Building User Interfaces

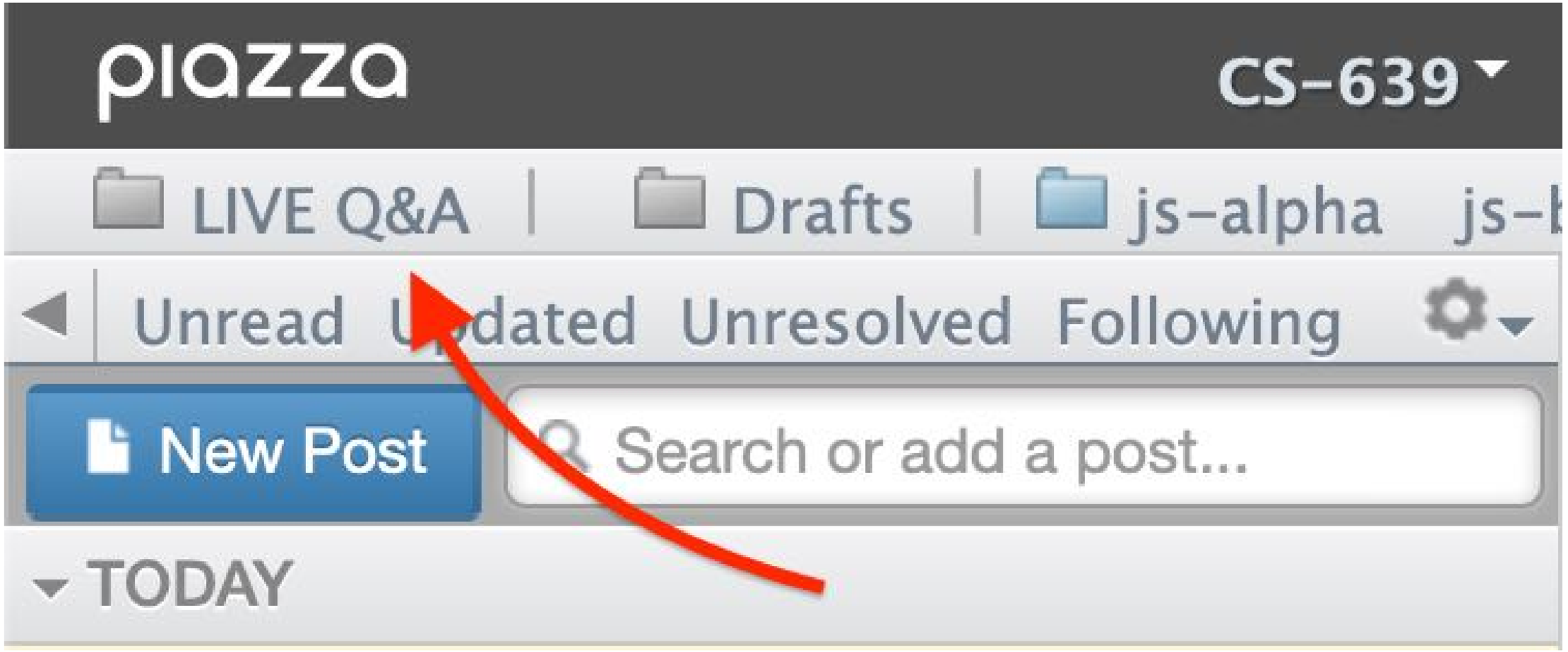
Designing for Web & Desktop

Professor Bilge Mutlu

What we will learn today?

- A brief history of user interfaces
- Platform-specific design
  - Designing for the desktop
  - Designing for the web

Live Q&A Reminder



Commentary on React

Problem: *React components* vs *functional programming* 👈 will not scale!

Solution: Effective use functional and React components.

Ask "what is the code doing?"

