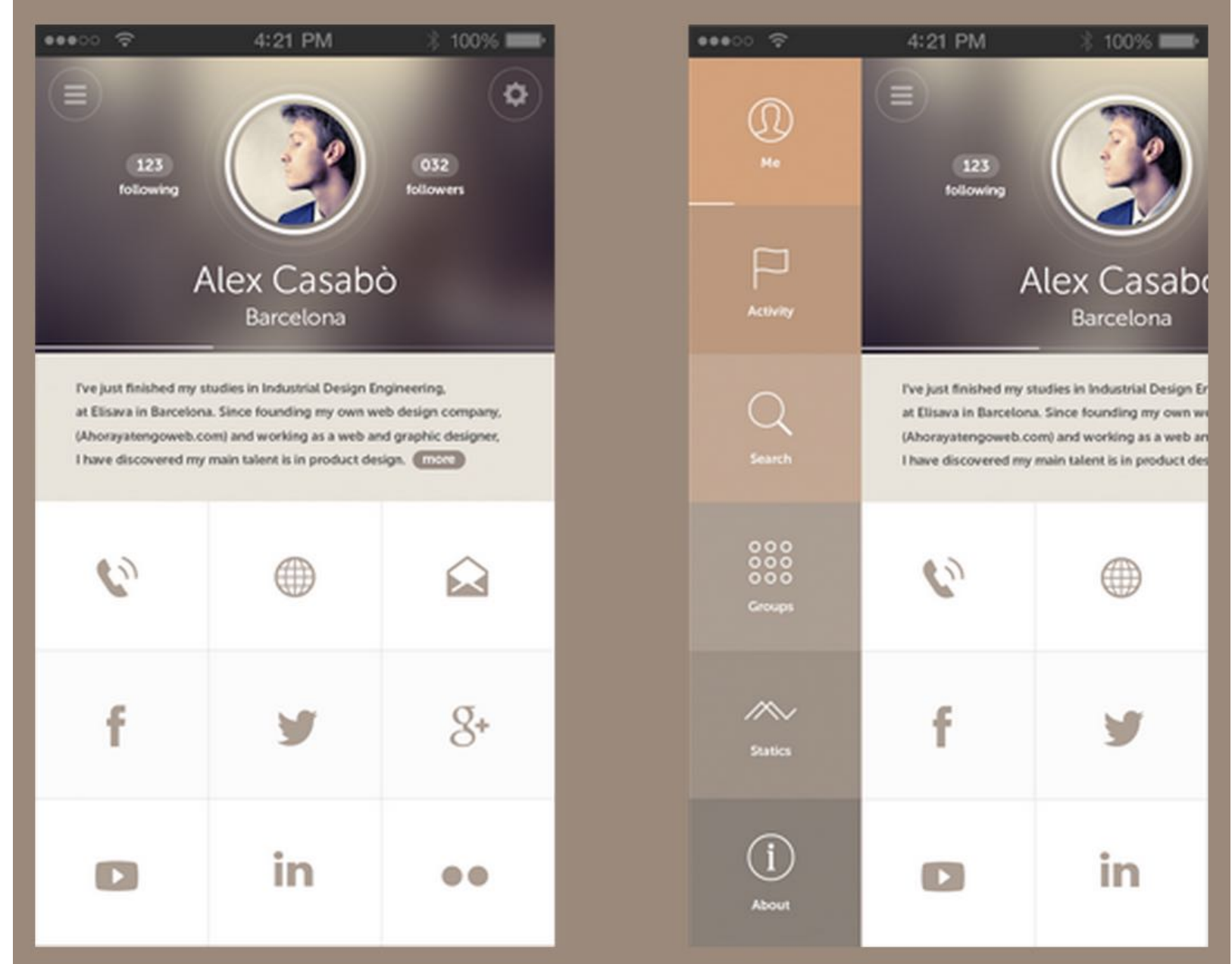
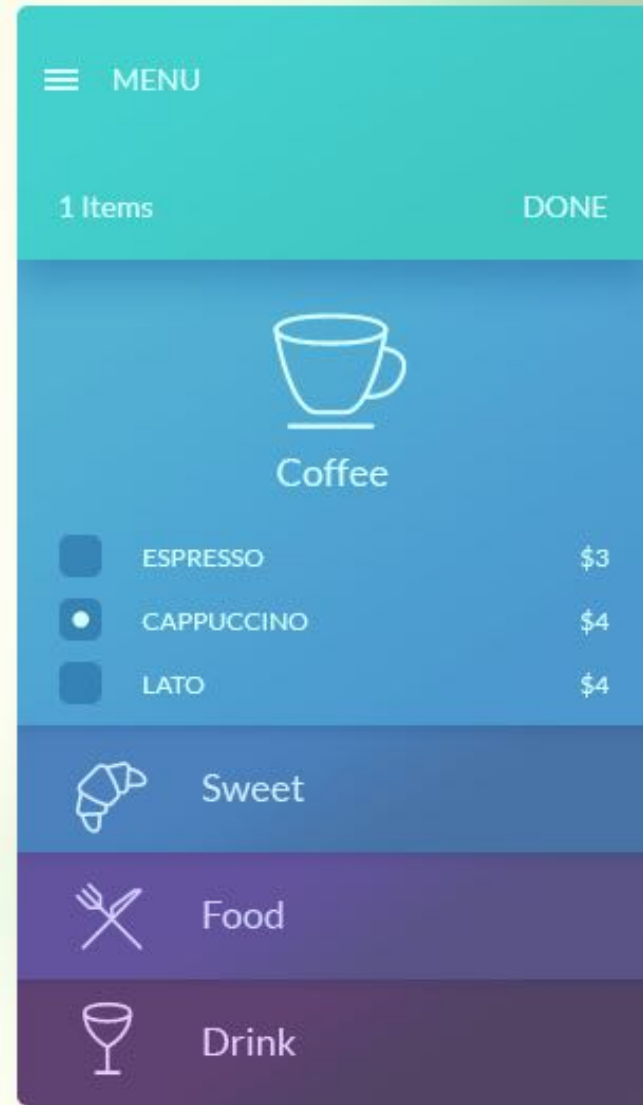
