

# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation!

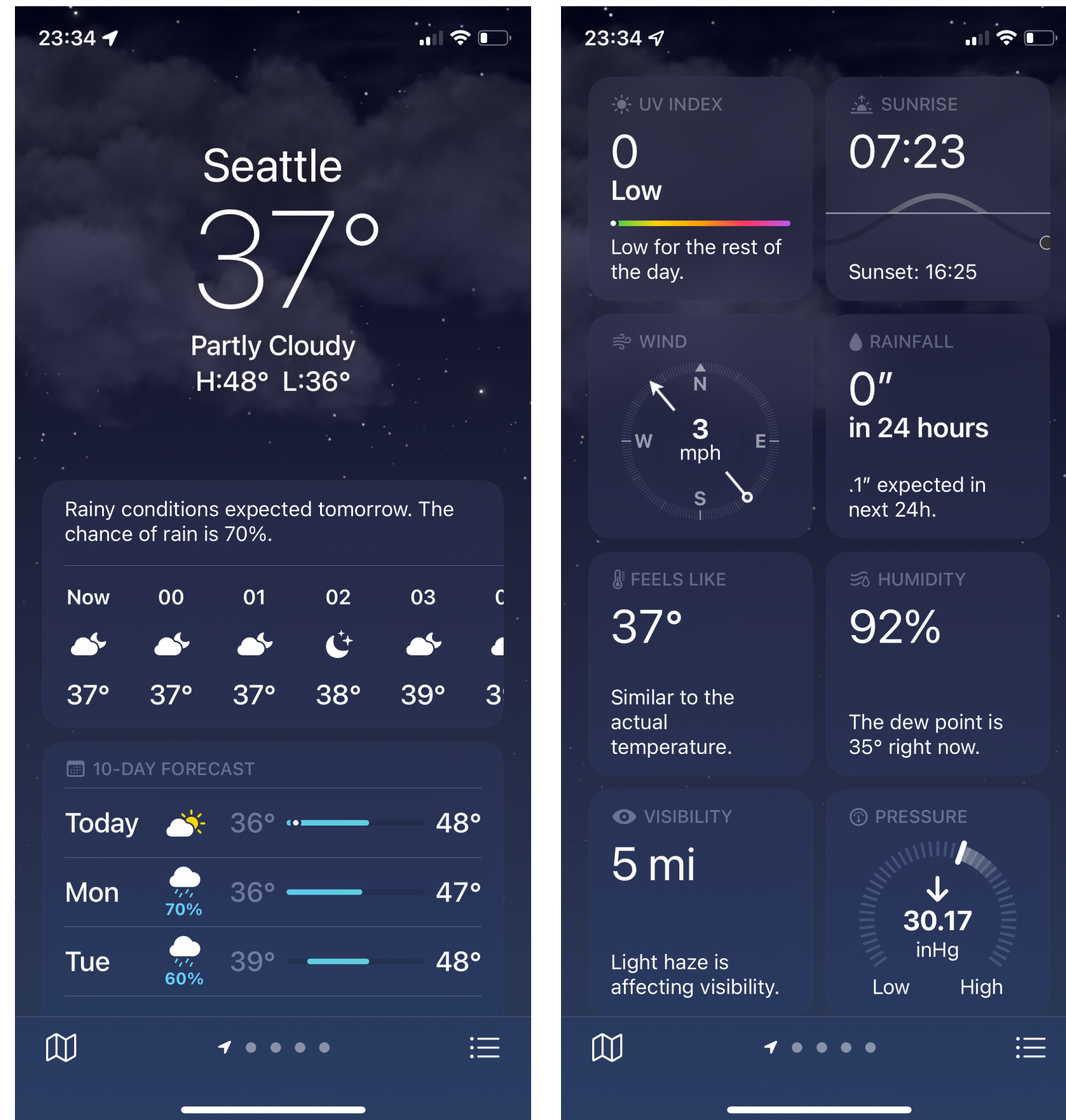
### Lecture 15: Visual Design

# Today's Topics

- UI Hall of Fame and Shame
- Visual Design
  - Graphic Design Principles
  - Gestalt Principles
  - Color
  - Typography
- Team work time on 3c: Usability Testing (due 11/29) and 3d: Preliminary Digital Mockup (due 12/2)
  - Both are due after break, but we encourage you to get started early!

# UI Hall of Fame and Shame

# Hall of Fame or Shame?



iOS 15



iOS 14

# Visual Design

# Why now?

Unlike most of the design principles we've covered so far, we're now delving into graphic design.

*How much space should I put between these items?*

*What color scheme should I use?*

*How many fonts should I use?*

You should not be thinking about these questions until you get to digital mockups! Your paper prototype cannot answer these questions.

**These tips apply equally to your final poster and your digital mockup!**



graphic design is my passion

NO...



