

Building User Interfaces

Interaction Design

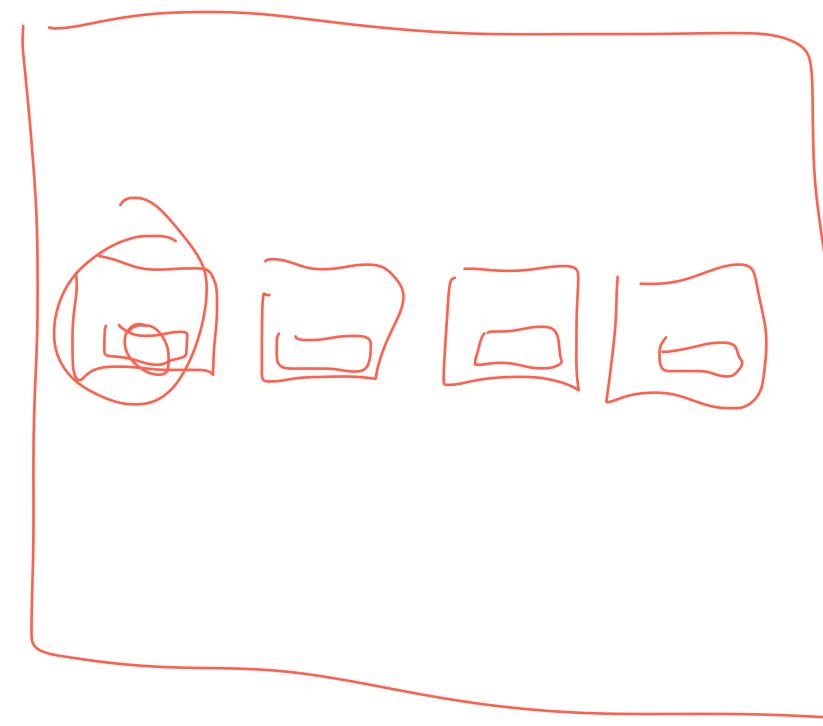
Structure, Layout, & Navigation

Professor Bilge Mutlu

Announcements

- React 1 α and React 1 β deadlines extended: *Thursday → Sunday*
- Review sandbox code (e.g., CodePen) provided in lectures

See in CodePen



What we will learn today?

- Interaction structure
- Visual layout design
- Principles of navigation

Interaction Structure

Information Architecture

Definition: The design of the organizing principle of an interactive system.

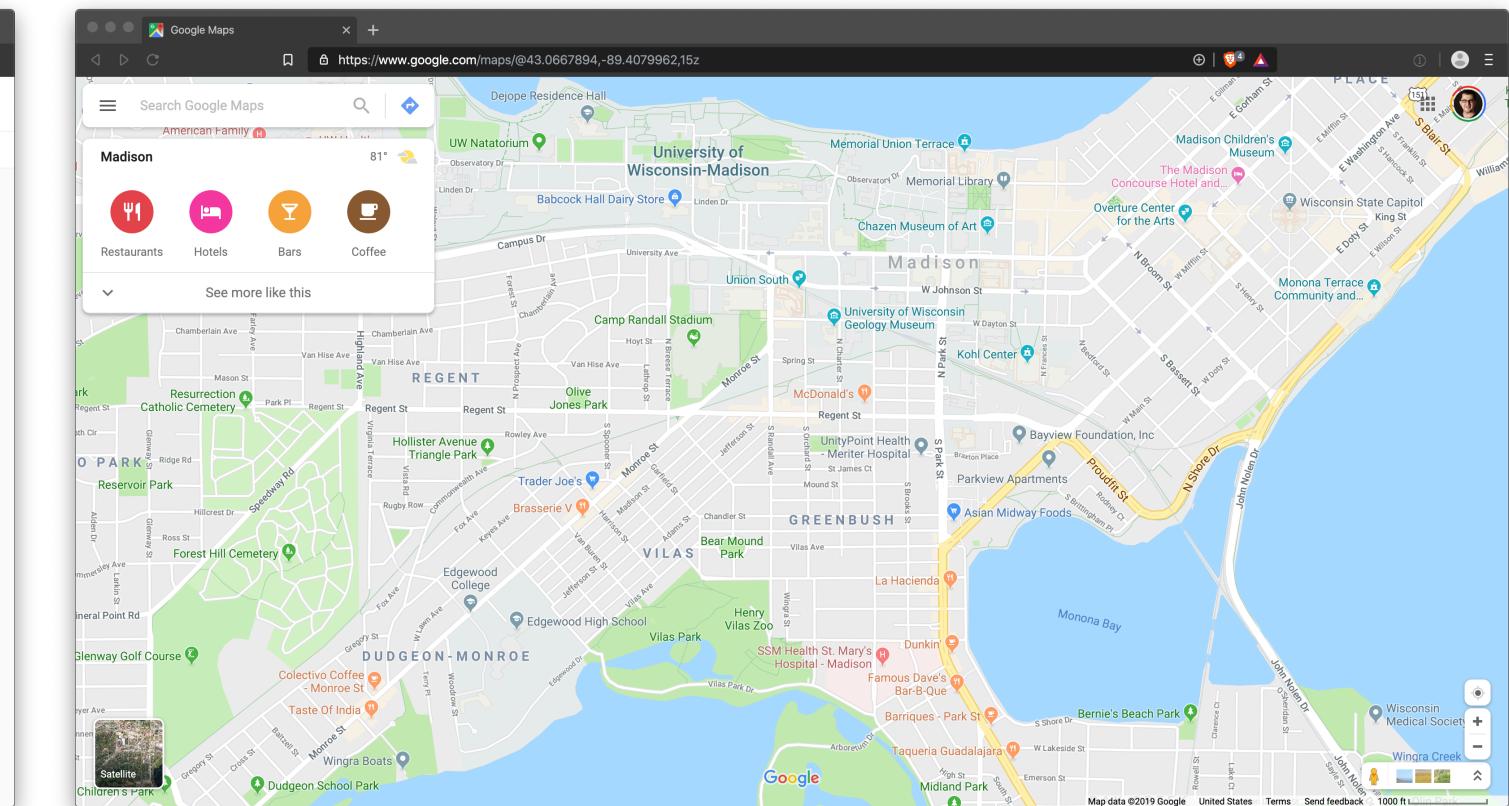
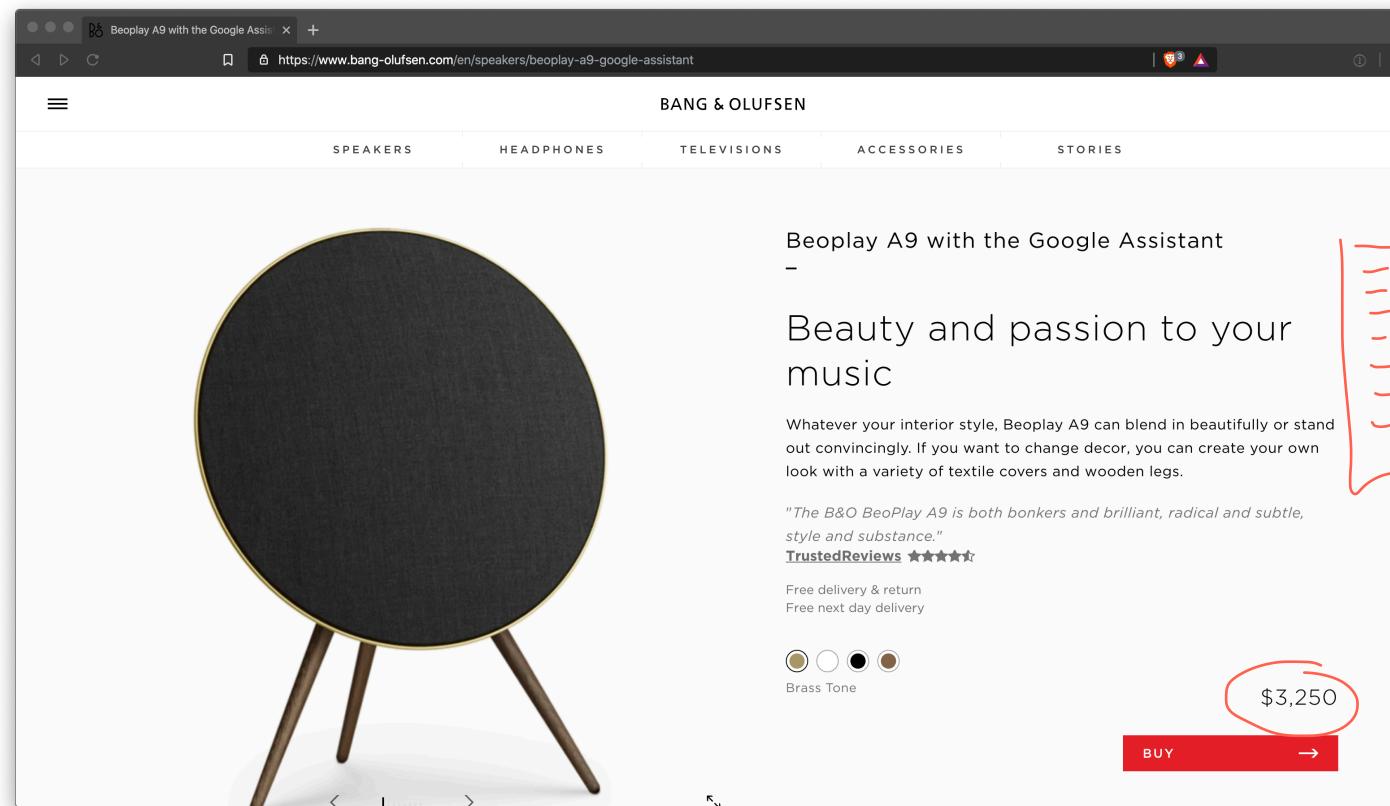
A set of structural categories:¹

1. "Show one single thing"
2. "Show a list or set of things"
3. "Provide tools to create a thing"
4. "Facilitate a task"

¹Tidwell, 2010, *Designing Interfaces*

"Show one single thing"

Focuses on conveying information on a specific topic/facilitating a specific activity

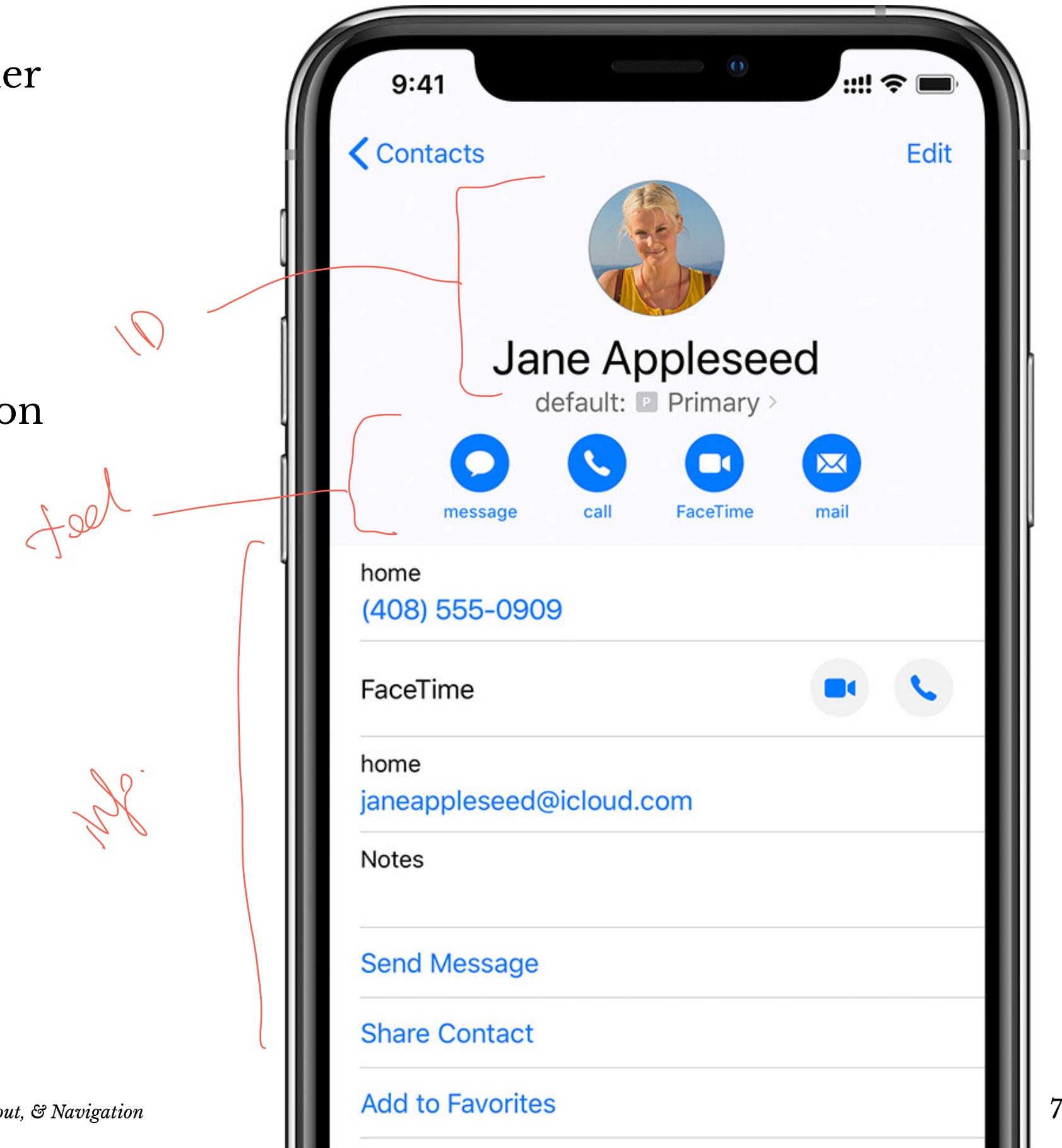




Supports a specific activity, eliminating other distractions.

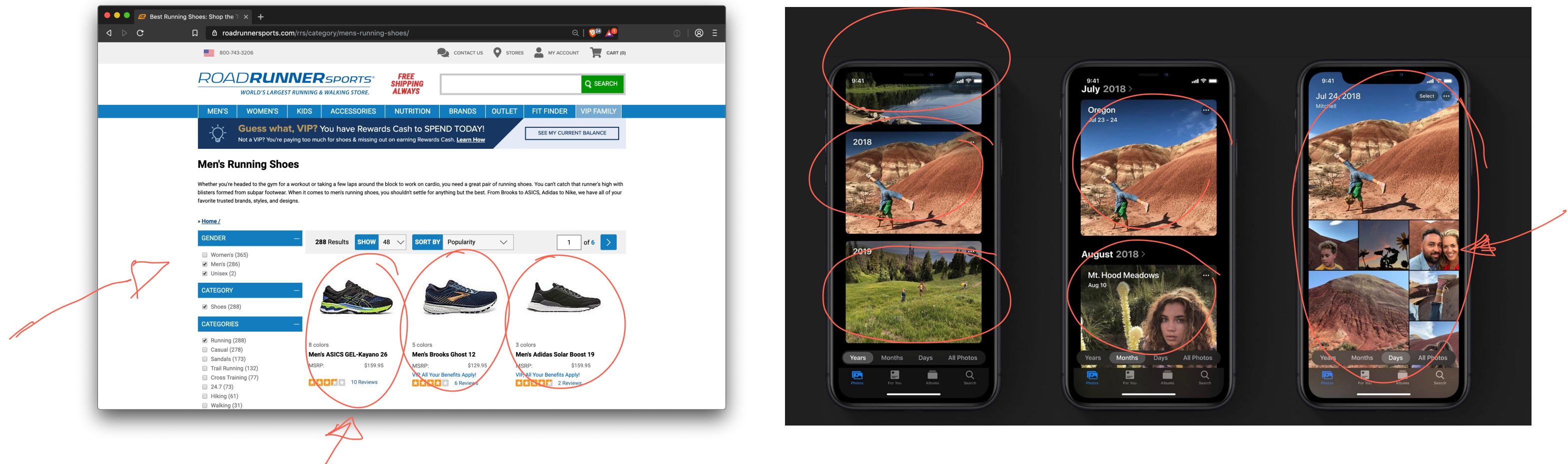
Includes key components:

1. Content of the "single thing"
2. Supporting tools that help the user act on the content



"Show a list or set of things"

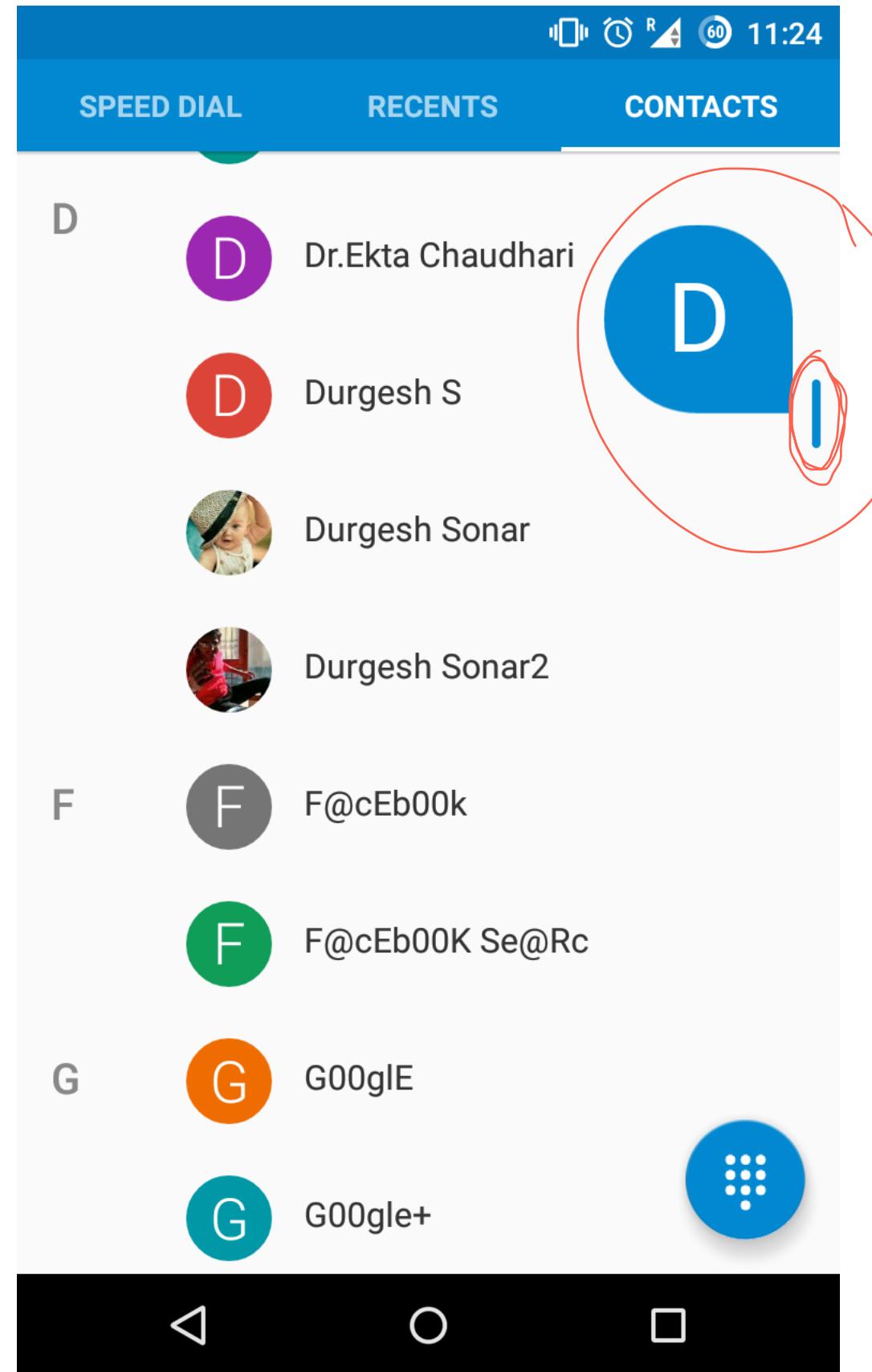
Provides rows or grids of items of the same kind that provide links to components that focus on that item.



