


# Topic 7: UI Design Principles (part 3)

SECV2113 Human-Computer Interaction

Faculty of Computing

Universiti Teknologi Malaysia



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- 01** HCI PRINCIPLES
  - 02** VISUAL PERCEPTION
  - 03** INDUSTRY PRACTICE

# HCI PRINCIPLES

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## Shneiderman's 8 Golden Rules of Interface Design

The principles	Questions to consider	Mark Complete
1. Strive for consistency	Is the style of this element maintained across your site/app? Is this content placed in the correct location according to the site hierarchy? Does this follow the conventions for your chosen platform? How can you make your designs more consistent?	<input type="checkbox"/>
2. Enable frequent users to use shortcuts	Are there shortcuts available for your more experienced users? Who is this product designed for? Will there be a need to consider experienced users? How can you make it easier and quicker for experienced users?	<input type="checkbox"/>
3. Offer informative feedback	Does the user know where they are at in the process? Does the user know what they have done after performing this action? How are you communicating this feedback to your user?	<input type="checkbox"/>
4. Design dialogue to yield closure	Does the user have to do any guessing here? Is it clear and obvious enough for your intended audience? Are there any next steps for the user? How are you communicating the system status with the user?	<input type="checkbox"/>
5. Offer simple error handling	Have you done everything imaginable to prevent this error from happening on your end? Is this error avoidable in the first place? If the user does make an error, how easy is it for them to fix it?	<input type="checkbox"/>
6. Permit easy reversal of actions	How many steps does the user have to take to reverse their actions? Will the user quickly realize they need to reverse the action in the first place? How can you make your users detect the possibility of reversal?	<input type="checkbox"/>
7. Support internal locus of control	Will the user feel in control at this specific touch point in your app? Will they be surprised in an unpleasant manner? Does the site feel easily navigable? Does the user feel safe and in control? How can you make the user feel more safe and in control?	<input type="checkbox"/>
8. Reduce short-term memory load	Are there enough visual cues here for the user to find the functionality or item? Do they have to remember things to understand what's going on? How can you help the user recall?	<input type="checkbox"/>

## Norman's 7 Principles (1988):

1. Use both knowledge in the world and knowledge in the head.
2. Simplify the structure of tasks.
3. Make things visible.
4. Get the mappings right.
5. Exploit the power of constraints, both natural and artificial.
6. Design for error.
7. When all else fails, standardize.

## 18 Principles of Interaction Design by Bruce Tognazzini

No	Principle	Description
1	Anticipation	The system should attempt to anticipate the user's needs.
2	Autonomy	The user should feel in control of the system and its actions.
3	Color Blindness	Avoid using color as the only means of conveying information.
4	Consistency	The interface should be consistent in appearance and behavior.
5	Defaults	Reasonable default values should be provided.
6	Efficiency of the User	Design for user efficiency, not just system performance.
7	Explorable Interfaces	Users should be able to explore safely without fear of error.
8	Fitts's Law	Larger and closer targets are easier to hit.
9	Human Interface Objects	Use familiar interface objects that reflect real-world analogies.
10	Latency Reduction	Minimize delays and provide feedback to make latency feel shorter.
11	Learnability	The interface should be easy to learn and remember.
12	Metaphors	Use metaphors that are familiar and intuitive to users.
13	Protect Users' Work	Users' work should be preserved, even in the event of errors.
14	Readability	Text should be legible and easy to scan.
15	Track State	Keep users informed of the system's current state.
16	Visible Navigation	Navigation options should be easily visible and accessible.
17	User Control	Users should initiate and control actions, not the system.
18	Visible Interfaces	Important elements should be visible without unnecessary clutter.

# **VISUAL** **PERCEPTION** **N**

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What is  
the ***first***  
thing you  
see?





At first glance  
you would see  
a **human face**



But looking  
more closely  
you start to see  
the details

The idea of Gestalt principles:

“The **whole of something** is more ***important*** to our understanding than **the individual parts.**”

# Gestalt Principles in UI Design

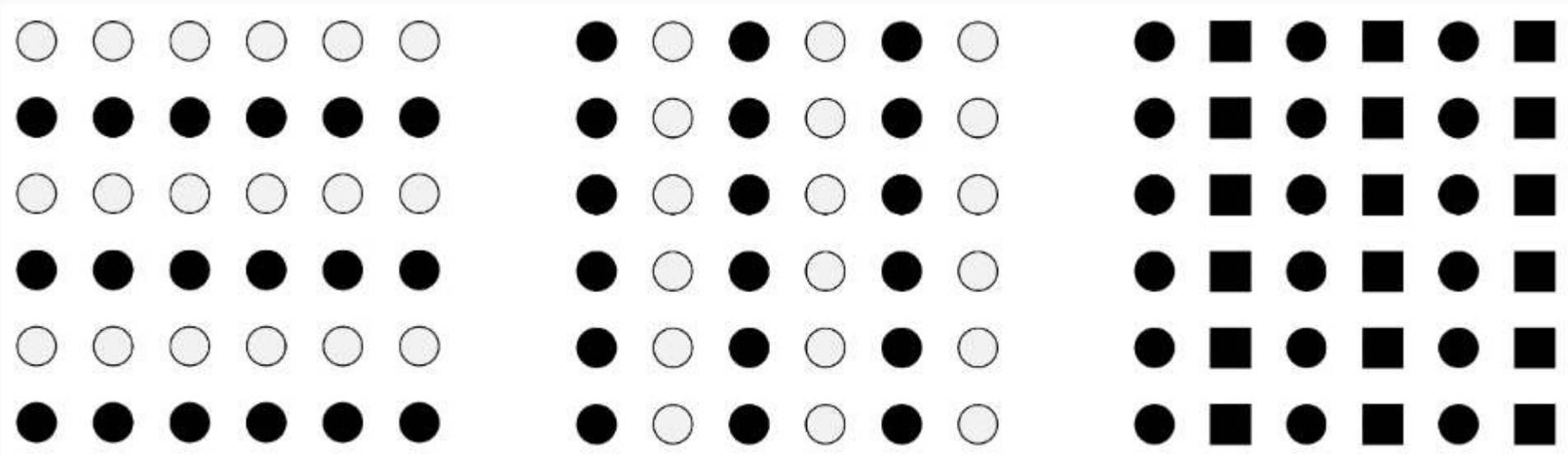
- Similarity
- Proximity
- Enclosure
- Continuation
- Figure & Ground

# Similarity

*Similar objects* are seen as  
grouped

# Similarity

- Similarity of objects form groupings:
  - At left, light and dark shades create similarities among horizontal groups
  - At center, light and dark shades creates similarities among vertical groups
  - At right, circle and square shapes create similarities among vertical groups