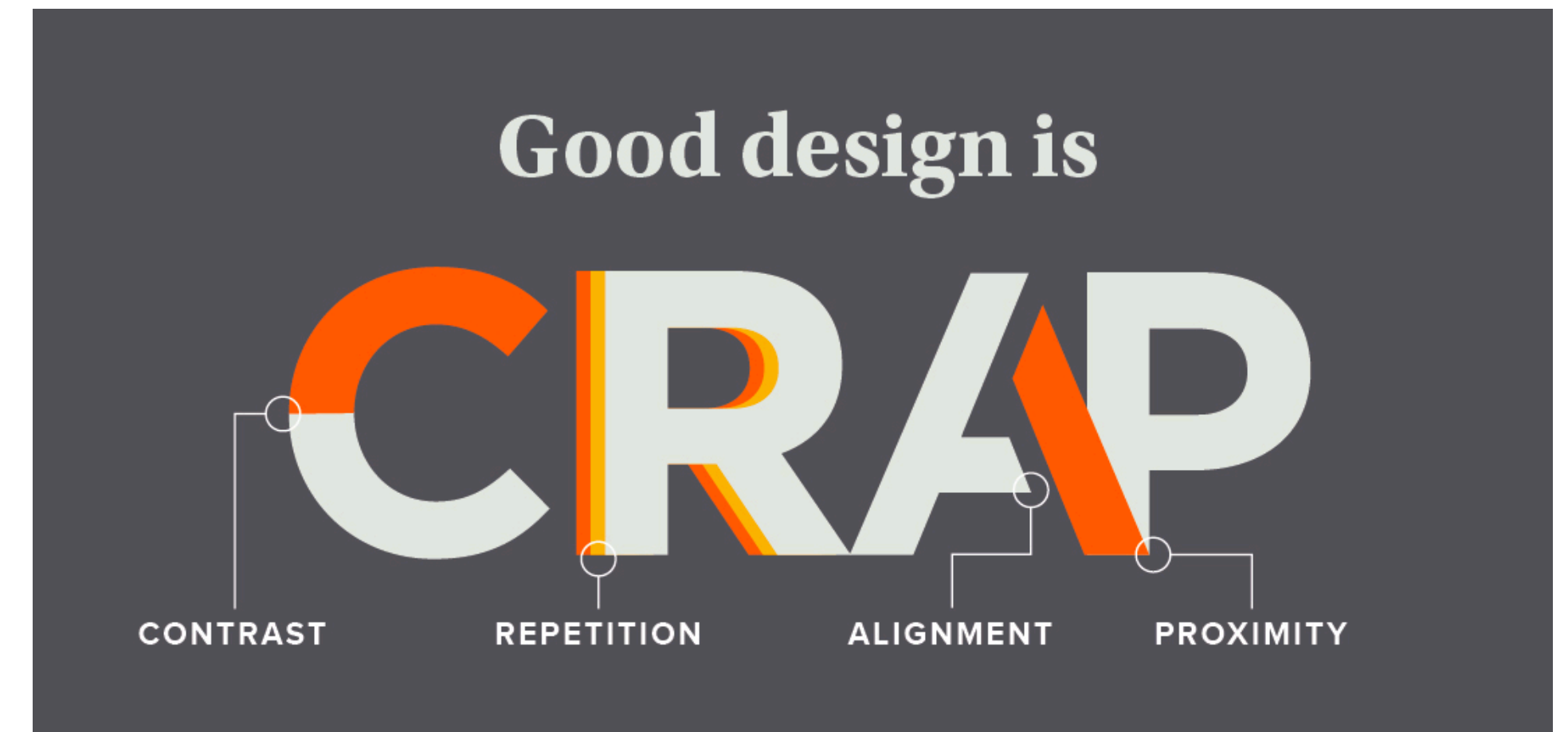
graphic design is **OUR** passion



# Graphic Design Principles

# C.R.A.P. Design Principles

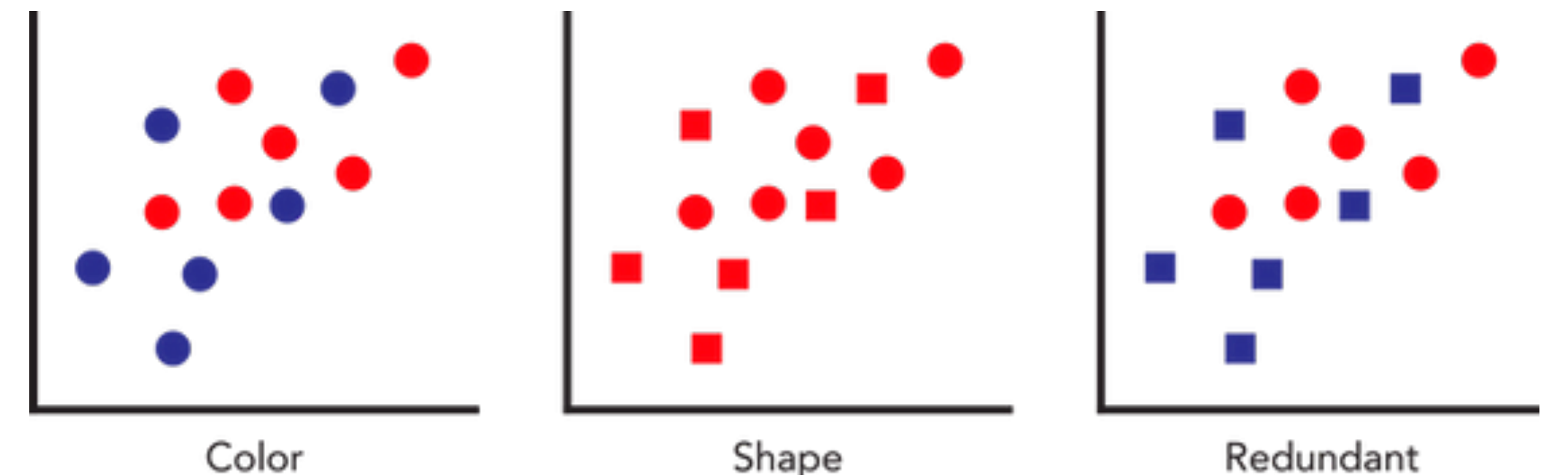
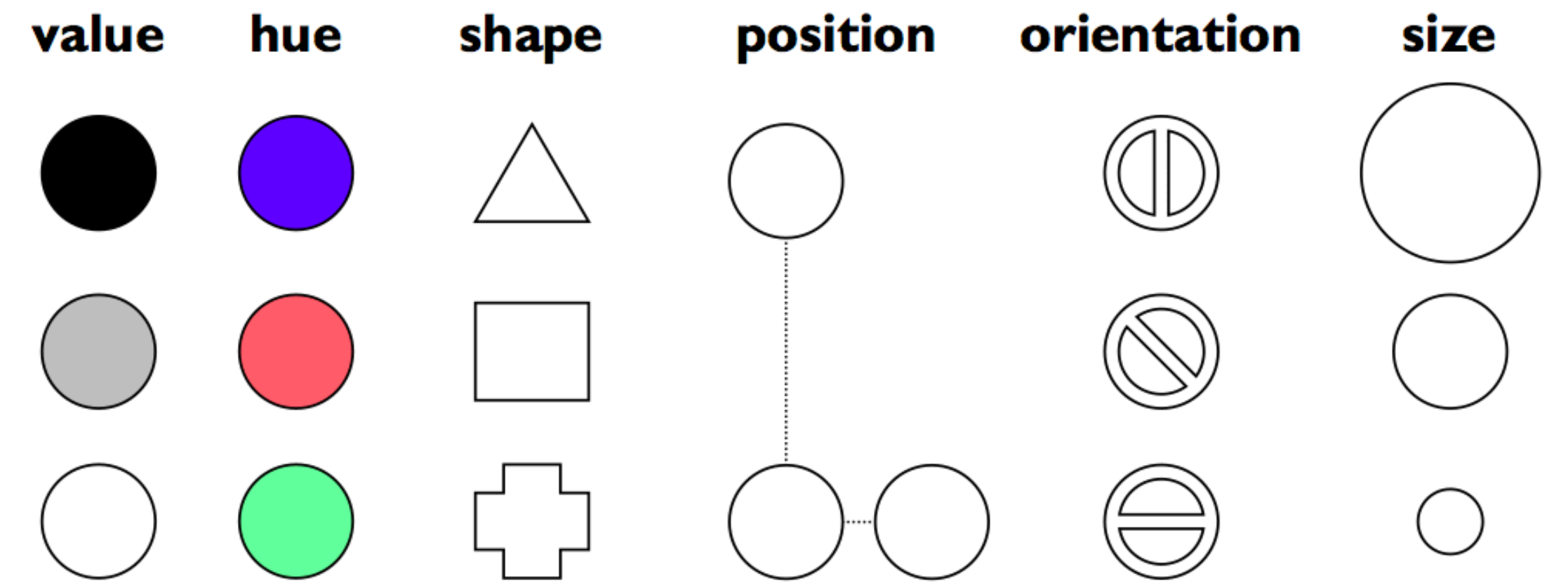
- A main goal of design is *simplicity*. By following these principles, we reduce inessential features until we're left with something that is easier to learn and faster to use.
- **Contrast:** Imply a difference in meaning by a difference in style
- **Repetition:** Repeat visual elements to create unity and cohesiveness
- **Alignment:** Align elements to create visual connections and unity
- **Proximity:** Group related elements, put unrelated things far apart



# Contrast

- **Contrast:** imply a difference in meaning by a difference in style
- Visual objects have several visual dimensions
- Elements that are meant to be the same should not look “slightly different”
  - Unimportant differences reduce simplicity and increase confusion
- Elements that are not the same should look very different
  - Perhaps along multiple dimensions — this is called redundant coding

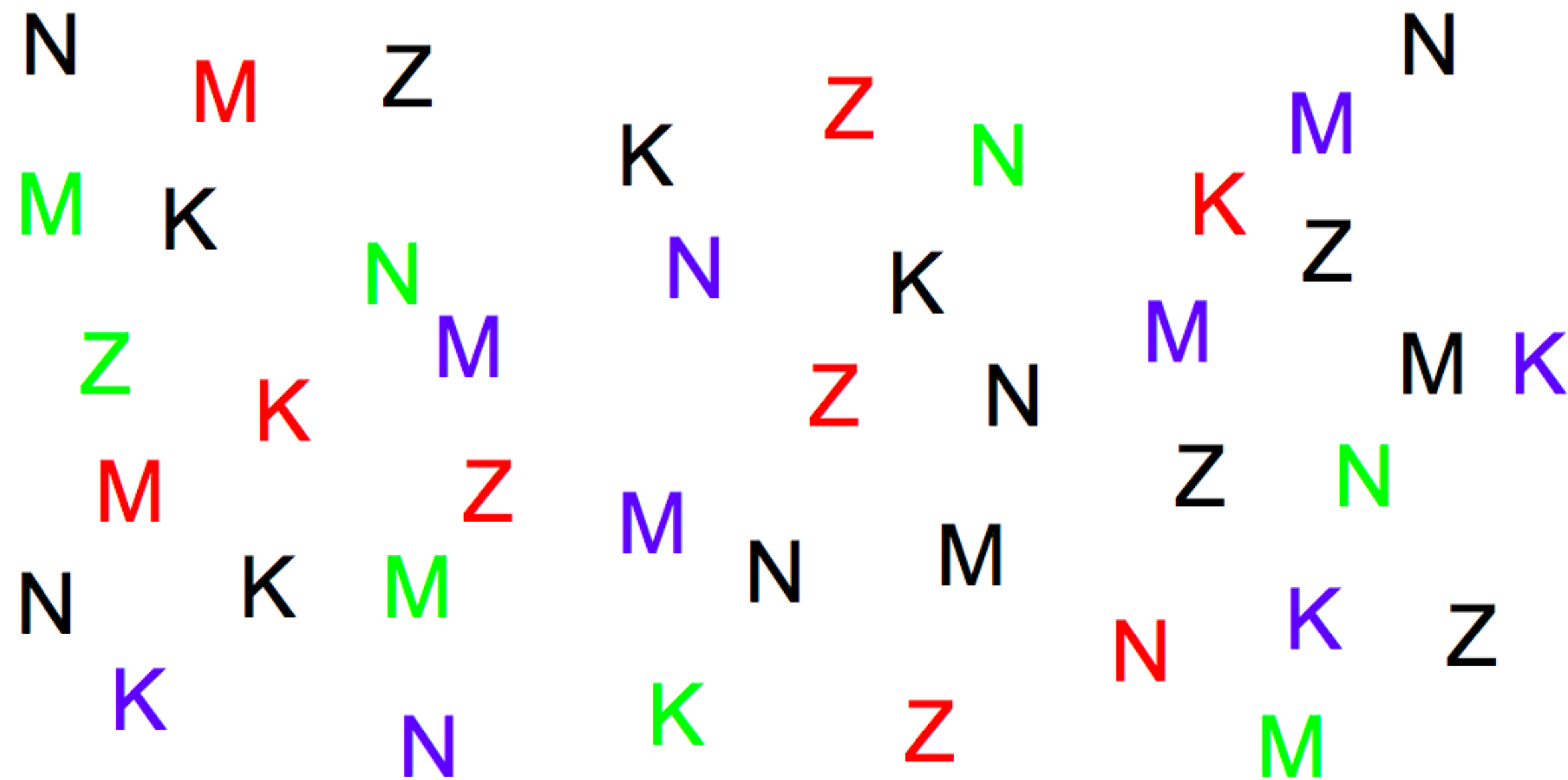
## Six Visual Dimensions



# Visual Variables and Perception

- **Selectivity**: the degree to which a single level of the variable can be selected
  - E.g.: value, hue, position, orient, size
- **Associativity**: how easy it is to ignore the variable
  - E.g.: all variables but size and value
    - These are **dissociative** since they interfere with your ability to perceive other variables
- Selectivity and associativity are not mutually exclusive!

# Visual Variables and Perception

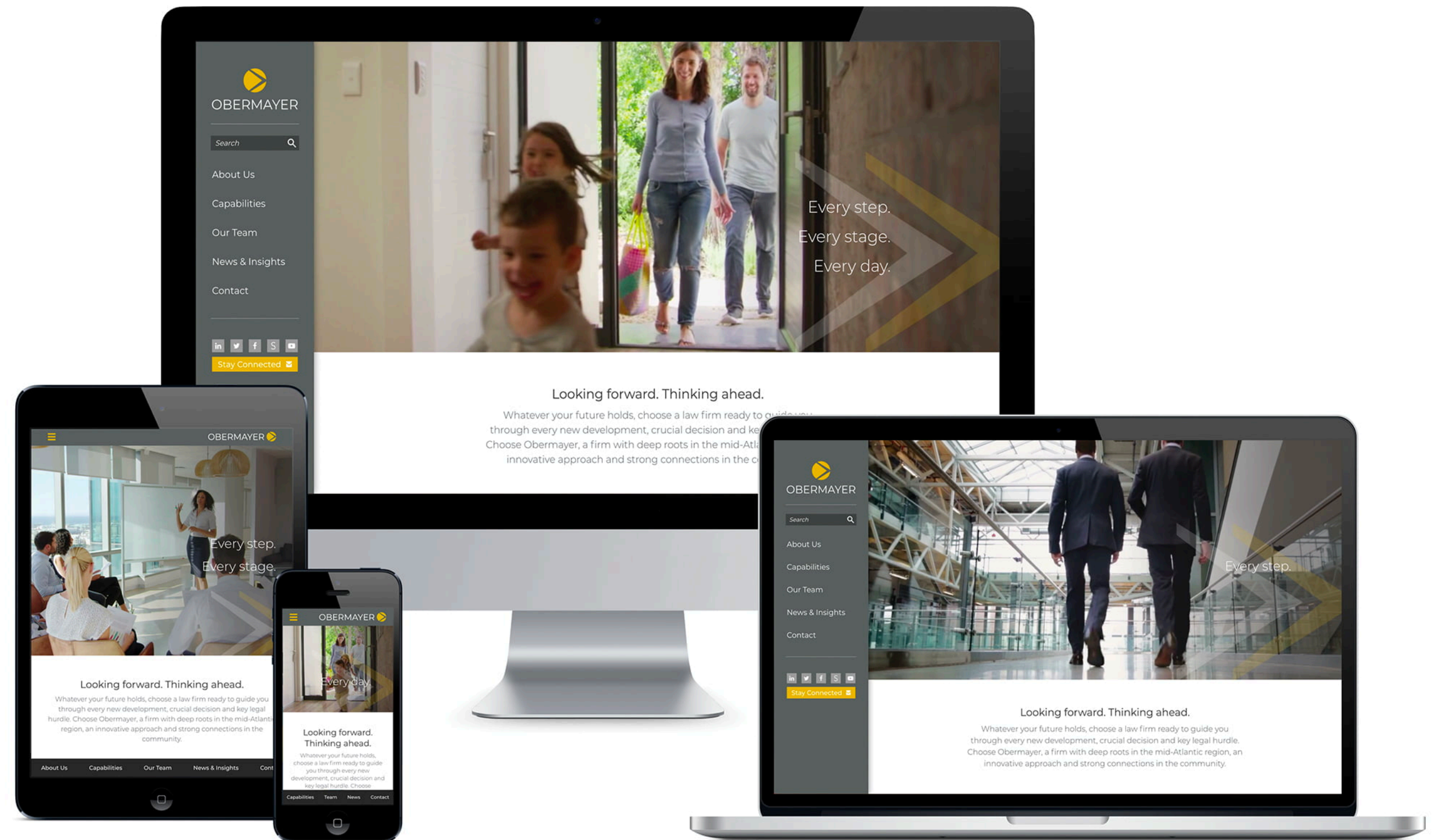


- Find all the letters on the left edge (**position**)
- Find all the red letters (**hue**)
- Find all the K's (**shape**)

Which of these questions were easy to answer and which were hard? The easy ones are **selective** visual variables.