Includes design elements that help the user
organize and categorize the lists

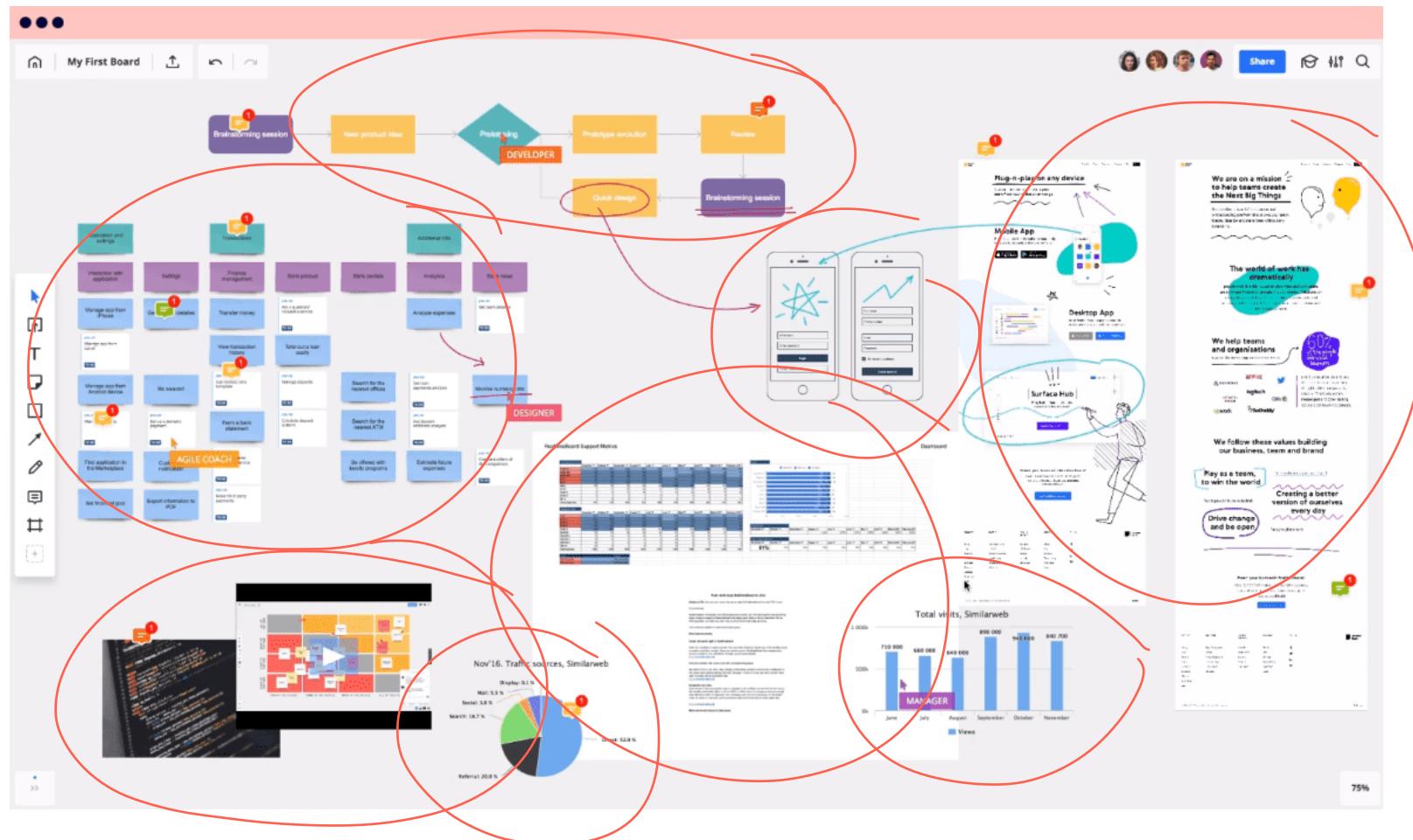
- ✖ Can be applied hierarchically

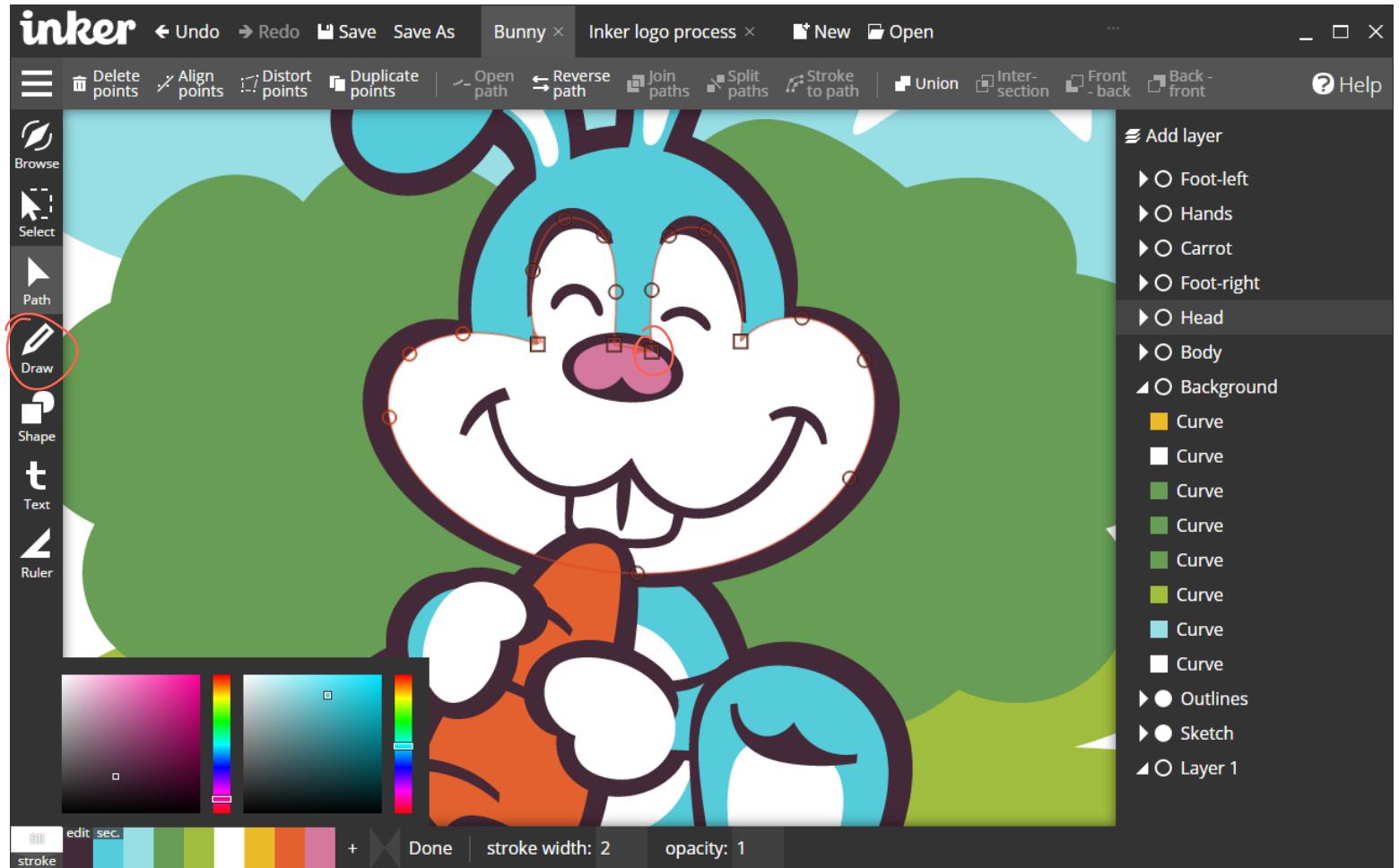
Does this remind you of something we've
been discussing?



"Provide tools to create a thing"

Supporting user creation of new content, e.g., a canvas on which to write, draw, paint or structured form for data entry





Let's start by getting to know you...

We just need a few details to get us rolling.

First name

Elaine

Last name

Benes

Enter the last name from your Social Security card

ZIP code

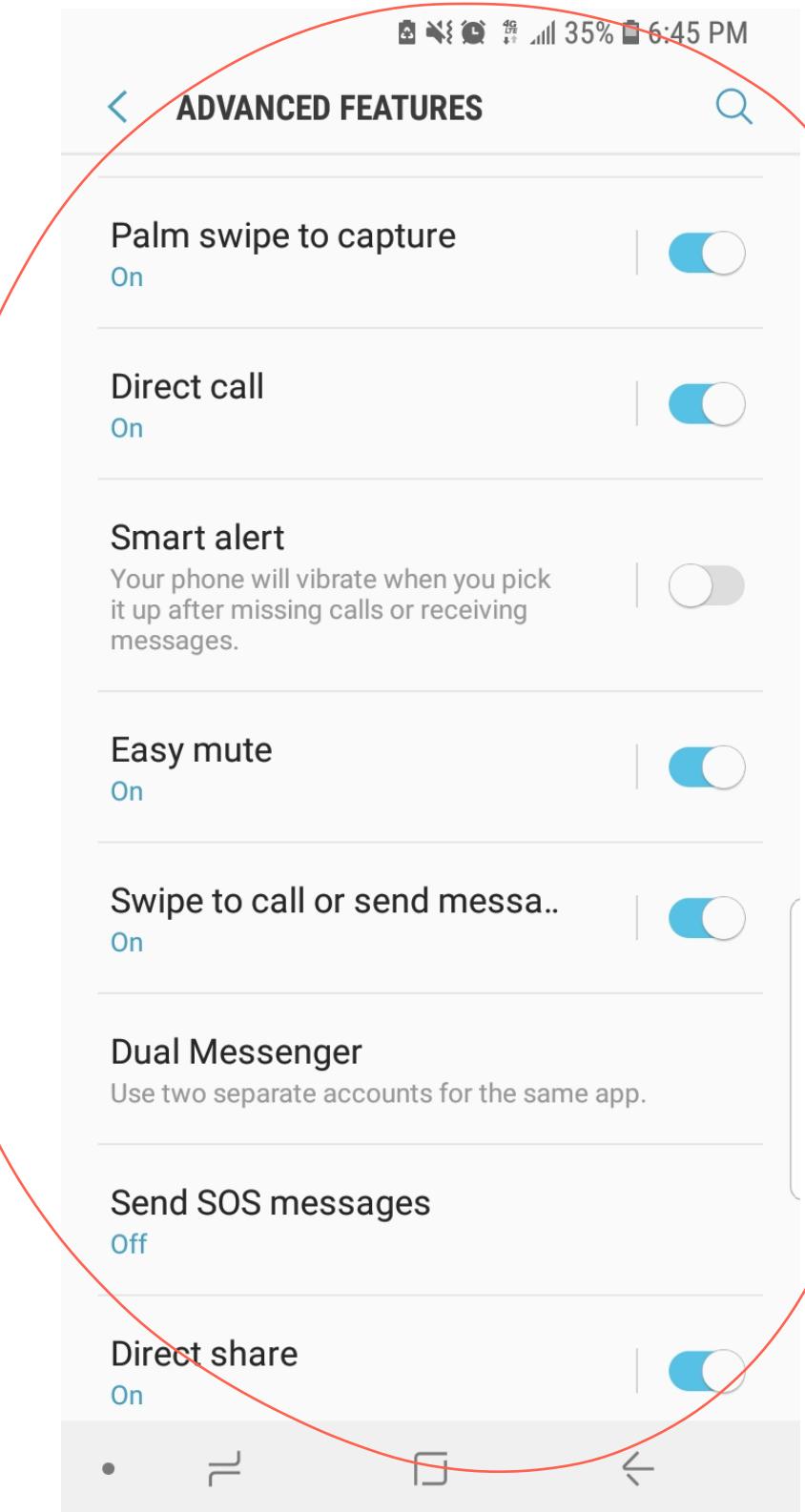
I live outside the U.S.

Continue

"Facilitate a task"

Provides collections of components or controls that help users perform specific actions, e.g., changing a setting

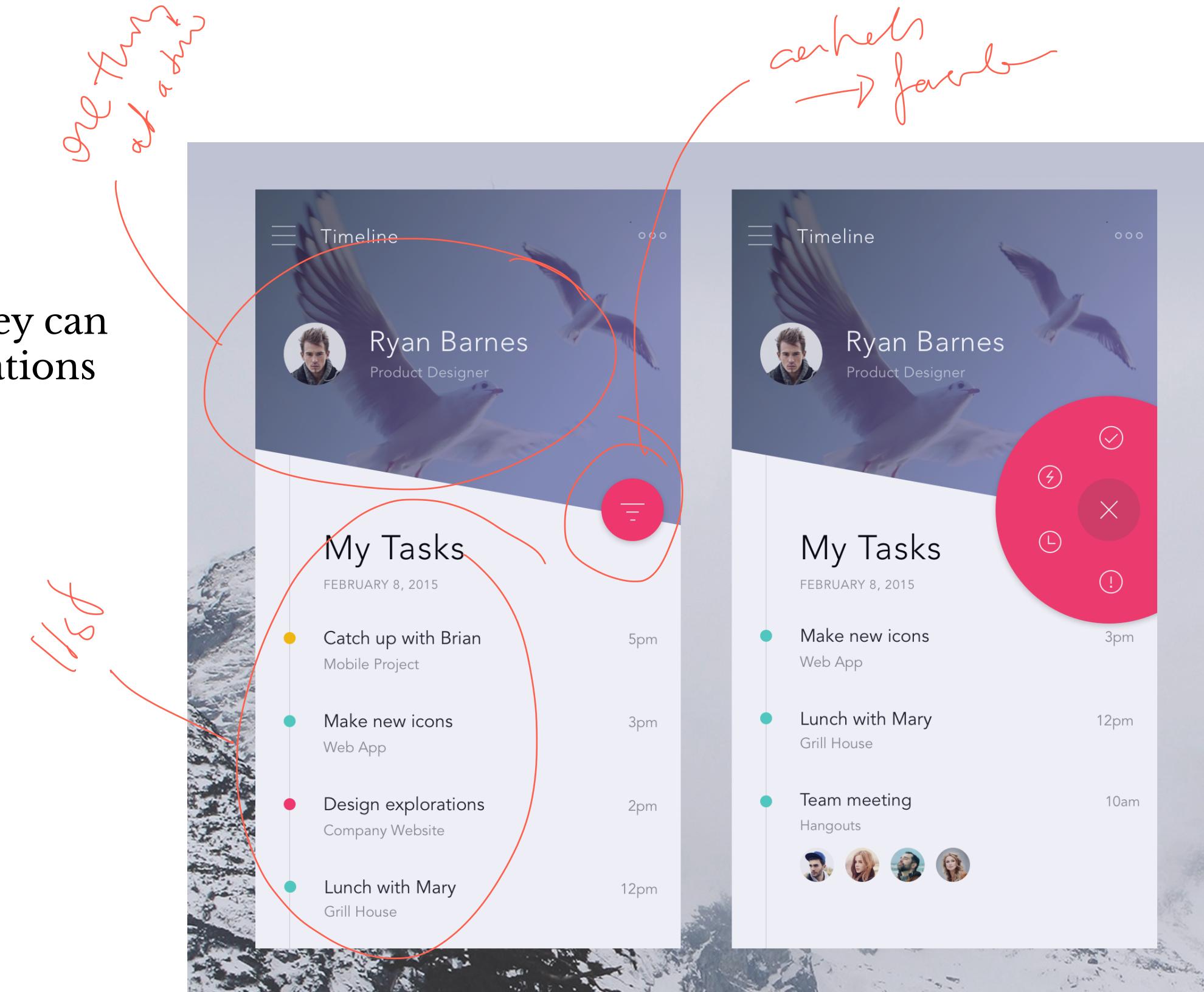
The designer must organize these controls in an effective and logical way



Combining Structures

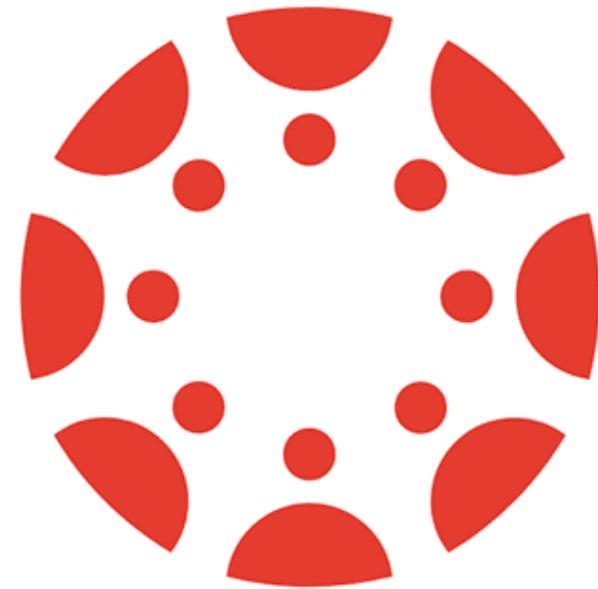
Any page/component can follow the structure of these components, thus they can be combined to create complex applications

Single-page applications (SPAs) often combine these structures



Quiz 1

Complete the Canvas quiz.



canvas

Layout

Layout

Definition: Arrangement of visual elements on a canvas.²

1. Creating a focal point
 2. Following the golden ratio
 3. Using the rule of thirds
 4. Effectively using grids
 5. Integrating type
 6. Placing imagery
-
1. Using negative space
 2. Grouping using gestalt theory
 3. Creating visual hierarchy
 4. Exploiting visual scan patterns
 5. Creating contrast/emphasis

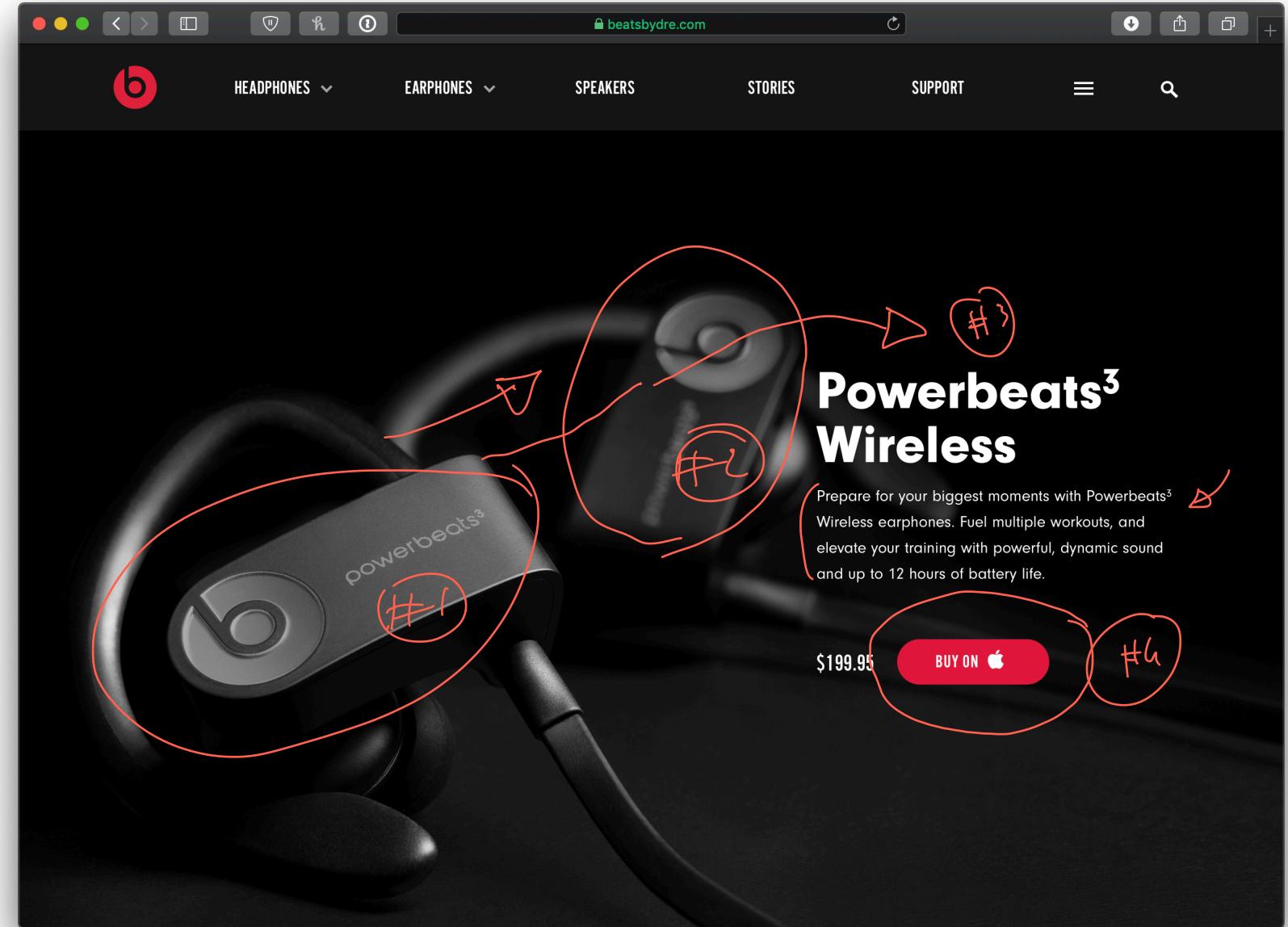
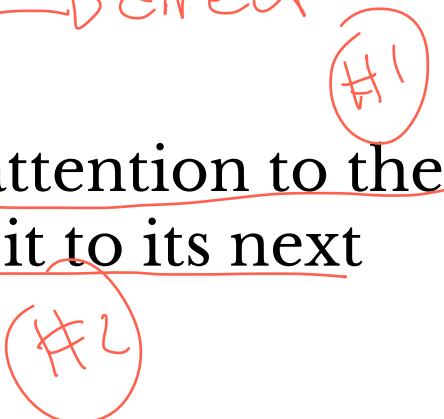
² These build on the visual design elements/principles that we covered last week.

Creating a focal point

Definition: Aka, center of visual interest, where the design directs the attention of the viewer first.

attract → direct

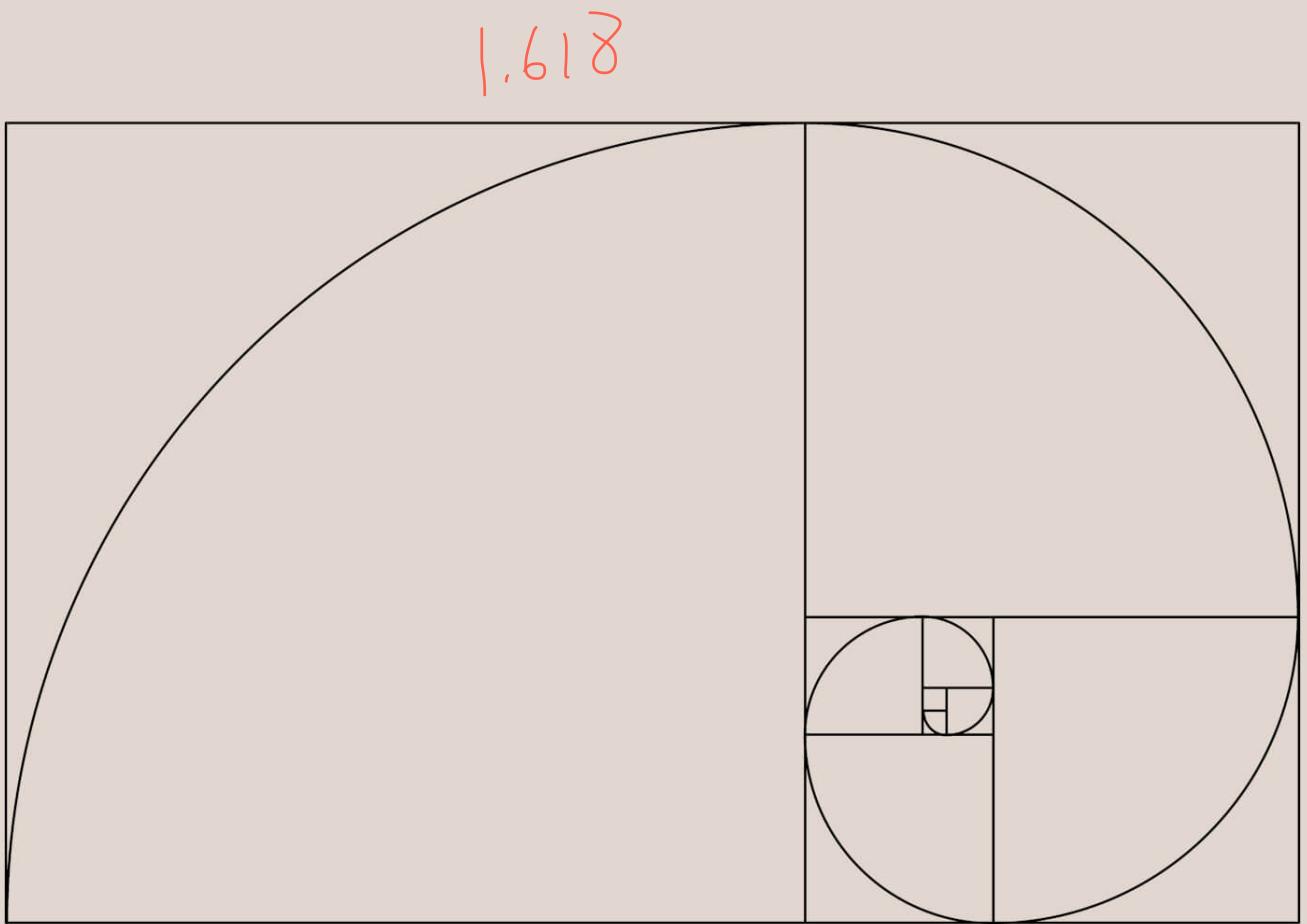
Pro Tip: Successful use locks attention to the focal point and gently guides it to its next destination.