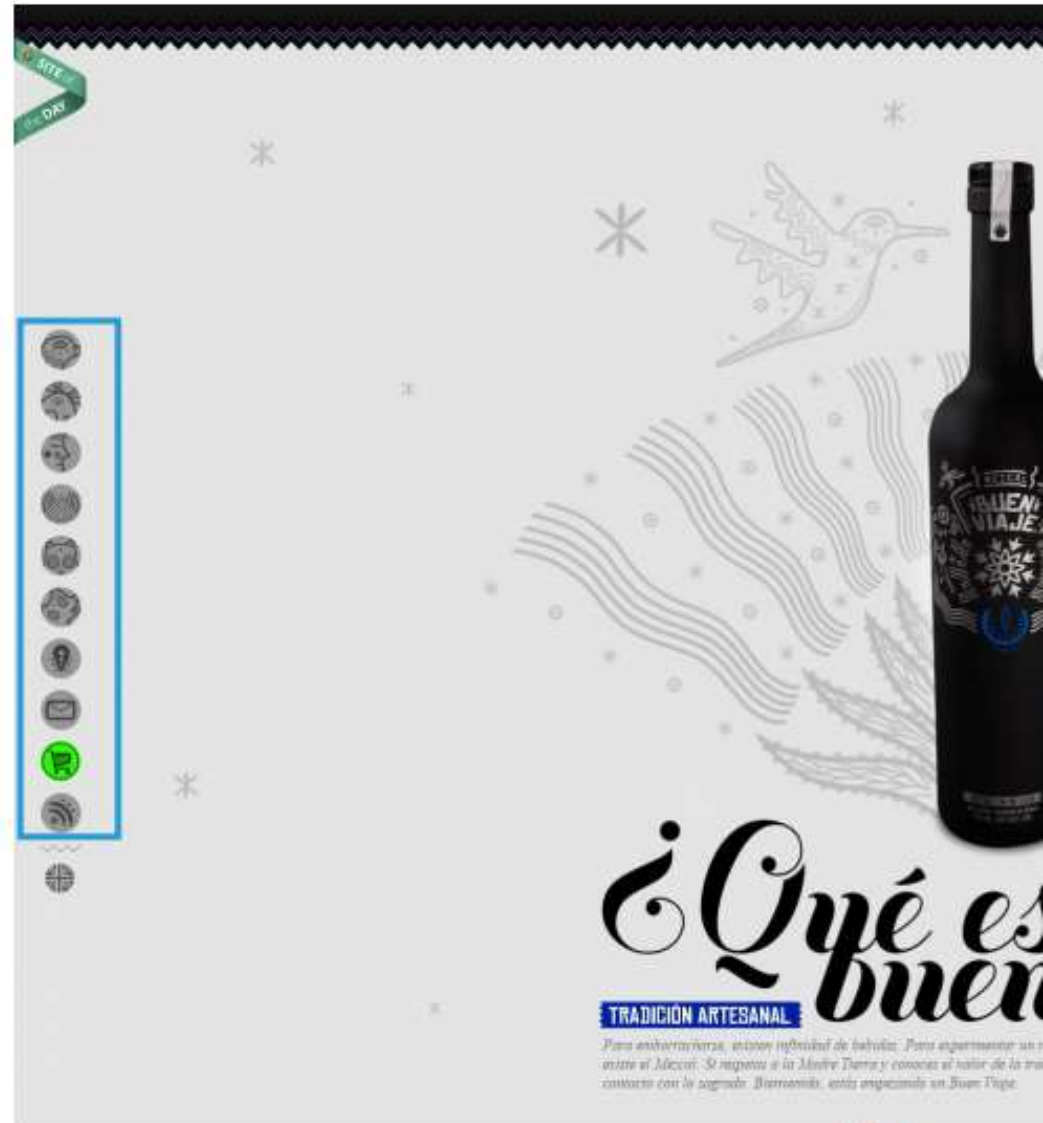
Source:

<http://newmediaabington.pbworks.com/w/page/66930745/Gestalt>



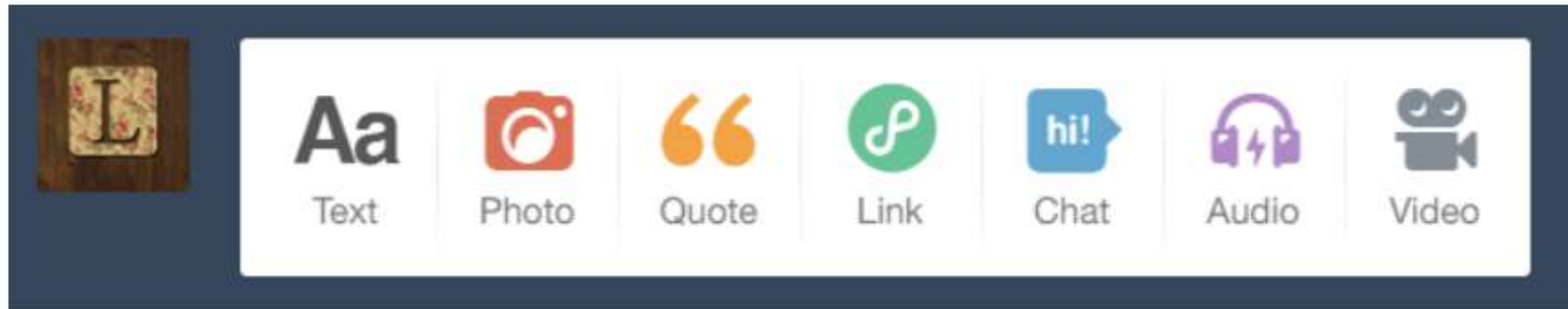
# Similarity

- Each icon has a different image
- These icons are similar in shape and style
- They are perceived to be one group and share the same level of function





# Similarity



- Each block has a different icon
- The blocks share similar structure: an icon with text underneath
- They are perceived to be one group and share similar function: create a new blog post
- Users know exactly what UI elements to look for