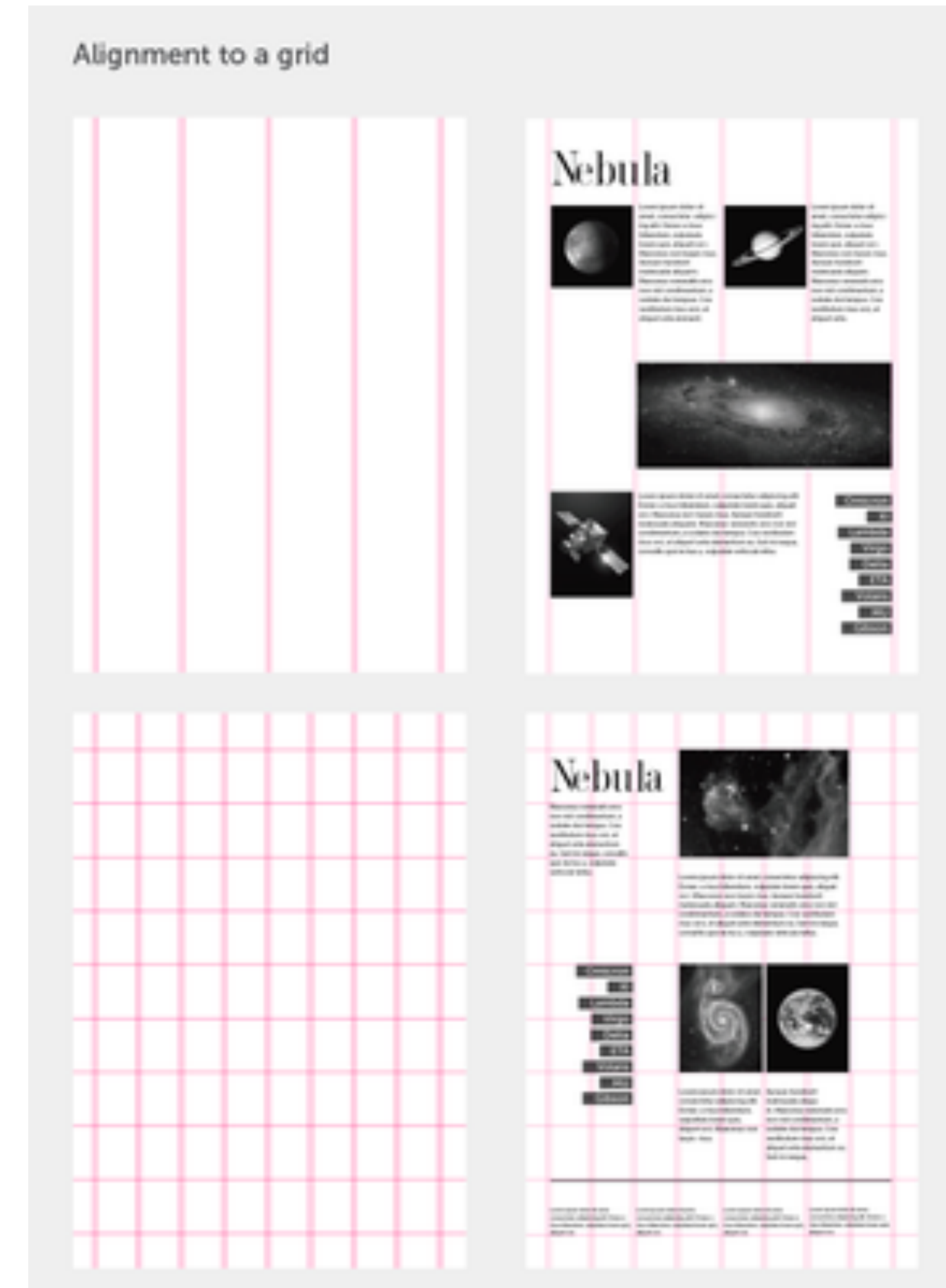
# Repetition

- **Repetition:** repeat visual elements to create unity and cohesiveness
- Good candidates to repeat: color palette, typefaces, graphic styles
- Where contrast is about showing differences, repetition is about subtly using elements to make sure the design is viewed as being part of a larger whole.
- Be wary of too much repetition!



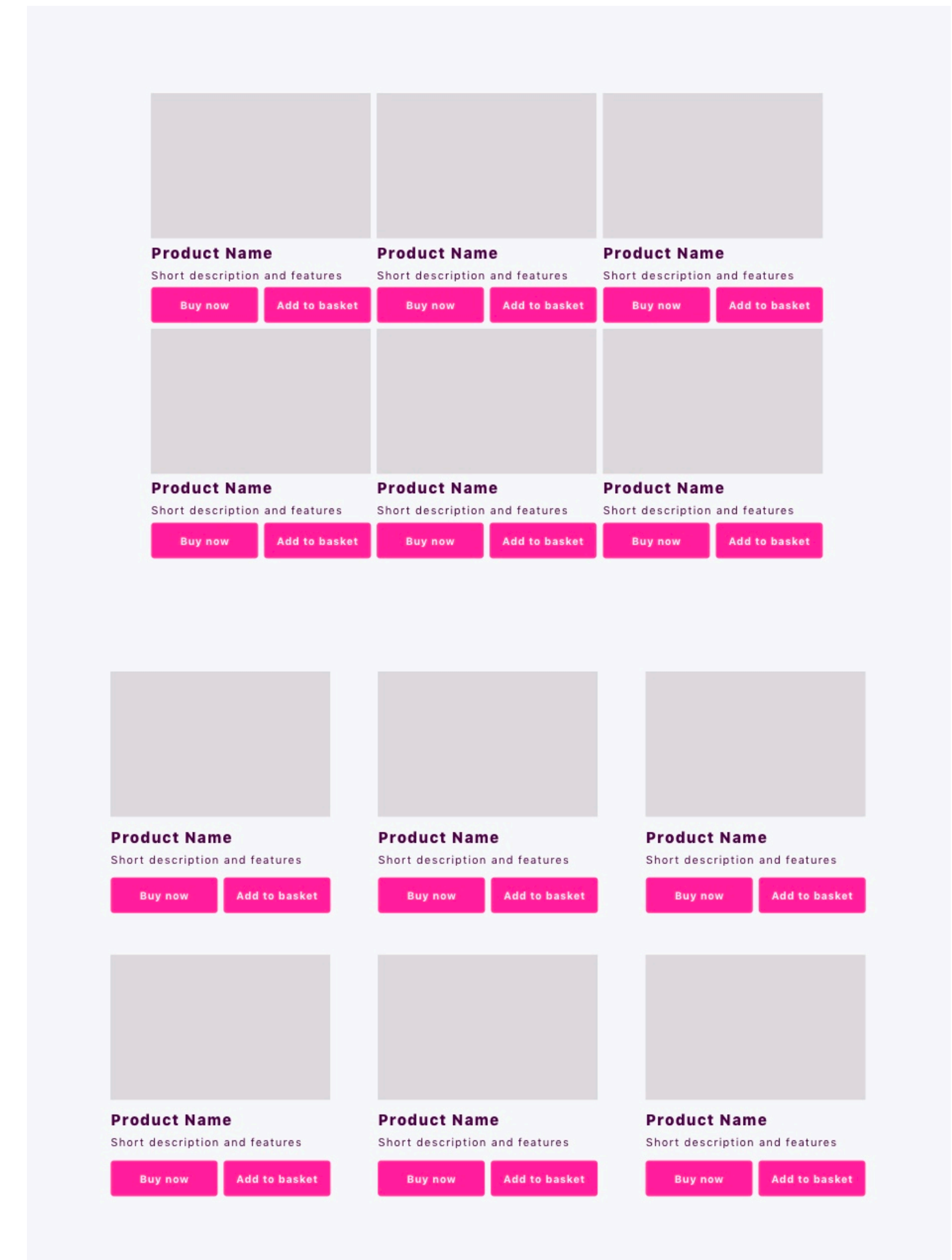
# Alignment

- **Alignment:** align elements to create visual connections and unity
- Nothing should be placed on a page arbitrarily
- Columns within a page make it easier to scan horizontally
- Grids are very useful for achieving good alignment. This will give your design a clean, well-organized look.