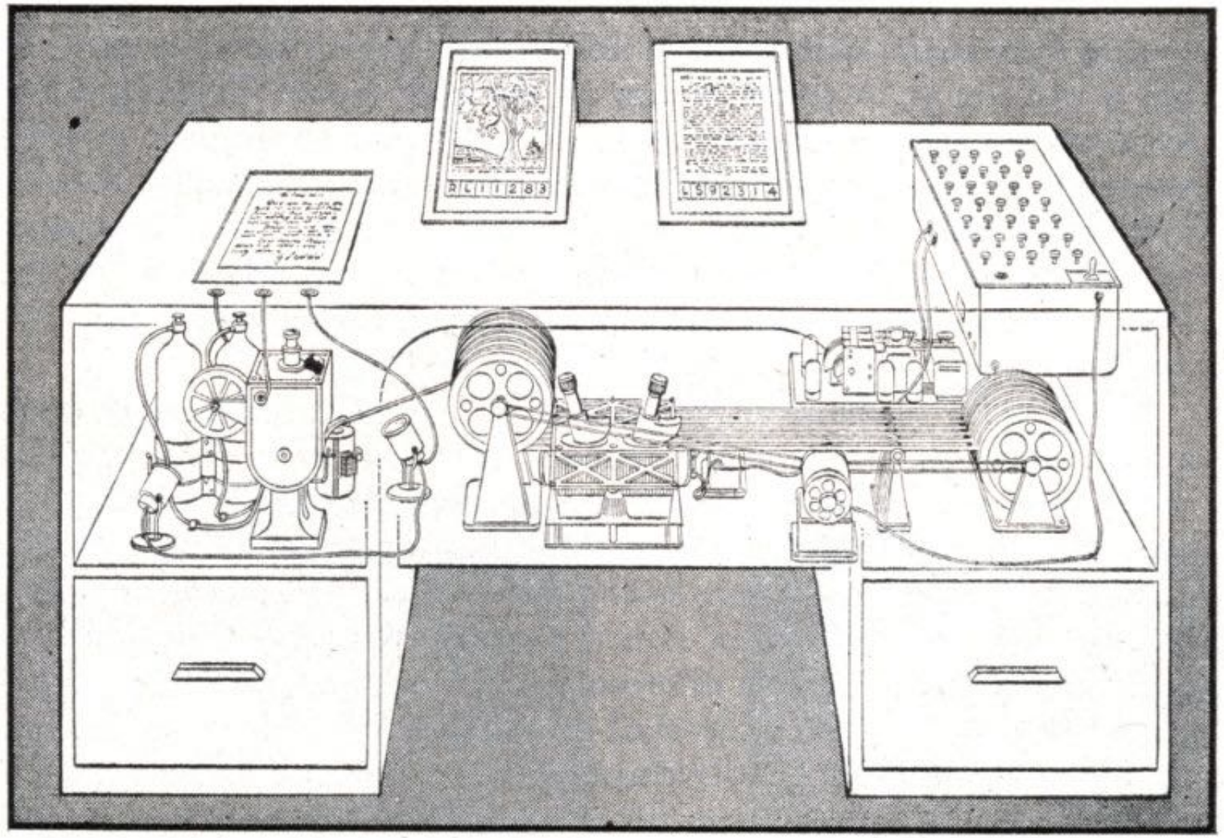
1. Creating reusable React elements ⬅ class components
2. Computation, manipulating data, updating states ⬅ functional components

Resources: Mosh Hamedani, ReactJS Hooks

A Brief History of User Interfaces

Milestone 1: *Memex*, 1945[1] [2] [3]

A "proto-hypertext" system that connected documents using associated trails embedded into a desk, developed by Vannevar Bush.