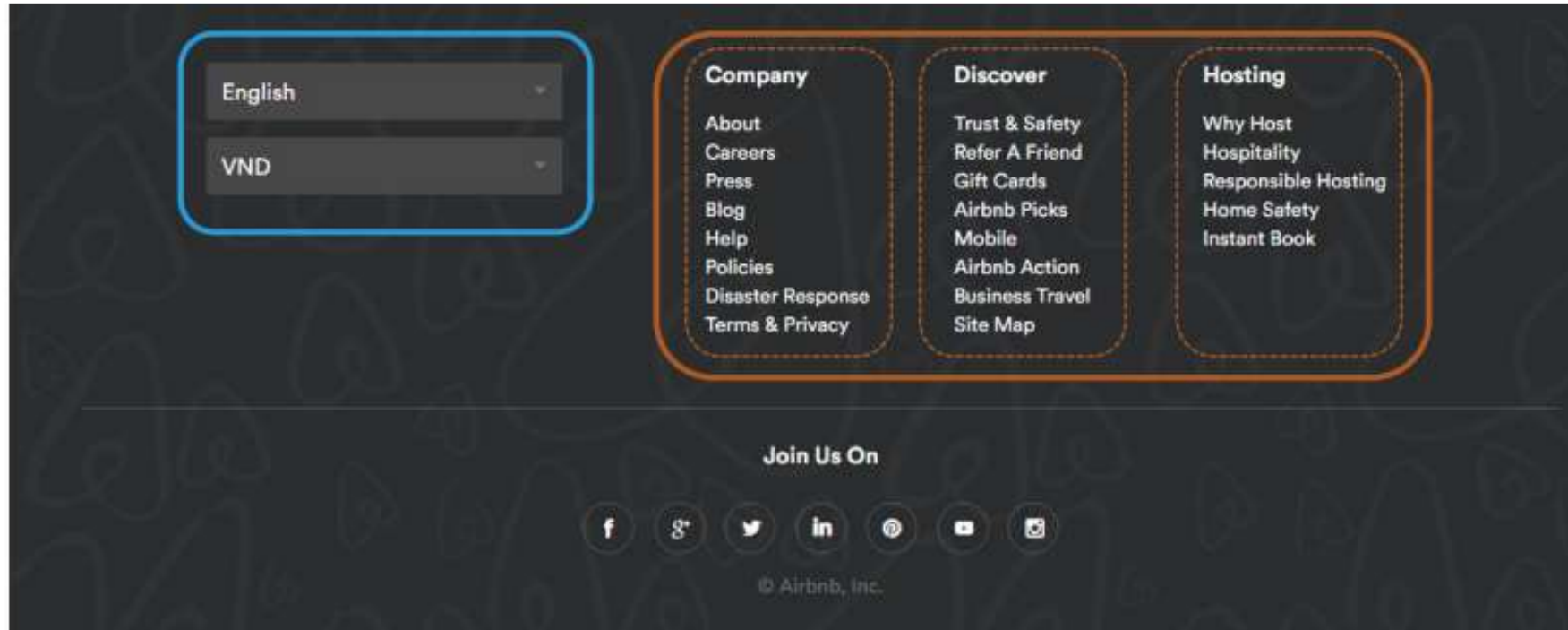
# Proximity

When elements are *close together*, they are seen as grouped

# Proximity

By using white space, we can separate  
as well as build the relationship  
between elements

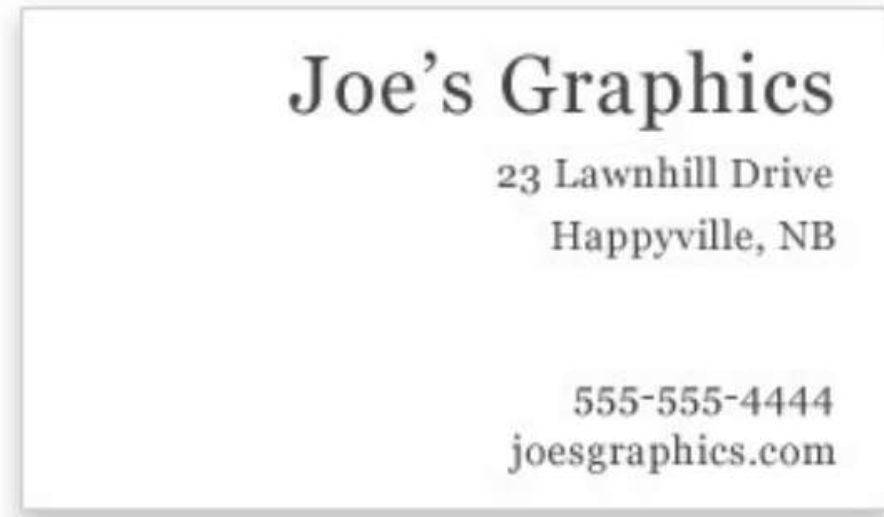
# Proximity



- Language & Currency fields are put close enough to be seen as one group
- The links on the right side are arranged with proper amount of white space. They are seen as 3 small groups and together form one big group

# Proximity

- White space, however, is just one part of implementing proximity.
- A design can have a lot of white space, but if items are not **grouped correctly**, the white space will have little effect.



Two business cards

Source: <https://www.webdesignerdepot.com/2010/01/the-principle-of-proximity-in-web-design/>

# Proximity

- Using white space effectively and grouping related elements are critical to giving your website a clear visual hierarchy.
- Hierarchy is conveyed by the way in which elements are grouped and sub-grouped.
- This hierarchy helps the user understand where they've been and where they want to go and, thus, helps to communicate the purpose of the website.
- A list is a good example of an element that has the potential to communicate visual hierarchy.

Fish	Fruits
BMWs	Lemons
Doors	Apples
Numbers	Pears
Friends	Grapes
Armchairs	Vegetables
People	Cucumbers
Drums	Lettuce
Computers	Celery
Singers	Carrots
Monkeys	Meats
Beers	Mutton

The list on the left has a clear visual hierarchy, showing the relationships between items (indented items are sub-categories of the primary items)

Source: <https://www.webdesignerdepot.com/2010/01/the-principle-of-proximity-in-web-design/>