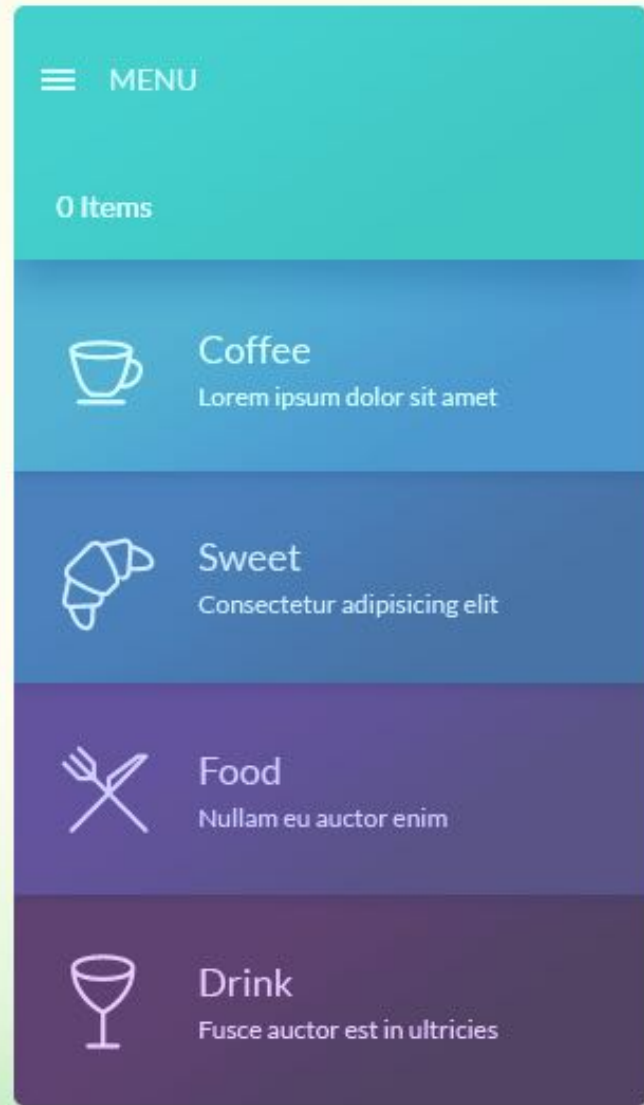
The Color Wheel