# Proximity

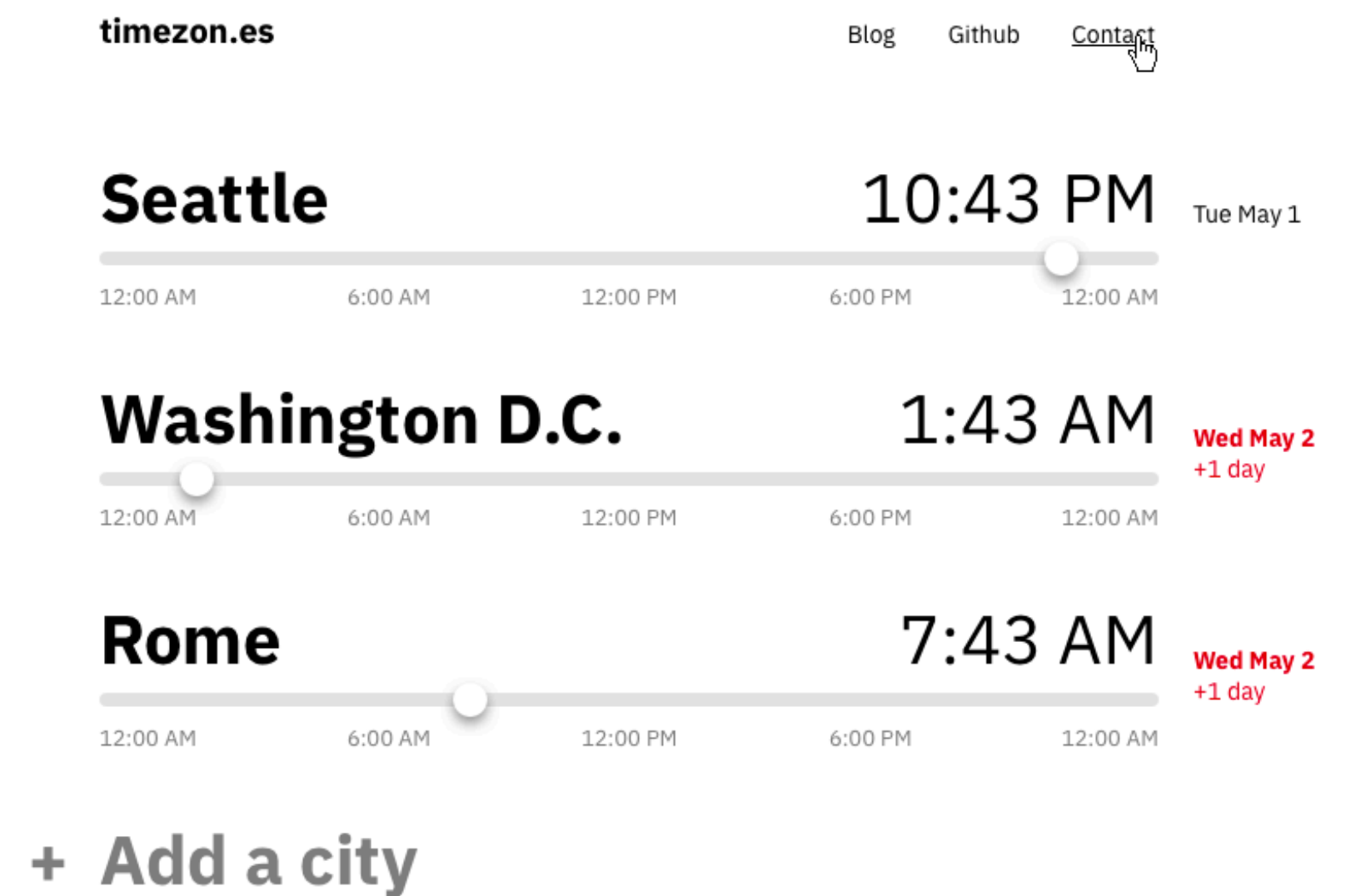
- **Proximity:** group related elements, put unrelated things far apart
- Group related items together to create a visual unit rather than separate items
- Keep space between unrelated items
  - Users should not be confused or have to work hard to figure out a relation
- Be aware of unintentional groupings





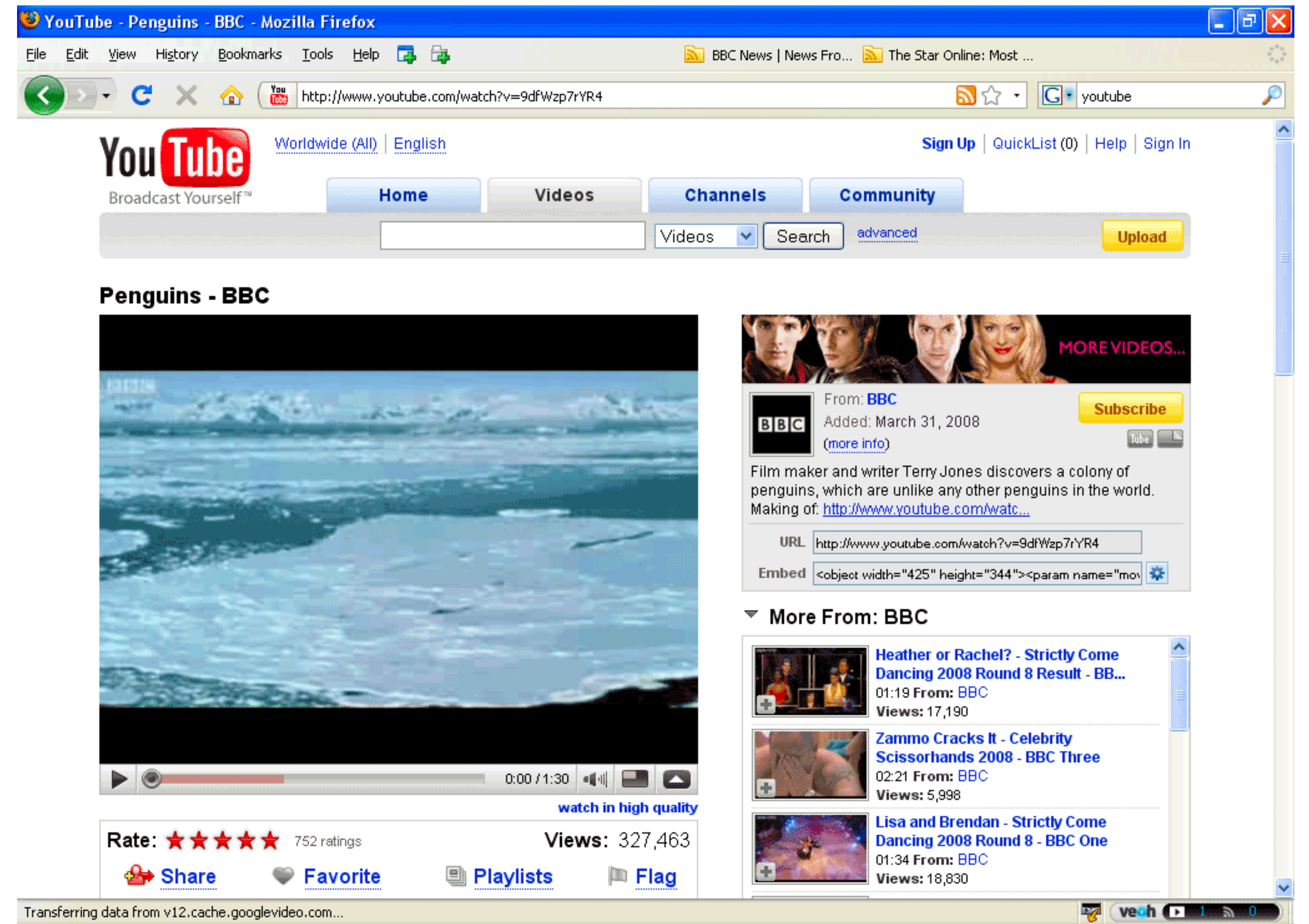
# Test for Simplicity

- Use the “**squint test**” to simulate how you interpret a design at a glance - close one eye and squint the other.
- What stands out? Is it what’s actually important in your design?



# Activity (Part 1)

- Provide a critique of this interface using the **C.R.A.P. design principles** (contrast, repetition, alignment, and proximity) - Q1
- Write your answers here, but don't submit yet: <https://tinyurl.com/cse440-lecture15activity>
- We will answer the other questions later on!



# Gestalt Principles

# Gestalt Principles of Visual Perception

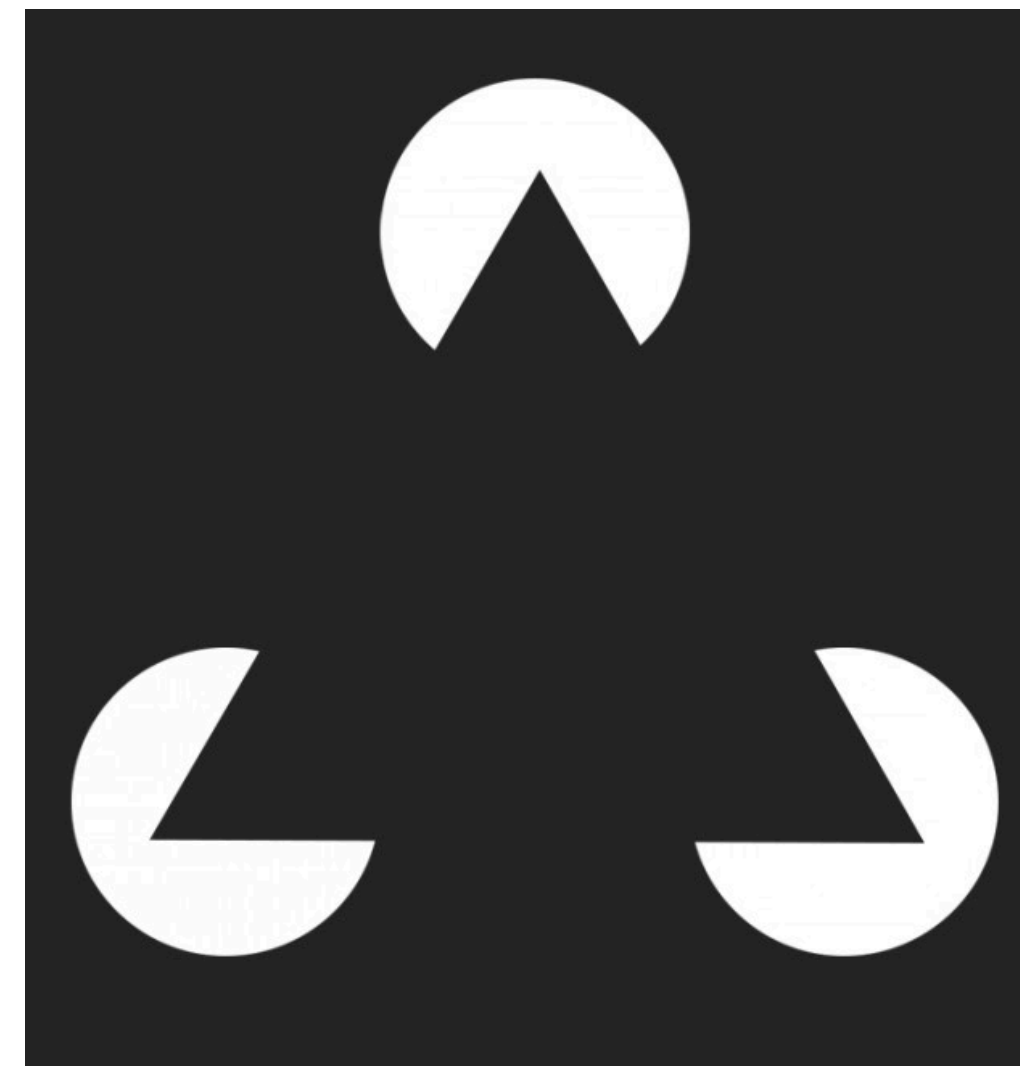
**Gestalt theory:** the human brain simplifies and organizes designs that consist of many elements, by subconsciously arranging parts into an organized whole, rather than just a series of disparate elements.

Our brains are built to see **structure and patterns** in order for us to better understand the environment that we're living in.