Following the golden proportion³

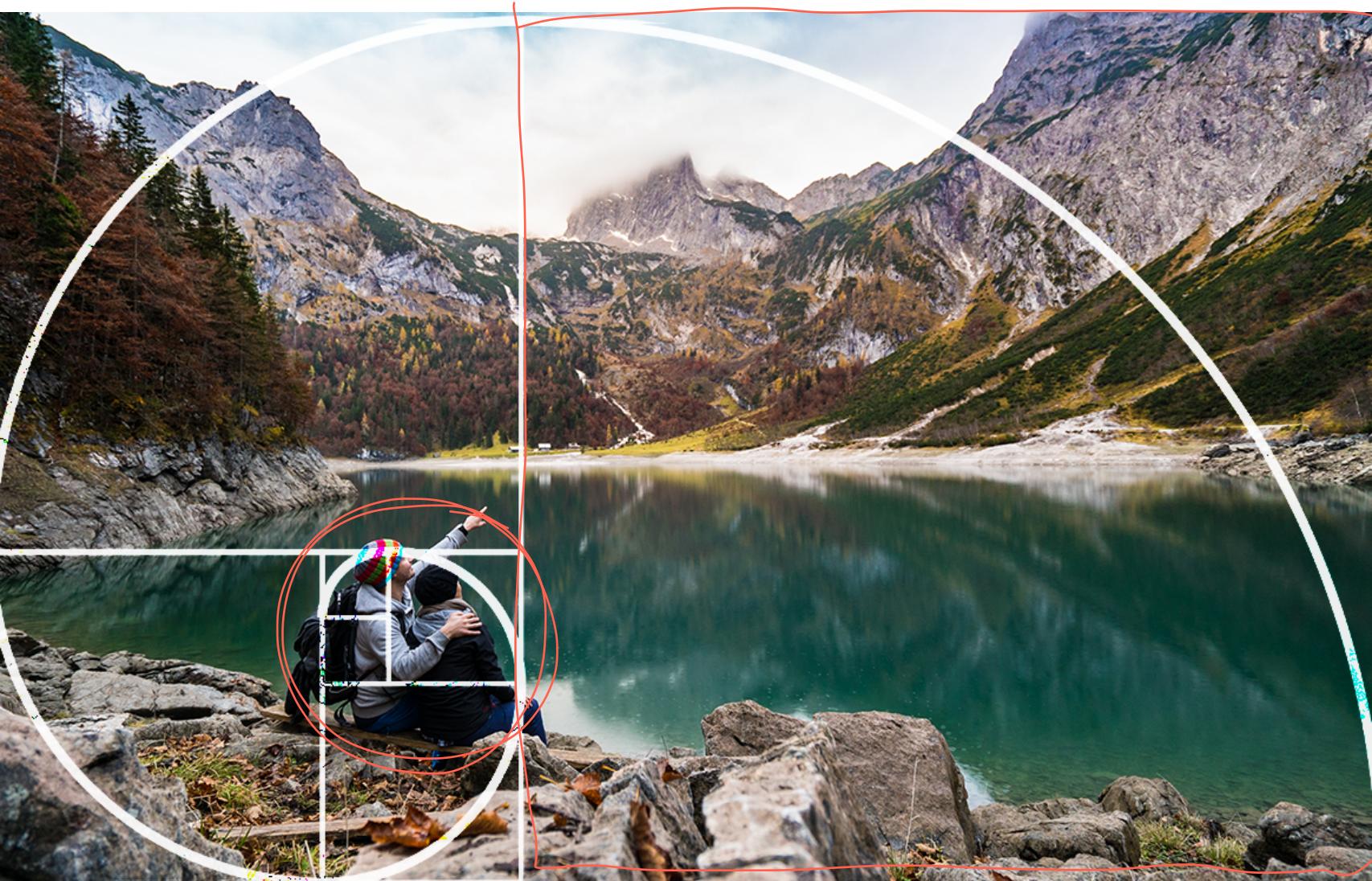
Definition: A ratio, 1:1.618, which creates a compositional grid that suggests an asymmetrical, but balanced placement of items on a layout and produces a universal aesthetic appeal.

The golden ratio



thesplashlab.com

→³ Further reading on the golden ratio



A website landing page for 'W/M'. The header features a logo with 'W/M' and navigation links for HOME, ABOUT US, SERVICES, and CONTACTS. The main section has a large title 'Business goals achieved with design' and a descriptive paragraph about the team's expertise in design for business. Below the text are 'PRICING' and 'Contact Us' buttons. The right side of the page features a large graphic of a Vitruvian Man figure, which is a stylized human form drawn within a circle and square, composed of various colors and geometric shapes. The background of this section shows a faint, semi-transparent image of a crowd of people.

Using the rule of thirds

Definition: An approximation of the golden ratio that is easier and more flexible to use. When the canvas is divided into a 3x3 grid, the intersections serve as focal points.



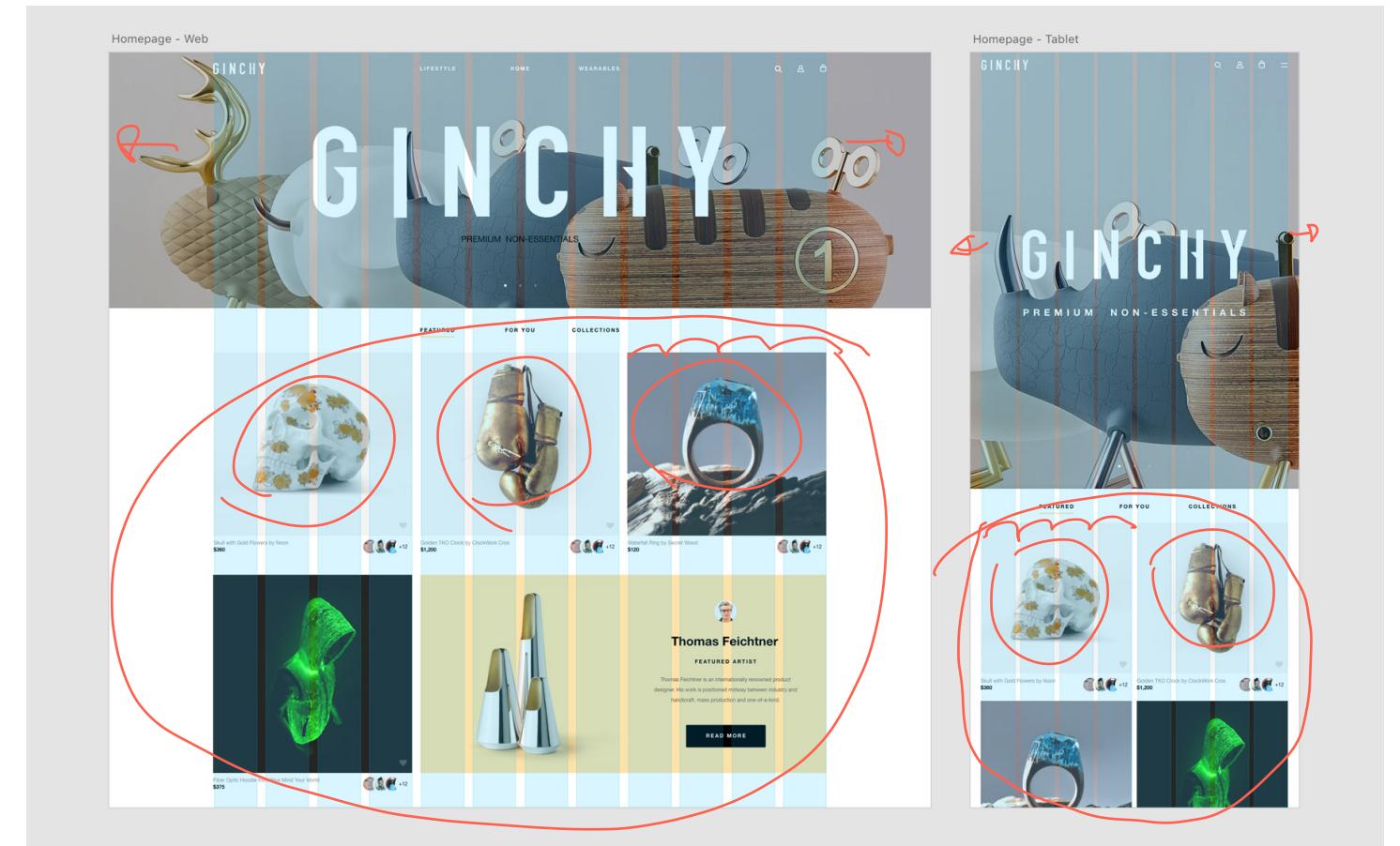
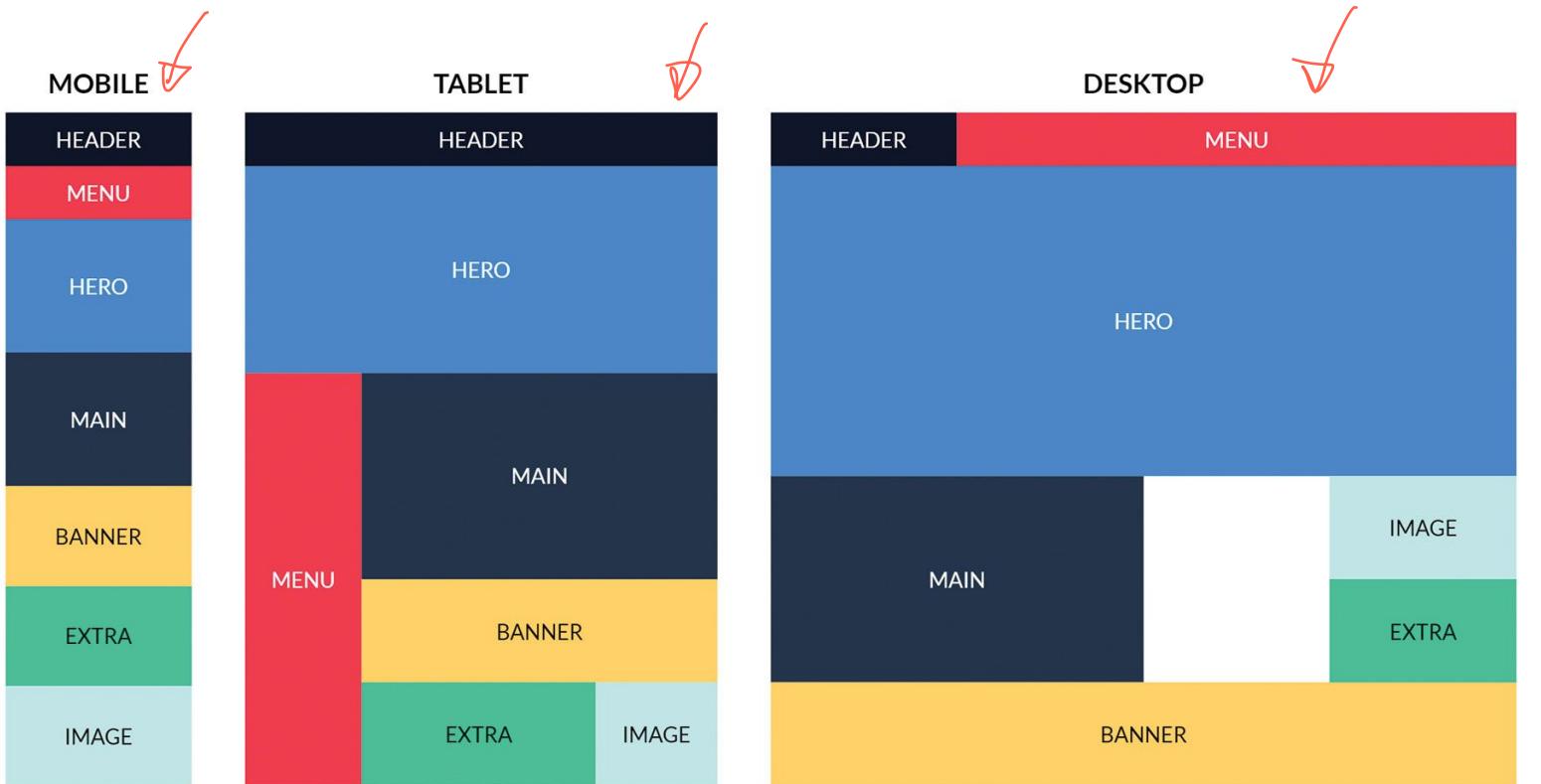
Effectively using grids

Definition: Grids serve as a visual framework for organizing elements in an orderly and balanced fashion.

Parameters associated with grids: format, aspect ratio, margins, trim size, bleed, live area, column, alley, gutter, and grid.

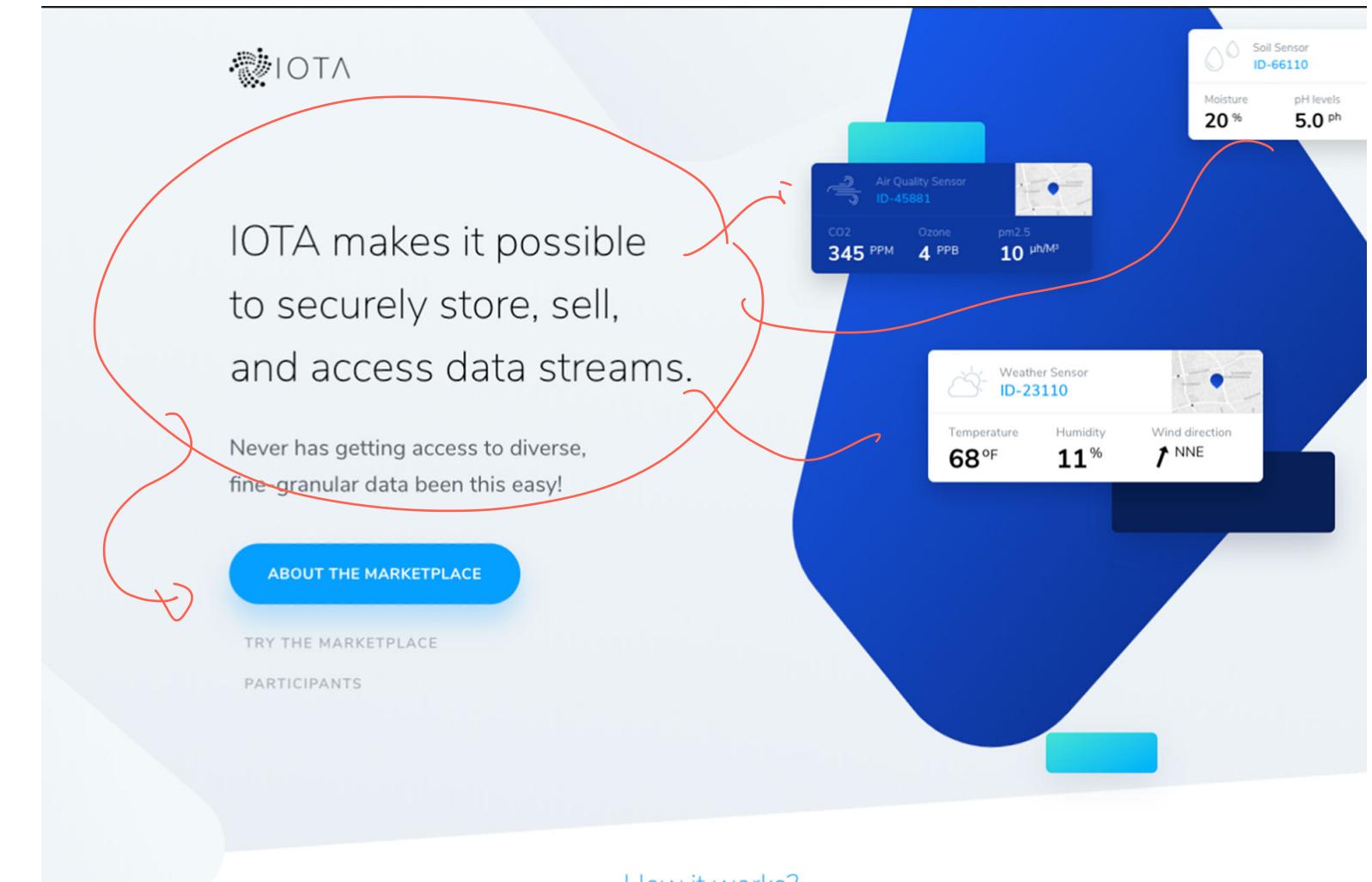
- ① Effective visual layout
- ② Modularity





Integrating type

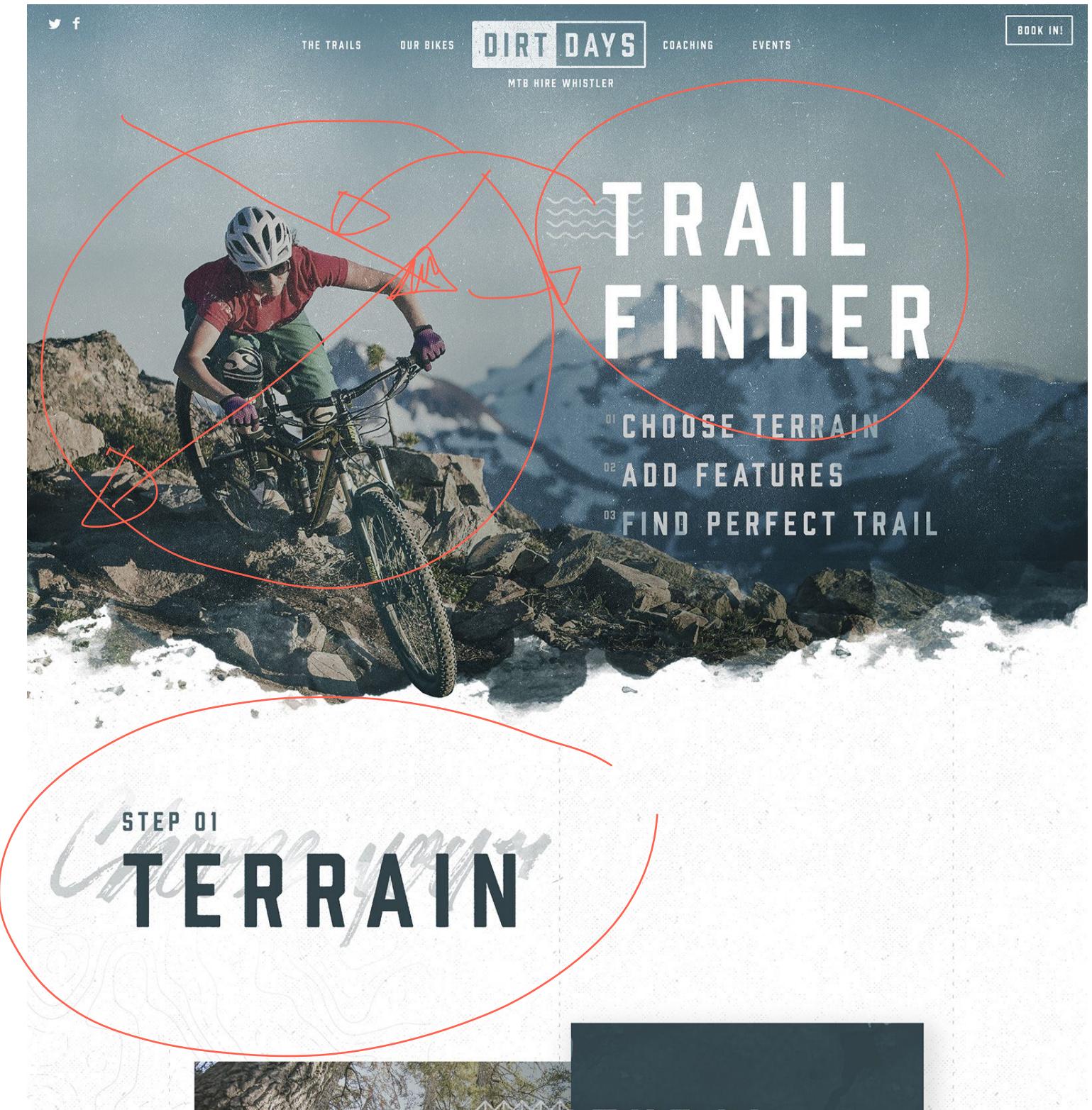
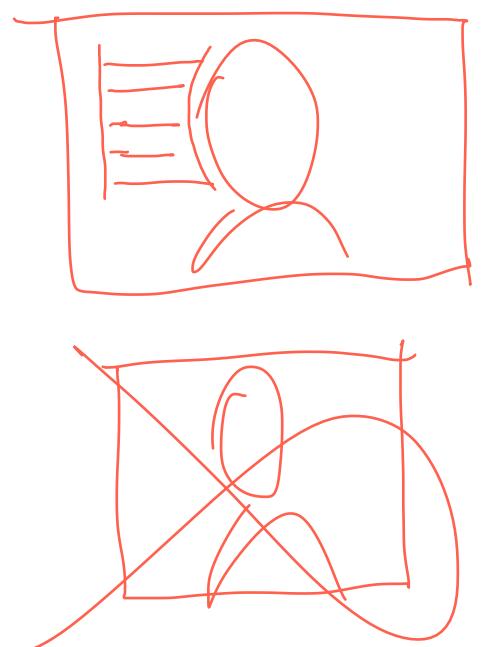
Definition: The use of *headlines* or *blocks of text* to guide the user's attention to messages.



Placing imagery

Definition: The use of imagery to create a focal point or movement on the canvas.