MEMEX in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

[1] Wikipedia: Memex

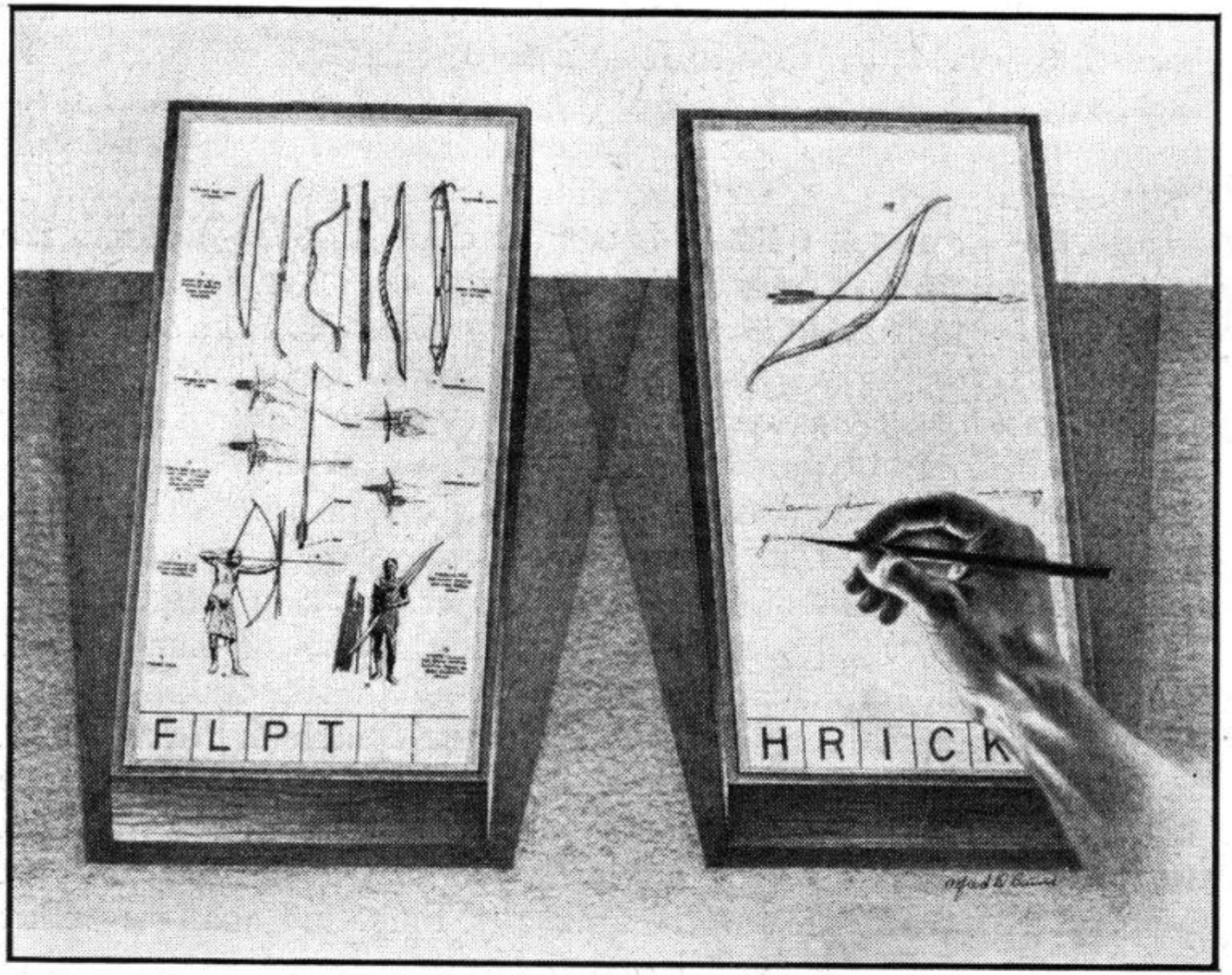
[2] The Atlantic: As We May Think

[3] Image Source: Monoskop

Milestone 1, *Continued*[4] [5]

“Consider a future device … in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.”

— Vannevar Bush, 1945



MEMEX IN USE is shown here. On one transparent screen the operator of the future writes notes and commentary dealing with reference material which is projected on the screen at left. Insertion of the proper code symbols at the bottom of right-hand screen will tie the new item to the earlier one after notes are photographed on supermicrofilm.

[4] The Atlantic: As We May Think

[5] Image Source: Monoskop

Milestone 2: *Sketchpad*, 1963[6] [7]

The first program to utilize a complete graphical user interface and that implemented object-oriented programming, non-procedural programming, constraints, pen input, etc. Sketchpad was developed by Ivan Sutherland.

