

Introduction to HCI

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Visual Design

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Learning goals

- ▶ Why visual design is important and useful to consider when building interfaces
- ▶ Visual hierarchy, visual flow, proximity and grouping, positive/negative space
 - ▶ How they are related to one another
- ▶ The gestalt principles of closure, similarity, continuity and proximity and the differences between each
- ▶ Examples of how all of the above can be achieved effectively using visual cues
- ▶ Basic typographic concepts
- ▶ Basic guidelines for colors

Acts of graphic design

- ▶ Typography: manipulating type (i.e., fonts, characters, glyphs, etc.) for readability, emphasis, and aesthetic value
- ▶ Layout: arranging graphic elements (type, illustrations, lines, etc.) on a workspace (page, device, etc.)
- ▶ Animation: setting the changing properties of graphic elements over time
- ▶ Illustration: creating symbols and pictures to communicate a concept (can include photography).
- ▶ Interaction: animating with user input

Goals of visual design

- ▶ Provide guidance: by communicating structure, importance, and relationships
- ▶ Control pace: by providing orientation, space to breathe, clean routes through content
- ▶ Express meaning: by communicating message, style, feeling, emotion, engagement
- ▶ Use visual language to give content meaning that will make sense to the viewer

What can we do with visual design?

Practical considerations, e.g.,

- ▶ Is it readable?
- ▶ Understandable?
- ▶ Efficient?
- ▶ What's the experience of using it?
- ▶ Aesthetic considerations, e.g.,
 - ▶ What feelings, emotions, etc. does the design evoke?
 - ▶ Is it clean and/or nice to look at?

Visual language

- ▶ Layout, **typography**, color, all factors in visual language
 - ▶ Need to understand them to exploit them effectively
 - ▶ A visual language is influenced by:
 - ▶ Human perception and cognition
 - ▶ Tradition and culture
- ▶ Like spoken language, it's really complicated and ever-changing. Not just one thing.

Layout

- ▶ Page layout is the art of manipulating the user's attention on a page to convey meaning, sequence, and points of interaction."
– Tidwell. Designing Interfaces (2006)
- ▶ Definition: arranging graphic elements (type, illustrations, lines, etc.) on a workspace (page, device, etc.)
- ▶ A good layout considers:
 - ▶ Visual hierarchy
 - ▶ Visual flow
 - ▶ Grouping & alignment
 - ▶ Positive and negative space

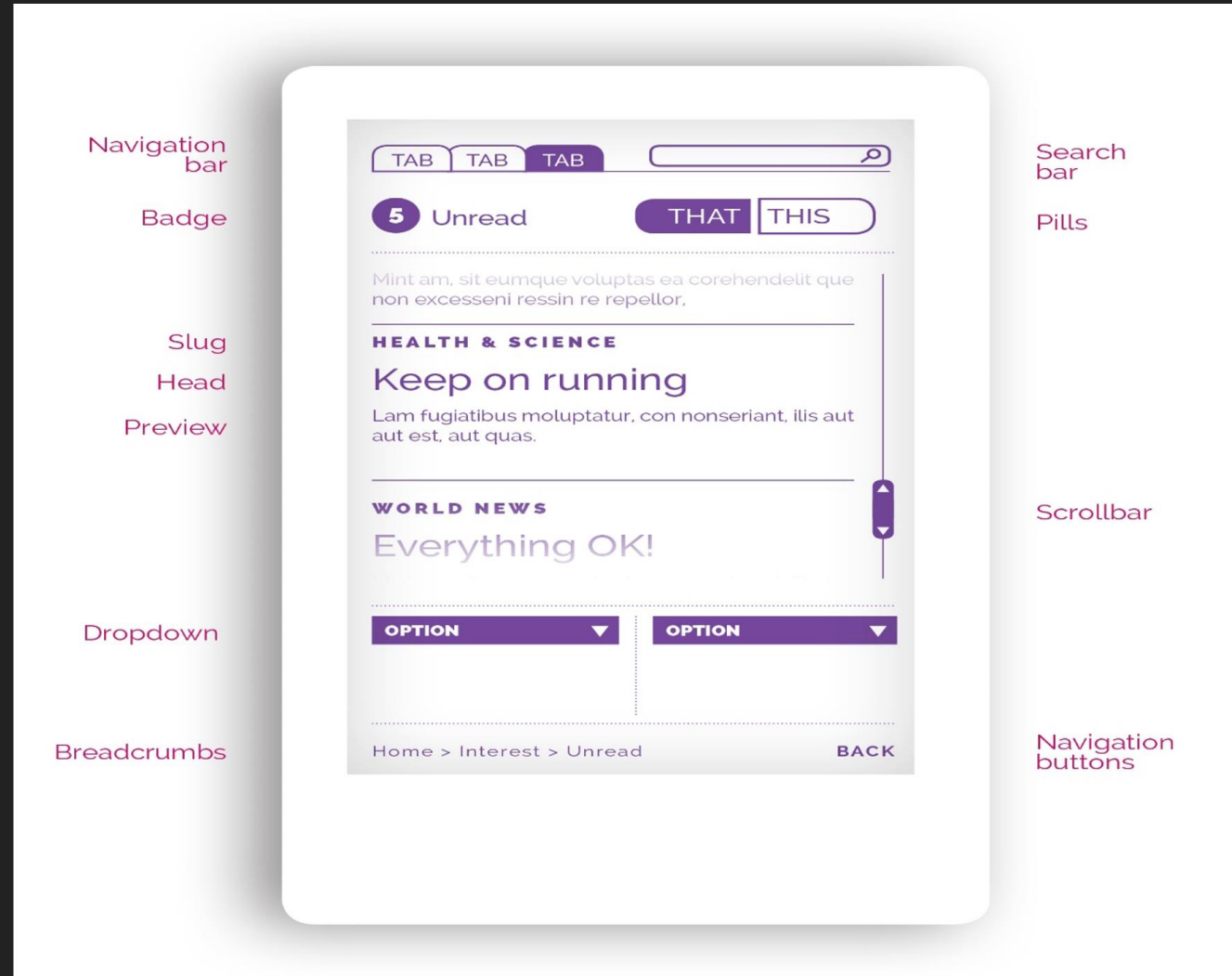
Visual hierarchy

- ▶ Definition: the structure of information on a page that communicates order, emphasis, and relationship.
- ▶ Communicating designer's conceptual model:
 - ▶ Emphasize what's important; de-emphasize what isn't.
 - ▶ Start with structural hierarchy
 - ▶ How should the information be organized/grouped?
 - ▶ What's a title? heading? content? caption?
 - ▶ What's the same? what's different? what's related?
- ▶ Communicate levels/differences in hierarchy with one or more visual cues