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



↓ Cool

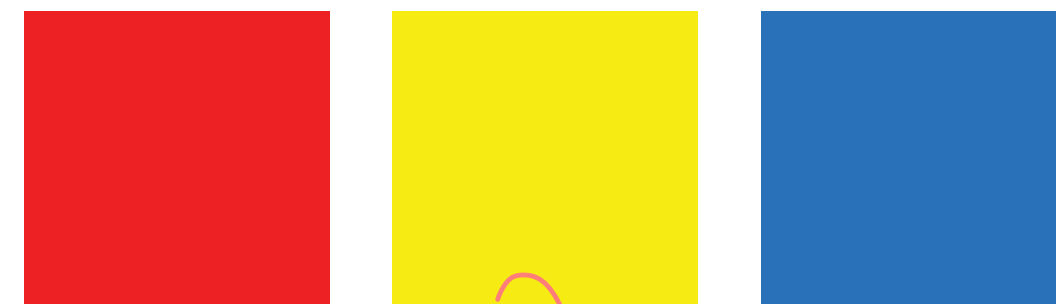
↓ Warm



I can pick any tint or shade of any hue I want.



the HSV model



Hue

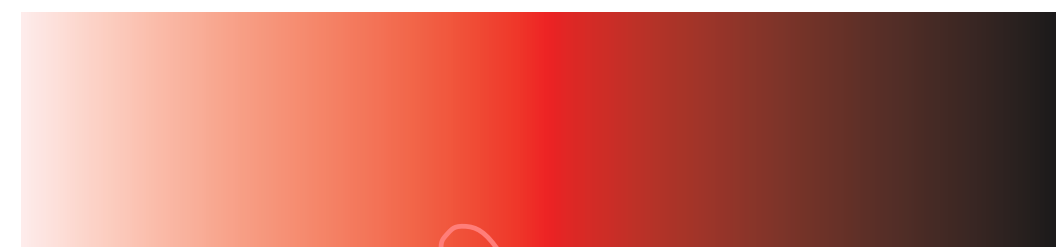
Low



High

Saturation

Light



Dark

Value