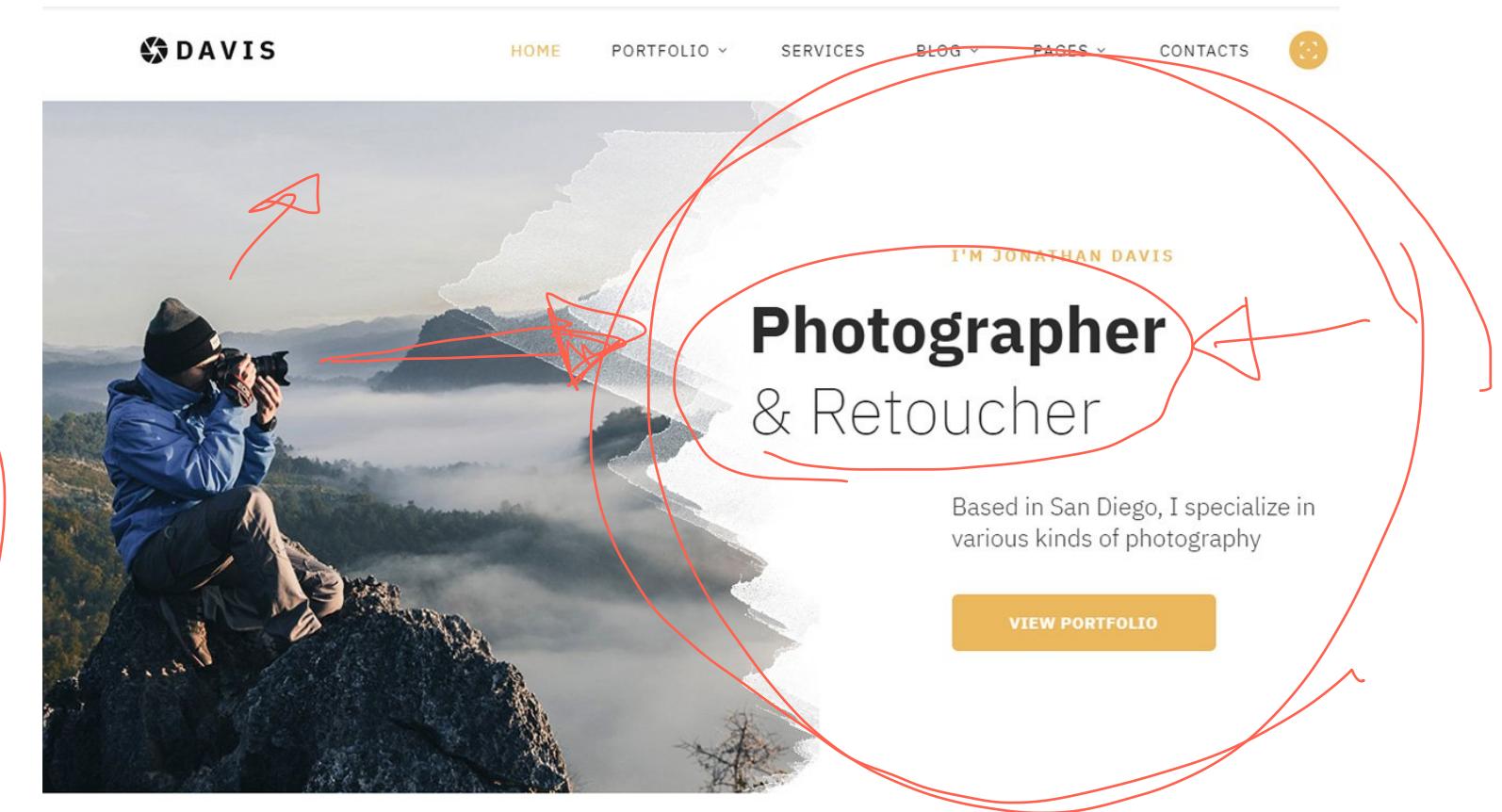
Pro Tips: Place on top, not bottom; direction should be toward next focal point; never flip images; do not interrupt headlines; do not wrap text around images.



Using negative space



Definition: Space left on the canvas from other design elements, used to provide a visual break and create balance.

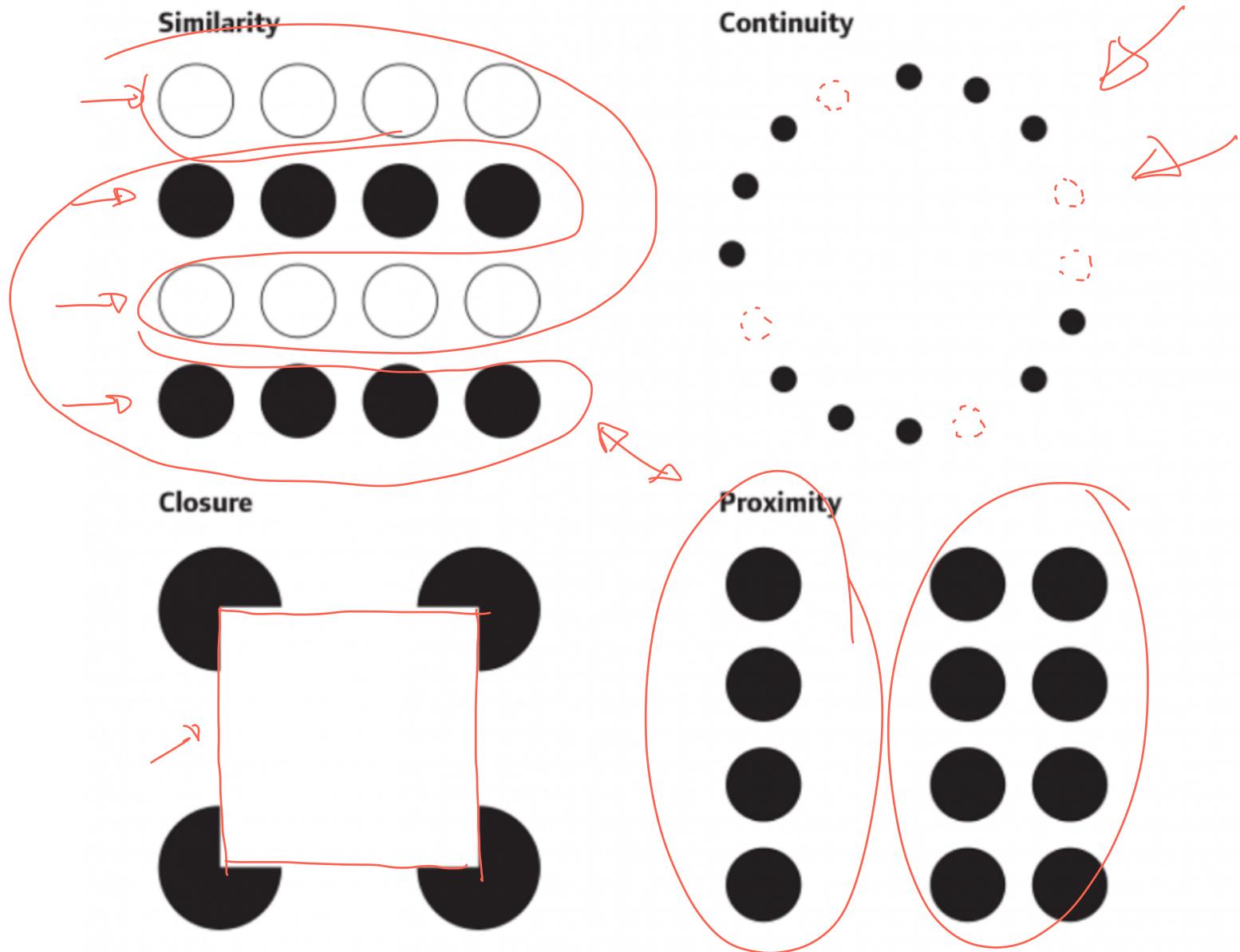


Grouping using Gestalt Theory

Definition: Visual perception principles that predict how users will perceive design elements.

Includes four key principles:

1. Proximity
2. Similarity
3. Continuity
4. Closure



Similarity
This principle states that objects that share similar visual characteristics; shape, size, colour and so on, create a connection in the viewer's mind implying that they are related or naturally belong together. In the diagram above horizontal lines of the same sized shape appear to be grouped together because alternately they are either solids or outline.

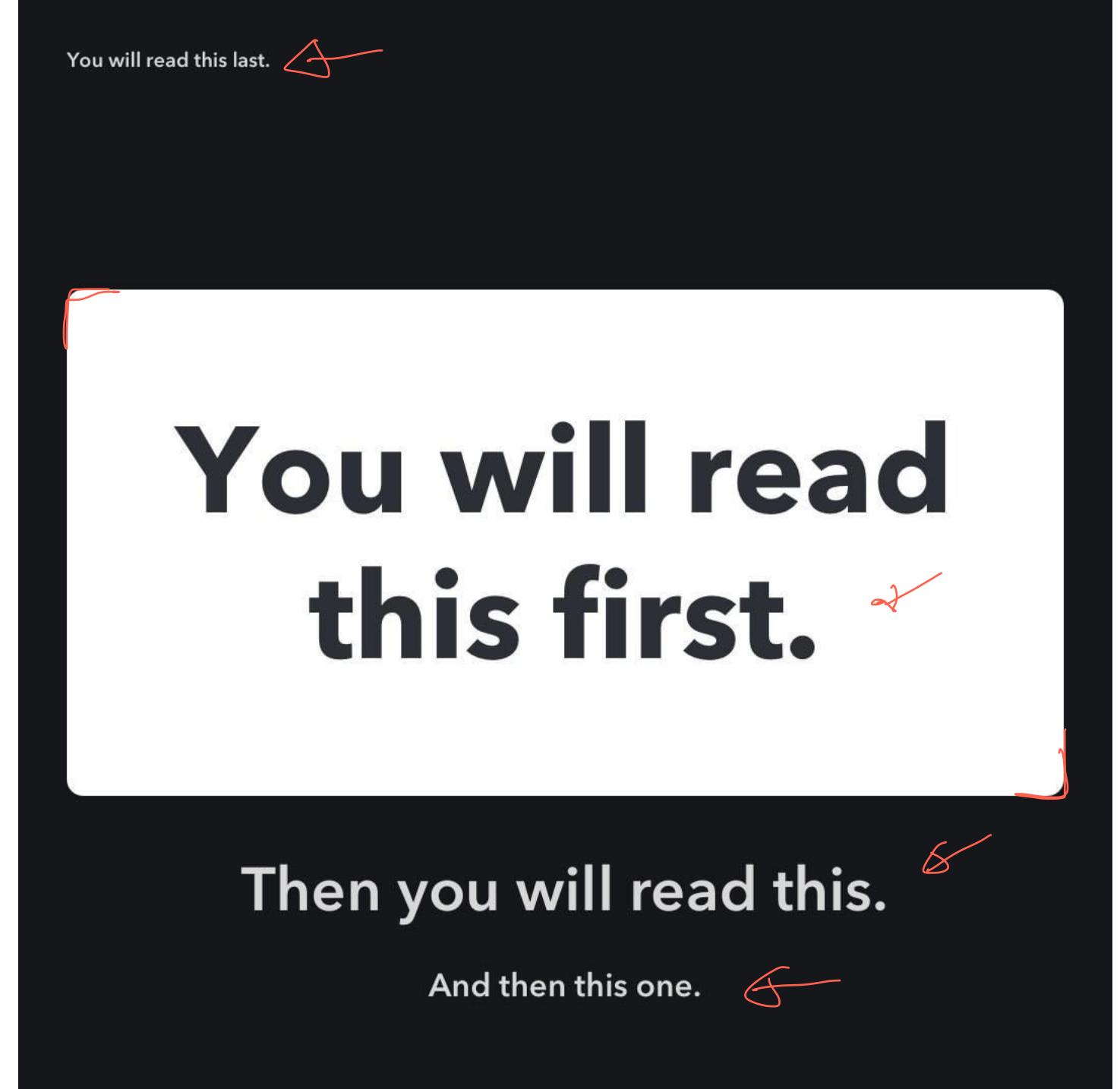
Closure
In this example the effect is created in the mind of a white square floating above four solid circles, even though there is no square. The principle of closure states that when elements are aligned in such a way that we perceive that the information is connected, we tend to see complete figures even when some of the information is missing.

Continuity
The gestalt principle at work here is that closure occurs when an object is incomplete or a space is not entirely enclosed. Provided enough of the shape is indicated, we perceive the object as whole by filling in the information that is absent, thus completing the circle.

Proximity
Proximity occurs when objects or elements are placed close together. They tend to be perceived as a group or a unified whole. In the example above, the vertical lines of dots that are closer together appear to be more related to each other or are understood as a single unit, separate from the single line of dots on the left.

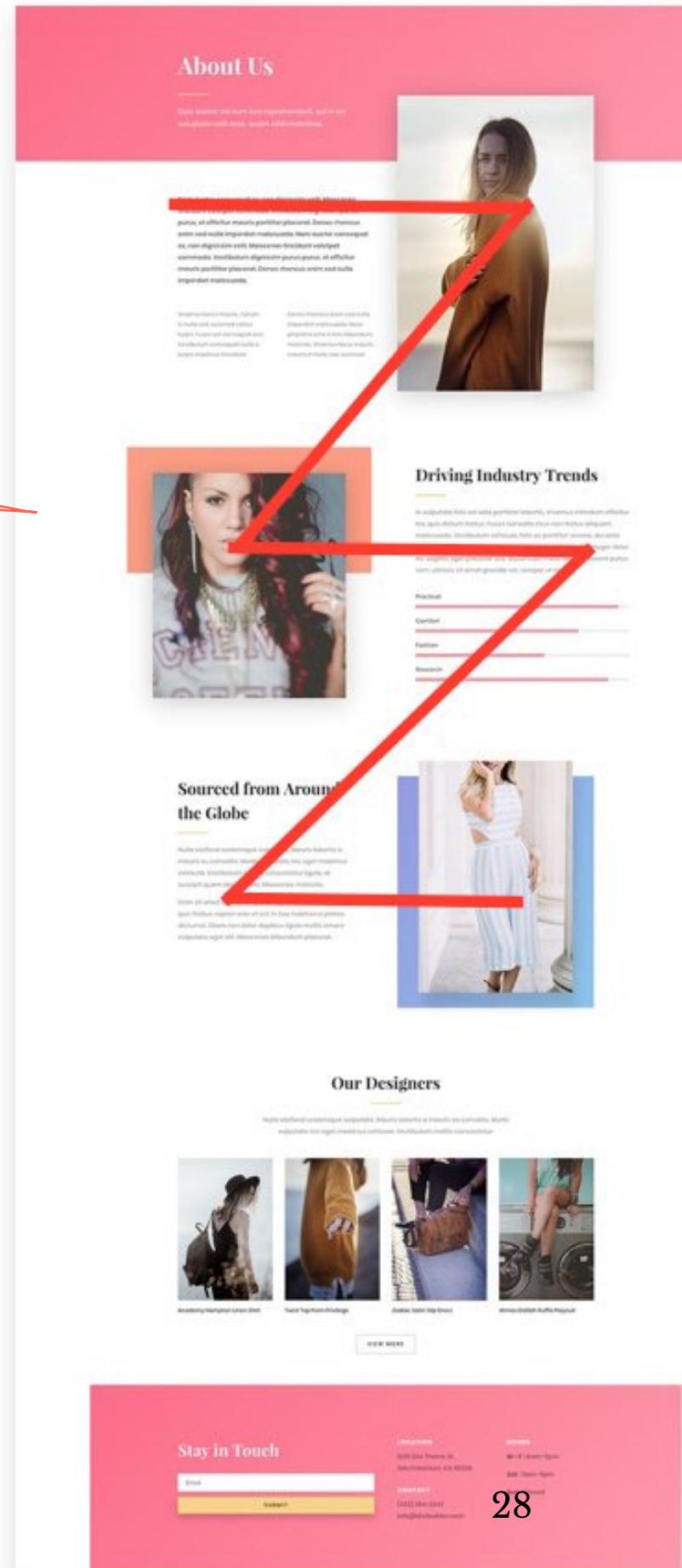
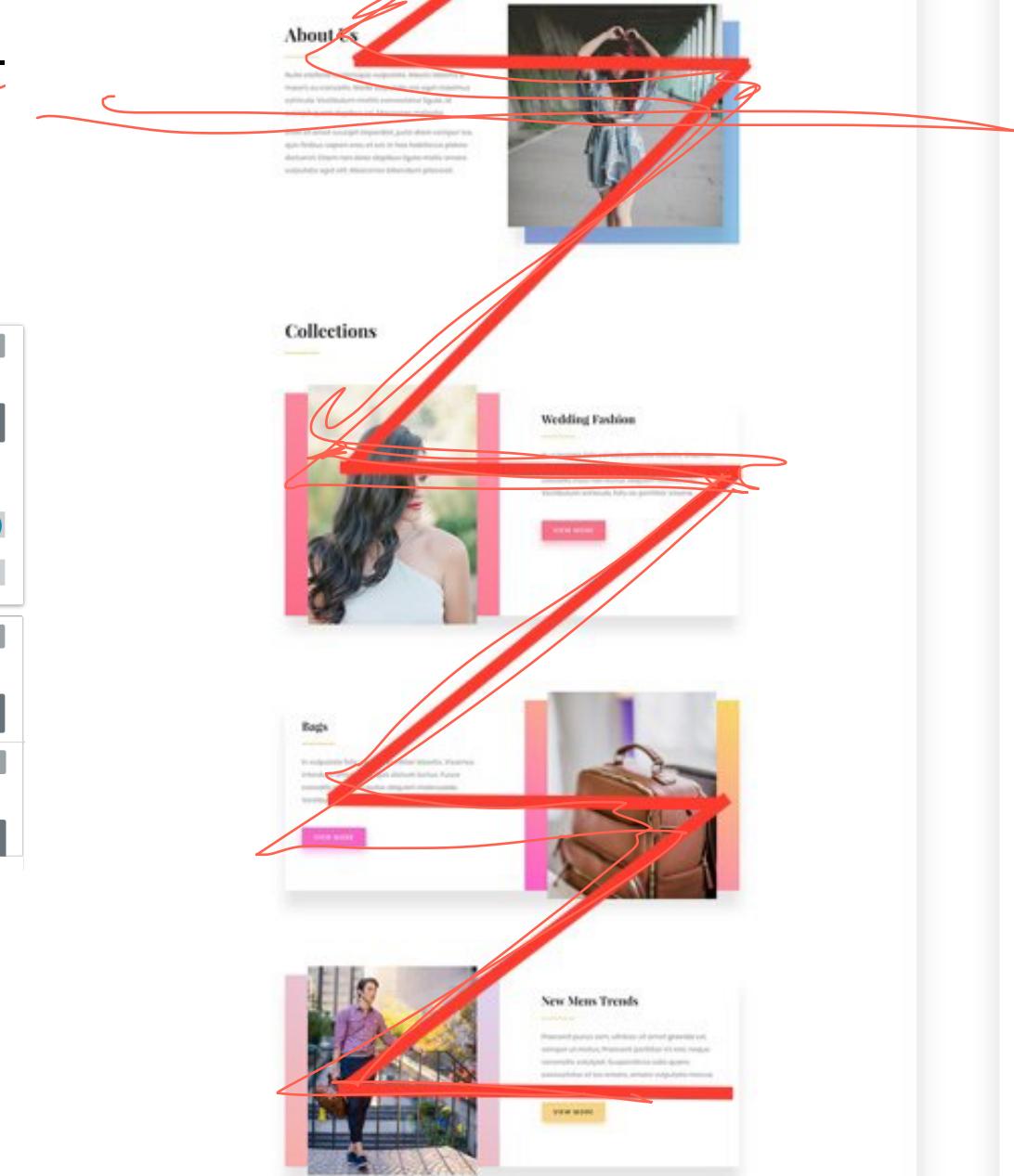
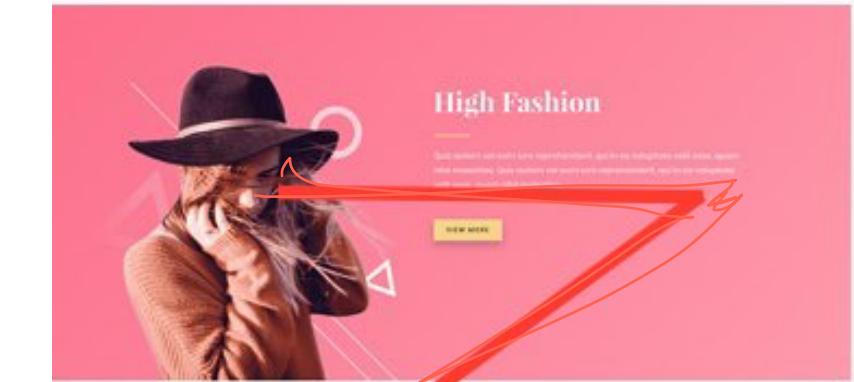
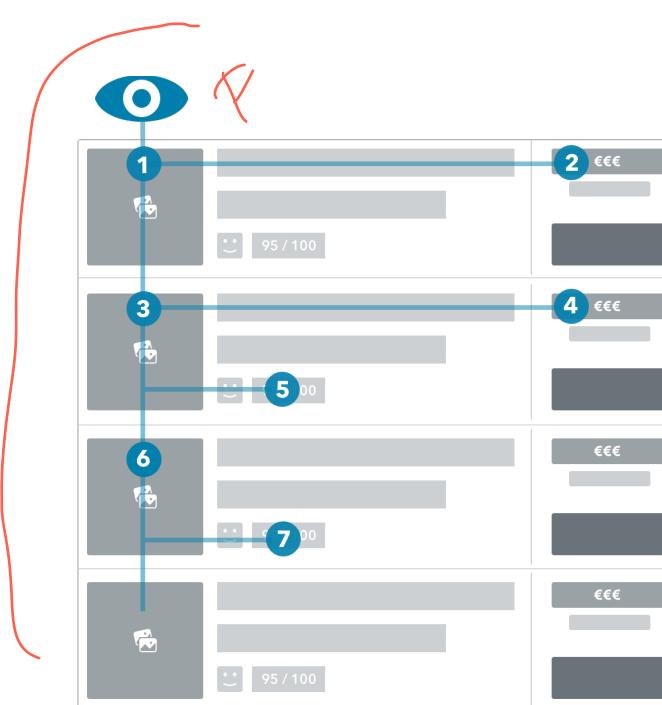
Creating visual hierarchy

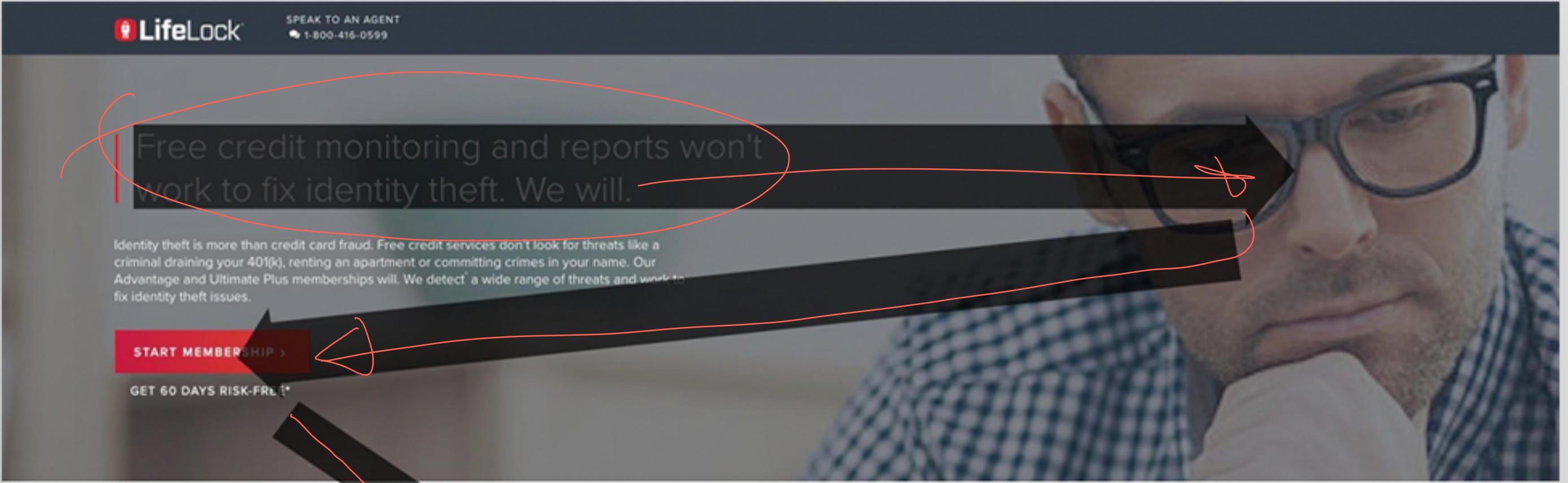
Definition: Using relative positioning and sizing to communicate what design elements are more important and should be looked at first.