What is in a hierarchy? Example: elements of a webpage



What is in a hierarchy? Example: elements of an application



Graphic © Paul Bucci 2014; used with permission

Visual cues

- ▶ Definition: sensory input via the eyes that are processed during visual perception—basically, everything on the page
- ▶ Own every dot/line/pixel; be aware what you're communicating by presence and absence
 - ▶ Use individual or combined cues, including (not limited to):
 - ▶ Whitespace, groupings,
 - ▶ Indents and alignments
 - ▶ Line breaks
- ▶ Contrasting **fonts**, **weights**, **colors** or SMALL/LARGE caps
- ▶ Graphics, lines, rules, bars, etc.

Visual flow

- ▶ Definition: the order in which the eyes/attention naturally pass through page elements
 - ▶ Focal points: are deliberate visual cues to draw the viewer's attention
 - ▶ Points of entry: where you start on the page
- ▶ English speakers naturally read left-right, top-bottom
 - ▶ Consider the "Z"
 - ▶ Focal points can counterattack this flow
 - ▶ Is that good or bad? depends on what you're going for

Gestalt: grouping and alignment

- ▶ Usually a question of “what goes with what”?
 - ▶ Grouping and alignment can be used intentionally to create hierarchy and visual flow
- ▶ Two ways to approach the problem:
 - ▶ Knowledge of human perception can help
 - ▶ e.g., Gestalt principles
 - ▶ Grid systems

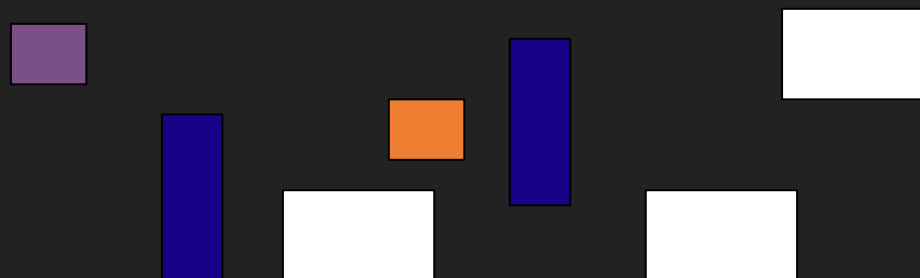
smashingmagazine.com/2014/03/design-principles-visual-perception-and-the-principles-of-gestalt/

Gestalt principles

- ▶ Examples of cognitive principles that explain how people interpret groupings and alignments
 - ▶ Proximity: nearby things are perceived as related



- ▶ Similarity: things that are the same in size, shape, color etc. are perceived to be associated

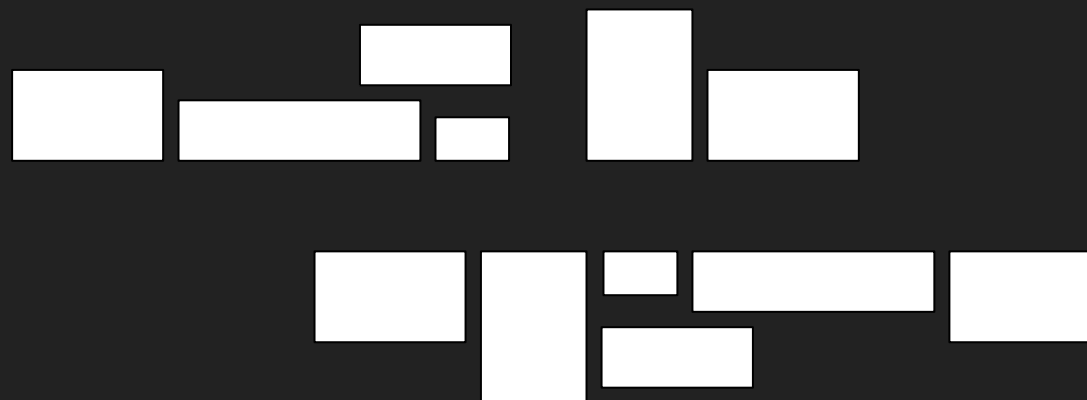


Gestalt principles

- ▶ Closure: groups of things that create shapes/forms are often perceived as whole forms



- ▶ Continuity: users tend to perceive curved or straight lines caused by alignment



Example: Gestalt principles in an application

- ▶ What are some examples of closure, proximity, continuity and similarity in the PowerPoint toolbar?