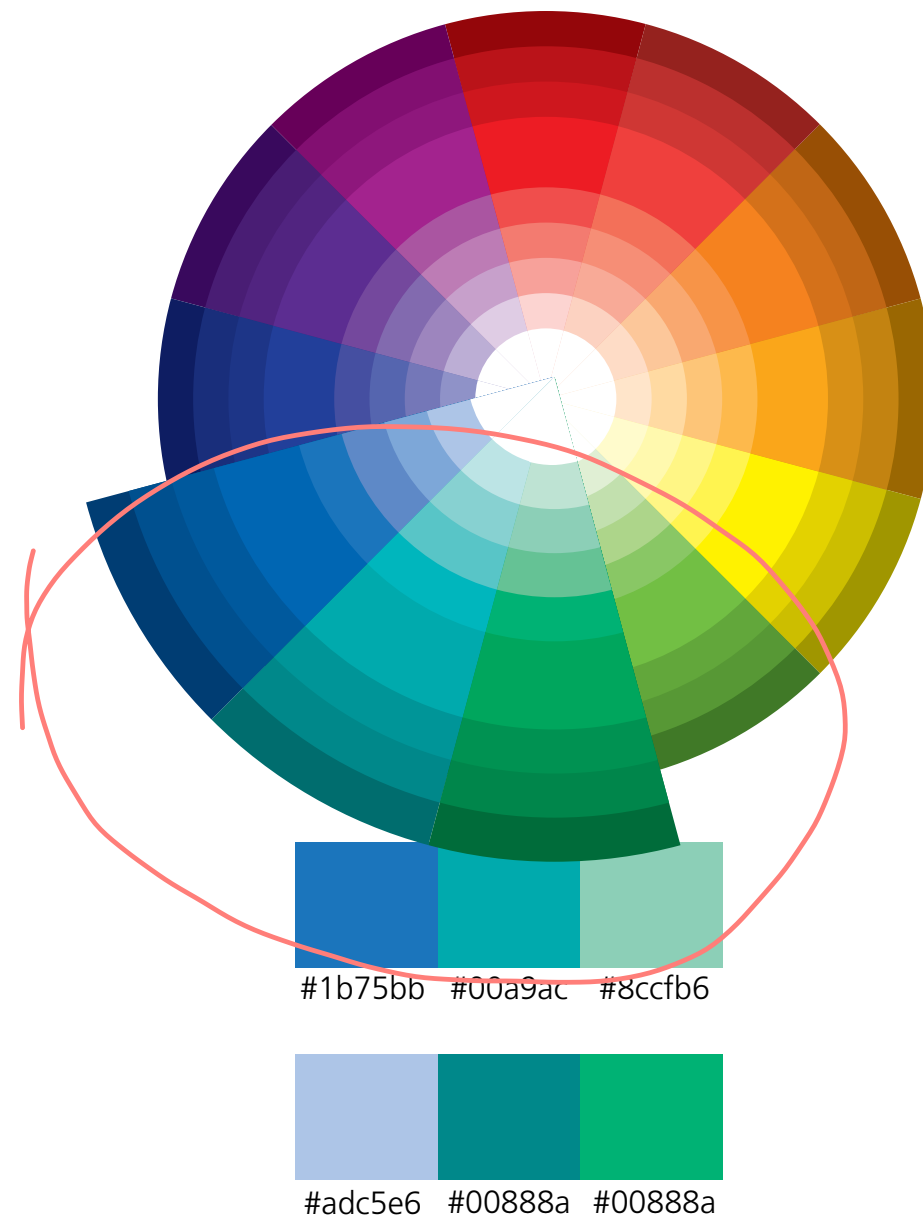
Color Palettes

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

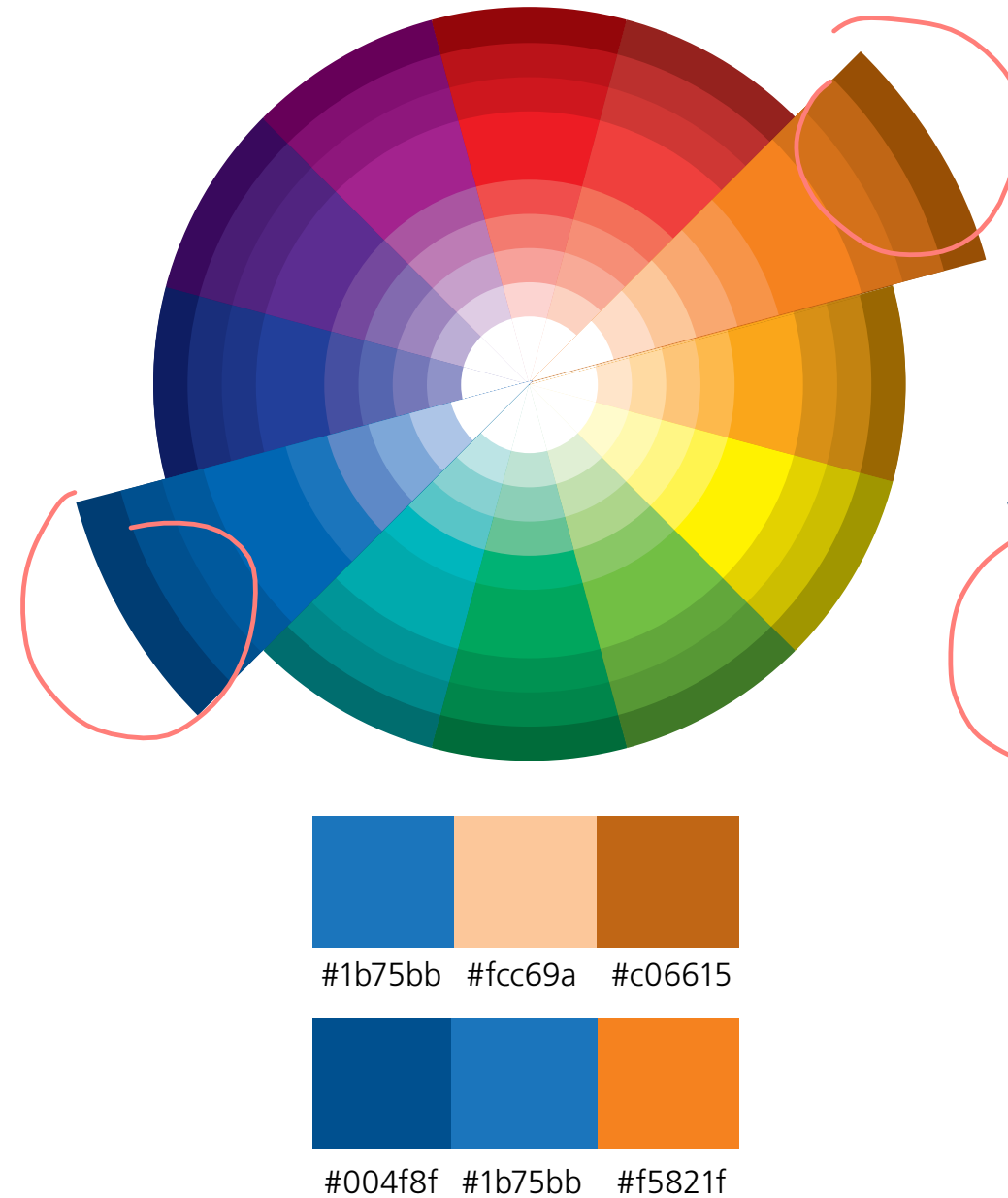
UNDERSTANDING COLOR THEORY



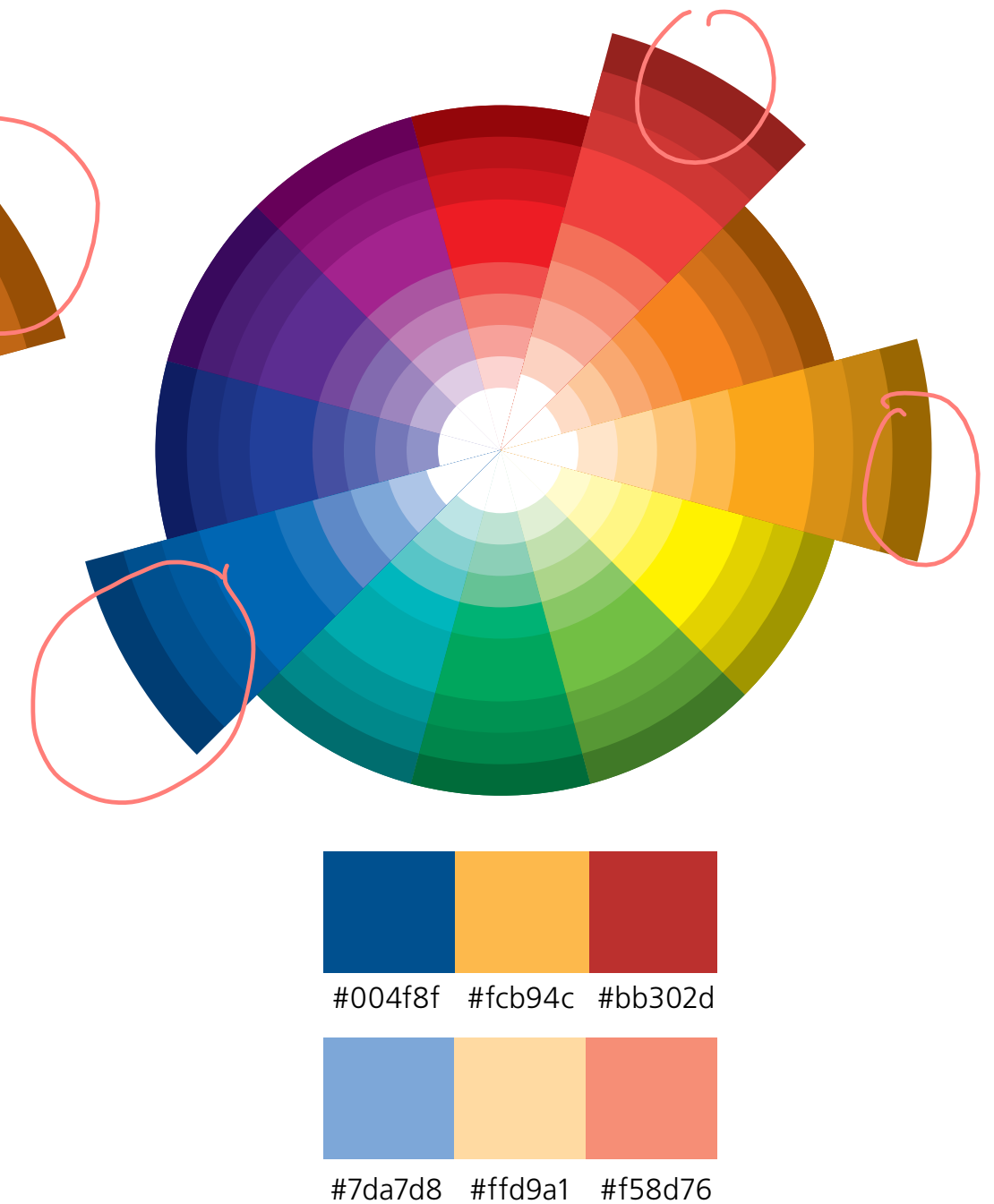
ANALOGOUS



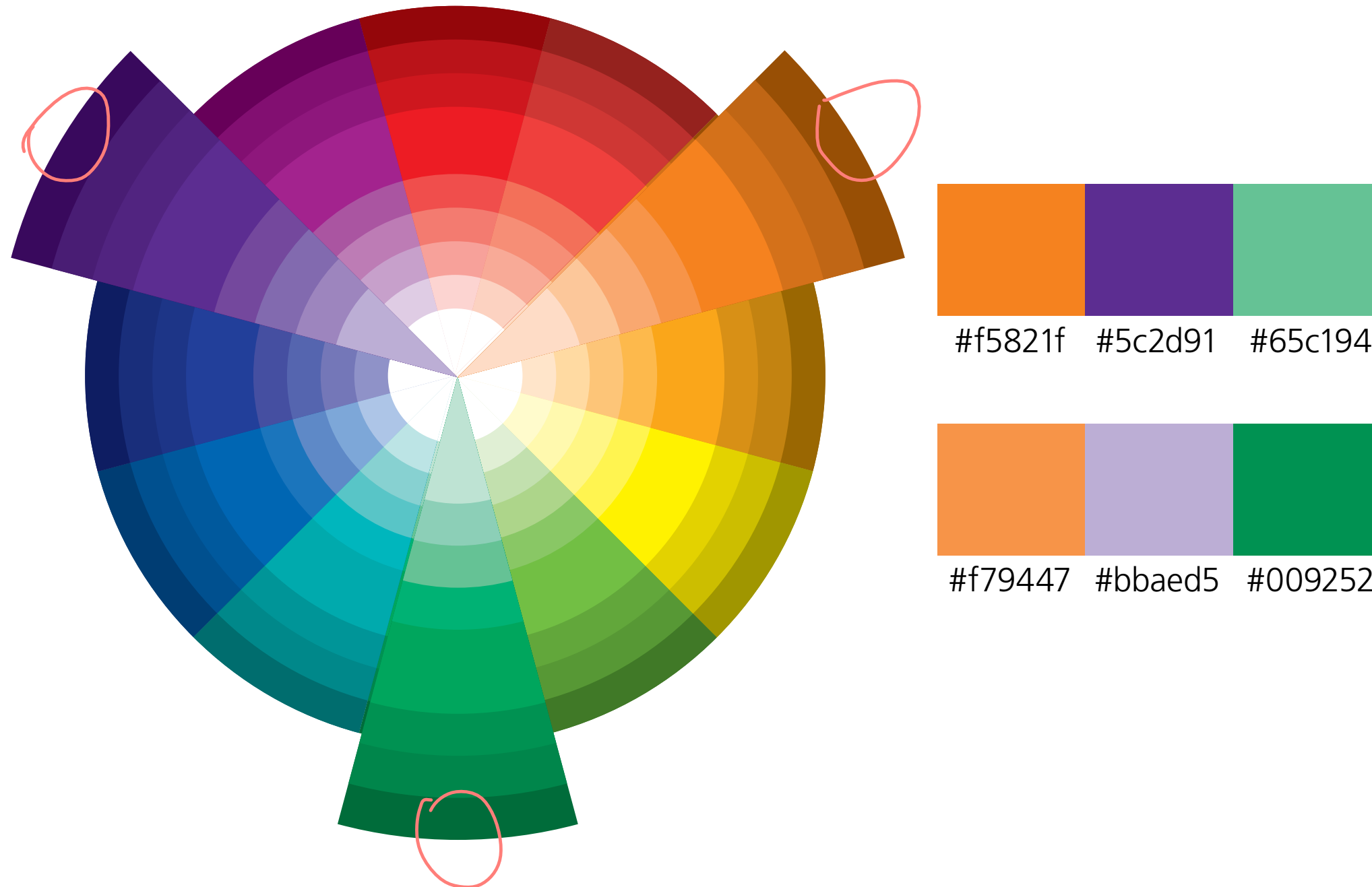