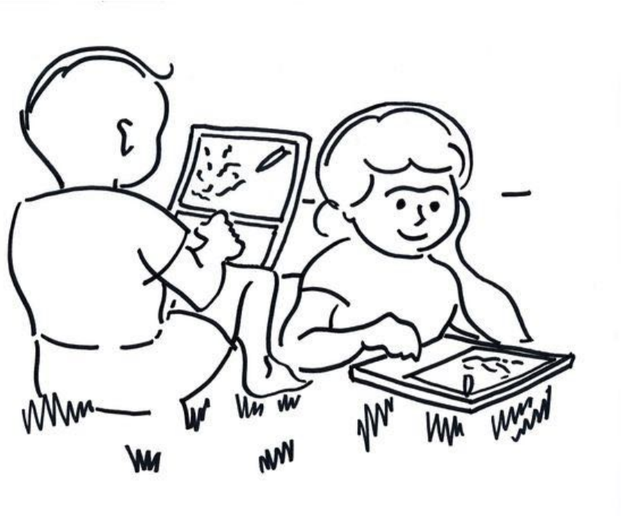
[6] Wikipedia: Sketchpad

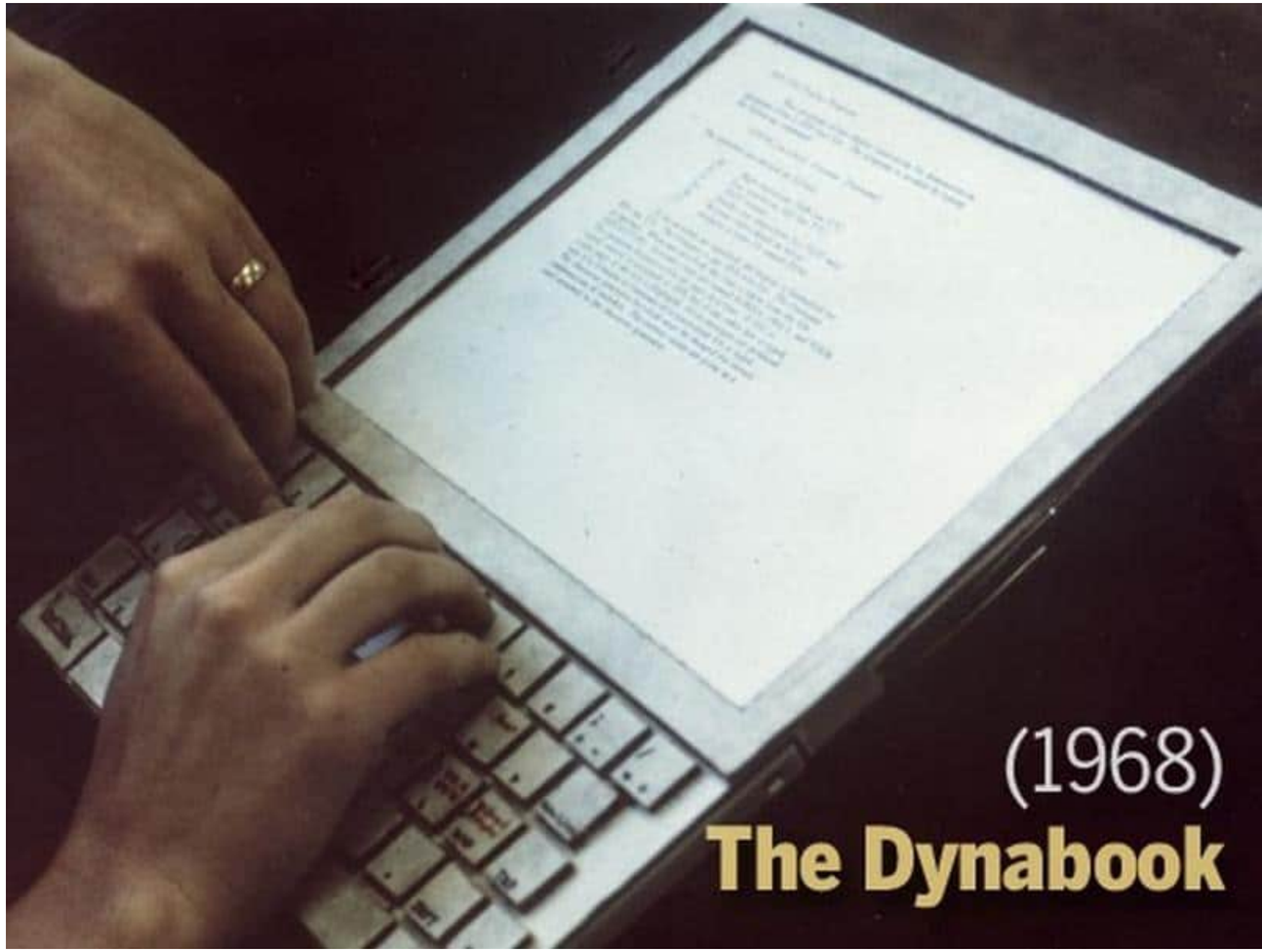
[7] Image source

rce

Milestone 3: Dynabook, 1968[10] [11]