Following Gestalt Principles helps us convey **meaning at a glance.**

# Gestalt Principles

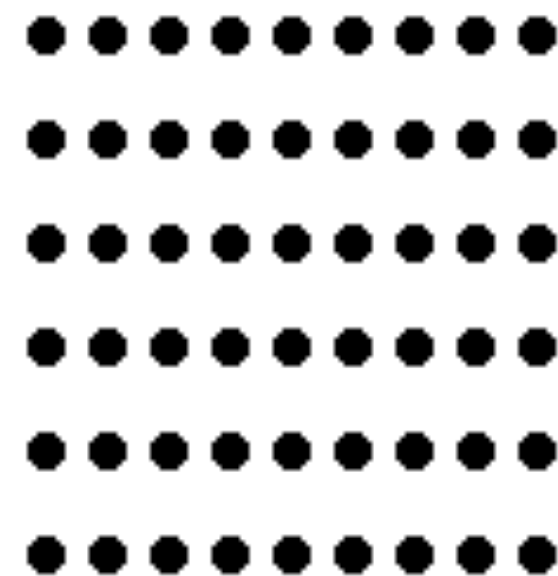
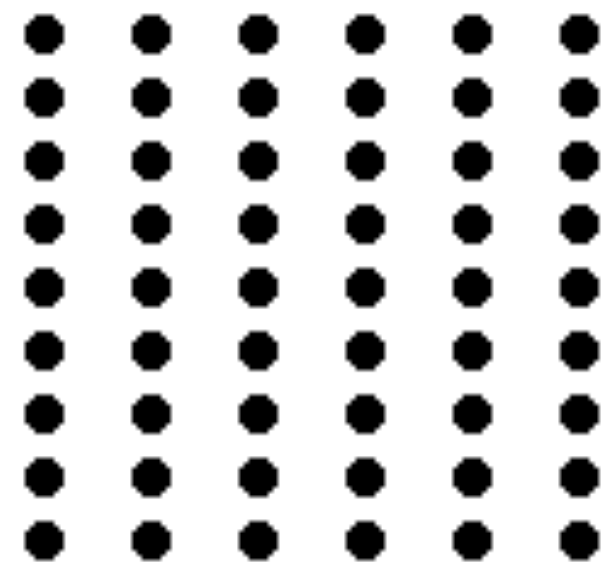
We fill in broken lines and create continuities guided by recognition



# Gestalt Principles

**Proximity:** objects close to each other are perceived as grouped

Already covered in C.R.A.P.!



## Using Lies in Research

By Nate Bolt · March 8, 2011

While it might be an uncomfortable topic, uncovering the lies behind a product or interface can be one of the most effective ways to turn ailing projects around.

[Read More](#)

## Considerations for Mobile Design (Part 2): Dimensions

By David Leggett · March 1, 2011

In part two of this series, David helps readers adapt their design regimes to the (typically) small screens of mobile devices. Using responsive design, our experiences adapt to a variety of conditions.

[Read More](#)

## A Simple, Usable Review

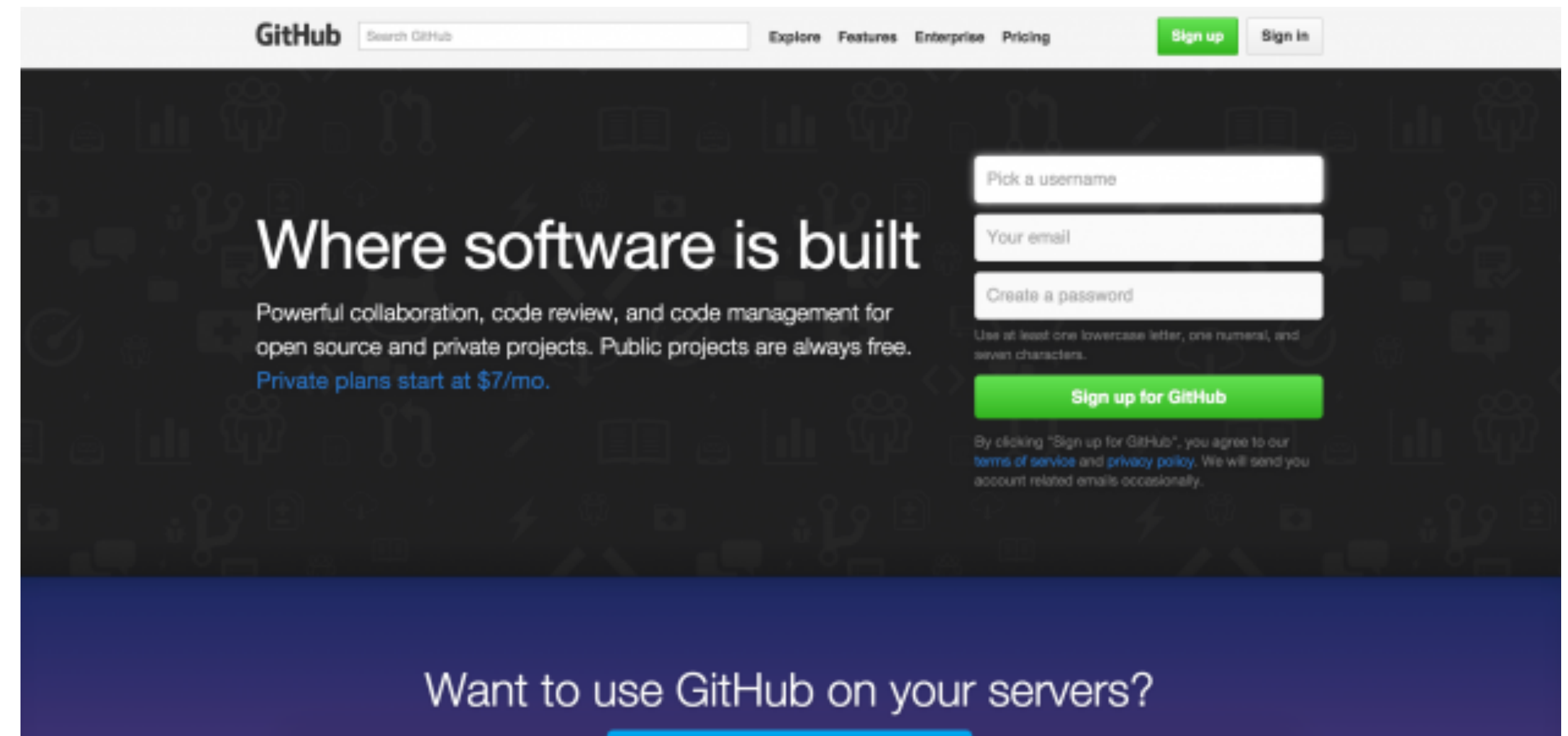
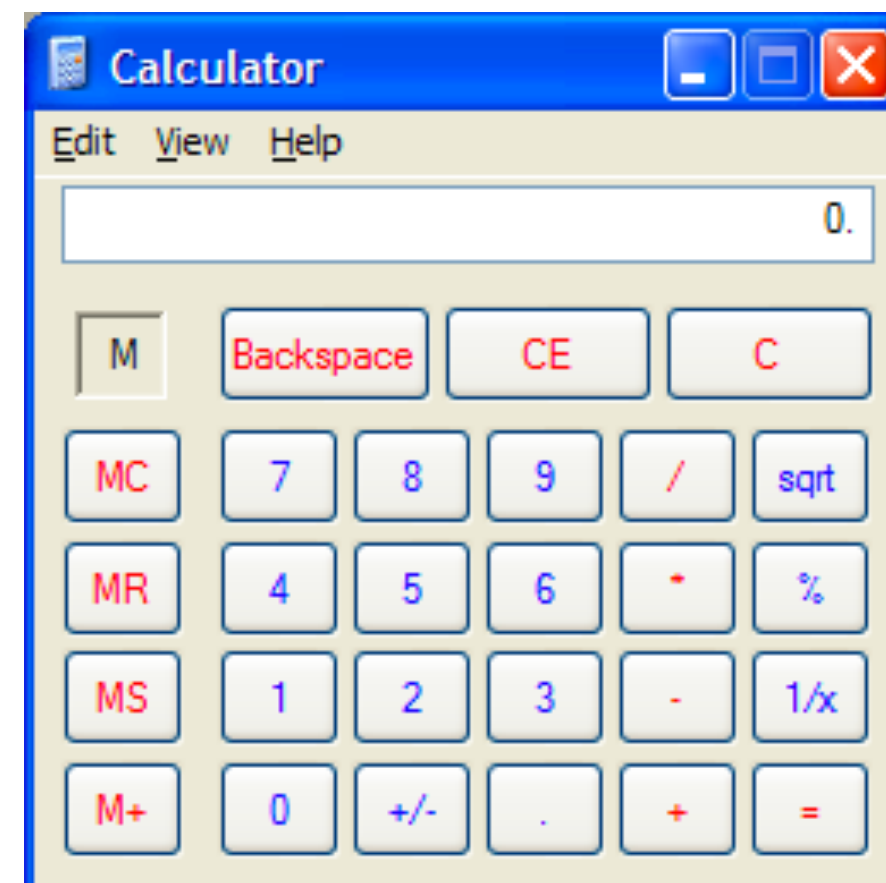
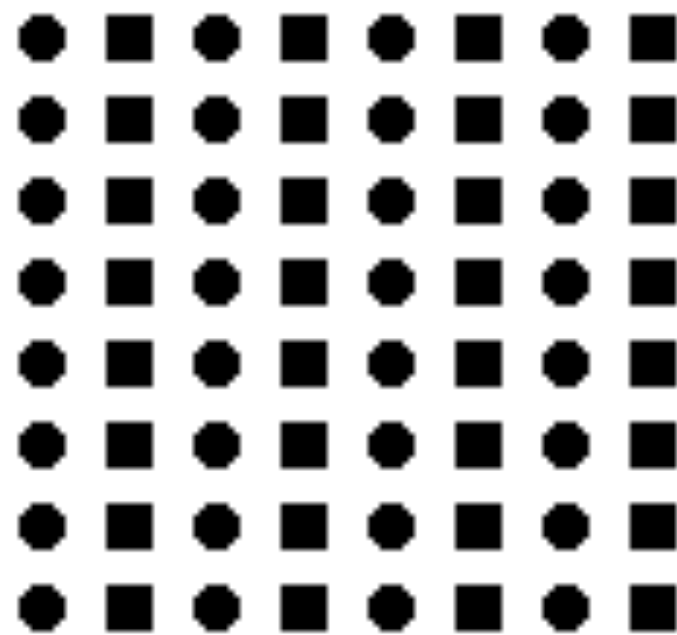
By Paul Seys · February 24, 2011

In this detailed review, Paul Seys describes an up-and-coming UX title that's jam-packed with lessons for designers both new and established. Follow along to learn how author Giles Colborne's teaches his readers the essence of great design.