COMPLEMENTARY



SPLIT-COMPLEMENTARY



TRIADIC

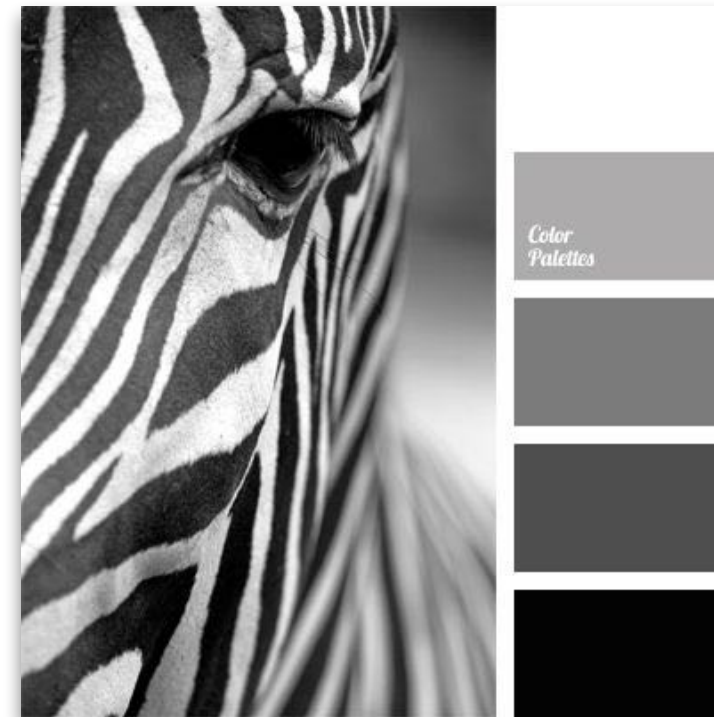


MONOCHROMATIC



ACHROMATIC

warm



cool

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

check them out!

different ways of achieving the same effect



normal



protanomaly

red weakness: red, orange, yellow shift in hue towards green



deuteranomaly

green weakness: yellow, green, orange shift toward red



protanopia

severe deficiency in red spectrum



deuteranopia

severe deficiency in green spectrum



Questions about *Color*?