Supporting alignment: grid systems

- ▶ Act as a framework to organize elements in a logical way
 - ▶ Origins in print media
 - ▶ Increasingly common in web frameworks
- ▶ Grids vary in complexity
 - ▶ Can be challenging to build a grid for complex layouts
 - ▶ Even simple grids are useful to layout major components of designs



Vermont
Symphony
Orchestra

Winter 2007 Season	Aaron Copland The Tender Land January 2007	Eric Satie Gymnopedie 1, 2 February 2007
	01/12/07 Middlebury College Center for the Arts 8:00 pm	02/03/07 Johnson State College Dibden Center for the Arts 8:00 pm
	01/19/07 Johnson State College Dibden Center for the Arts 8:00 pm	02/10/07 Castleton State College Fine Arts Center 8:00 pm
	01/26/07 Lyndon State College Alexander Twilight Theater 8:00 pm	02/17/07 Middlebury College Center for the Arts 8:00 pm

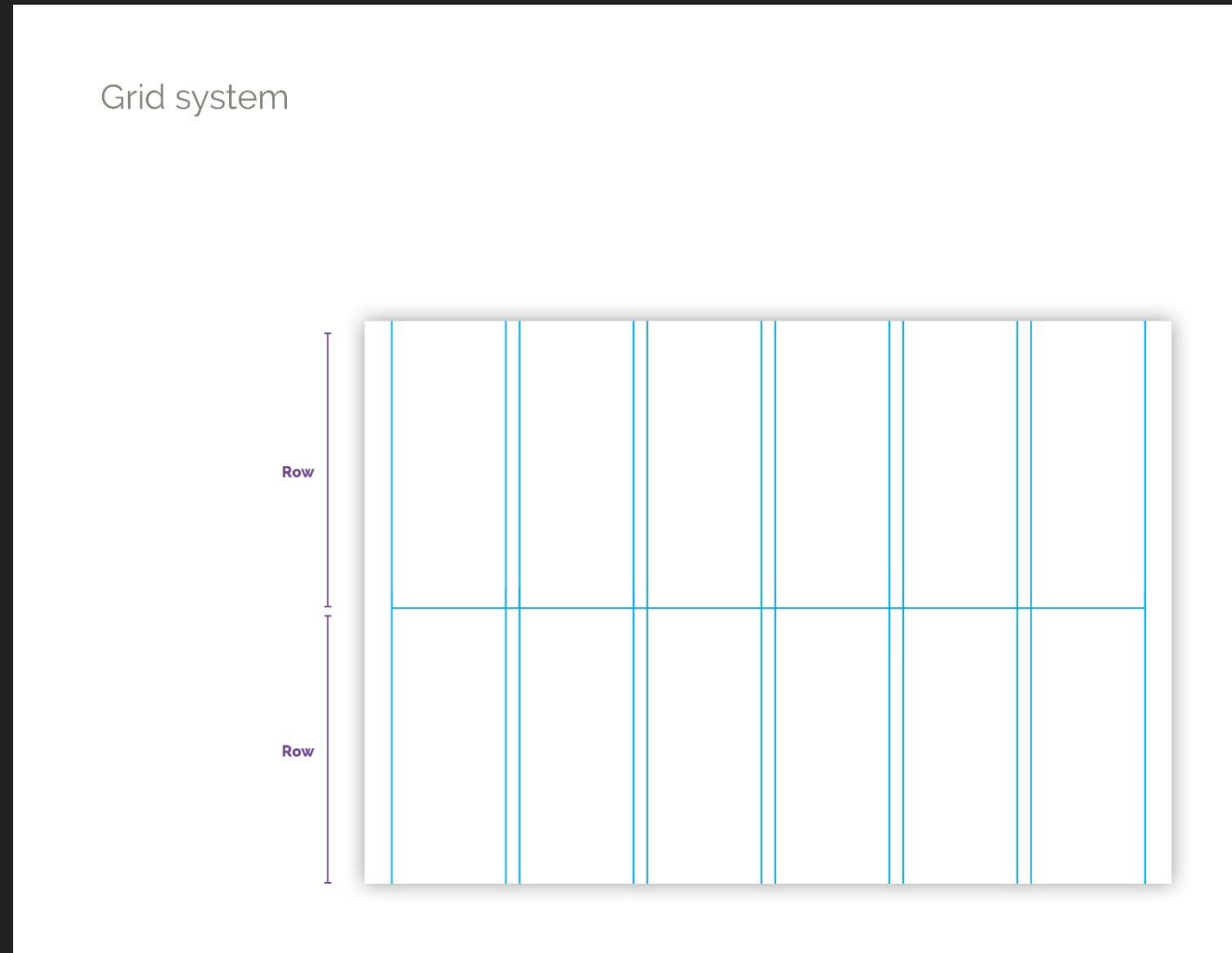
Source: wikipedia.com - Grid Systems

Grid system elements

Grid system



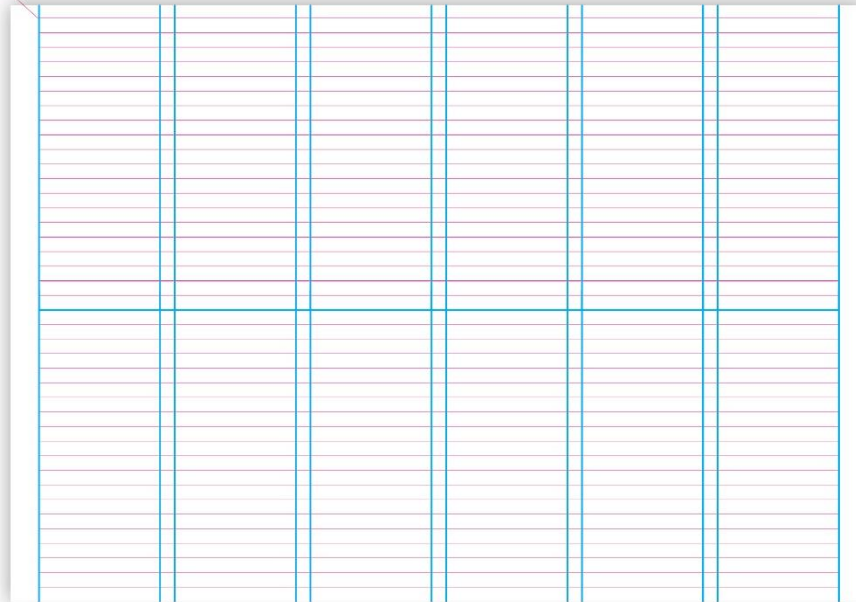
Grid system elements



Grid system elements

Grid system

Baseline grid



Grid system elements

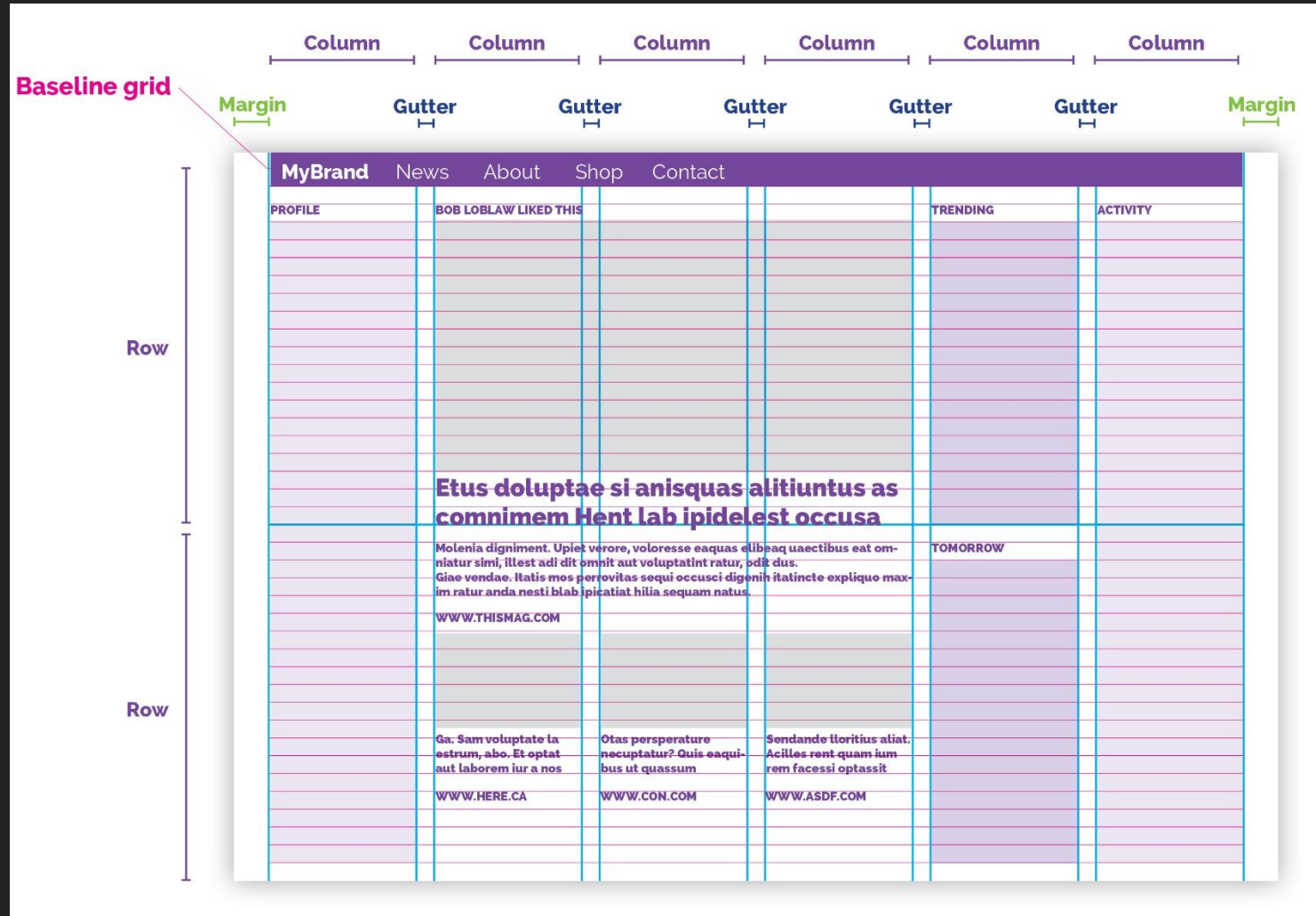
Grid system



Example of a website layout on this grid

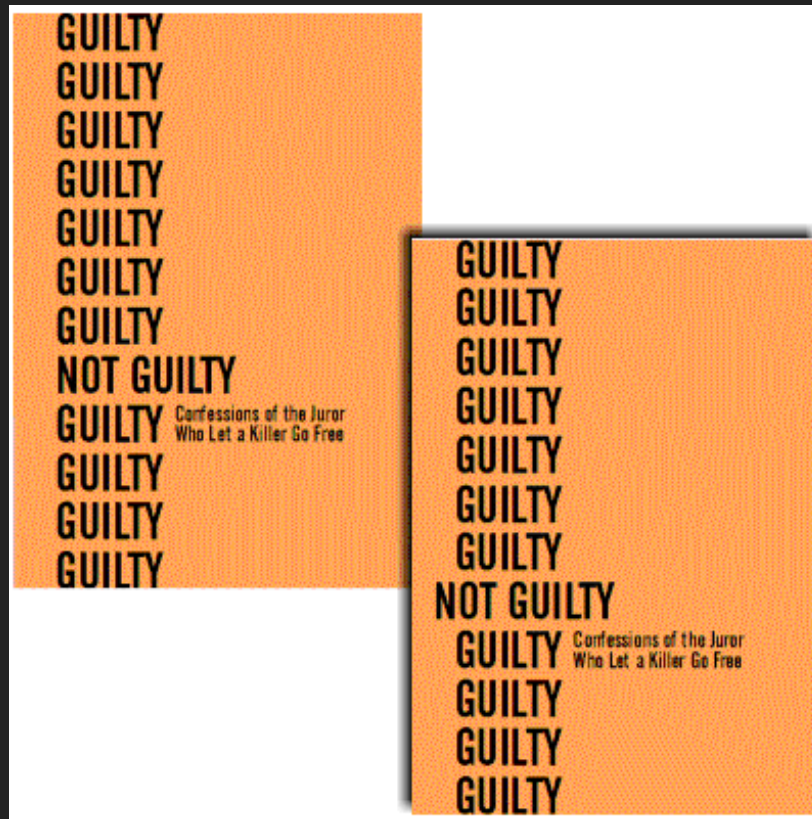


Different layout, same grid



Breaking alignment

- ▶ Misaligning items on purpose can be very effective.
- ▶ Compare:



from About.com. Desktop publishing.