A conceptual portable educational device for children (i.e., the first laptop/tablet computer) developed by Alan Kay.





[10] Image sources: left, right

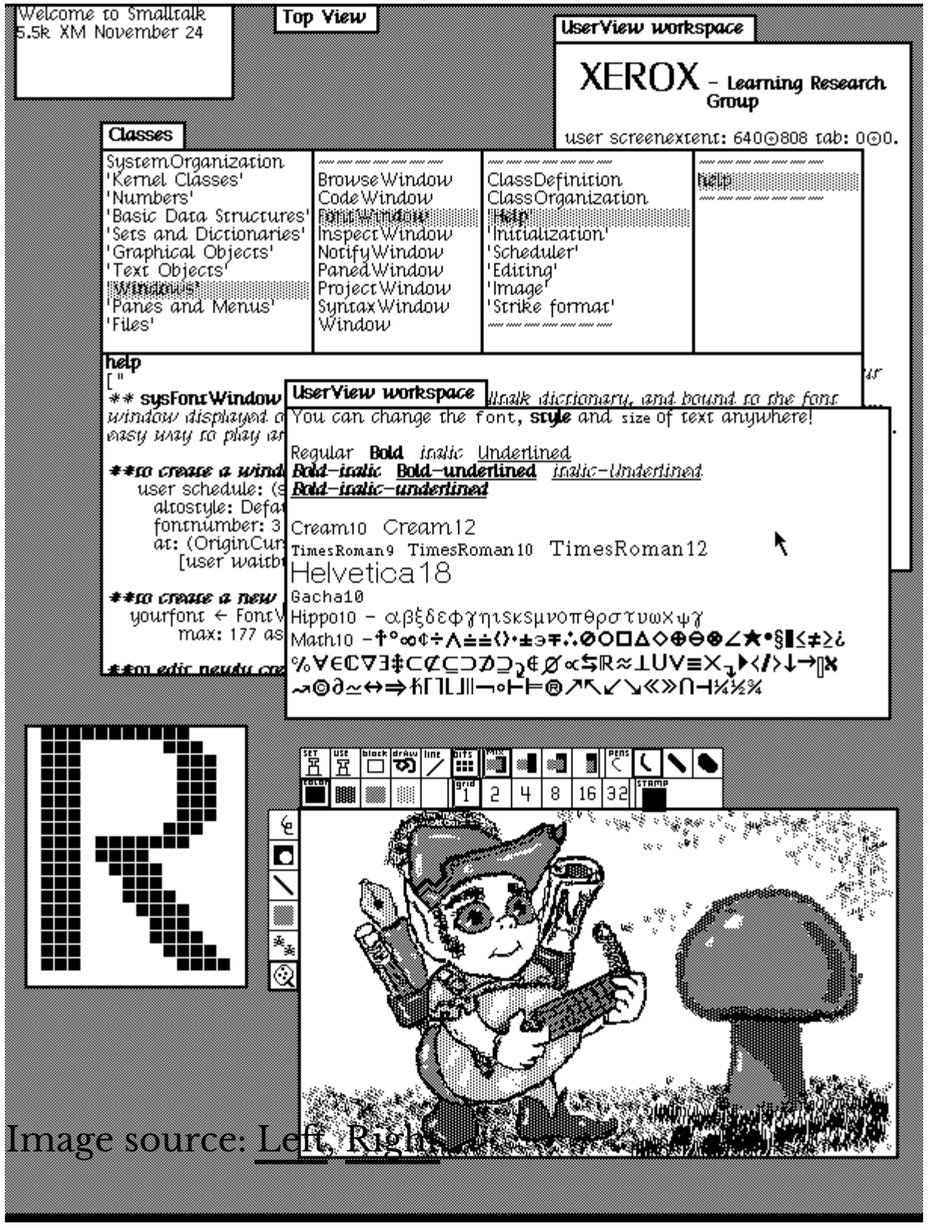
[11] A talk by Alan Kay on the history of Dynabook