[Read More](#)

# Gestalt Principles

**Similarity:** objects that are similar form a group  
(related to contrast in C.R.A.P.)



# Gestalt Principles

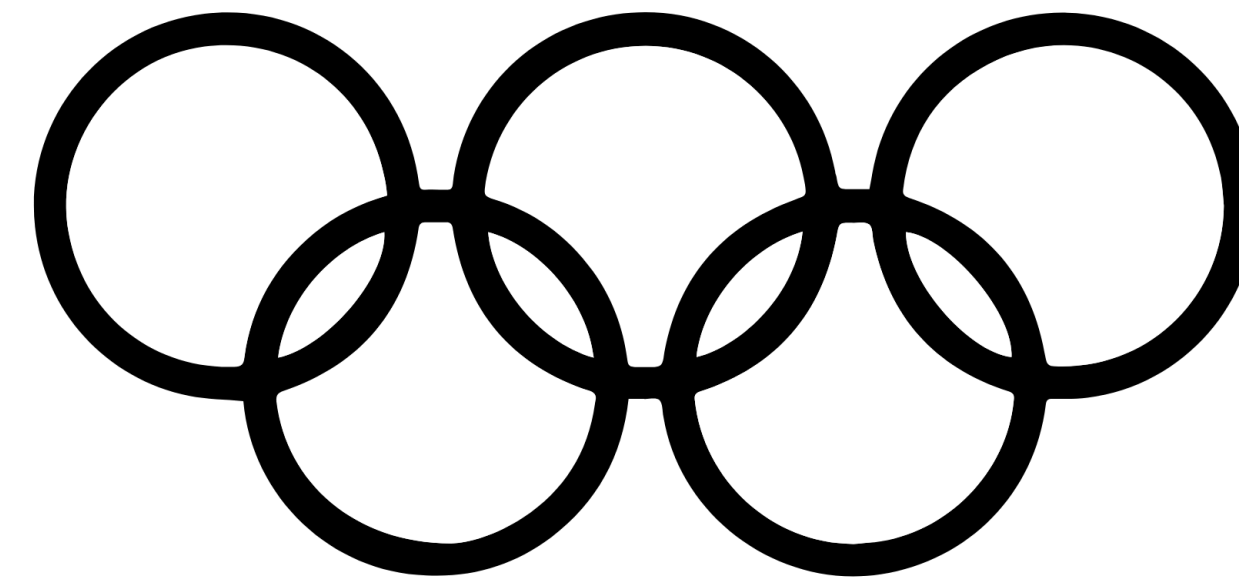
**Closure:** even incomplete objects are perceived as whole





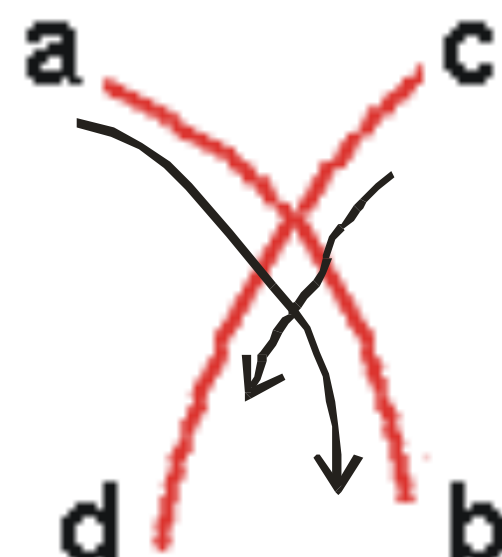
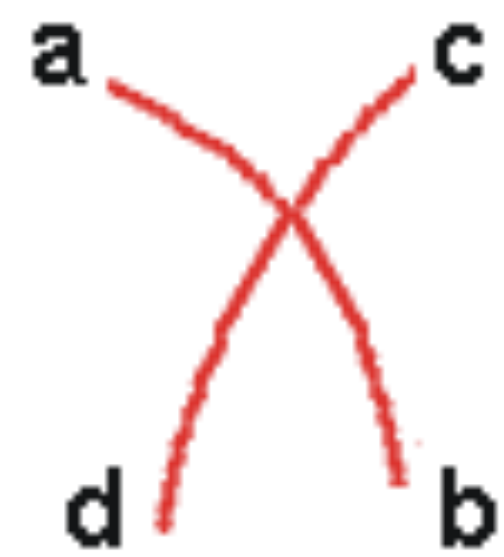
# Gestalt Principles

**Symmetry and Order:** objects are perceived as symmetrical and forming around a center point

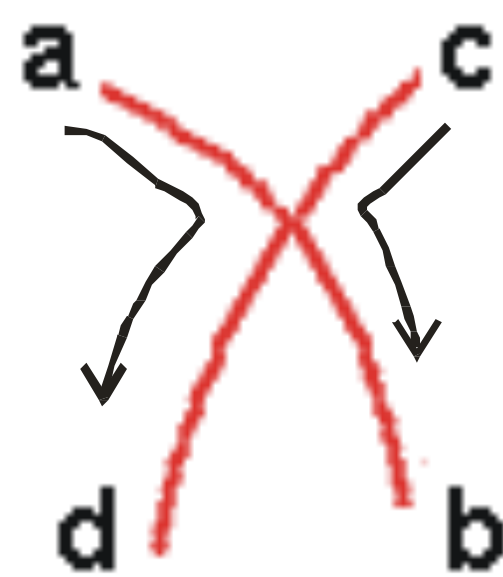


# Gestalt Principles

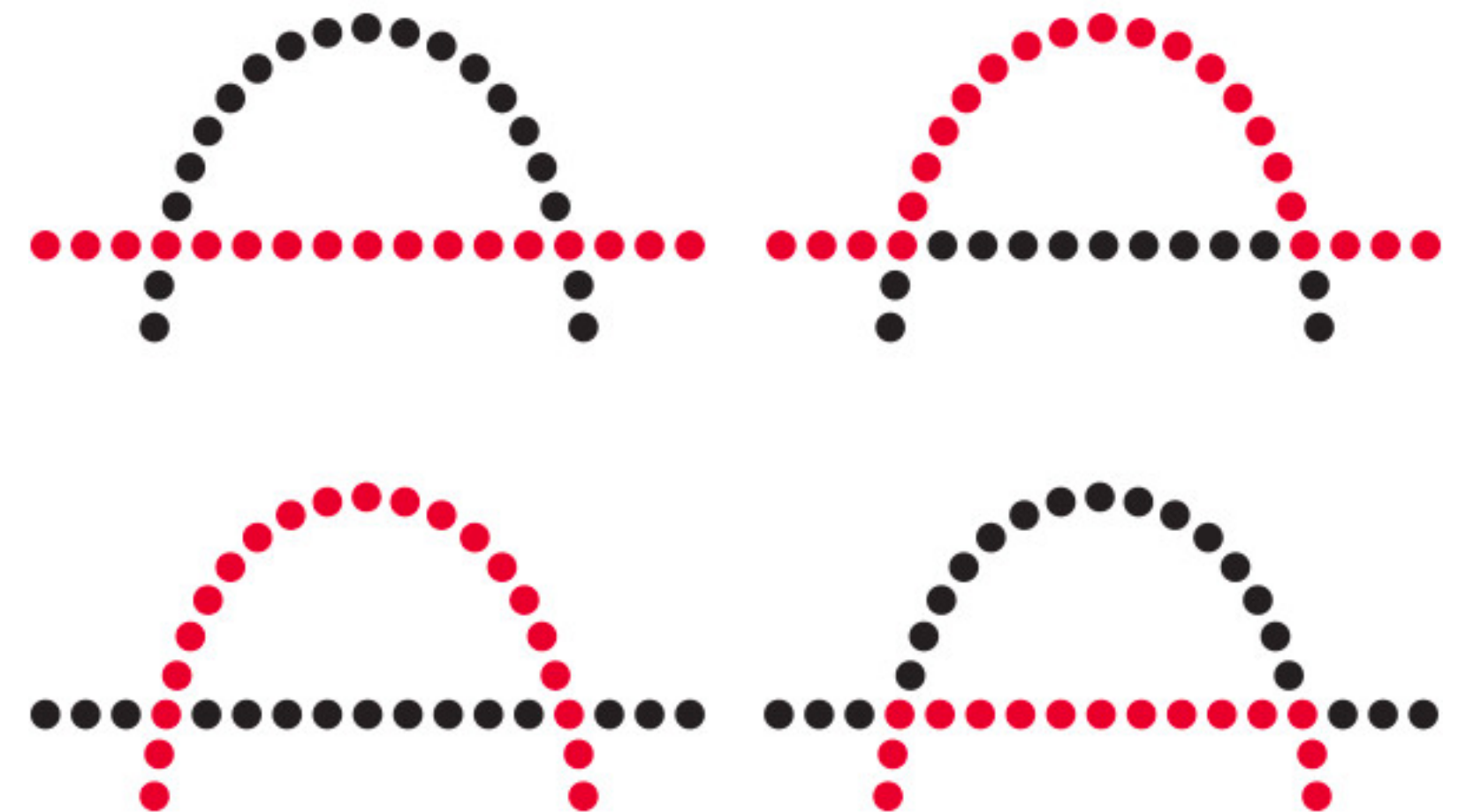
**Continuity:** objects are perceived as grouped when they align



what most people see



not this



# Negative Space

- Use **negative space** (also known as white space) for grouping, instead of lines
- Use margins to draw your eye around a design
- Don't crowd controls together
- Crowding creates spatial tension and inhibits scanning

Section

Start:   Include Endnotes

Page Number

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Restart at 1

From Top:

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Columns

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Spacing:

Line Numbers

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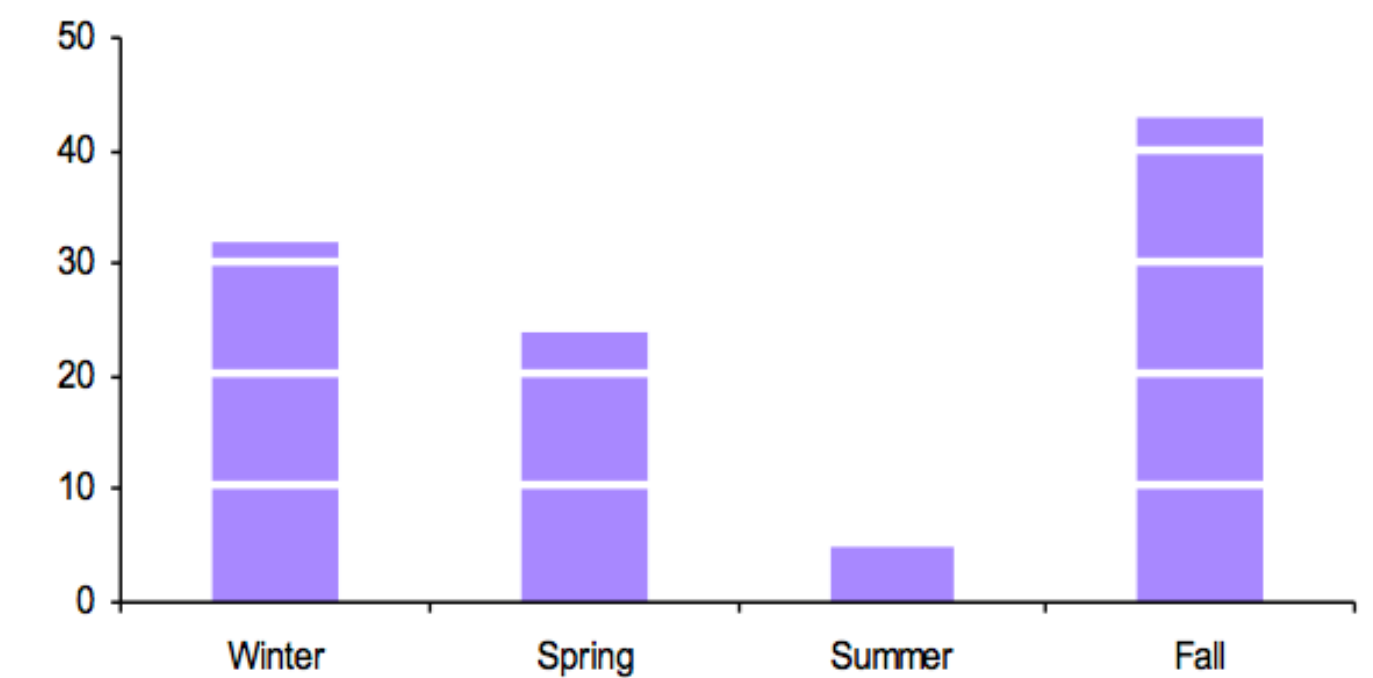
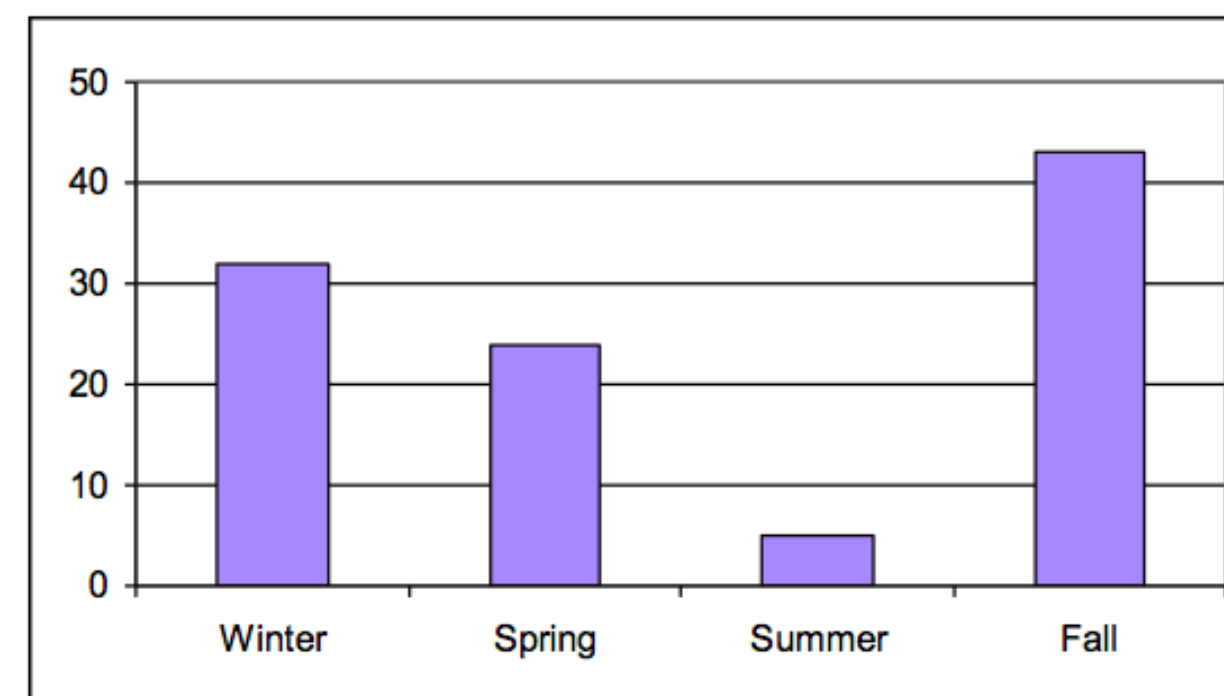
From Text:

Header/Footer

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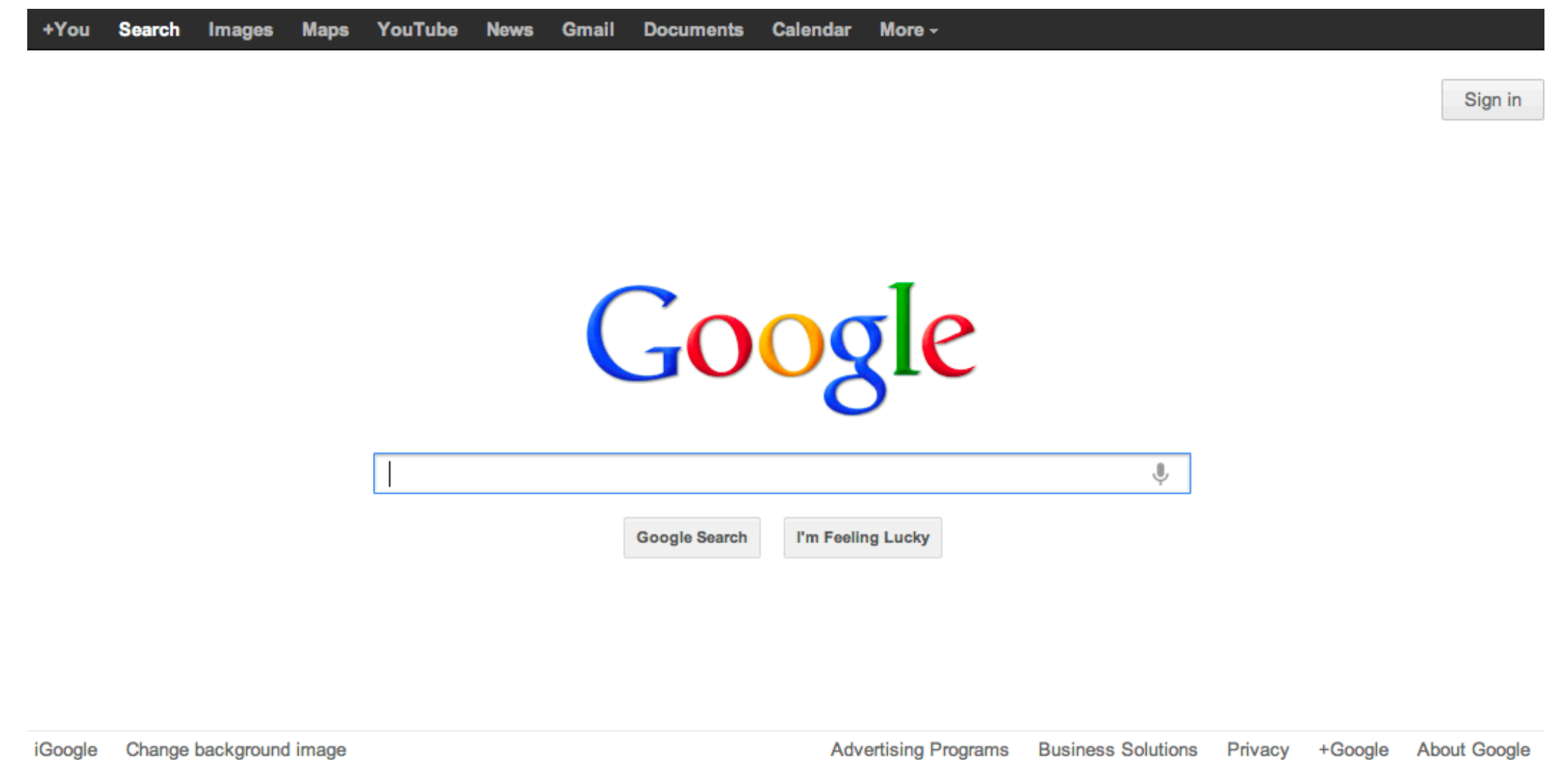
From Bottom:

First Page Special



# Balance and Symmetry

- On a small scale, symmetry might mean exact, mirror-image equivalence (think logos, like the ones shown previously)
- On a larger scale, symmetry means **balance**: is there the same amount of “stuff” on each axis of symmetry?
  - “Stuff” can be measured by **mass** (quantity of nonwhite pixels) and **extent** (area covered by the pixels)
  - Both mass and extent should be balanced
  - Axis of symmetry is usually vertical