Exploiting visual scan patterns

Definition: Designing layouts that exploit common eye-scanning patterns, e.g., the F-pattern and the Z-pattern.





How LifeLock works to help protect you from identity theft.

Our proprietary technology alerts you to wide range of identity threats.¹ If you have an identity theft problem, our U.S.-based team of specialists will work to fix it.



DETECT & ALERT

We can detect a wide range of threats and will alert you by phone,² email and text of the suspicious activity.³



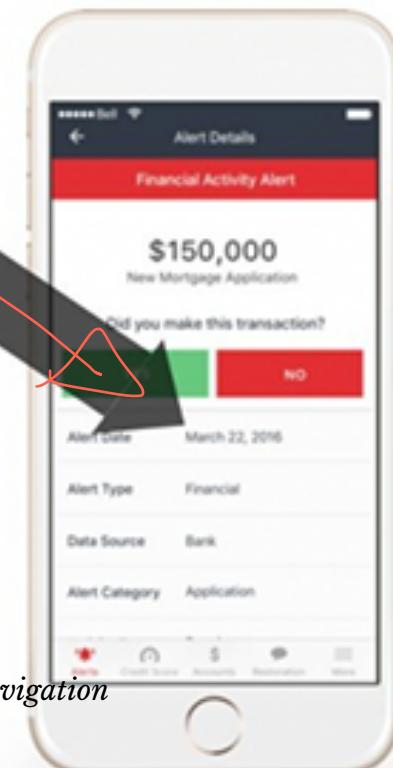
RESTORE

If you become a victim of identity theft while a LifeLock member, a dedicated U.S.-based Identity Restoration Specialist will work with you from start to finish to help fix the issue. With our \$1M Service Guarantee⁴, we'll spend up to \$1M on lawyers and experts if needed.



REIMBURSE

If you have money stolen due to identity theft, we'll replace it, as provided by your plan.⁵



Creating contrast and emphasis⁴

Definition: Using contrast and emphasis to establish visual hierarchy by manipulating features of design elements, including position, size, color, typographic characteristics.

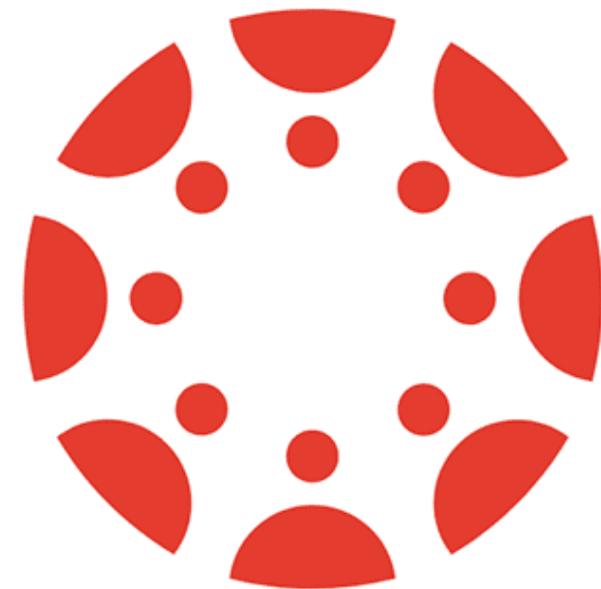
TABLE 10.1. Opposing features that can create contrast.

Contrast Type	Feature 1	Feature 2	
Spatial contrast	Filled space High density	Empty space Low density	
Layout contrast	Top High Right Isolated Symmetrical	Bottom Low Left Grouped Asymmetrical	
Form contrast		Simple ✕ Representational Geometric Angled	Complex ✕ Abstract Organic Curved
Direction contrast	Vertical Static	Horizontal Moving	
Style contrast	Technical and precise Playful	Hand-drawn and irregular Serious	
Size	Large Long Wide	Small Short Narrow	
Color contrast	Dark Black and white Warm colors Vivid	Light Colorful Cool colors Muted	
Texture contrast		Fine Smooth	Coarse Rough
Typographic contrast	<u>Serif</u> Roman style (regular)	<u>Sans serif</u> Bold style	

⁴ Golombisky & Hagen, 2010, *White space is not your enemy*

Quiz 2

Complete the [Canvas quiz](#).

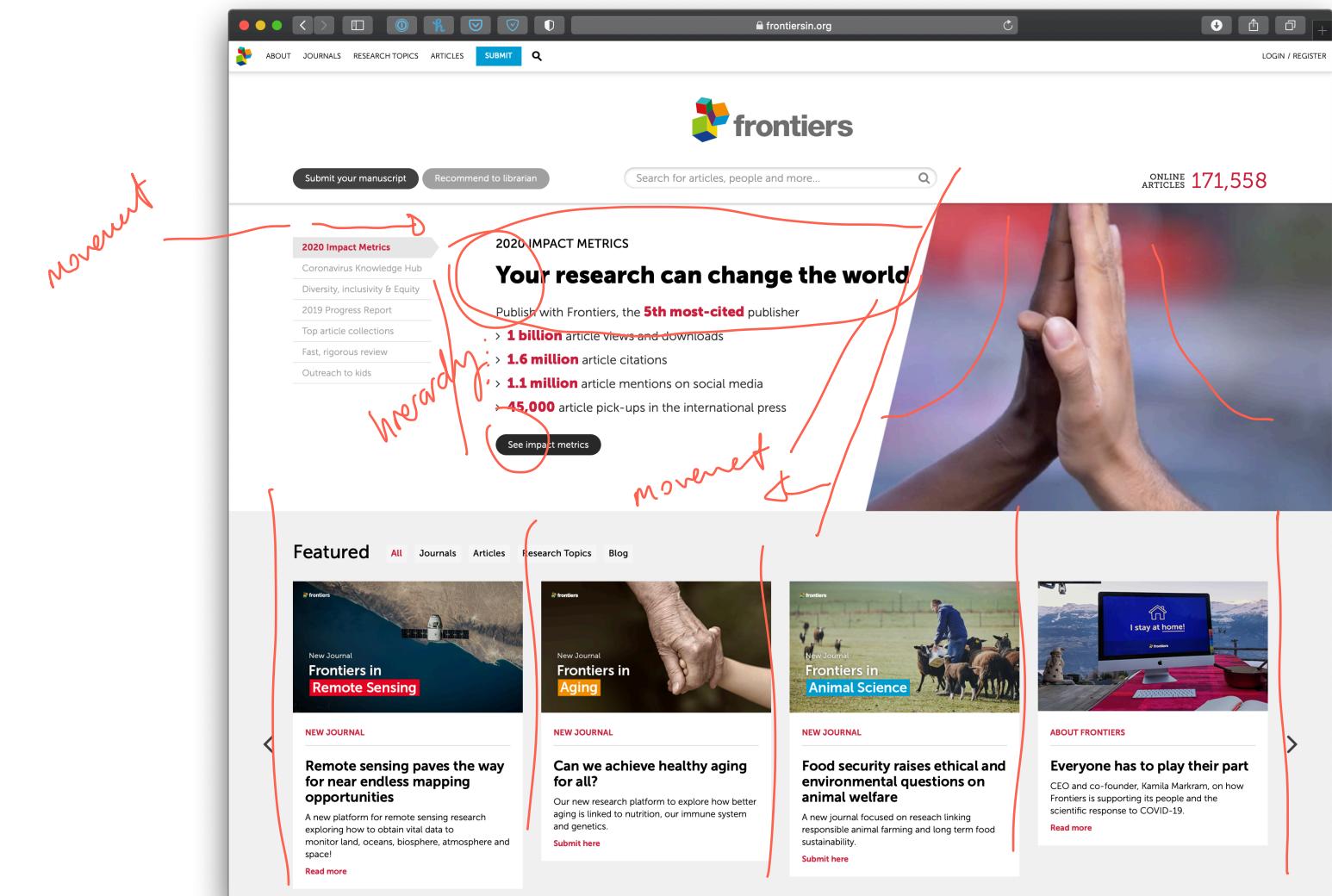


canvas

In-Class Activity 1: Layout Deconstruction

Cheatsheet:

Creating a focal point
Following the golden ratio
Using the rule of thirds
Effectively using grids
Integrating type
Placing imagery
Using negative space
Grouping using gestalt theory
Creating visual hierarchy
Exploiting visual scan patterns
Creating contrast/emphasis

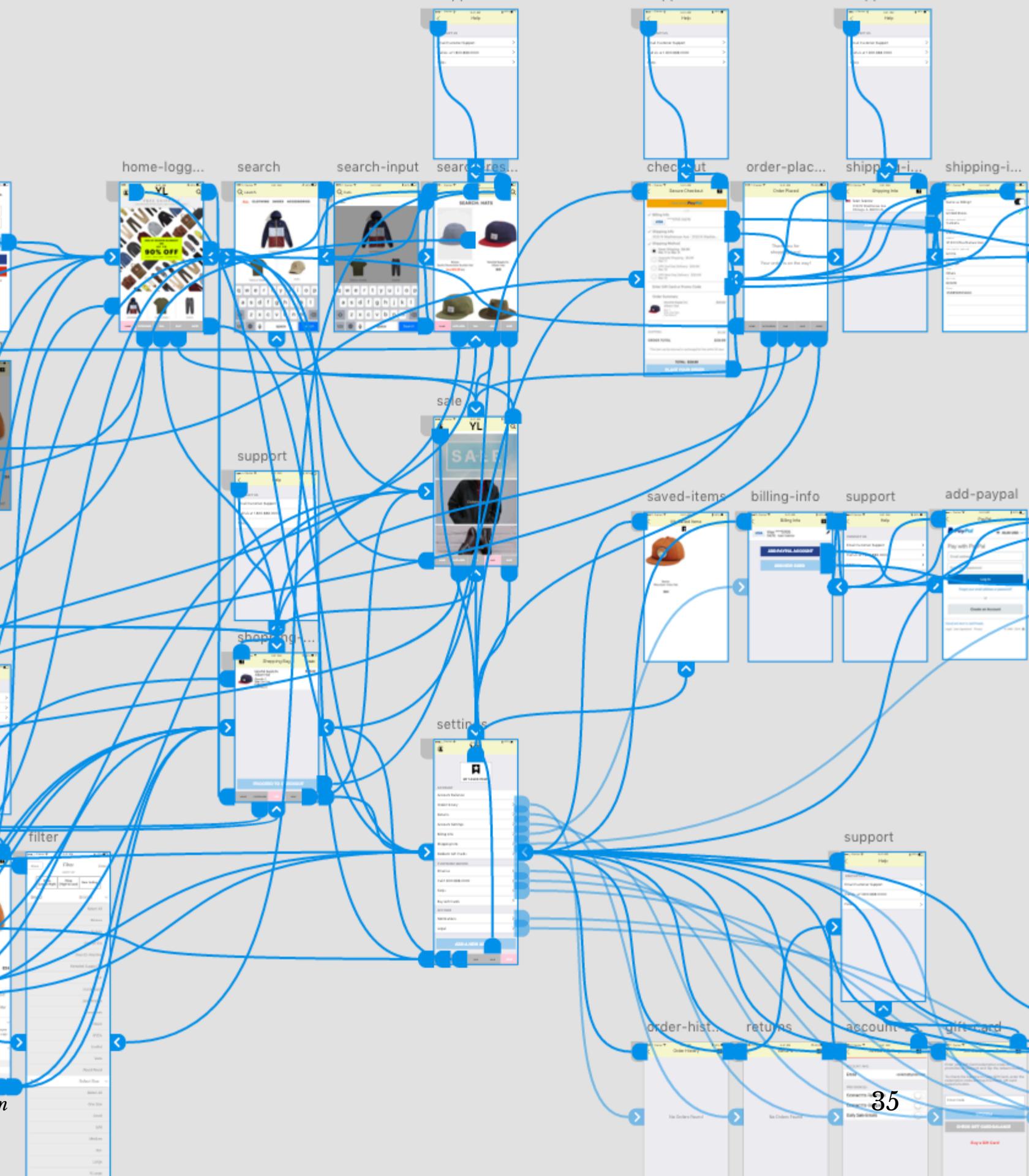


Principles of Navigation

Principles of Navigation⁵

1. Wayfinding
2. Cost
3. Aids
4. Models

⁵ Tidwell, 2010, *Designing Interfaces*



Wayfinding

Definition: User behavior where navigation across components follows a particular workflow or supports user goals.

Three key elements:

- 1. Labels & signage
- 2. Navigation clues & aids
- 3. Maps, e.g., site maps

*local
in/out
user
global*



E2 Centrum
E2 Amfiteatern
Huvudutgång

[BACK TO SHOP](#)

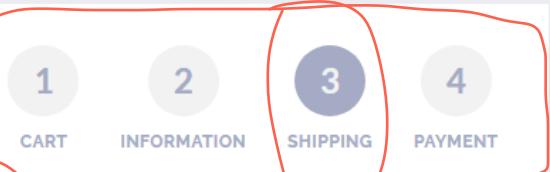
SECURE CHECKOUT 

Complete Your Purchase

NEED HELP?

If you need help, contact us and let us help you. Support is available for 24 hours.

+111 2345 678 mail@company.com



[BACK](#)

SHIPPING METHOD

Choose one of the shipping methods below

Standard Shipping 2-3 Days

\$3.00

Special Shipping 1-2 Days

\$7.50

SHIPPING TO

John Doe
32 Syarifudin Street, West Bogor, West Java,
Indonesia 112233

PHONE 012 34 567 89
ETD 1-2 Days

ESTIMATION

Order

\$137.19

Shipping

\$0.00

Discount

\$0.00

Tax

\$10.00

TOTAL

\$147.19

[GO TO PAYMENT METHOD →](#)

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The screenshot shows a product page for a Cuisinart MCP-12N Multiclad Pro Stainless Steel 12-Piece Cookware Set. The product image displays several stainless steel pots and pans. The price is listed as \$197.21 & FREE Shipping. There are links for Shipping Details & FREE Returns, a Coupon button, and a link to save an extra \$6.09 with a coupon. The page also mentions Amazon's Choice and a 2,264 customer reviews. A 'Get the Best Deal' button is present. The total estimated cost is \$147.19, including shipping and tax.

SITEMAP

- | | |
|--|--|
| <p>Monki</p> <p>H&M HOME</p> <p>& Other Stories</p> <p>ARKET</p> <p>Afound</p> | <p>Animal welfare</p> <p>Chemicals</p> <p>Climate positive value chain</p> <p>Water</p> <p>Business ethics</p> |
| <h3>Get involved</h3> | |
| <p>Career</p> <p>Grow with us</p> <p>Be yourself</p> <p>Enjoy our culture</p> <p>More about our values</p> <p>Be proud</p> | <p>Care for your clothes</p> <p>Recycle your clothes</p> <p>Sustainability Summary 2017</p> |
| <h3>Investors</h3> | |
| <p>Lead the way</p> <p>Randall April, H&M</p> <p>Andreas Sjunnesson, Weekday</p> <p>Anna Norling, Cheap Monday</p> <p>Michael Hafner, Monki</p> <p>Sofia Carpentier, & Other Stories</p> <p>Helene Fredell, H&M Home</p> | <p>Financial calendar</p> <p>Reports and presentations</p> <p>The H&M group 2017 in words and pictures</p> <p>Capital Markets Day 2018</p> <p>The share</p> <p>Shareholders</p> <p>Dividend</p> <p>Five year summary</p> |
| <h3>Media</h3> | |
| <p>Stylish rewards</p> <p>H&M Incentive Program</p> <p>Find your career with us</p> | <p>Newsroom</p> <p>Image galleries</p> <p>Calendar</p> <p>Social media</p> <p>Media contacts</p> |
| <h3>Sustainability</h3> | |
| <p>Vision and strategy</p> <p>Sustainability strategy</p> <p>Stakeholder engagement</p> | <p>Media contacts</p> |

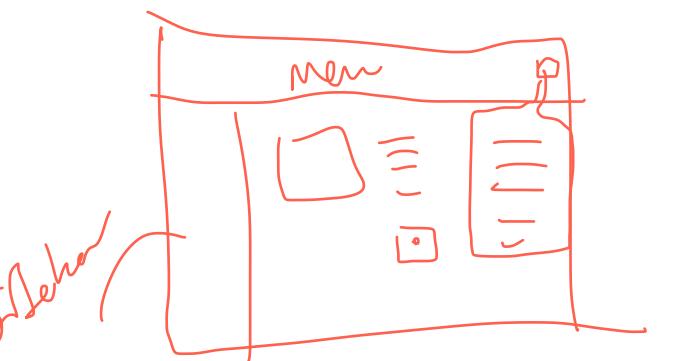
Cost

Definition: The time and effort required by users to navigate between components.

Two key principles:

1. Minimize factors that increase cost of navigation: *context switch, errors, delays* <
2. Minimize travel time by minimizing number of steps and context switches

Aids



Definition: Design elements that aid users in navigating through content.

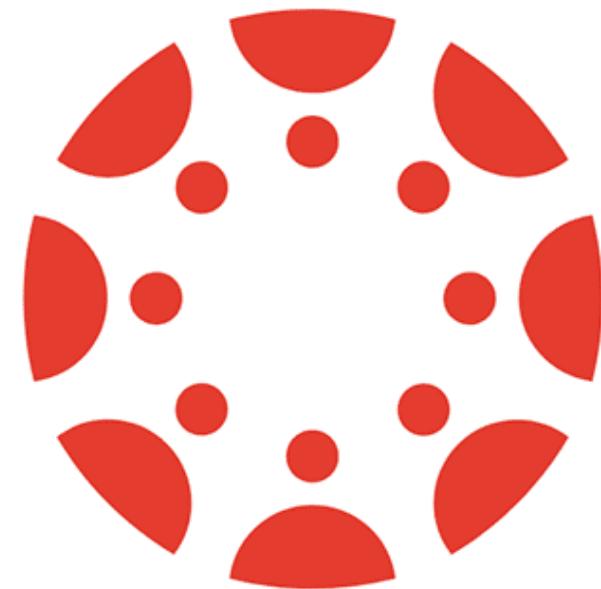
Three types of navigation aids:

1. Global navigation aids, e.g., menus, tabs, sidebars
2. Utility navigation aids, e.g., settings pane
3. Associative/in-line navigation aids, e.g., related links



Quiz 3

Complete the [Canvas quiz](#).