Milestone 4: Xerox Alto, 1973[12] [13]

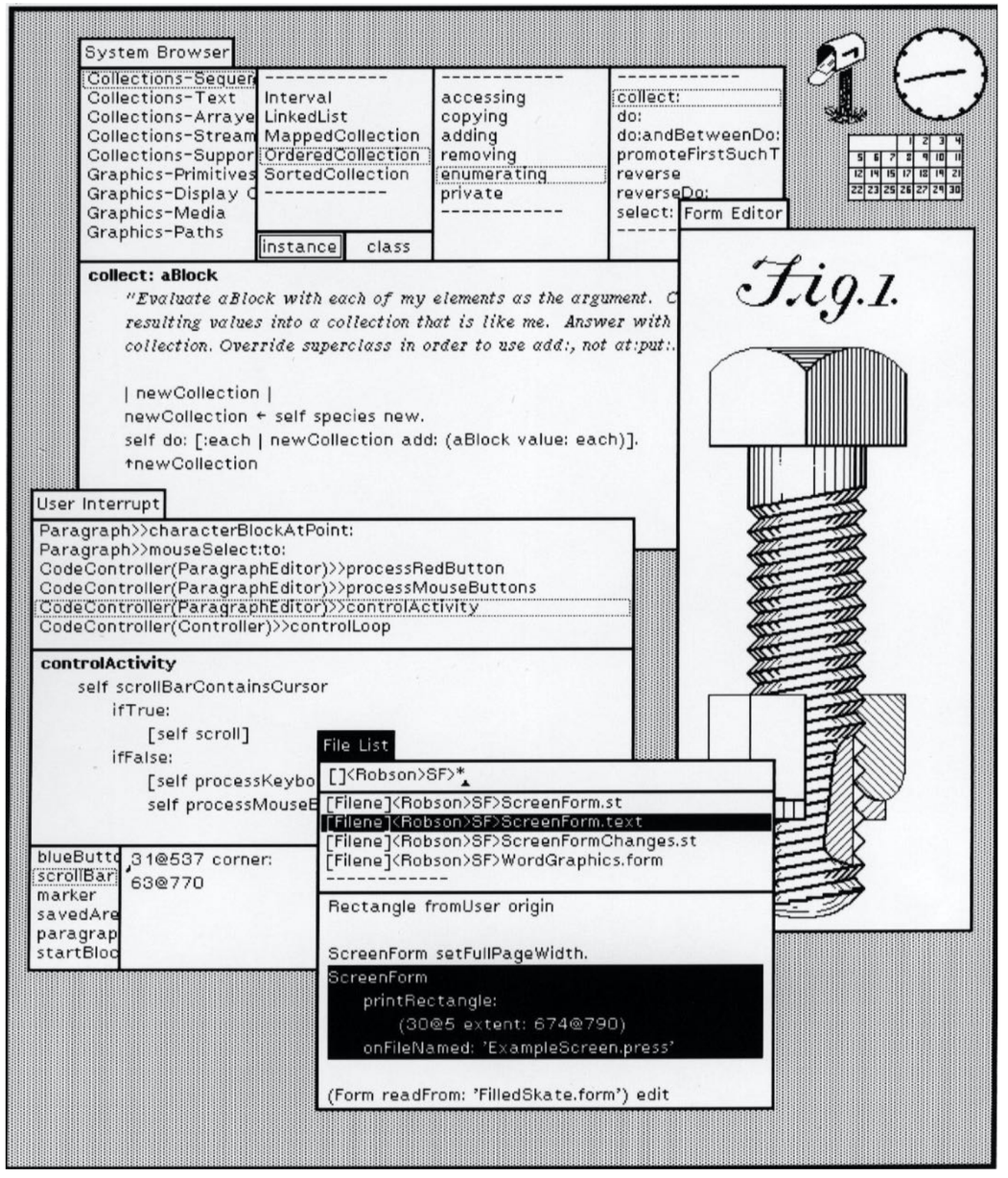
The first computer to support an OS based on a GUI that integrated the ideas developed for Dynabook. It was developed at the Xerox PARC (Palo Alto Research Center).