Images

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

purpose

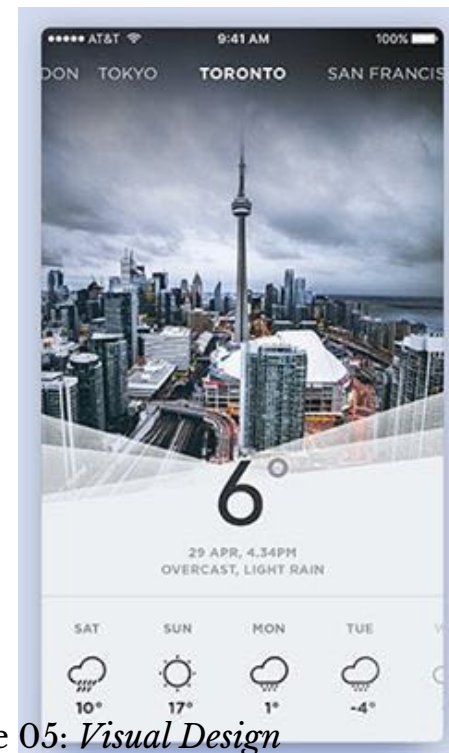
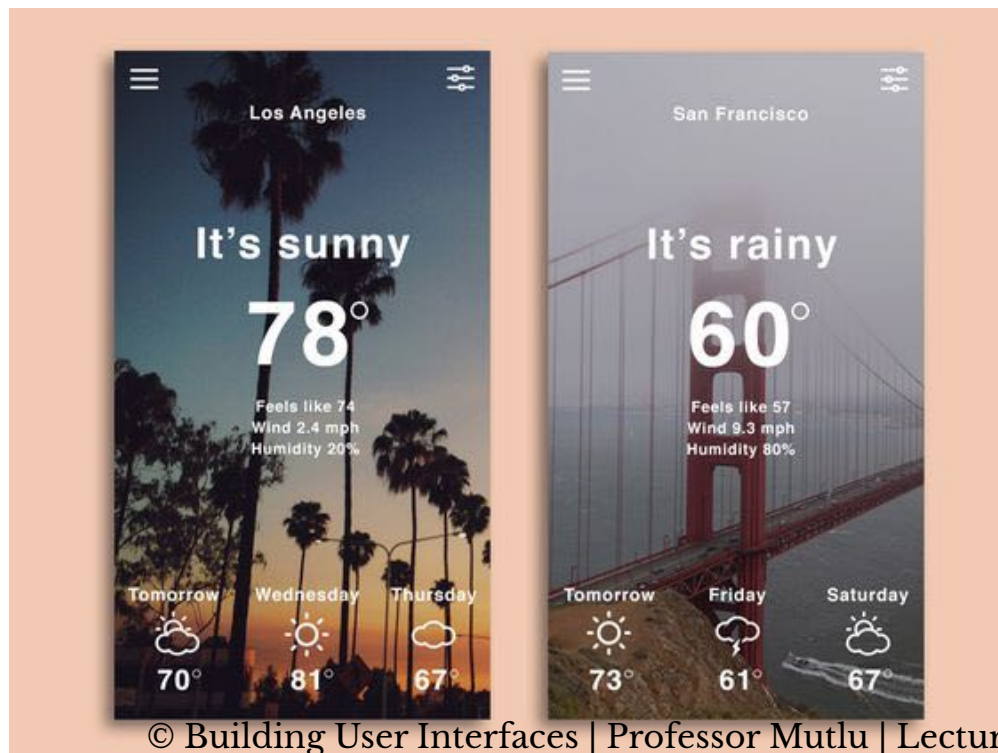
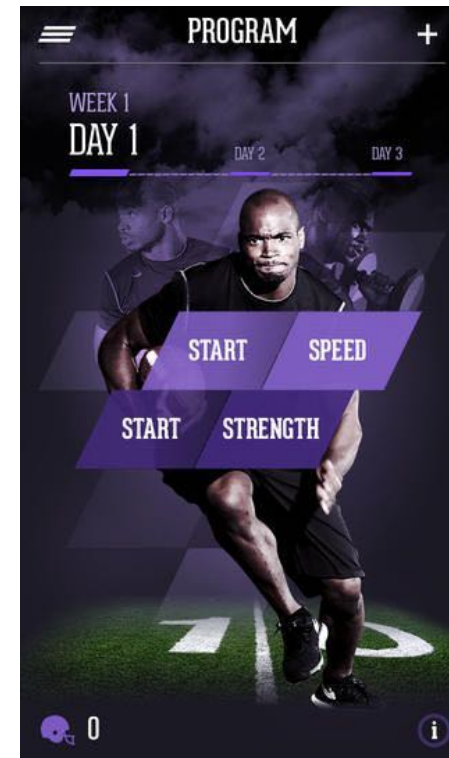
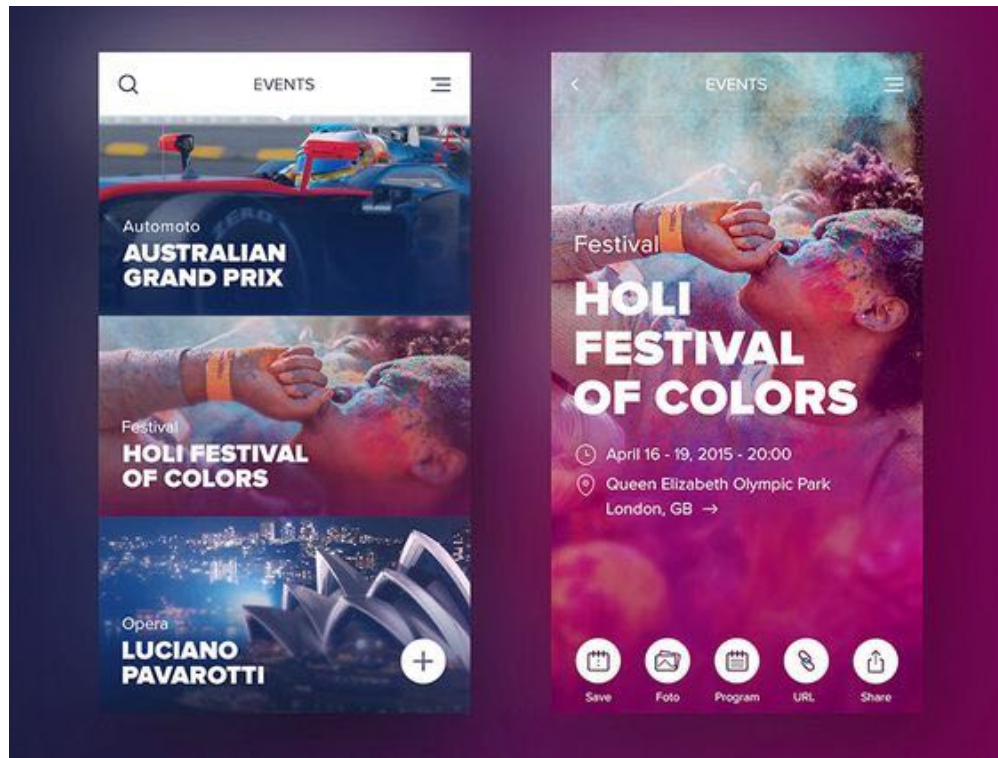
image