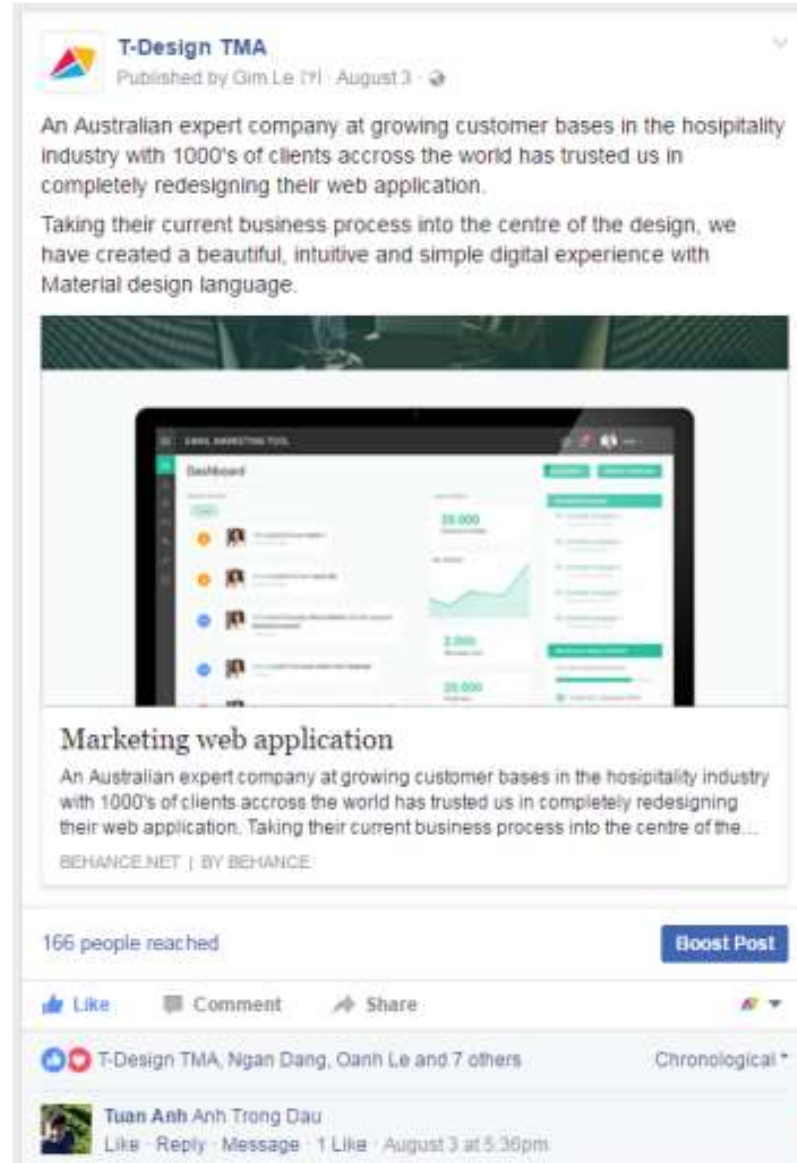
# Enclosure

Things that have a *boundary*  
around them are seen as  
grouped



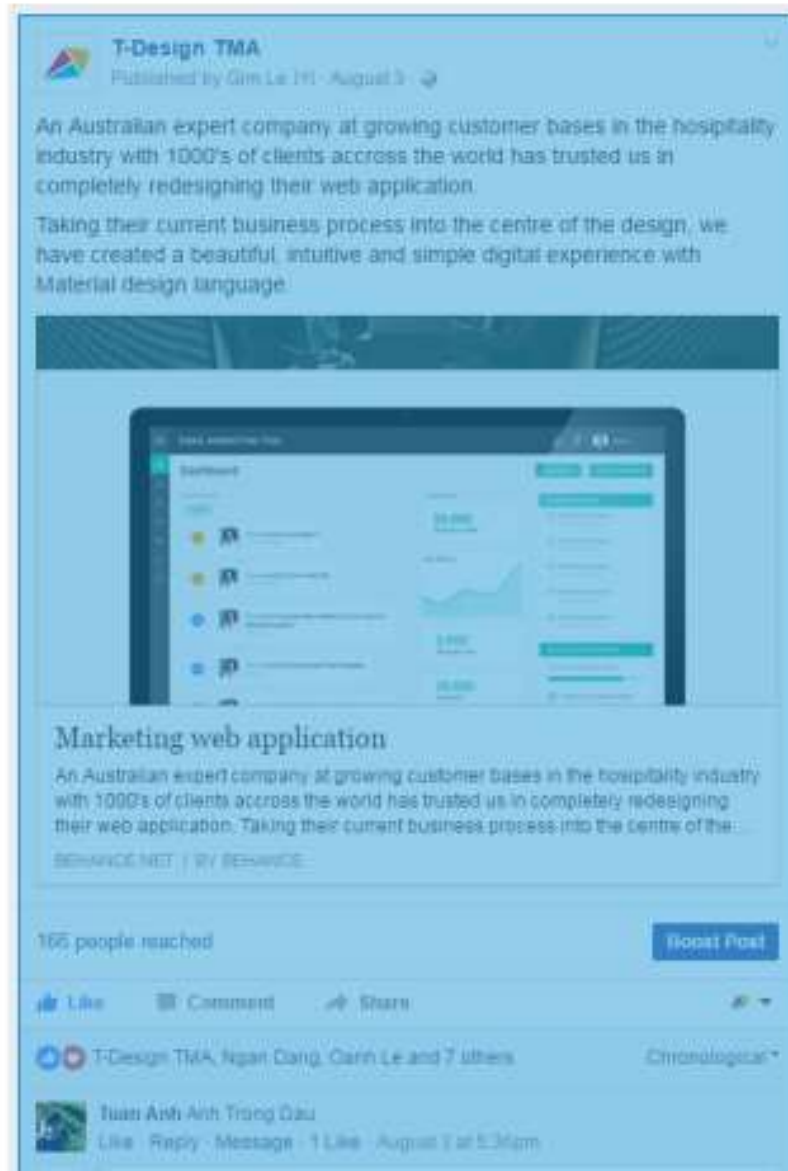
# Enclosure

- Have you ever noticed the way Facebook elements are grouped together?



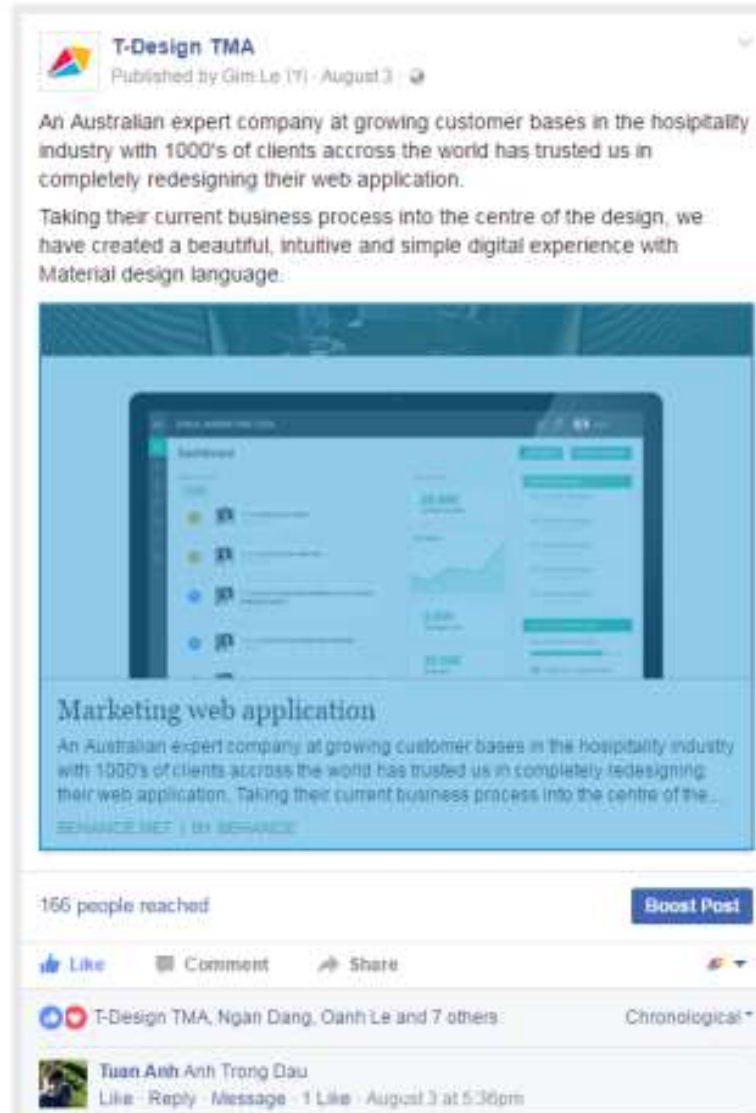
# Enclosure

- There is a border around the whole post
- This is to separate one post to another