**3 Minute Stretch Break**

Color

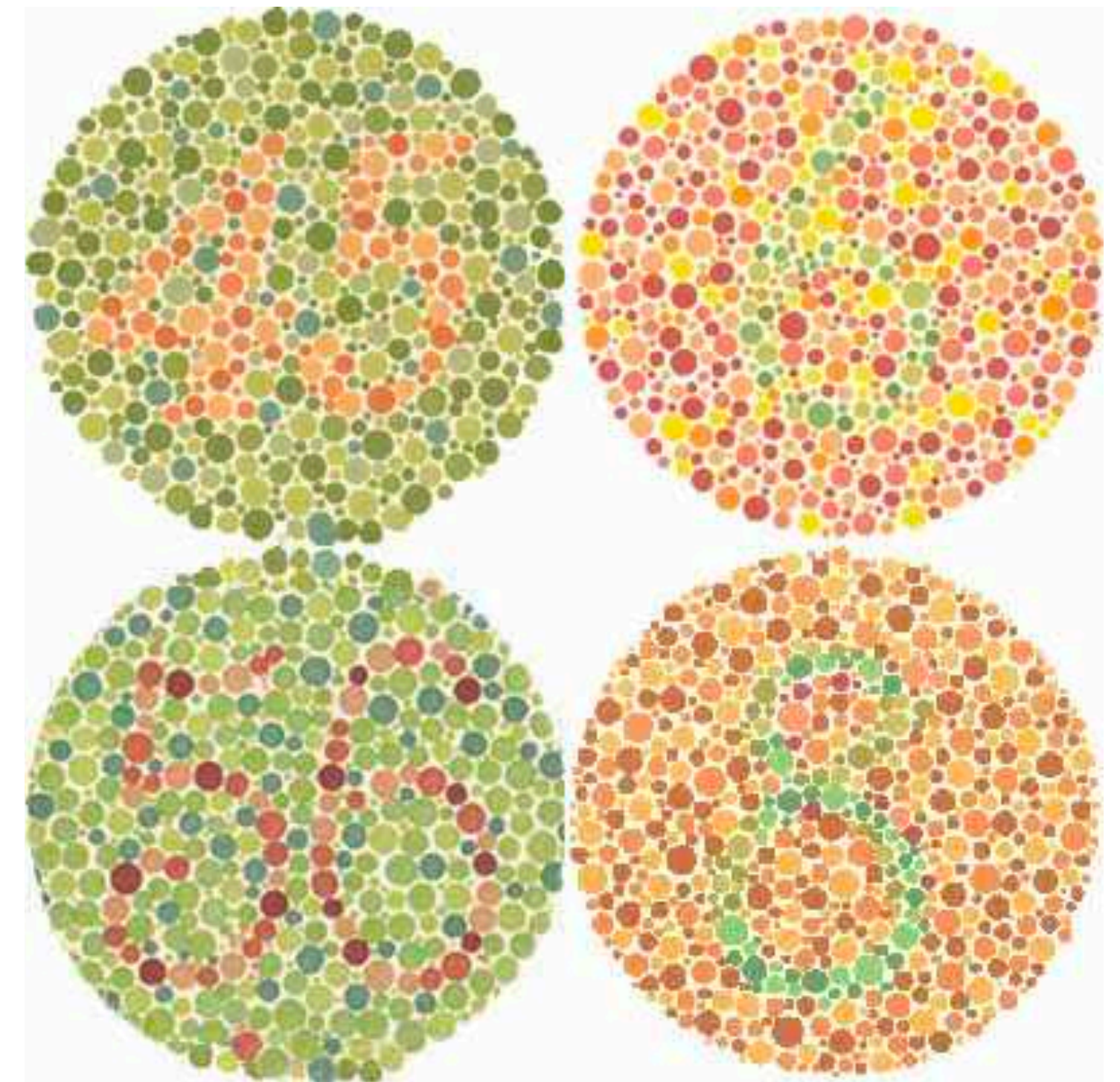
# Saturation

- Avoid saturated colors



# Color Vision Deficiency

- Color deficiency is common
  - Red-green color deficiency affects ~8% of the population (typically more in people with XY chromosomes)
  - Blue-yellow deficiency is much more rare
- Don't depend just on color, use redundant coding to distinguish elements
- Also don't depend on red-green distinctions

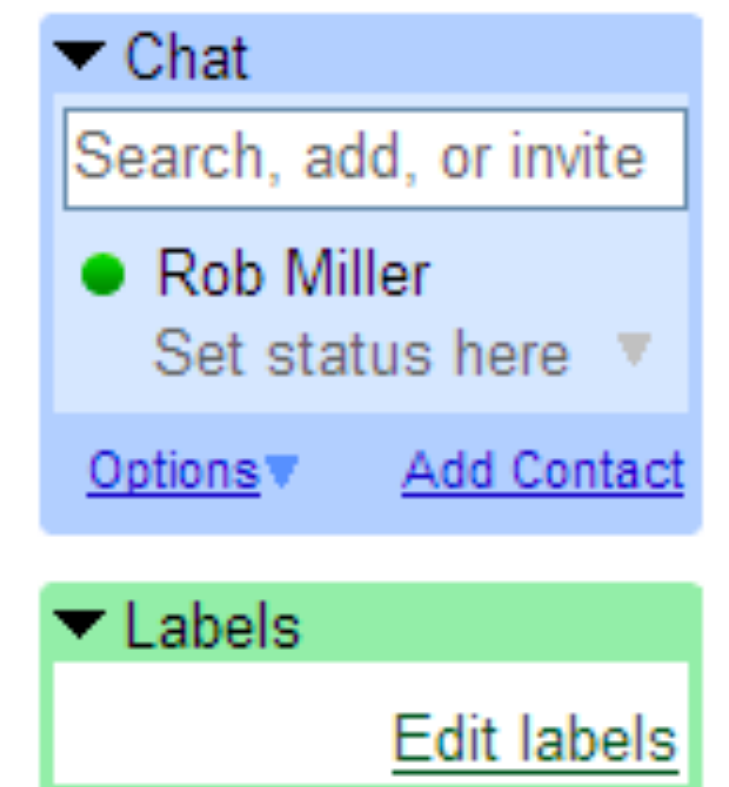




# Color Guidelines



- Use few colors (simplicity)
- One common technique is to use just one weakly saturated hue in varying values combined with white/black/gray
- Combine that with an accent color for when you want something to pop out
- Red = error, green = go, yellow = caution (at least in Western countries)



# Color Guidelines

- There are lots of tools to pick color palettes
  - Personal favorite: [colors.co](http://colors.co)
  - If you want to make your own, you can pick one primary color and use analogous colors for some variation
  - Make sure that your color palette has **high contrast**, that overlapping the colors **does not clash**, and that it is **color vision deficiency-friendly!**
- To test your color-matching skills (just for fun!): [color.method.ac](http://color.method.ac)



# Typography

# Typography

- **Typography:** the art and science of displaying text
- **Font:** the shapes of letters and other characters
- **Spacing:** the white space around letters, words, lines, and paragraphs
- **Kerning:** the process of adjusting character spacing for particular pairs of characters

Georgia **Vott**

Times New Roman **Vott**  
kerning

Arial **rn**

# Text Spacing

- Use negative space
  - Always leave margins around body text; never pack it tightly against an edge
- Use generous **leading** (line spacing)
  - Make sure body text is not overcrowded
- Keep text paragraphs narrow
  - About 60-75 characters / 12-15 words

20/20 Four score and seven years ago,  
our forefathers brought forth upon  
this continent a new nation, conceived in  
liberty and dedicated to the proposition  
that all men are created equal.

20/24 Four score and seven years ago,  
our forefathers brought forth upon  
this continent a new nation, conceived in  
liberty and dedicated to the proposition  
that all men are created equal.

20/28 Four score and seven years ago,  
our forefathers brought forth upon  
this continent a new nation, conceived in  
liberty and dedicated to the proposition  
that all men are created equal.

# Font Selection

- Use the same principles of simplicity and contrast
- Don't use more than 2 or 3 typefaces
  - e.g., one for body text, one for display text
- Don't use two faces from the same font category
  - e.g., only one sans serif
- Use size, weight, style (e.g., italic/small caps), hue to establish essential contrasts
  - But 4-5 font varieties at the very most (and less if your design doesn't use font much)



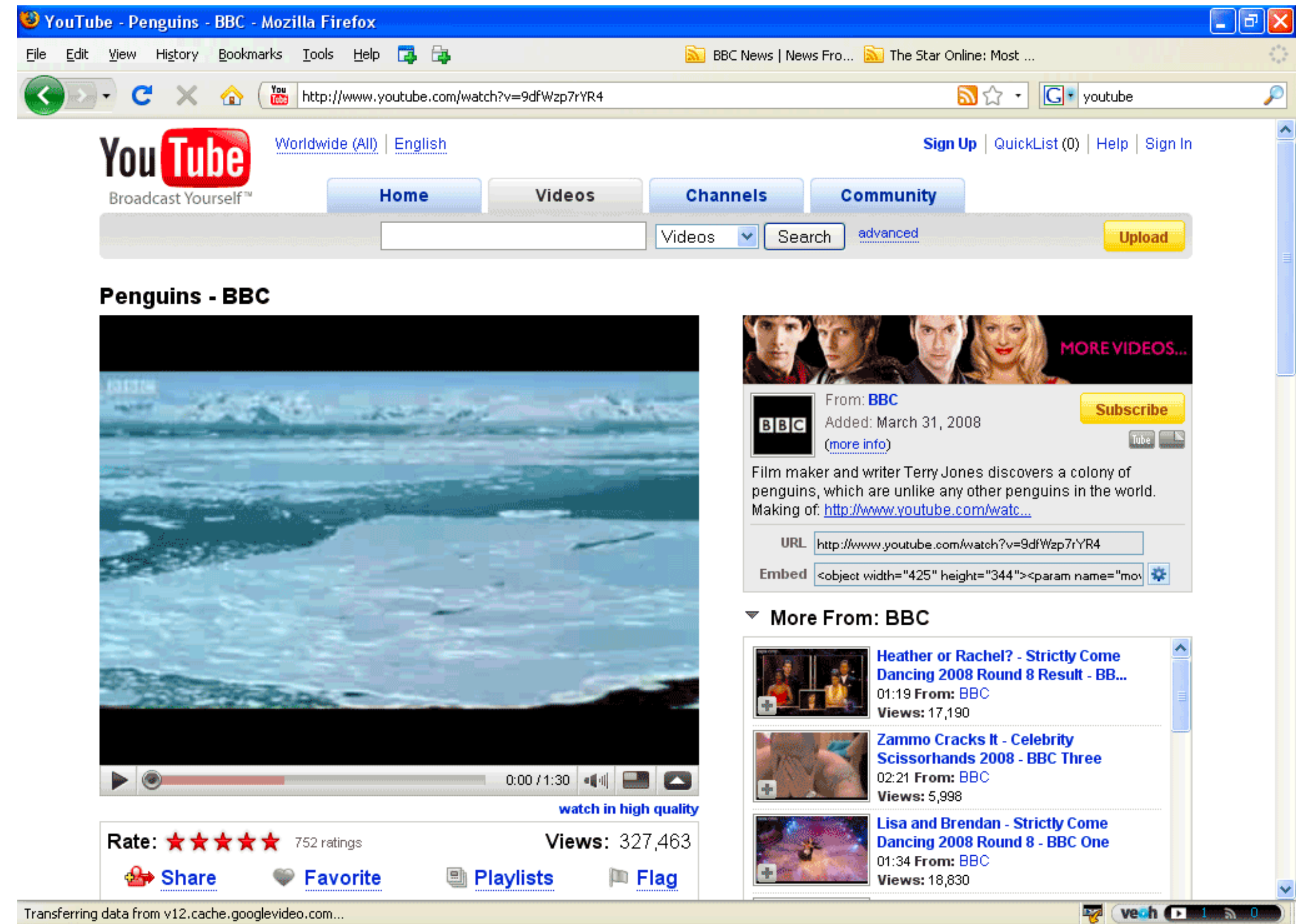
**Putting it All Together**

# Activity (Part 2)

## Reminder of principles:

- Gestalt Principles (closure, balance and symmetry, negative space, continuity)
- Color
- Typography

- Using all of the principles that we've learned about visual design, **build on your earlier critique** of this interface - Q2
- Also, how would you improve this design? - Q3
- Submit your answers here: <https://tinyurl.com/cse440-lecture15activity>
- We will share answers with the class once you finish!





# Work Time on 3c / 3d

- **3c** - due 11/29 @ 11 AM
  - Reminder: don't give your tester the answers that you're looking for! Allow them to puzzle through your interface and share what they're thinking
  - More tips are in the slides from **Lecture 13!**
- **3d** - due 12/6 @ 11 AM
  - Don't begin working on digital prototyping until **after** you finish revising your paper prototype!
  - **Figma** will likely be the most straightforward platform
    - Let us know if you have any questions about Figma and we will do our best to answer
    - Interactivity is not required, but feel free to experiment!
- Have a relaxing break and see you next week! :)