Breaking alignment

- ▶ But when not done carefully, it just looks off.

I have this
really great grid
layout.

Grids make it easy to align
two blocks of text along a
shared baseline to create
balance.

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Positive vs. negative space

- ▶ Positive space: the space your objects occupy
- ▶ Negative space: the space between and around your objects.
 - ▶ Defines the content in the positive space
 - ▶ Defines focal points
- ▶ One common philosophy is to strive for a balance
 - ▶ Not too cluttered; not too empty

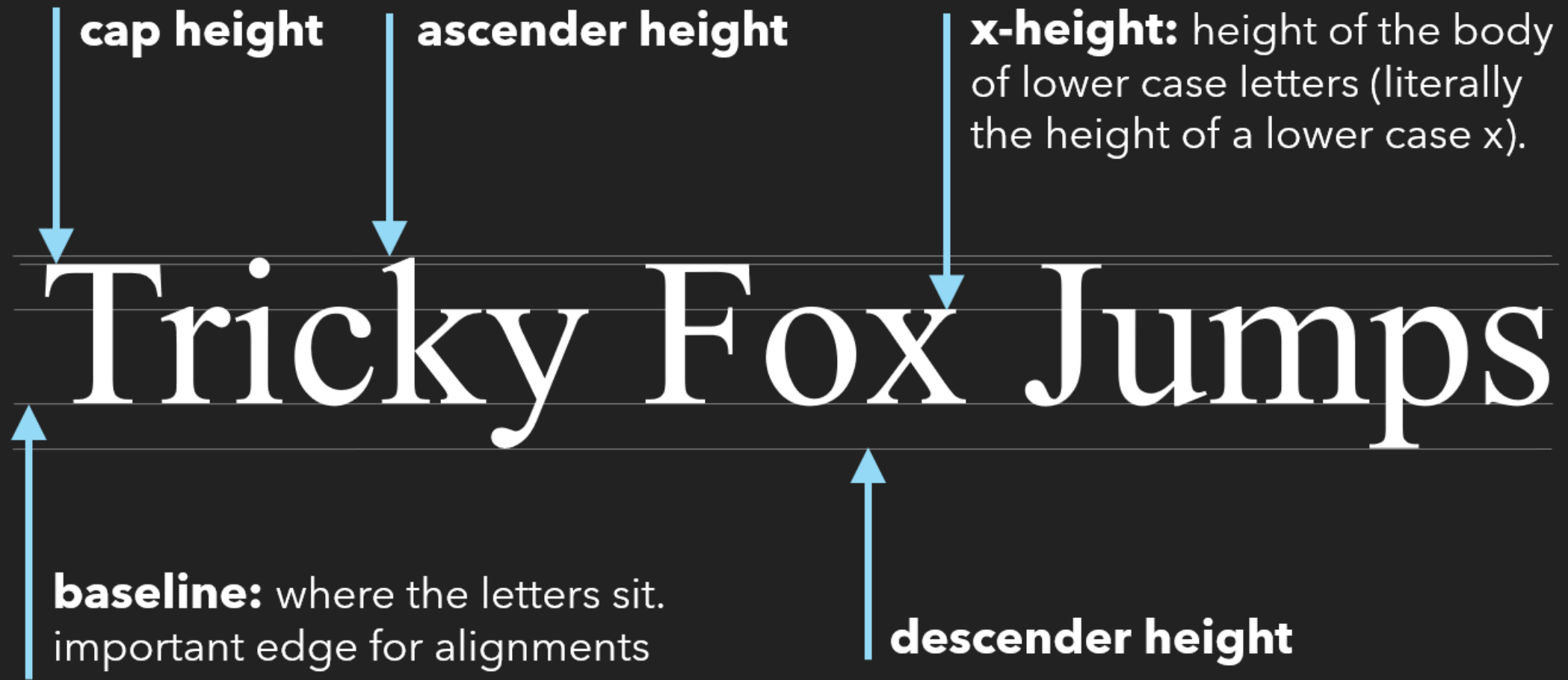
Positive vs. negative space when applying other concepts

- ▶ e.g., proximity only works if there is enough space between groups



- ▶ e.g., good alignment, grid use, visual hierarchy, all work best with consistent application of white space