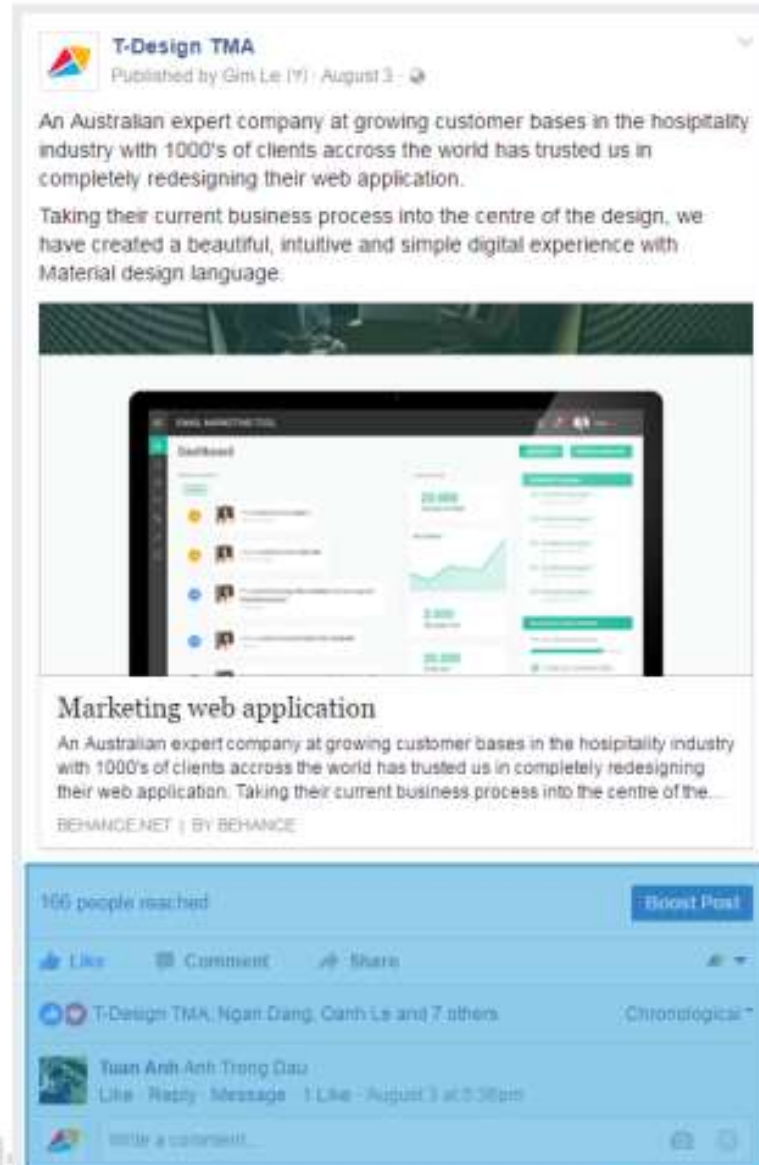
# Enclosure

- There is another border around the link representation
- The image, the title along with a short description appear to be grouped



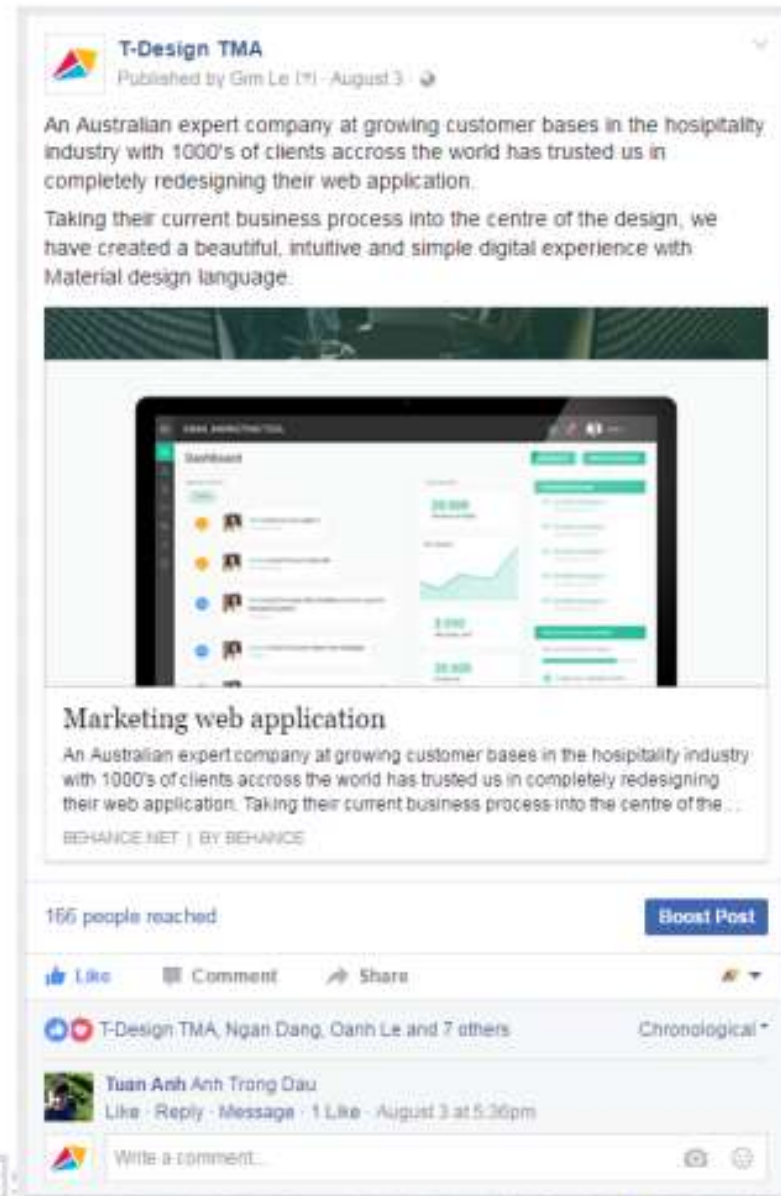
# Enclosure

- This area at the bottom is for social interactions and is formed by several lines
- This area is also divided into different sections



# Enclosure

- Enclosure is very helpful when you have limited space with a lot of information