canvas

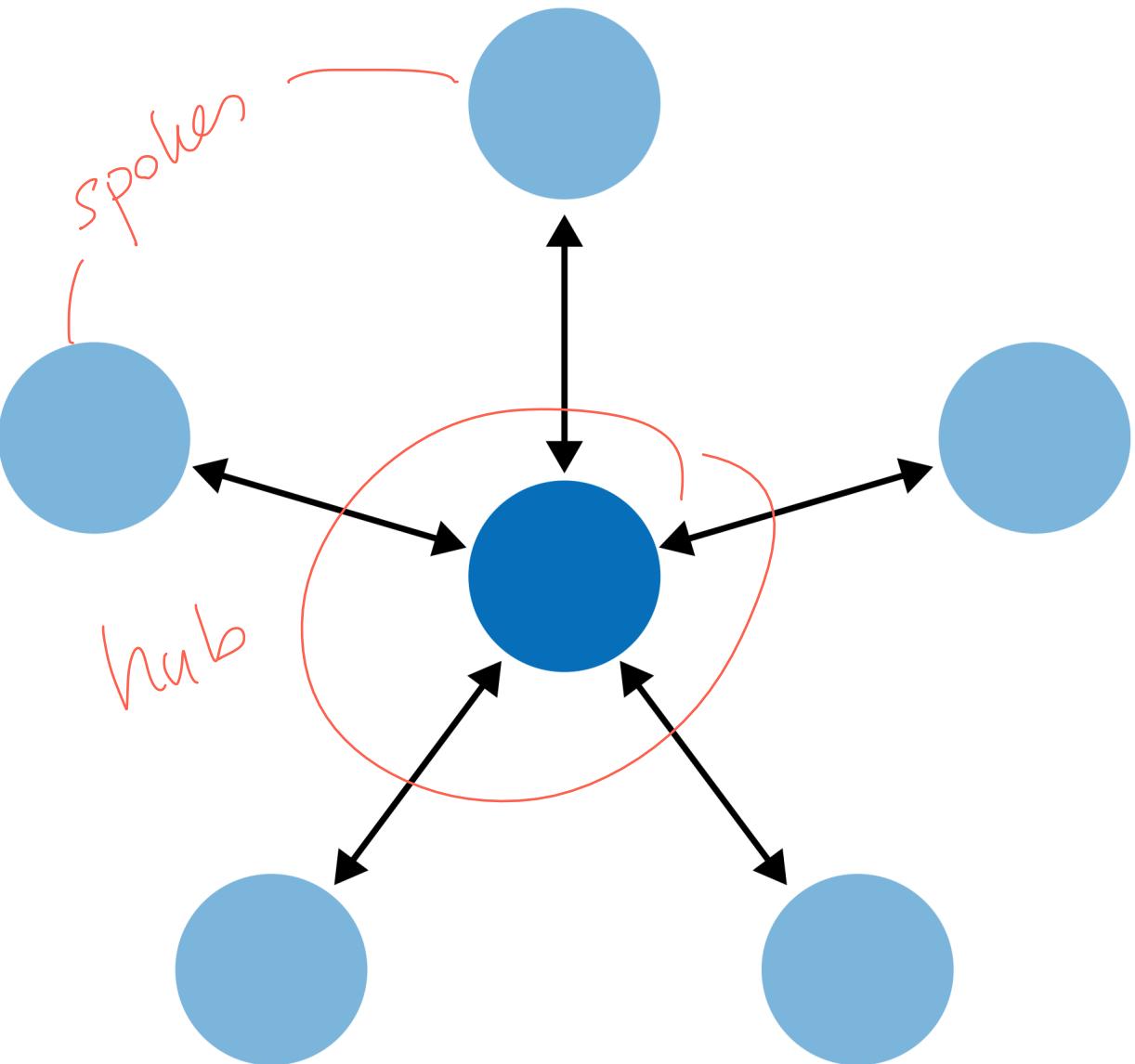
Models

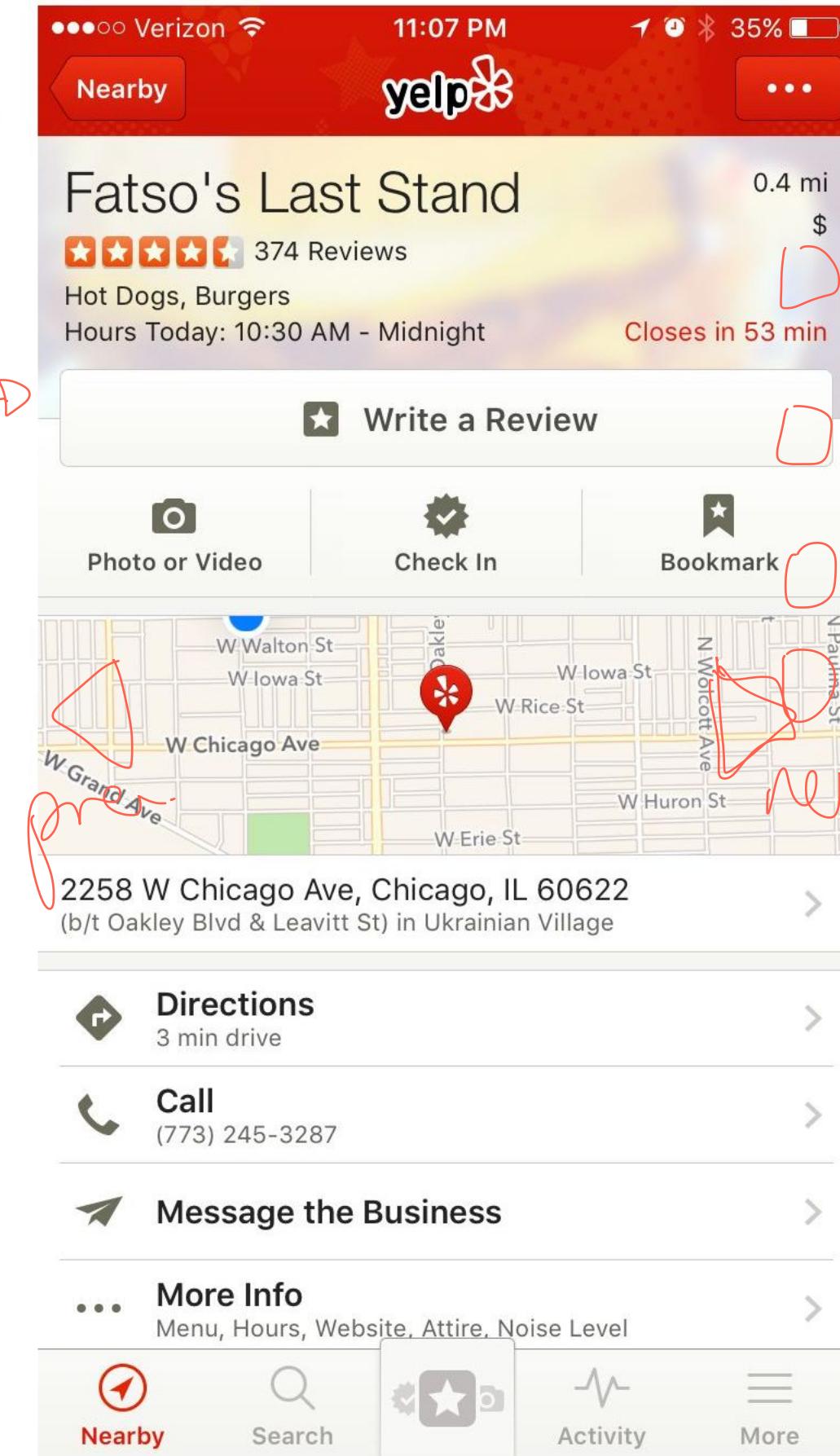
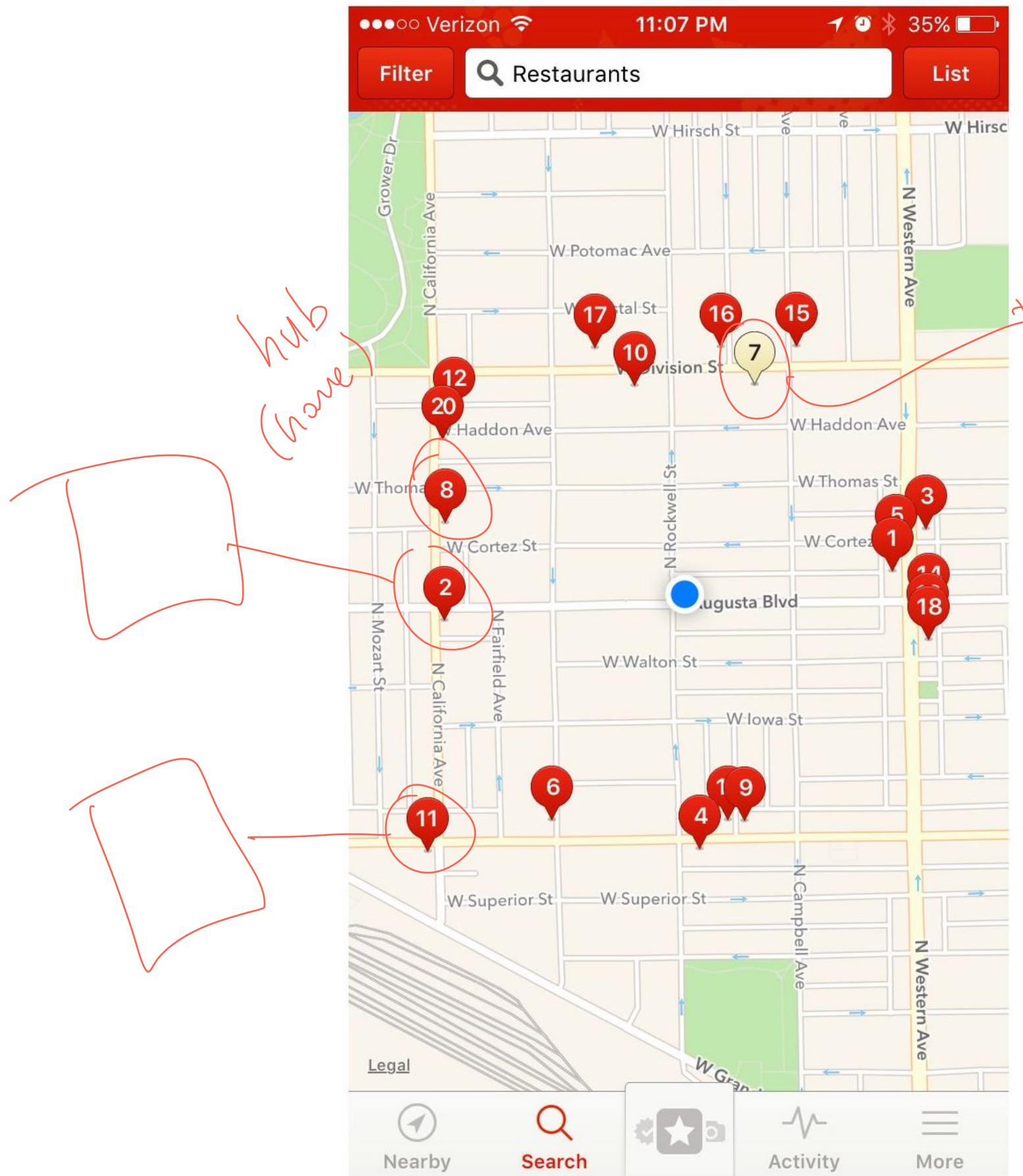
Definition: Commonly used patterns of navigation through interactive applications.

- 1. Hub and spoke
- 2. Fully connected
- 3. Multi-level
- 4. Stepwise
- 5. Pyramid
- 6. Pan-and-zoom
- 2. Flat navigation
- 3. Modal panel
- 4. Clear entry points
- 5. Bookmarks
- 6. Escape hatch

Models: Hub & spoke

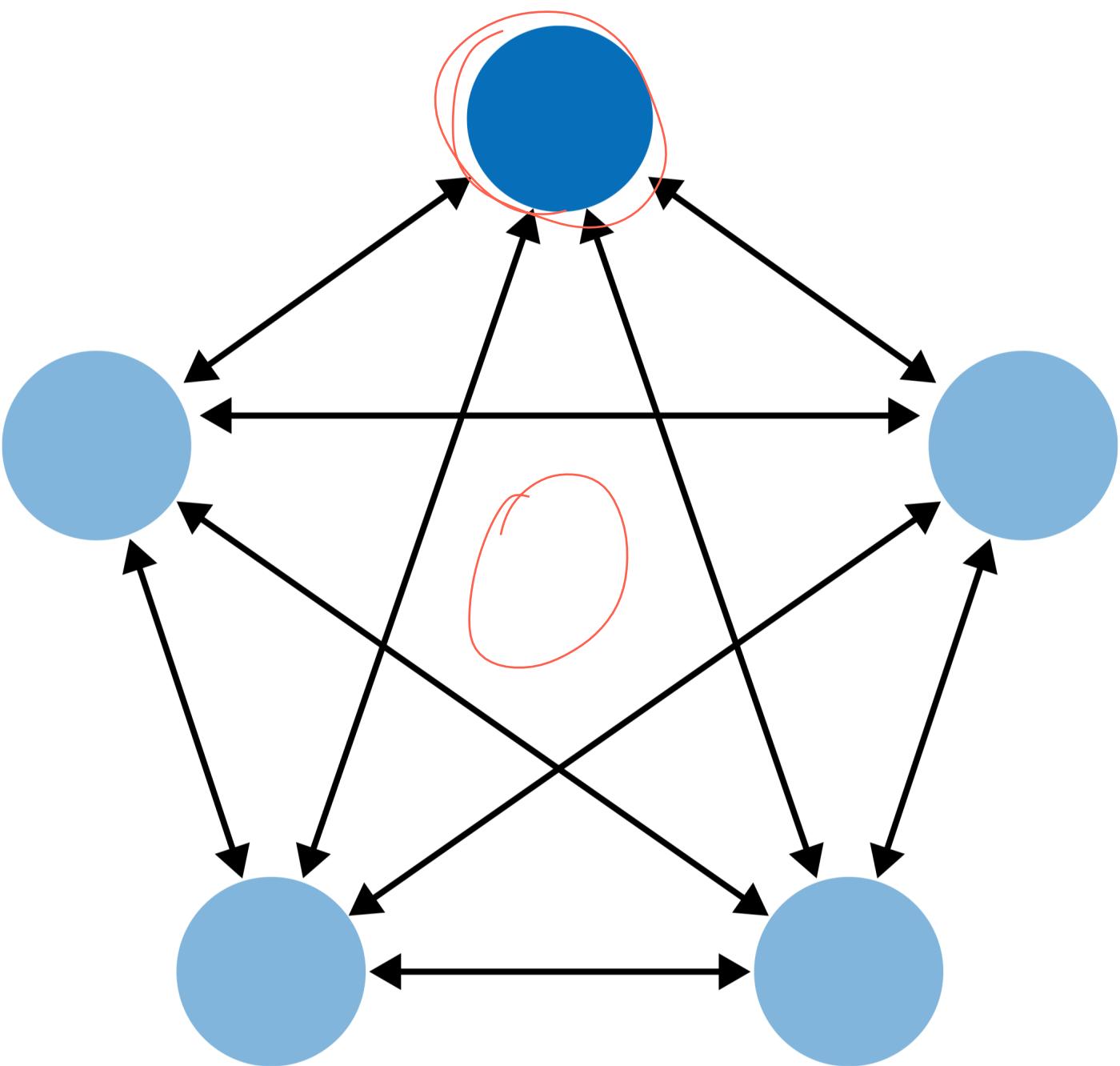
Definition: Involves a central hub, e.g., a home screen, that provides transitions to and from several specialized components.





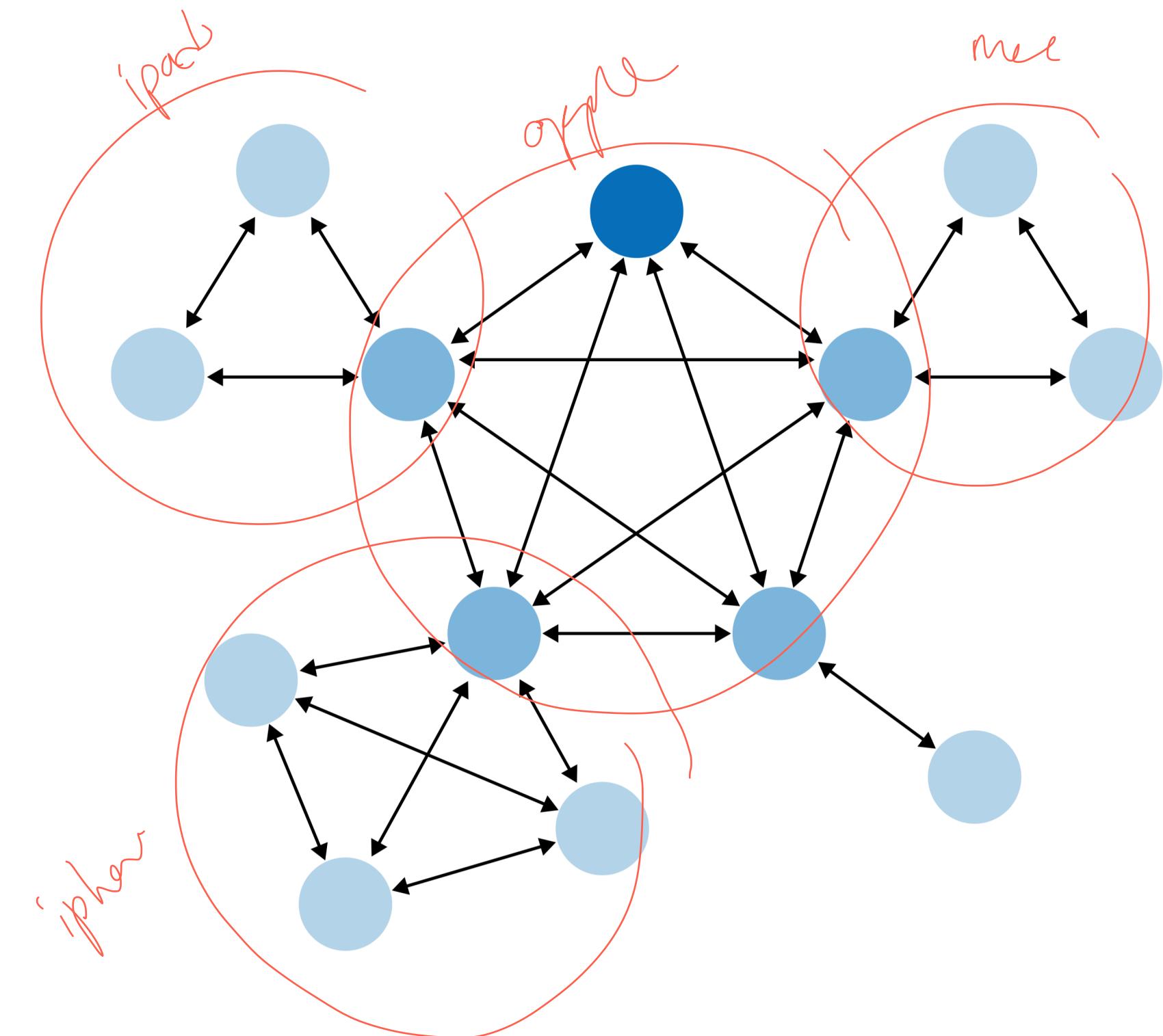
Models: Fully connected

Definition: A central component/page is connected to all other components that are also linked to each other.



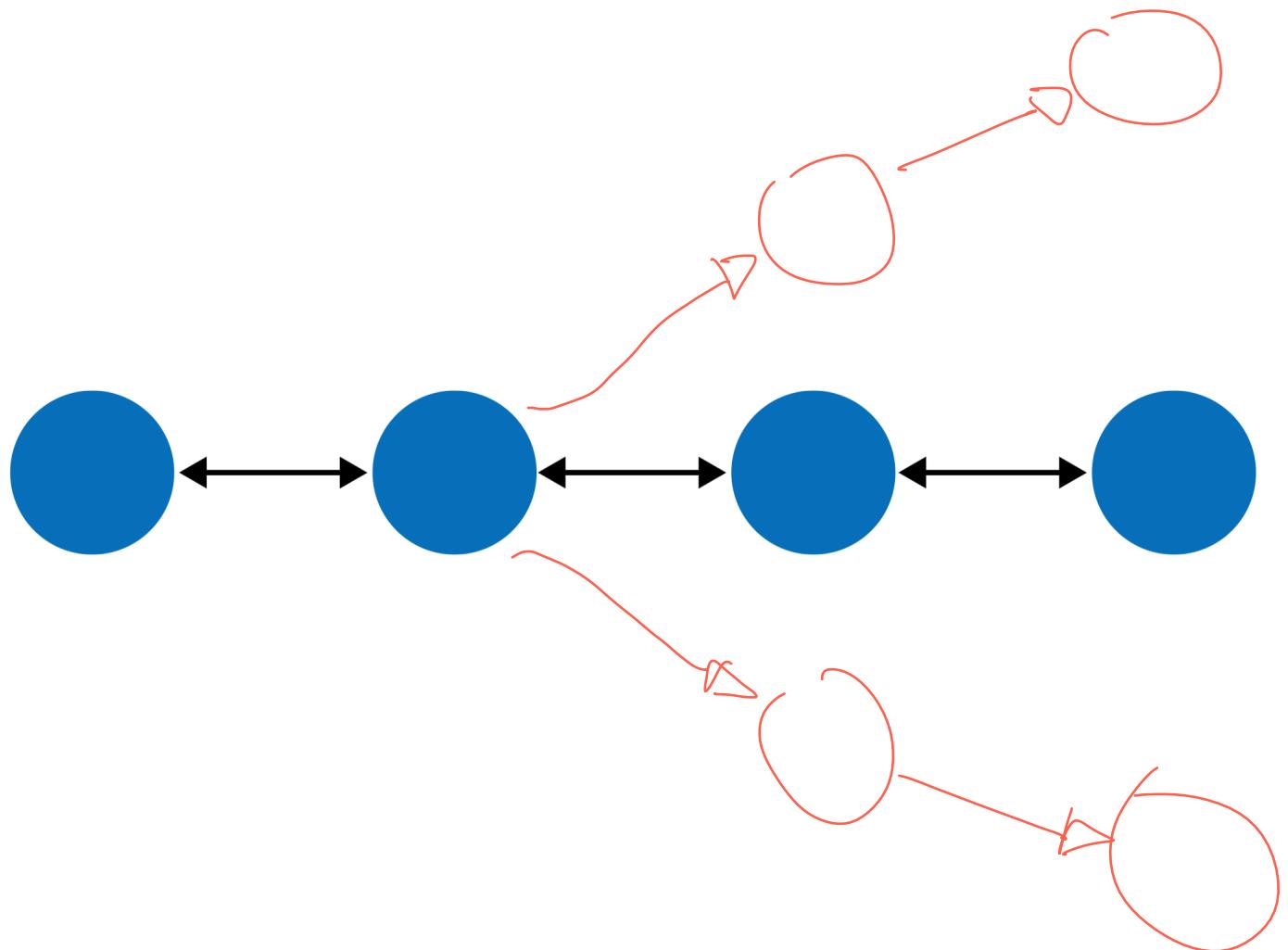
Models: Multi-level

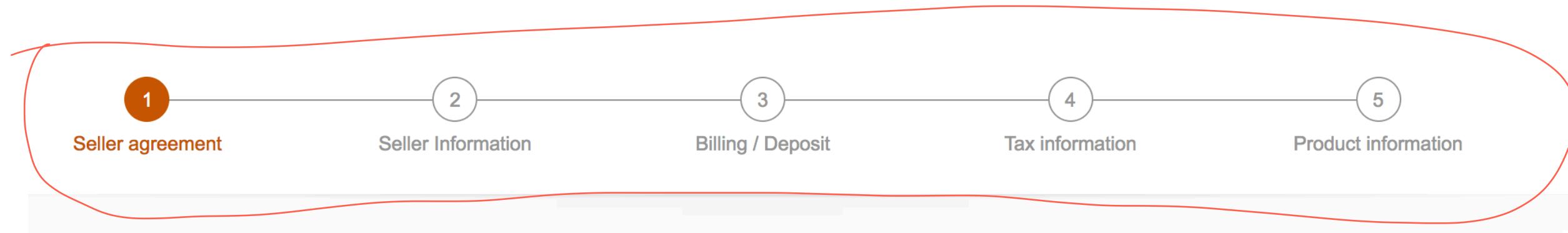
Definition: Involves main components that are fully connected with each other and sub-components that are only connected among themselves.



Models: Stepwise

Definition: Follows a sequential or branching navigation that represents step-by-step process, e.g., checking out on an e-commerce site.