Typography - some basic anatomy



Effects of x-height on legibility

- ▶ Variation affects apparent size, space efficiency, visual impact



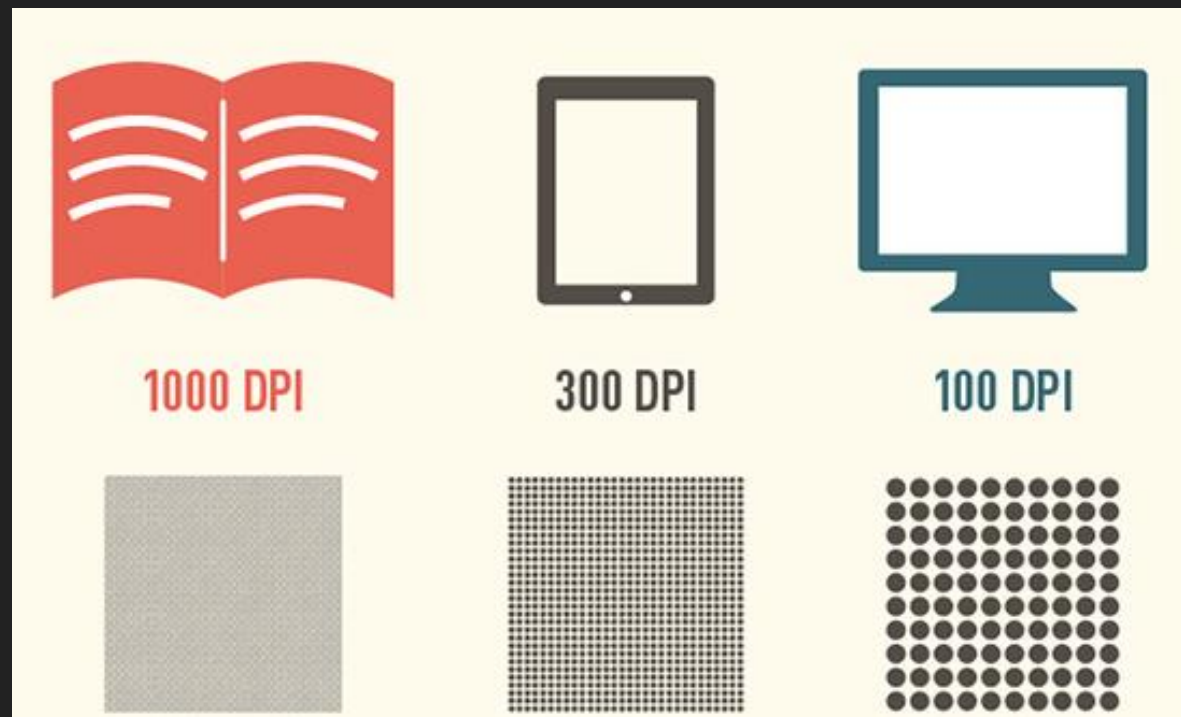
- ▶ Tall x-heights
 - ▶ Are often easier to read at small sizes
 - ▶ Double story letters are less compressed (e.g., e, a, s)
- ▶ But look bulky when large in small spaces (denser)
 - ▶ Letters with ascenders/descenders often suffer, because less differentiated from main body

Legibility vs. readability

- ▶ Legibility: how well you can make out individual letters in a font
 - ▶ 1ill vs. 1iIl rnm vs. rnm ?
 - ▶ Largely influenced by the design of the font itself
 - ▶ e.g., x-height, ascenders/descenders, serifs, ornament, etc.
- ▶ Readability: ease of understanding whole groups of text
 - ▶ poor setting can
make a *legible* font
unreadable
 - ▶ Influenced by the arrangement of whole groups of text
 - ▶ e.g., line spacing, measure, serifs

Legibility on web vs. print

- ▶ Detailed rendering of serifs can be affected by low resolutions
 - ▶ Sans serif are recommended for screens in general