# Enclosure

To separate the link of the picture from the post

To separate one post with another posts

To separate the comment section for the related post



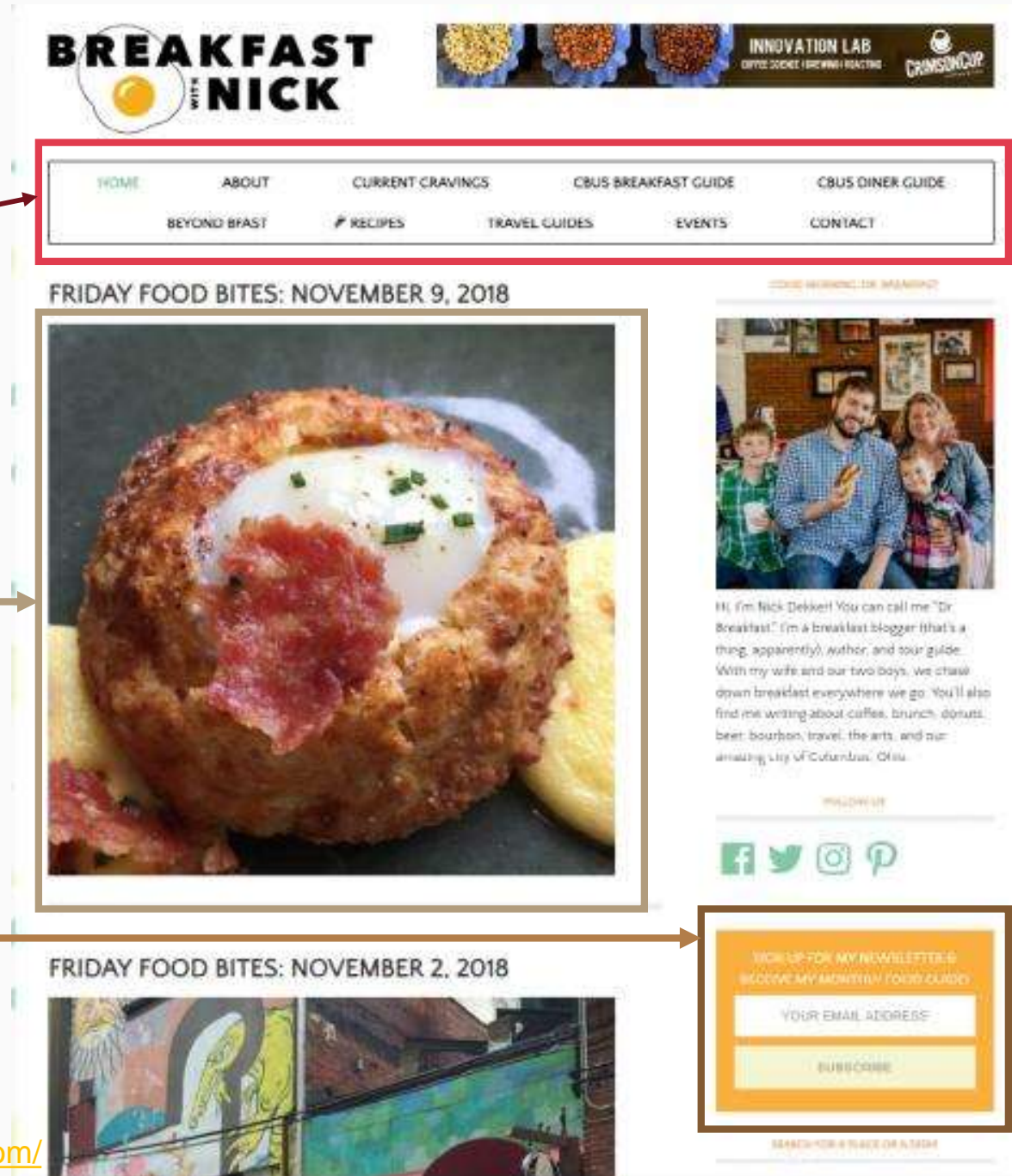
# Enclosure

To separate the menu options available in the blog

To separate one post with another posts

To separate the link where users can subscribe monthly food guide by

Source: <https://www.breakfastwithnick.com/>





# Continuation

Human eye follows *lines*,  
*curves*, or a *sequence of*  
*shapes*

# Continuation

Human eyes tend to see a single dotted line instead of a series of blue dots



# Continuation



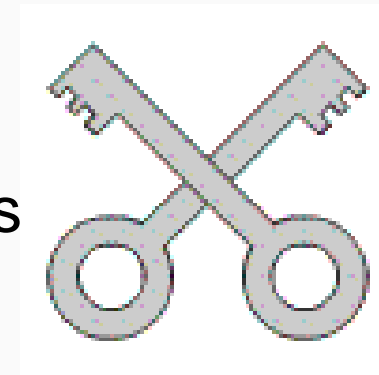
- The light gray line represents the length of the track
- There is another dark gray line placed over the light gray line
- When the dark line grows, we understand the passage of time

# Continuation

- The viewer's eye will naturally follow a line or curve.
- The smooth flowing crossbar of the "H" leads the eye directly to the maple leaf.



- Principle of good continuity is when human perceive each of two or more objects as different, singular and uninterrupted object even when they intersect.
- The alignment of the objects or forms plays a major role for this principle to take effect.
- This principle is well used by educator to teach kids on how to write letters of the alphabet and draw images.



Sources: <http://graphicdesign.spokanefalls.edu/tutorials/process/gestaltprinciples/gestaltprinc.htm>  
[https://en.wikipedia.org/wiki/Principles\\_of\\_grouping](https://en.wikipedia.org/wiki/Principles_of_grouping)

# Figure & Ground

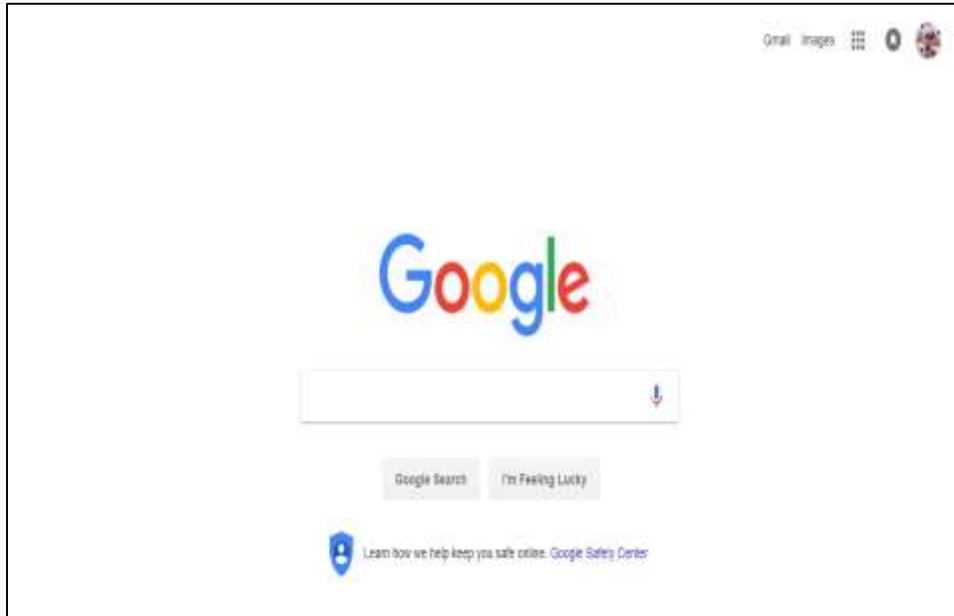
Elements are seen as either  
“*figures*” or “*grounds*”.