type

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

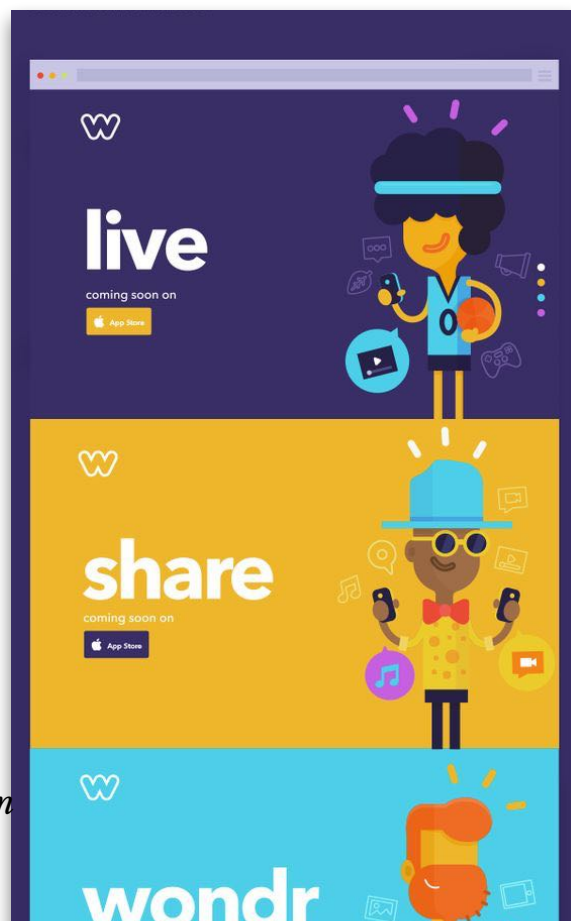
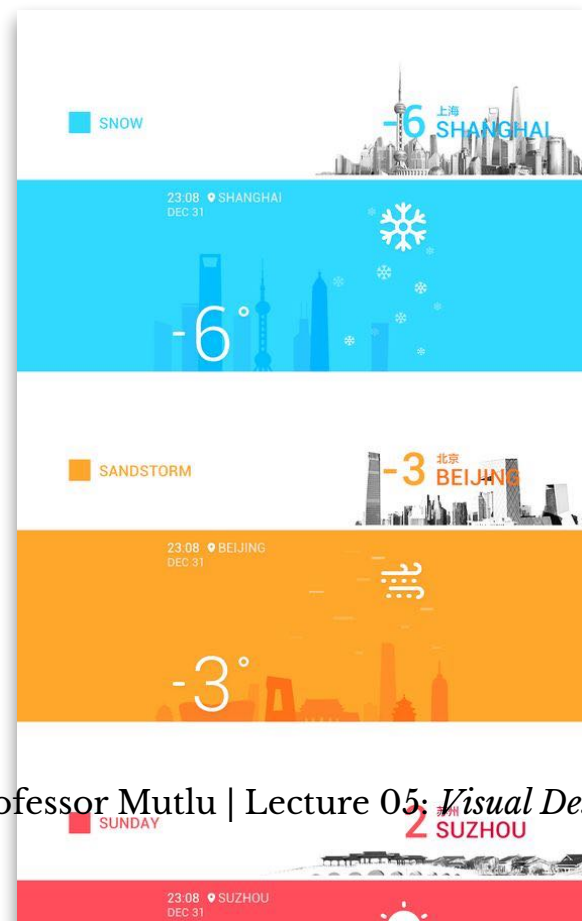
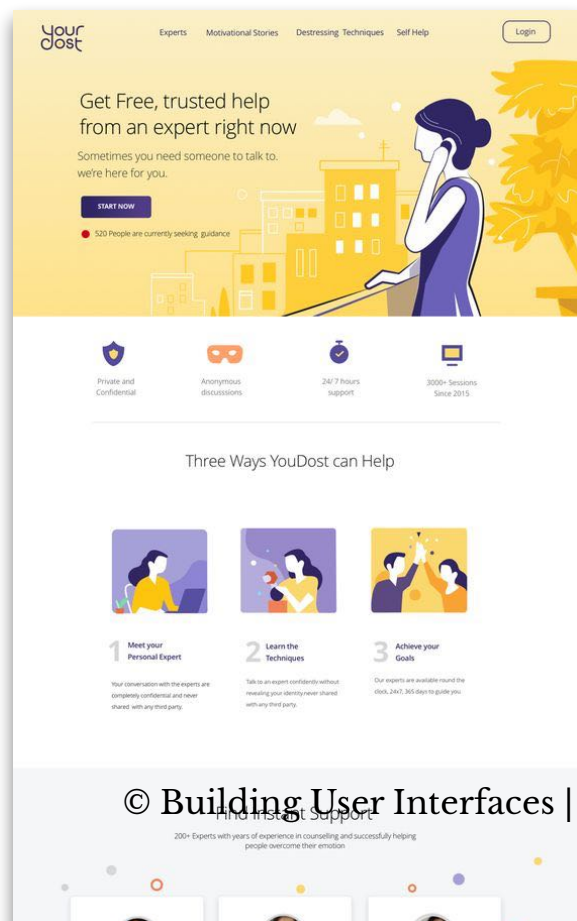


VECTOR GRAPHICS





◀ More Realistic Less Realistic ▶



Questions about *Images*?

Quiz 3

Complete the Canvas quiz.



Quiz 4

Complete the Canvas quiz.



canvas