Arguments for serif/sans Serif

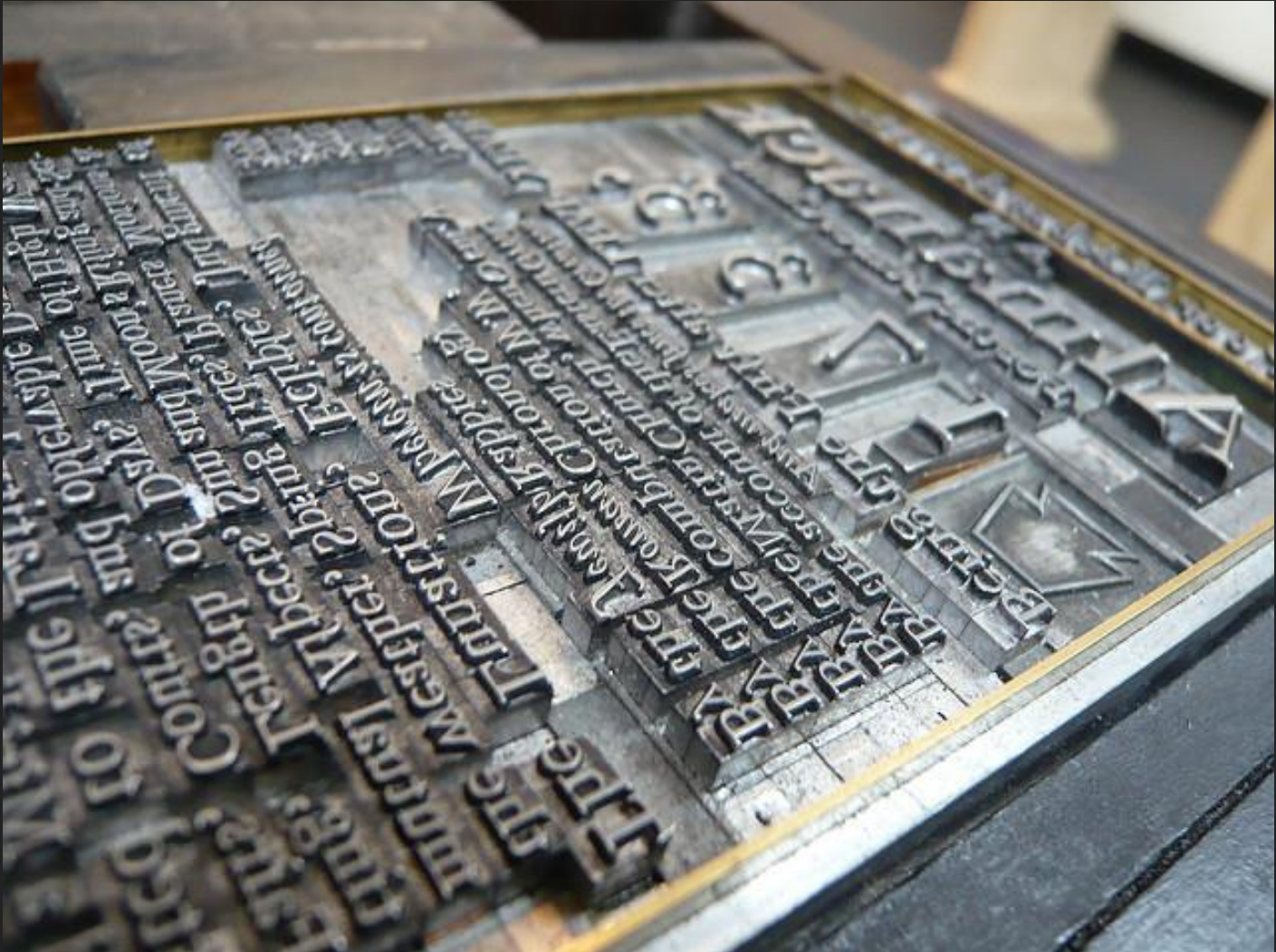
▶ Serif

- ▶ Guides the eye horizontally between letters
- ▶ Gives the eye something to hook onto and to makes seeing whole words easier
- ▶ Use serif when you have a lot of body text to reduce reading fatigue

▶ Sans serif

- ▶ Makes it easier to read small sizes on screens
- ▶ Better retains shape when blown up
- ▶ Use for emphasis and headings, body text onscreen

Lead blocks



Source: purdman1@flicker

Point size

- ▶ Measurement of point size is a historical precedent (72 pt = 1 inch)
- ▶ From when type was set on lead blocks, digitally, fonts are defined in a sort of imaginary box
- ▶ What you need to know: what maps to 12pt in one font will often vary for a different font



Point size: slightly larger than the distance between the highest ascender and the descender



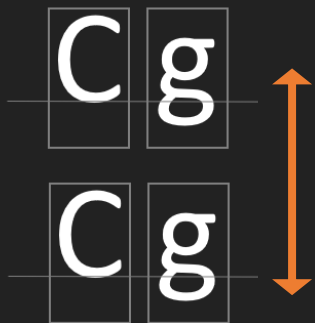
Calibri

Helvetica

Courier New

Typesetting: Line Spacing

- ▶ Standard spacing = 120% of point size
 - ▶ e.g., 10pt font would have 12pt spacing
- ▶ But different fonts at different sizes often needs adjustments
- ▶ And depending on the context and feeling you want to evoke, you may want to increase or decrease spacing



line spacing (leading): measured from baseline to baseline. Term 'leading' refers to the use of lead blocks to space letters in printing.

Typesetting: variations in line spacing

Designers play with line spacing in order to create distinctive layouts. Reducing the standard distance creates a denser typographic color - while risking collisions between ascenders and descenders. . . Expanding the line spacing creates a lighter, more open text block.

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Typesetting: line length / measure

- ▶ Line length: length (width) of a line of text on the page
- ▶ Measure: line length in characters per line

Shorter lines are generally easier to read than longer lines.

Because long lines break up the readers rhythm and they are more likely to lose their place when the eye starts the next line.

- ▶ Aim for something in the middle (that feels easy to read)
- ▶ For reading: 63 characters (+- 7)

So which font do I use?

Common heuristic: maximum 3 fonts

- ▶ Use other visual cues to distinguish further, e.g.,
 - ▶ Different sizes for different headings

HEADING 1

HEADING 2

HEADING 3

- ▶ Mixing of CAPS and Sentence case
- ▶ **Bold** and *italic* for emphasis
- ▶ Color to communicate **similarity** and **difference**

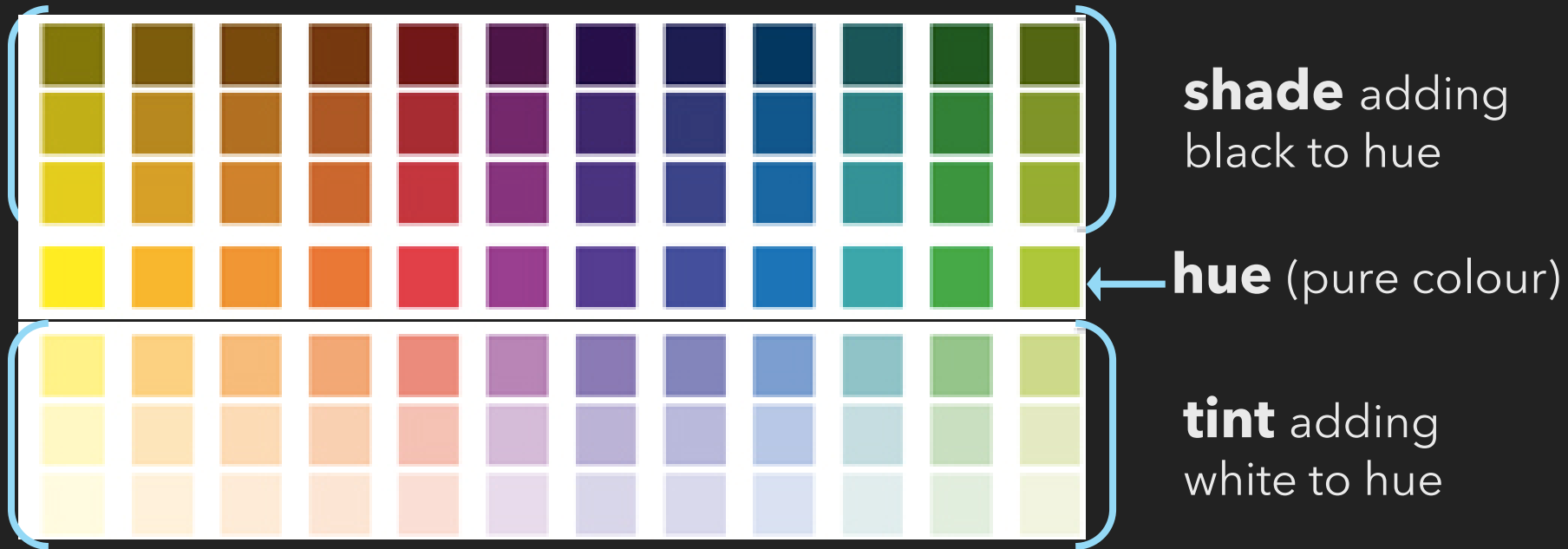
So which font do I use?