[12] Wikipedia: Dynabook

[13] Image source



14 Image source: Left, Right



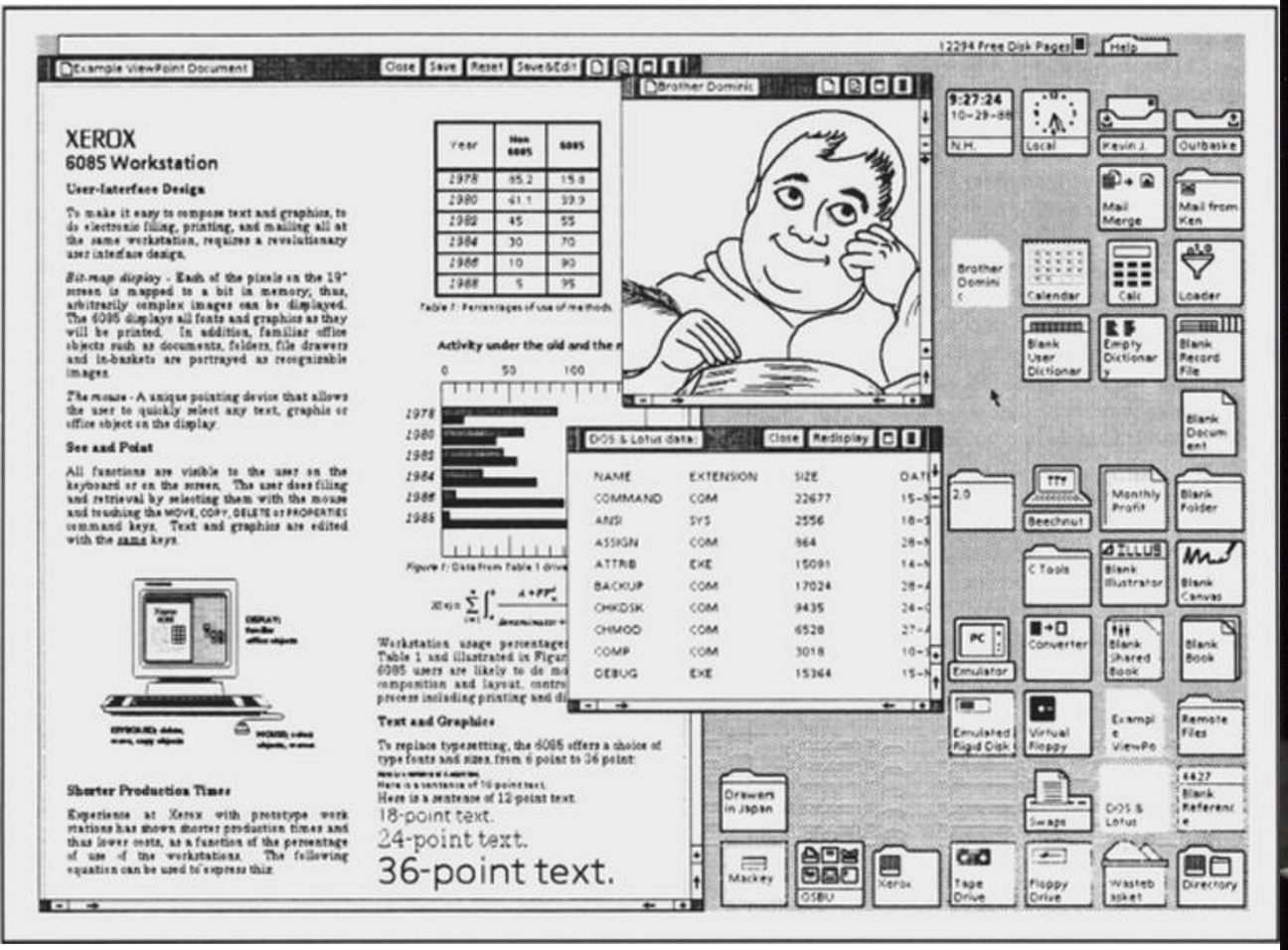
Milestone 5: Xerox Star, 1981[15] [16] [17]