Set up your Amazon selling account

Have the following available:



**Business name &
address**



**Mobile or
telephone number**



**Chargeable credit
card & valid bank
account**



Tax information
[What does this mean?](#)

Legal name

[What is a legal name? ▾](#)

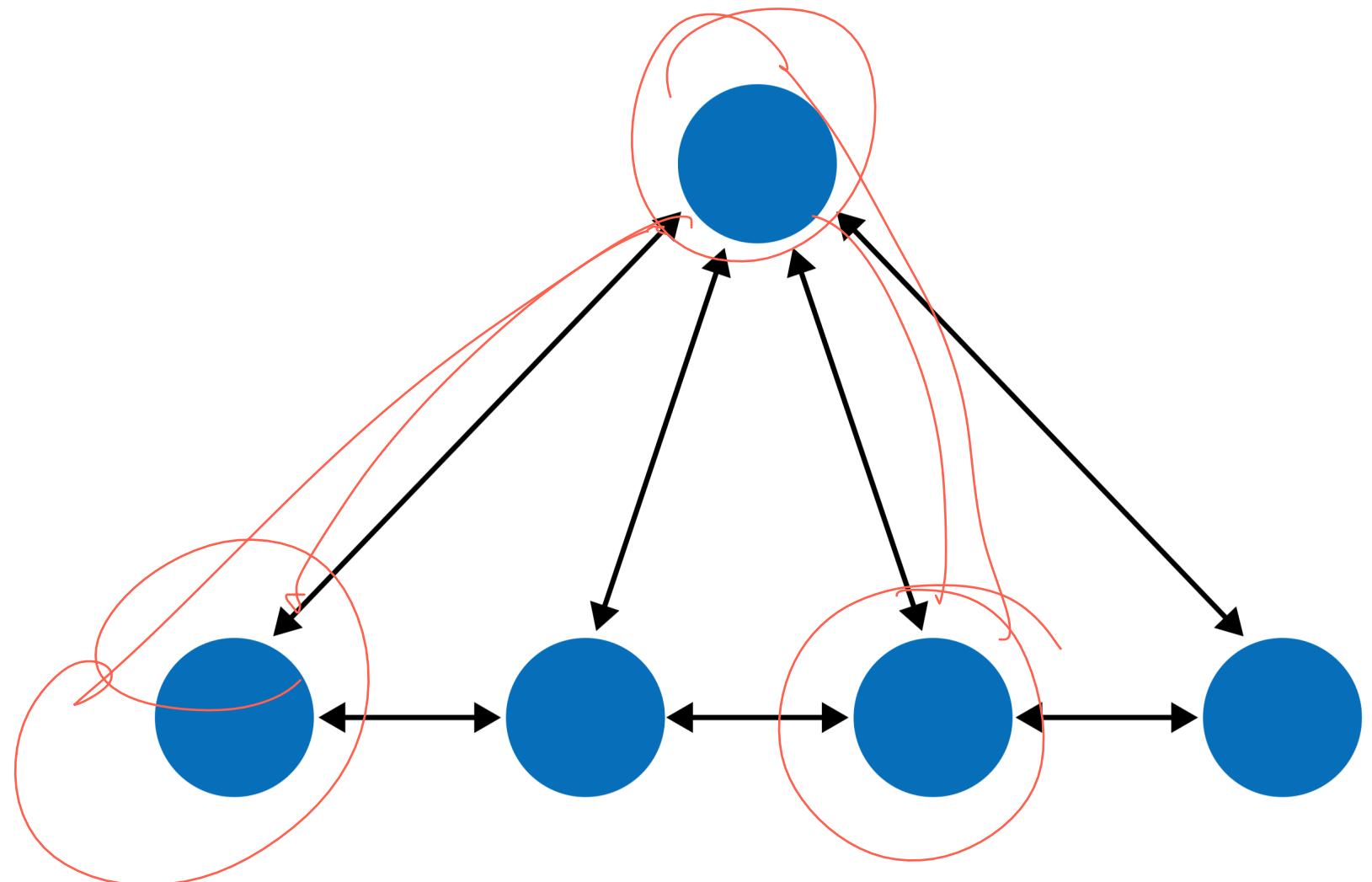
Seller agreement

I have read and accepted the terms and conditions of the
[Amazon Services Business Solutions Agreement](#)

Please Leave Feedback

Models: Pyramid

Definition: Similar to the stepwise model, but at each step, the user can navigate to the hub and back.



TurboTax Online

intuit **turbotax** Federal Free Edition

Upgrade My Account Search Contact

< Tax Timeline Personal Info Federal Taxes State Taxes Review File

\$0 Federal Refund \$0 NY Refund (in progress) Hide

Prepare State Your State Returns State Review



Let's get your state taxes done right

Here's what's coming up:

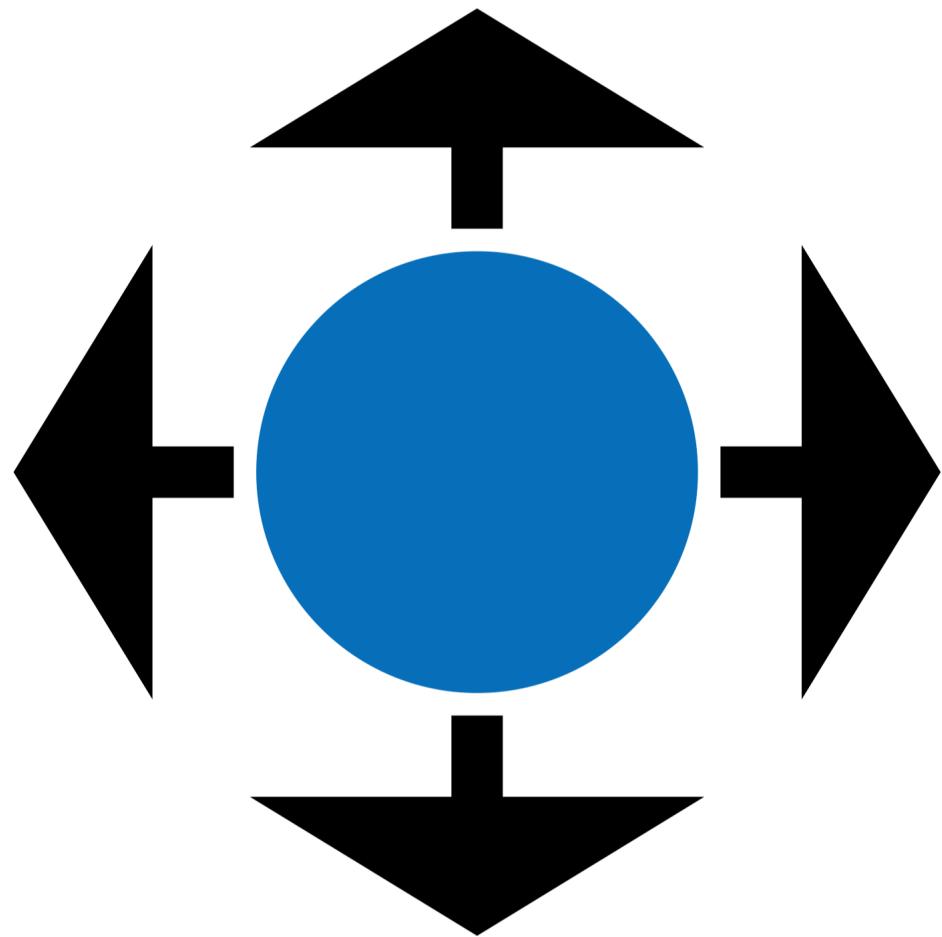
- We'll cover your state requirements
- We'll search for state tax breaks
- We'll help ensure your taxes are accurate

< Back Continue

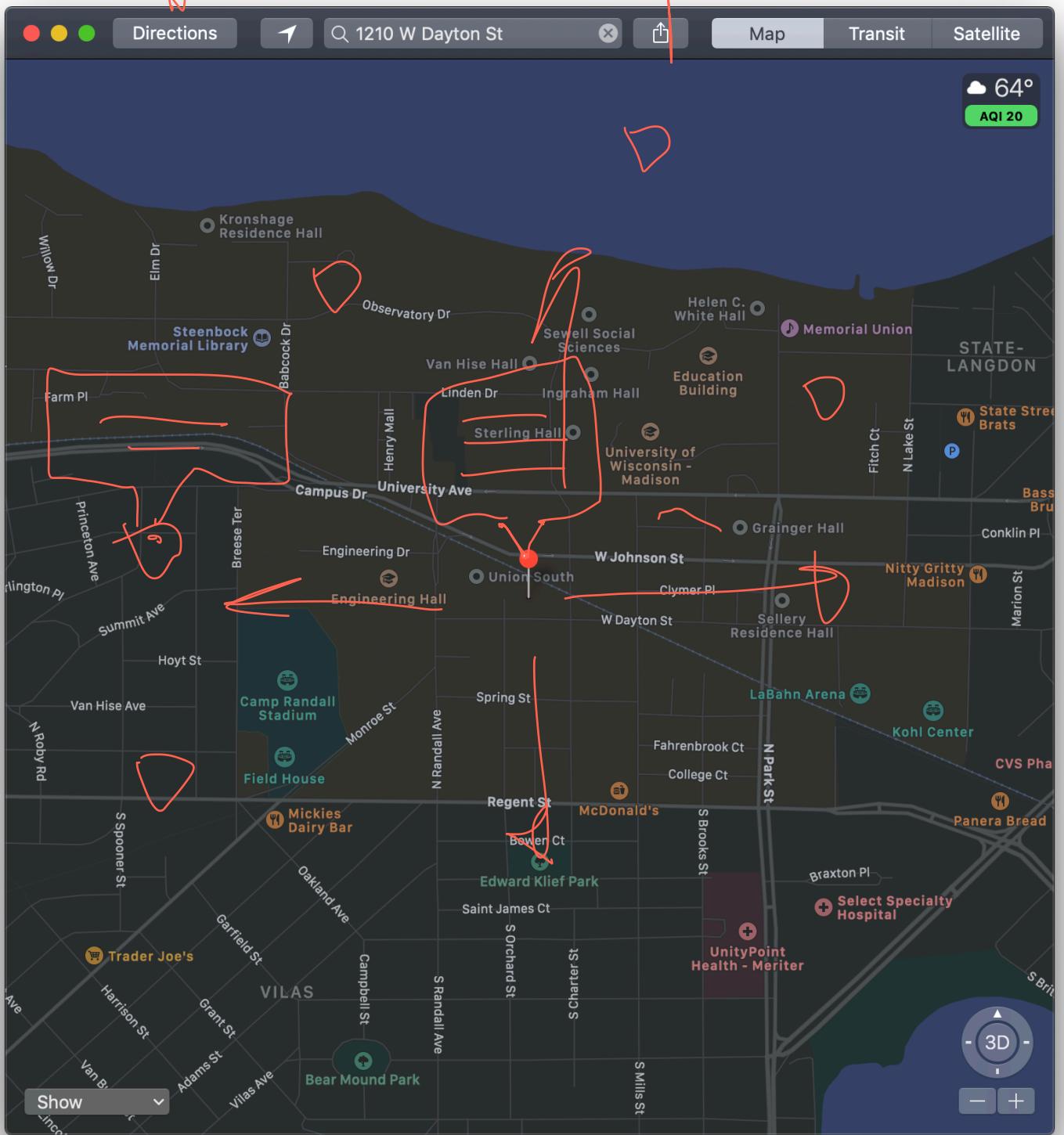
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Models: Pan-and-zoom

Definition: Provides users with the ability to continuously navigate across a large space of content, e.g., a map, a list, or a written document.



Map



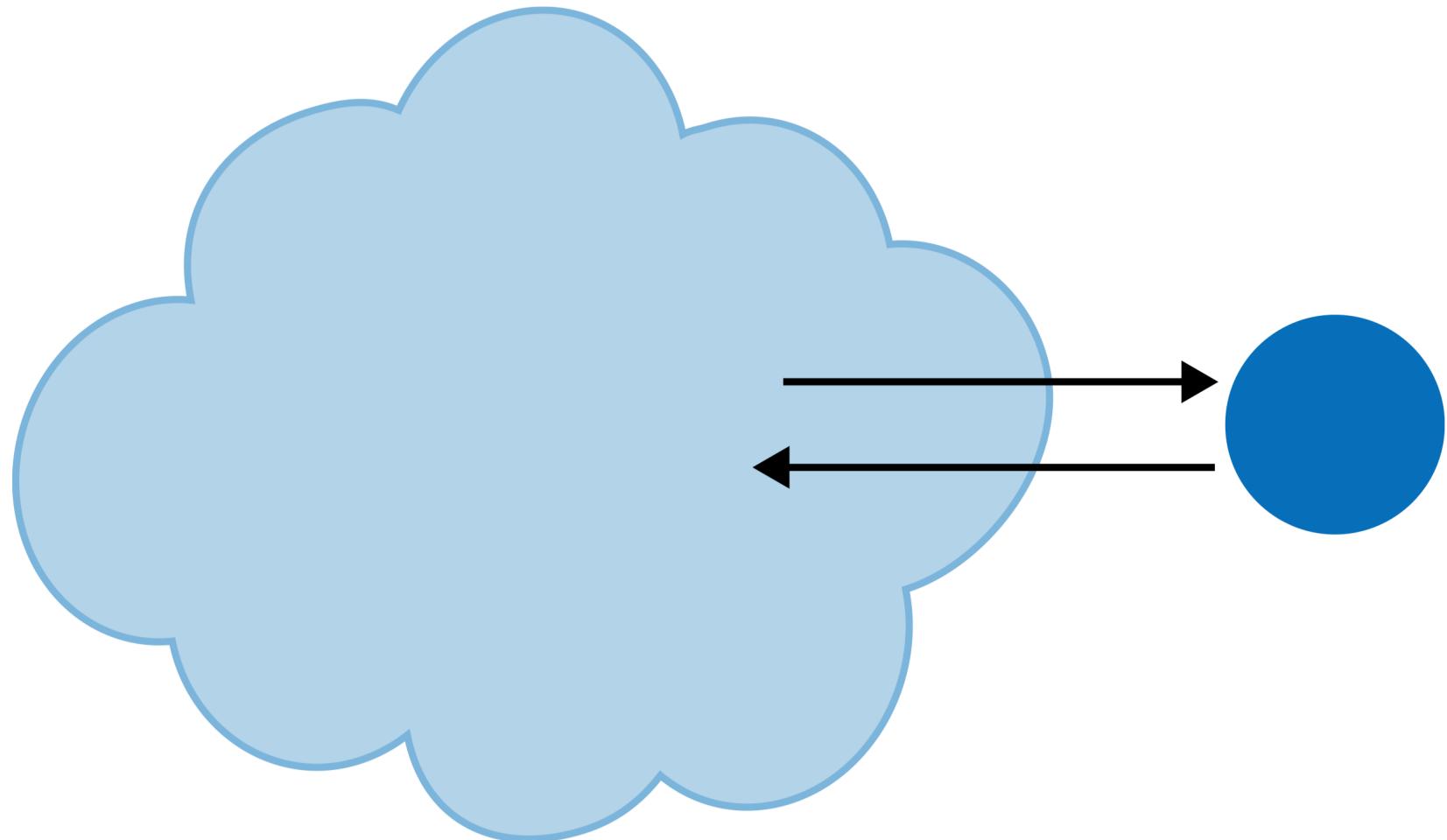
Text edit

Vestibulum sodales sem sit amet erat faucibus pellentesque. Duis vestibulum in velit ac cursus. Nullam ultrices feugiat nisl sed fermentum. Donec neque eros, molestie vel ullamcorper at, molestie vitae risus. Cras ut vestibulum mi. Pellentesque vitae bibendum sapien, sed mattis sem. Nam eu quam orci. In ut imperdiet nibh. Sed lectus est, commodo non augue at, vehicula tristique tellus. Proin condimentum, orci sed imperdiet commodo, nisl ipsum sodales ipsum, et maximus mauris dui sed felis. Aliquam tincidunt quam sed aliquet elementum. Aliquam nec ex et diam luctus semper vel in augue. Cras eu scelerisque enim. Sed id diam pharetra, gravida lectus at, maximus nisl. Curabitur eu magna imperdiet, accumsan purus id, faucibus neque. Praesent quam mauris, tincidunt in turpis et, posuere porttitor justo. Donec in dignissim risus. Sed ut ultricies orci, nec pharetra ante. Sed quis ex augue. Aenean id magna quis purus tristique sodales. Quisque bibendum dolor at ante viverra, sed placerat erat suscipit. Proin finibus lacus quis ligula pulvinar imperdiet.

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Models: Flat navigation

Definition: Involves a central workspace that is always visible and functions that do not require context switches or navigation.



Frame

Welcome

START NOW

VIDEO

iPhone X

Welcome

START NOW

VIDEO

375x812

Frame

Welcome

START NOW

VIDEO

3

Maria

Resolve

Let's add some UI elements to make it clear that they should scroll down further. 😊

a few seconds ago

Maria

temporally

Cancel

Reply

Comments

Show Resolved Comments

Receive email notifications

Page 1

3

Maria, a few seconds ago

Let's add some UI elements to make it clear that they should scroll down further. 😊

2

Maria, 26 minutes ago

This is cool.

1

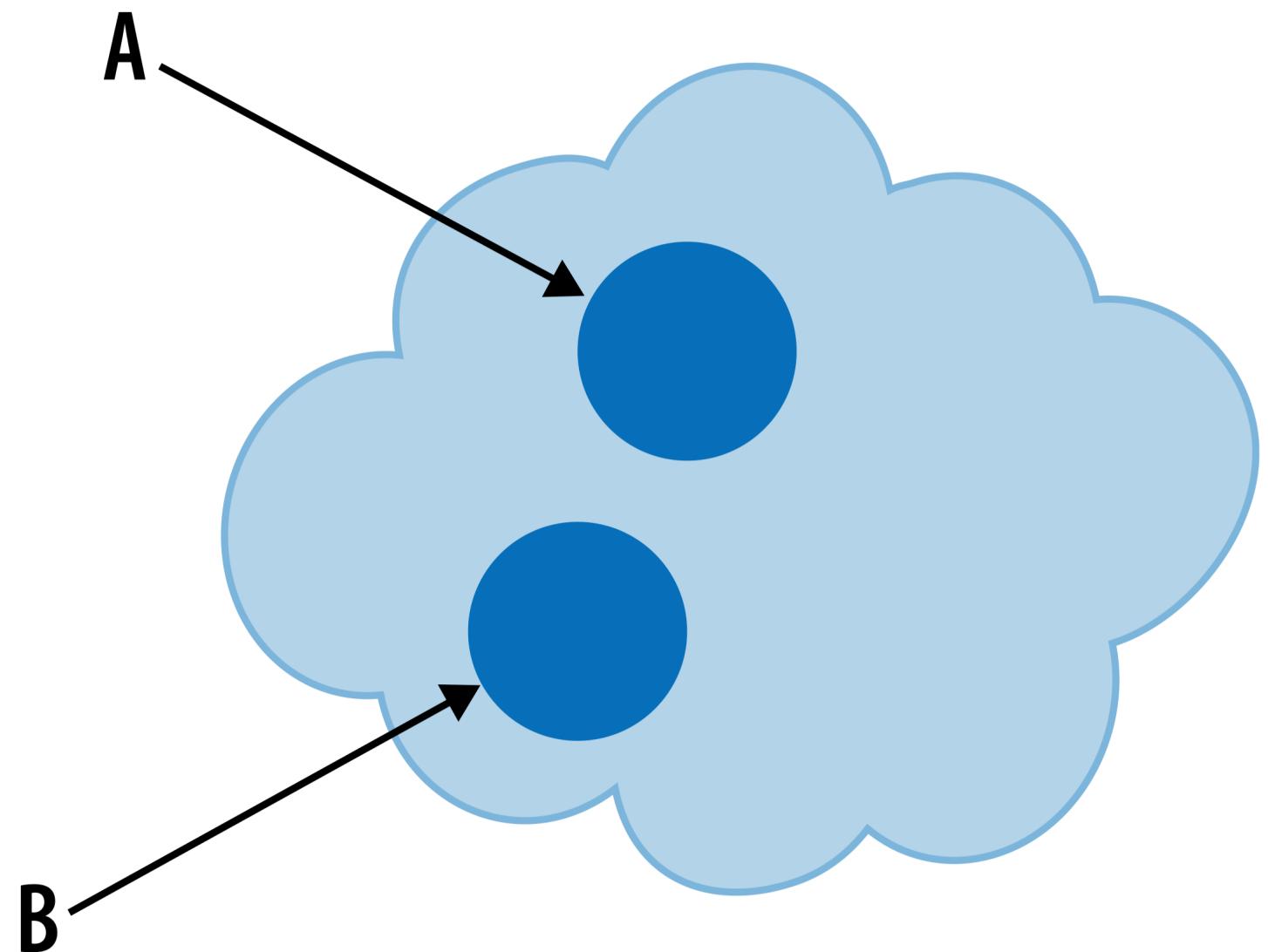
Maria, 39 minutes ago

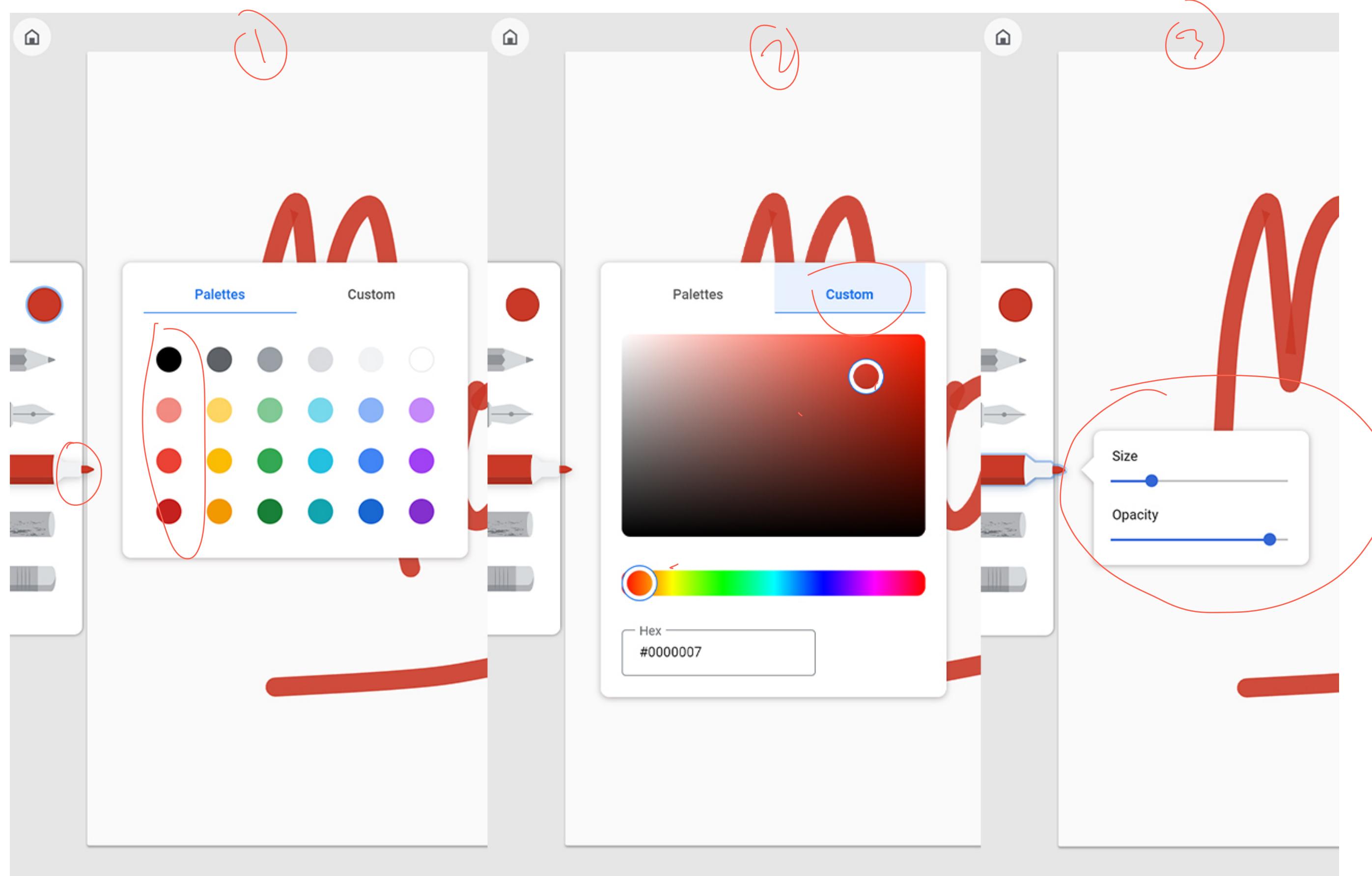
This should be a color-branded button

?