- ▶ Consider your constraints
 - ▶ What types of elements do you have?
 - ▶ How much space do you have?
 - ▶ What's the context and/or technology (web vs. mobile)?
- ▶ Choose a font and typeset it to:
 - ▶ Balance good legibility / readability
 - ▶ Achieves the look / feel / personality you that want

Color in visual design

- ▶ Color has many uses in design, which include :
 - ▶ Creating visual cues and hierarchy
 - ▶ Conveying feeling, style

Very basic color theory

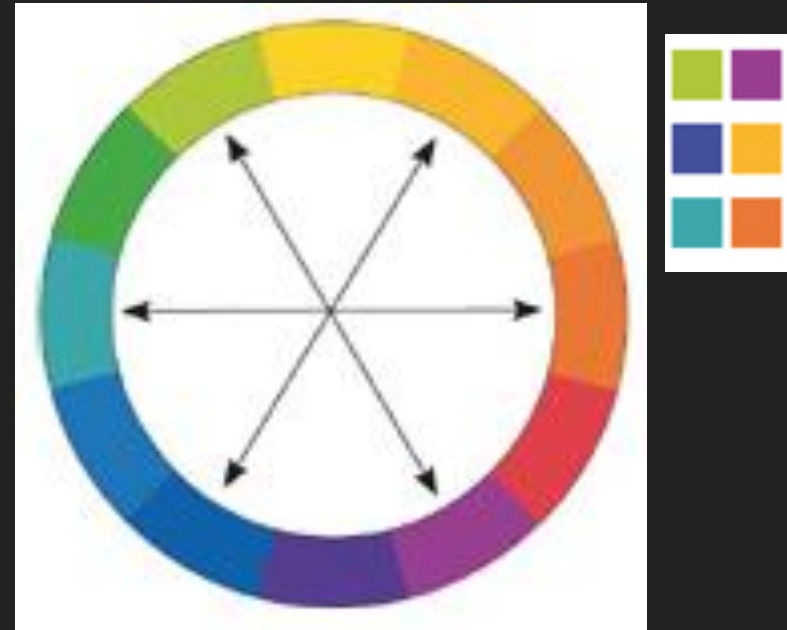
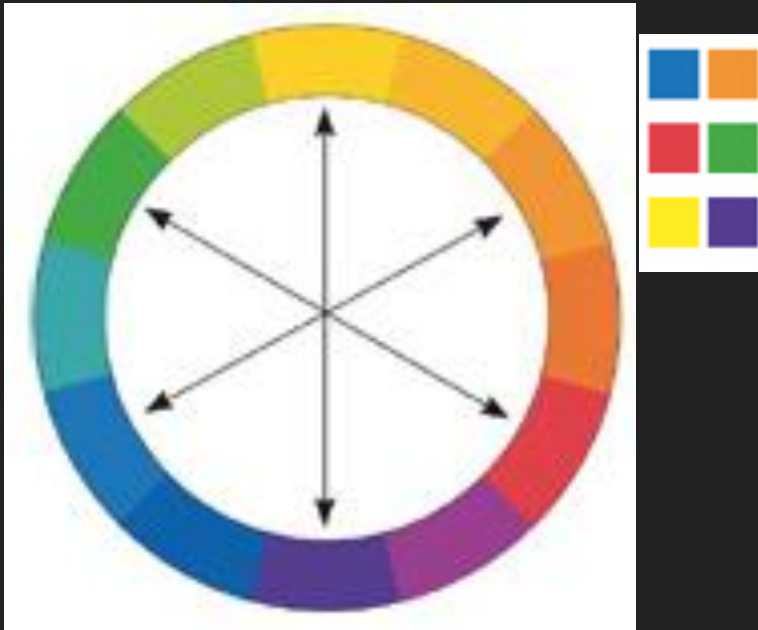


even though this shows discrete colors
... it's really a continuous gradient (infinite colors from white to black)

image from Williams (2008). The non-designer's design book

Color relationships

- ▶ Complementary colors: are a good place to start
 - ▶ Work best in as a combination of main color/accent
 - ▶ But are hard to read when used as text on background



Combinations of colors

- ▶ Most color combinations can look good together
 - ▶ The key is to vary the contrast to enhance readability
 - ▶ To increase contrast, you can adjust shade/tint of colors that bump into one another



This is pretty
hard to see



This has some
contrast

Guidelines for choosing colors

- ▶ Limit your palette – use what you need;
 - ▶ Think about what you intend to communicate with color! Make purposeful decisions to:
 - ▶ Communicate information or hierarchy
 - ▶ Evoke certain emotions or feelings
 - ▶ e.g., calm and warmth
 - ▶ e.g., edginess and tension
 - ▶ e.g., energy and excitement

Guidelines for choosing colors

- ▶ Use color-blind safe colors
 - ▶ Always for critical information
 - ▶ <http://colorbrewer2.org>
 - ▶ When color is the only way to distinguish the content
- ▶ Less important to avoid common color-blind combinations if multiple visual cues distinguish same content
 - ▶ e.g., showing changes in stock prices

0.08%	↑ 0.08%	↑ 0.08%
0.90%	↓ 0.90%	↓ 0.90%

Choosing colors resources

- ▶ Color index books



- ▶ Color blind simulators: <http://www.vischeck.com/>
- ▶ Color advice for maps and data: <http://colorbrewer2.org/>

Practicing good visual design

- ▶ Good design
 - ▶ Is invisible
 - ▶ Requires making tradeoffs
 - ▶ Is not just a matter of preference
 - ▶ There are right ways to approach the problem
 - ▶ You should be able to justify any element in your design