# Figure & Ground

- Very common in modals
- Figure: the Welcome box
- Ground: the transparent background that softens the content in the back



# Figure & Ground



Example of **figure** (*the Google text and search bar*) and **ground** (*the white background*)



Example of **figure** (*bird*) and **ground** (*the surrounding trees*).

Sources:

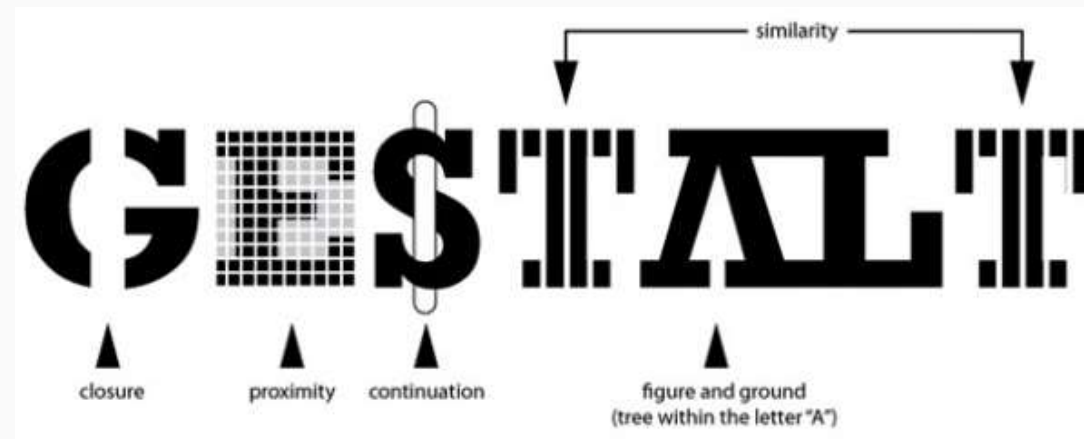
<https://wairimusensationndperception.weebly.com/figure-ground.html>

<https://www.google.com>



# **Example of Gestalt Principles Applied to Web Design**

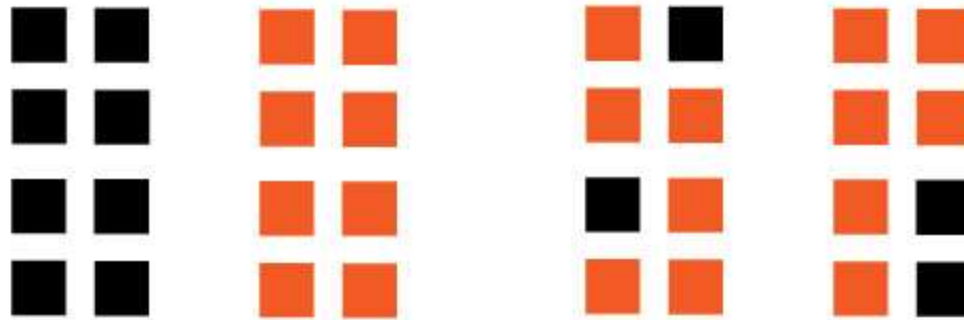
# Example of Gestalt Principles Applied to Web Design



Reference: Gayle Christopher, [gaylechristopher.com](http://gaylechristopher.com)

# Proximity/Grouping

- Things that are close together are perceived to be more related than things that are spaced farther apart.
- One of the first principles to impact perception
- Proximity overpowers similarity
- Only uniform connectedness overpowers proximity



Proximity overpowers similarity in color/contrast

# Proximity/Grouping

## COASTAL COLOR



### Coastal Colors: Blue & White

Whether crisp and tailored or soft and casual, this classic combo never goes out of style.

[> more](#)



### Coastal Colors: Citrus

Tangy yellows and zesty oranges add fresh-squeezed citrus coastal color style to any interior or exterior space.

[> more](#)



### Tropical Coastal Colors

From bright purples to dazzling pinks, lime greens to sunny yellows, this scheme demands hot colors and cool drinks.

[> more](#)

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## Daily Deals



Altec Lansing iPad  
Stereo Speaker System  
**\$39.99** Free Shipping  
~~\$149.99~~ MSRP



KNEX Thrill Rides - Hot  
Shot! Video Coaster  
**\$49.99** Free Shipping  
~~\$99.99~~ MSRP



WORX GT 10" Cordless  
Electric String Trimmer/...  
**\$54.99** Free Shipping  
~~\$145.99~~ MSRP



Logitech Harmony 300i  
Universal Remote  
**\$20.49** Free Shipping  
~~\$39.99~~ MSRP



Garmin Nuvi 1260T GPS  
Navigator, Lifetime Liv...  
**\$69.99** Free Shipping  
~~\$149.99~~ MSRP



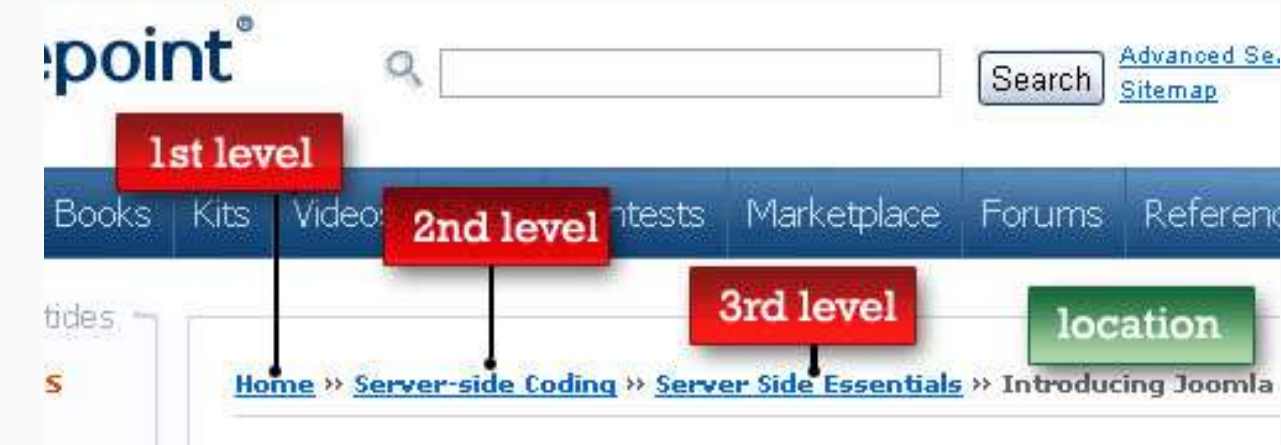
Titan Tape to PC USB  
Cassette-to-MP3  
**\$14.99** Free Shipping  
~~\$49.99~~ MSRP

# Good Continuation

- Elements arranged on a line or curve are perceived to be more related than elements not on the line or curve.
- All written language employs the principle of good continuation.
- Breadcrumbs, words in a paragraph, graphs, and linear arrangement (vertical or horizontal) communicate relatedness.