Models: Modal panel

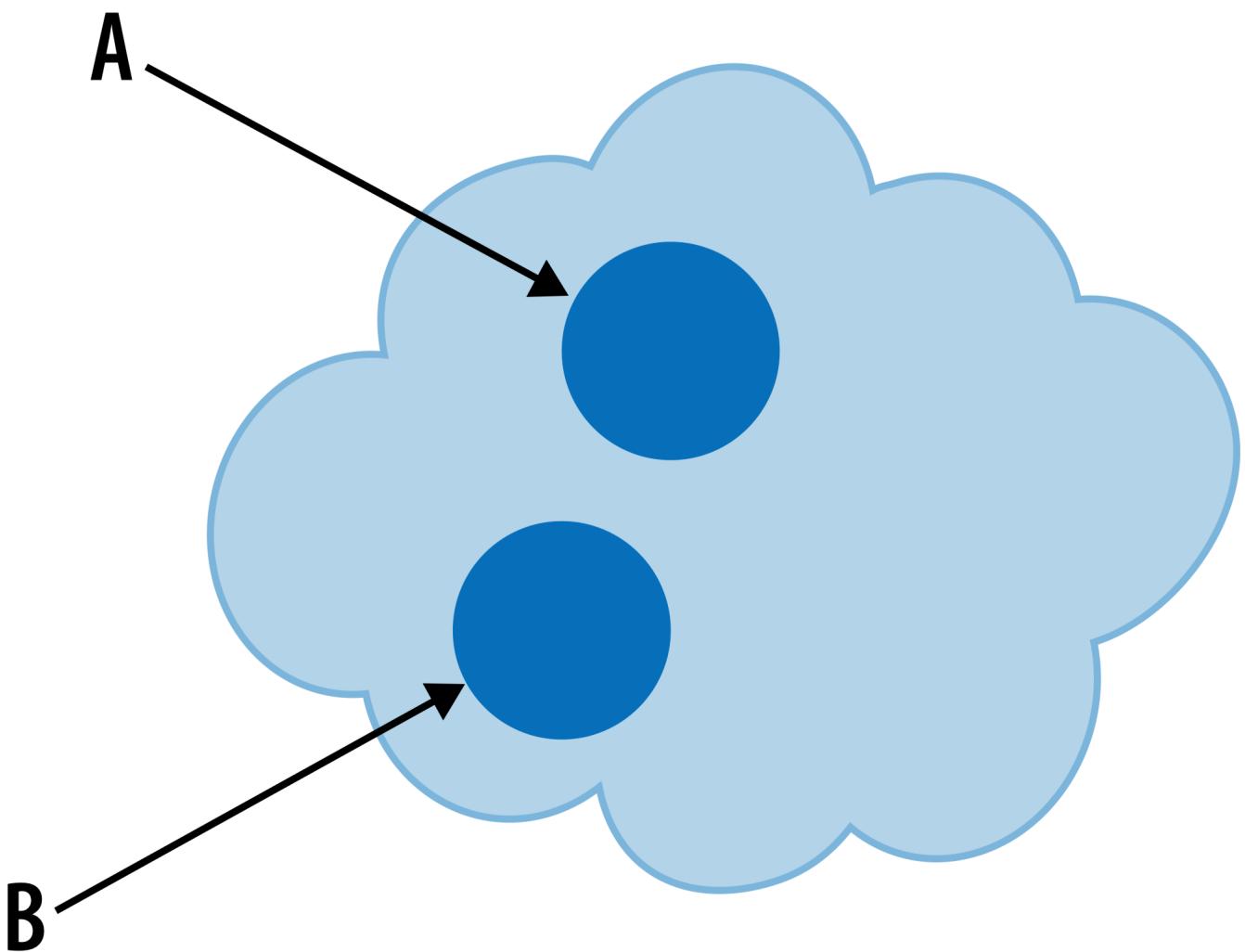
Definition: Follows the flat navigation model except for modal dialogs that are temporarily overlaid on them in canvas to help the user perform specific functions.





Models: Clear entry points

Definition: Complex applications involve navigational models with clear entry points that guide the user to frequently used or temporary functions without having to go through the hierarchical structure or a step-by-step process.



basecamp.com

Basecamp

How it works Before & after Got clients? Pricing Support Sign in Try it FREE

Get it together and manage projects the right way.

Before Basecamp: Projects feel scattered, things slip, it's tough to see where things stand, and people are stressed. **After Basecamp:** Everything's organized in one place, you're on top of things, progress is clear, and a sense of calm sets in.

Give Basecamp a Try *(Handwritten note: trial)*

4,883 companies signed up in the last week alone!

Create Basecamp projects for everything you're working on.

Involve everyone who's working on the project. *(Handwritten note: arrow pointing to the client section)*

Acme Co
2020 Marketing

The client

Add/remove people

Message Board

- Retouched team photos
- FYI — Hey Victor, here's
- Logo concept
- Question — Hey Victor,
- Ad comps
- Hey all, take a look at these and
- Campaign ideas
- Here's a few thoughts I had
- Raw shots from the shoot
- Here's a few shots from the

To-dos

Requests

- Company logo
- Victor 3:47pm Sure is!
- Business cards
- finalize overall design Jul 23
- Annie B.
- create press-ready files
- Annie B.
- send to printer Jul 29
- photograph cards for portfolio

Group Chat

Hey VICTOR, IS 1:00 STILL ON...

- Victor 3:47pm Sure is!
- Victor 3:48pm Mind if we grab sushi inste...
- Victor 3:48pm I've got a fever and the only...
- Adam 3:51pm Ha! Sounds great.

apple.com

Mac iPad iPhone Watch TV Music Support

iPhone 11 Pro

Pro cameras. Pro display. Pro performance.

From \$24.95/mo. or \$599 with trade-in.*

Learn more > **Buy >** *(Handwritten note: buy)*



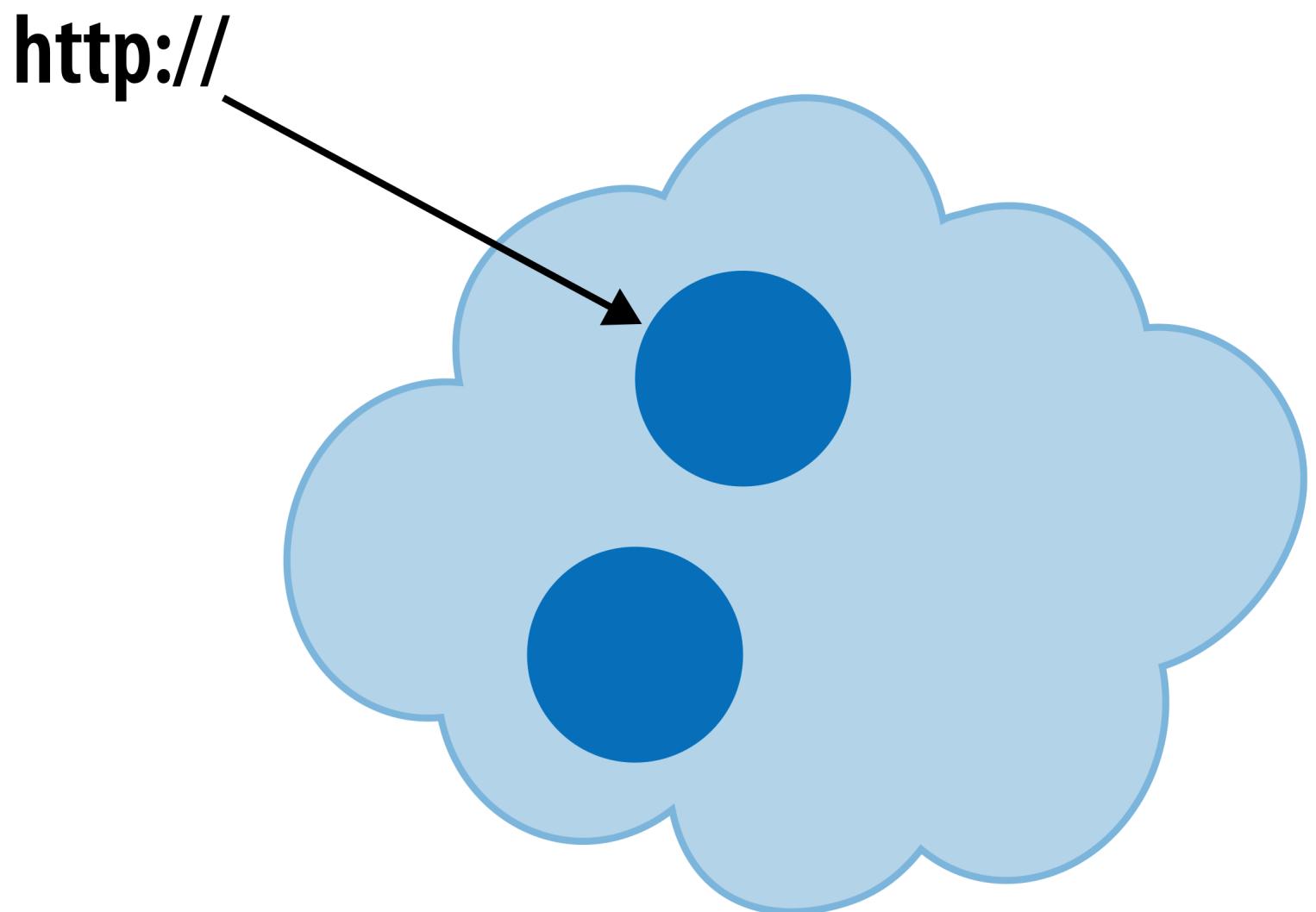
iPhone 11

Just the right amount of everything.

From \$16.62/mo. or \$399 with trade-in.*

Models: Bookmarks

Definition: Bookmarks allow frequent or infrequent users to directly access particular functions without having to navigate through hierarchical structures.



what will Doran do? *What will his brother do to avenge our murdered prince?*" She moved closer to the captain. "And you say, he does not wish to be a



"He do

The captain of guards knew the prince he guarded. Once, long ago, a callow youth had come from Norvos, a big broad-shouldered boy with a mop of dark hair. That hair was white now, and his body bore the scars of many battles... but his strength remained, and he kept his longaxe sharp, as the bearded priests had taught him. *She shall not pass*, he told himself, and said, "The prince is watching the children at their play. He is *never* to be disturbed when he is watching the children at their play."

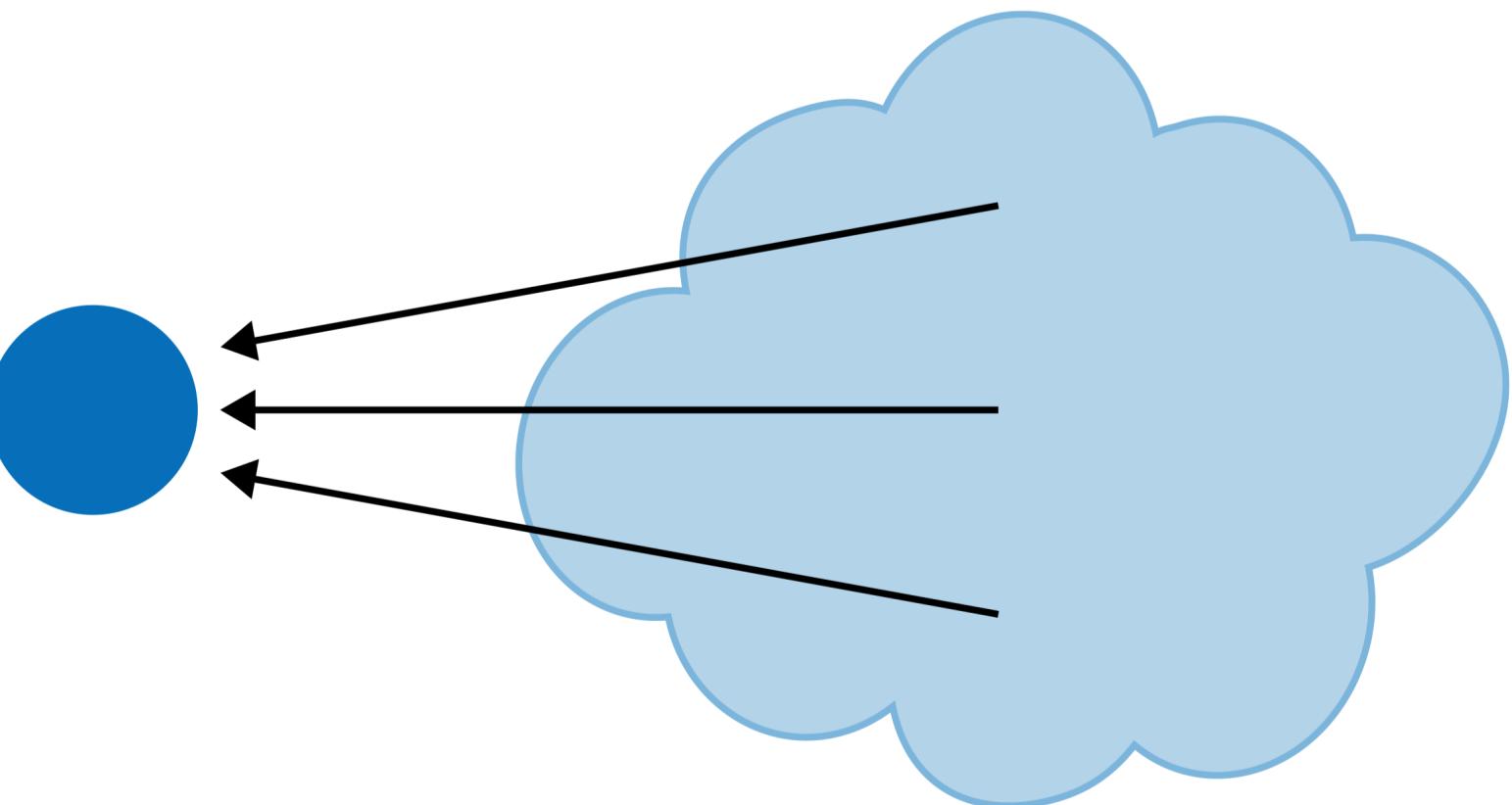
"Hotah," said Obara Sand, "you will remove yourself from my path, else I shall take that longaxe and—"

"Captain," came the command, from behind. "Let her pass. I will speak with her." The prince's voice was hoarse.

Areo Hotah jerked his longaxe upright and stepped to one side. Obara gave him a lingering last look and strode past, the maester hurrying at her heels. Caleotte was no more than five feet tall and bald as an egg. His face was so smooth and fat that it was hard to tell his age, but he had been here before the captain, had even served the

Models: Escape hatch

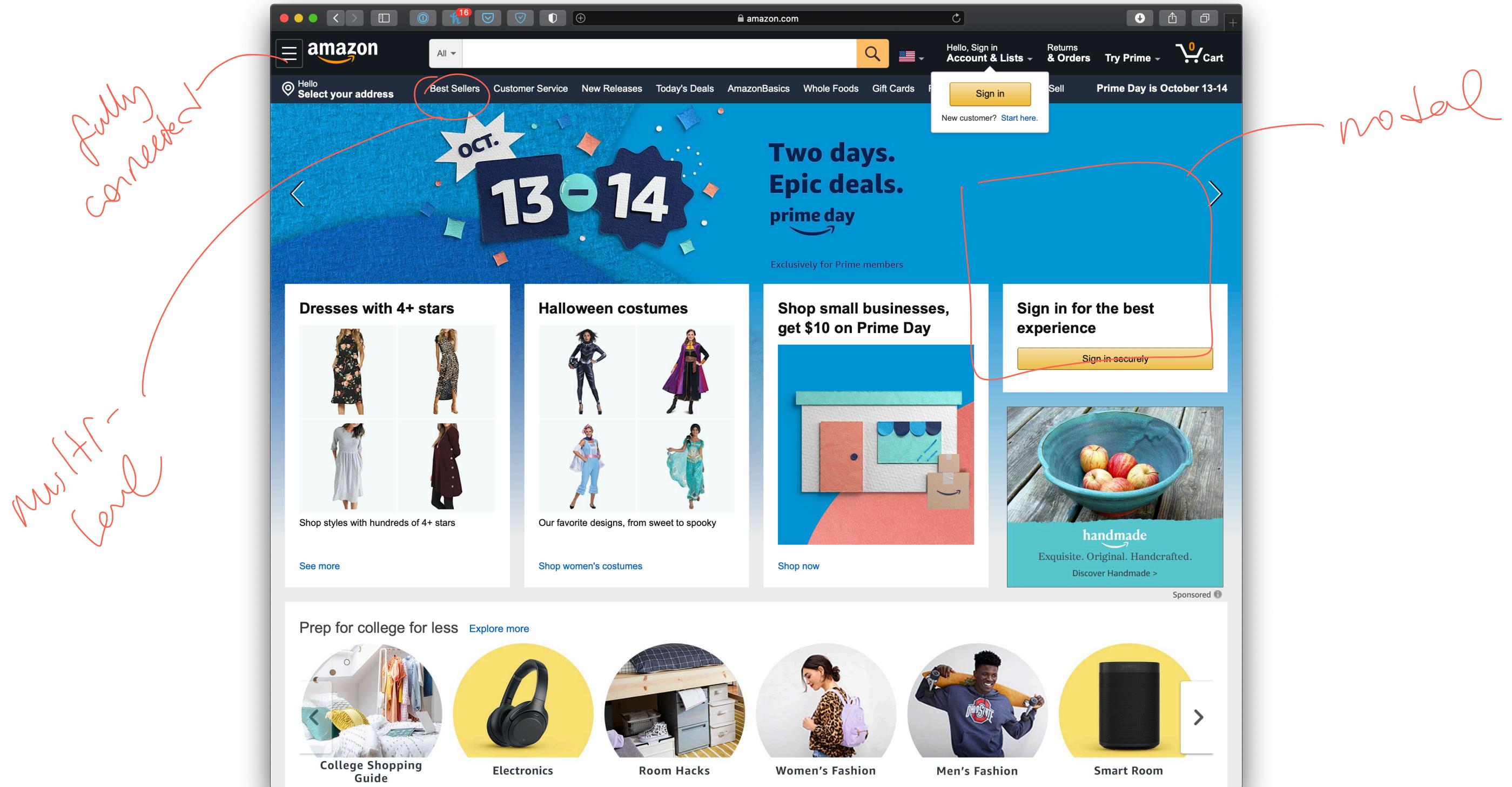
Definition: An "escape hatch" provides users with the ability to go back to the main component/page in a complex structure without having the trail steps back.



The screenshot shows the Amazon.com homepage. At the top left is the Amazon logo with a red circle around it. Below the logo is a search bar and a navigation bar with links for "Hello, Sign in", "Account & Lists", "Orders", "Try Prime", and a shopping cart icon. A message "Deliver to Madison 53711" is displayed. The main banner features an "All-new blink XT2" camera with a red circle around it. Below the banner are sections for "Deal of the Day" (BodyBoss Home Gym) and "Jennifer's gift picks". A sign-in prompt "Sign in for the best experience" with a "Sign in securely" button is visible. At the bottom, there's a "Today's deals under \$25" section.

The screenshot shows the apple.com homepage. At the top left is the Apple logo with a red circle around it. Below the logo is a navigation bar with links for "Mac", "iPad", "iPhone", "Watch", "TV", "Music", and "Support". A search bar is at the top right. The main banner features the "iPhone 11 Pro" with the text "Pro cameras. Pro display. Pro performance." and "From \$24.95/mo. or \$599 with trade-in.*". Below the banner is a large image of the iPhone 11 Pro with water splashing around it. Another banner for the "iPhone 11" with the text "Just the right amount of everything." and "From \$16.62/mo. or \$399 with trade-in.*" is also present.

In-Class Activity 2: Reverse Engineering Navigation Models

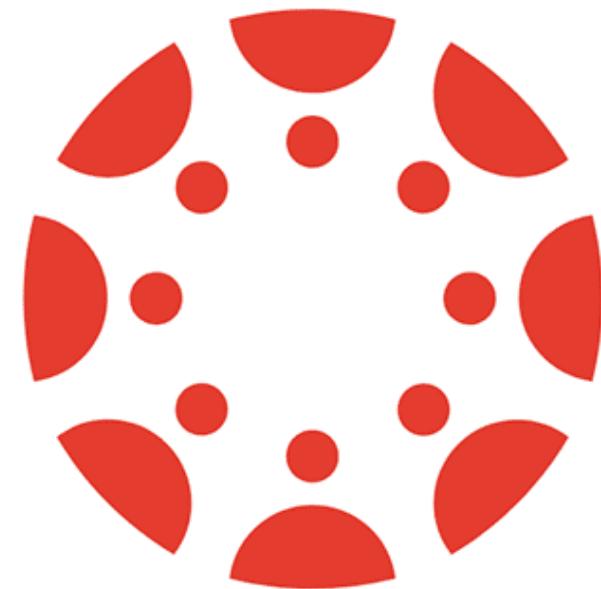


Principles of Navigation

1. Wayfinding
2. Cost
3. Aids
4. Models

Quiz 4

Complete the [Canvas quiz](#).



canvas

What did we learn today?

- Interaction structure
- Visual layout design
- Principles of navigation