# Good Continuation



# Similarity

- Visual elements that are similar in shape, size, color and direction are perceived as part of a group.
- Different modes of similarity are not created equal.
- Color is the strongest way to suggest relationships.
- Used in links, icons, page content to suggest similar behavior, relatedness, and reinforce content hierarchies to communicate context.
- Consistency in styling and content dimension is important and implies structure.





# Similarity



[Our products](#) | [Our book](#) | [Company blog](#) | [Product blog](#) | [Programming/Design jobs](#)

37signals 

## Work well.

Over 1 million people and businesses use our web-based applications to get things done the simple way.

We aim for the software sweet spot: Elegant, thoughtful products that do just what you need and nothing you don't.

"One of the Net's rising stars."  




**Basecamp** —OUR FLAGSHIP PRODUCT!  
**Project management and collaboration**  
Collaborate with your team and clients. Schedules, tasks, files, messages, and more.



**Highrise** —OUR NEWEST PRODUCT!  
**Online contact manager and simple CRM**  
Keep track of who your business talks to, what was said, and what to do next.



**Backpack** —JUST UPDATED!  
**Intranet, group calendar, organizer**  
Share info, schedules, documents, and to-dos across your company, group, or organization.



**Campfire** —IPHONE COMPATIBLE!  
**Real-time group chat for business**  
It's like instant messaging, but optimized for groups. Especially great for remote teams.

HOT: Check out our brand new [Affiliate Program](#) and earn money when you recommend our products to friends, colleagues, or clients.

## Figure-Ground

- Elements are perceived as either figures (elements of focus) or background.
- Human mind must rapidly decide which elements to focus on in a scene. This ability allows us to determine what we should pay attention to and what we can ignore even if it does provide context.
- Use color, shading, highlights to cue the viewer in on what has focus and ground depth: buttons that look like press-able buttons, links that change on rollover, overl



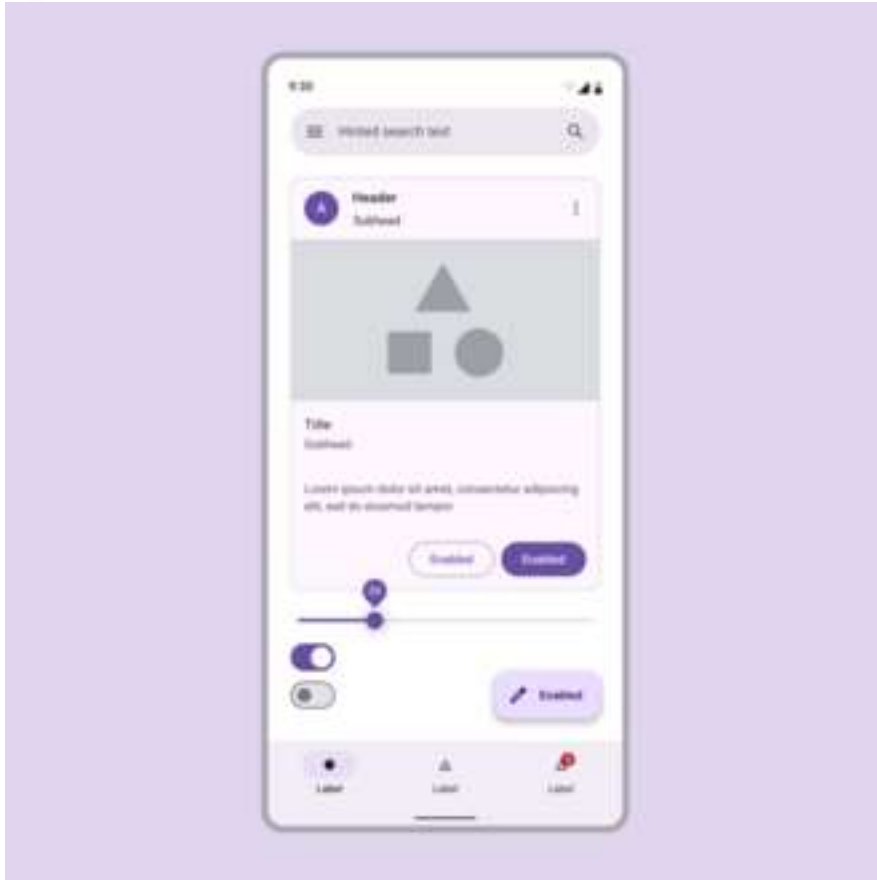
# Figure-Ground



# INDUSTRY PRACTICES

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# Google Material Design Principles



## Principle

### **Material is Metaphor**

## Description

Uses tactile reality (shadows, surfaces, and edges) inspired by paper and ink to provide cues.

### **Bold, Graphic, Intentional**

Emphasizes deliberate color choices, edge-to-edge imagery, large-scale typography, and intentional white space.

### **Motion Provides Meaning**

Animations are meaningful and reinforce the user's actions, helping with orientation and continuity.

### **Adaptive Across Devices**

Designs are responsive, scalable, and work seamlessly on all screen sizes and devices.

### **User Action Driven**

Interfaces are focused on user input and promote direct manipulation with clear feedback.

# Apple Human Interface Guideline

Principle	Description
Clarity	Ensure interfaces are easy to understand with legible text, precise icons, and straightforward navigation to eliminate ambiguity.
Deference	Minimize distractions by prioritizing content over UI elements, allowing users to focus on tasks with a clean, unobtrusive design.
Depth	Use visual hierarchy, layering, and subtle effects (e.g., shadows) to create a multi-dimensional experience that guides users naturally.
Consistency	Maintain familiar design patterns and behaviors across apps to align with Apple's ecosystem, enhancing user familiarity and comfort.
Feedback	Provide clear, immediate responses to user actions (e.g., visual cues, animations) to confirm interactions and reduce confusion.
Simplicity	Keep interfaces uncluttered, using minimal design elements and standard UI components (e.g., UIKit) to ensure intuitive functionality.