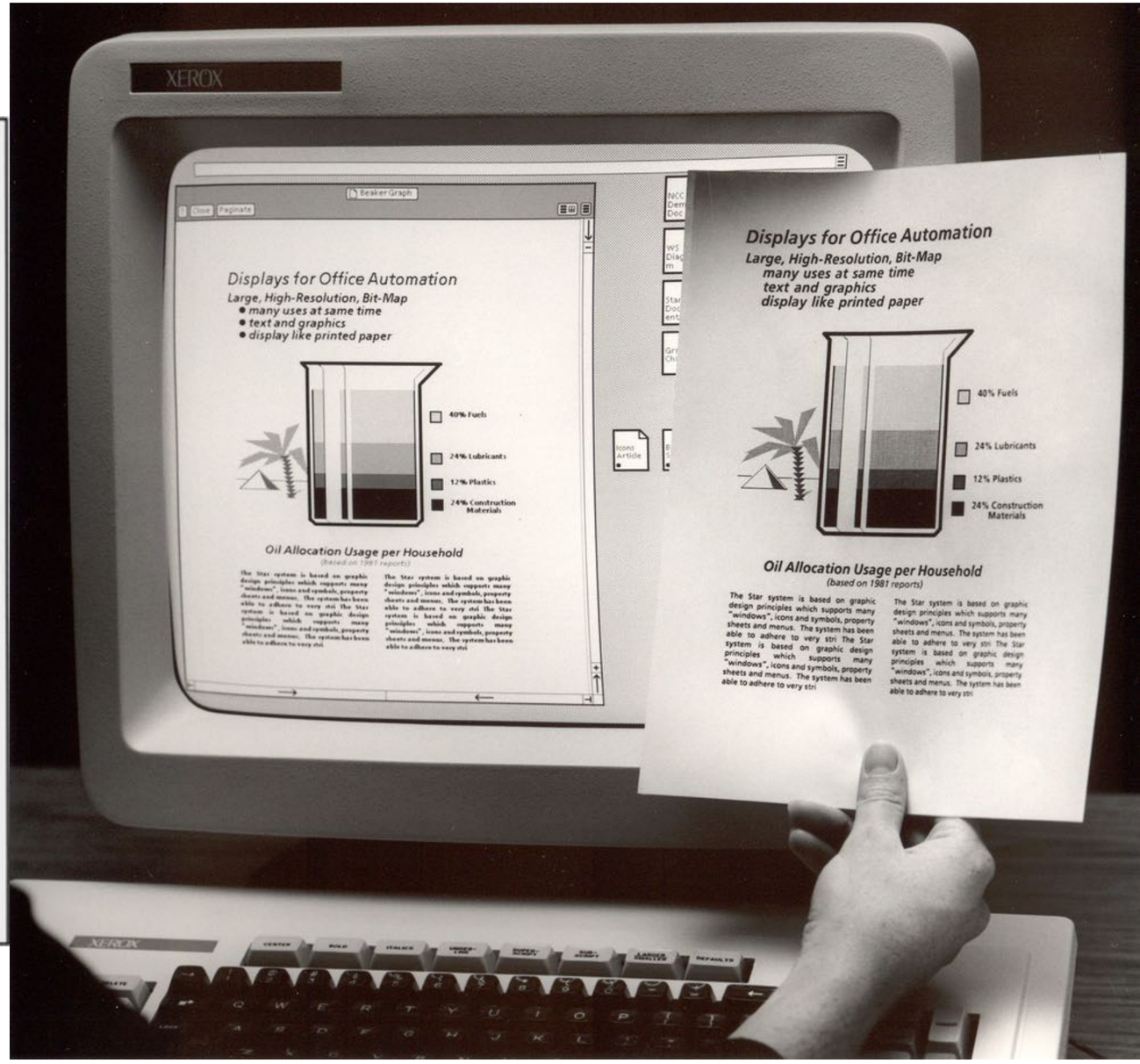
First commercial system with a user interface that integrates today's technologies, including windows, icons, folders, mouse, etc.

[15] Wikipedia: Xerox Star

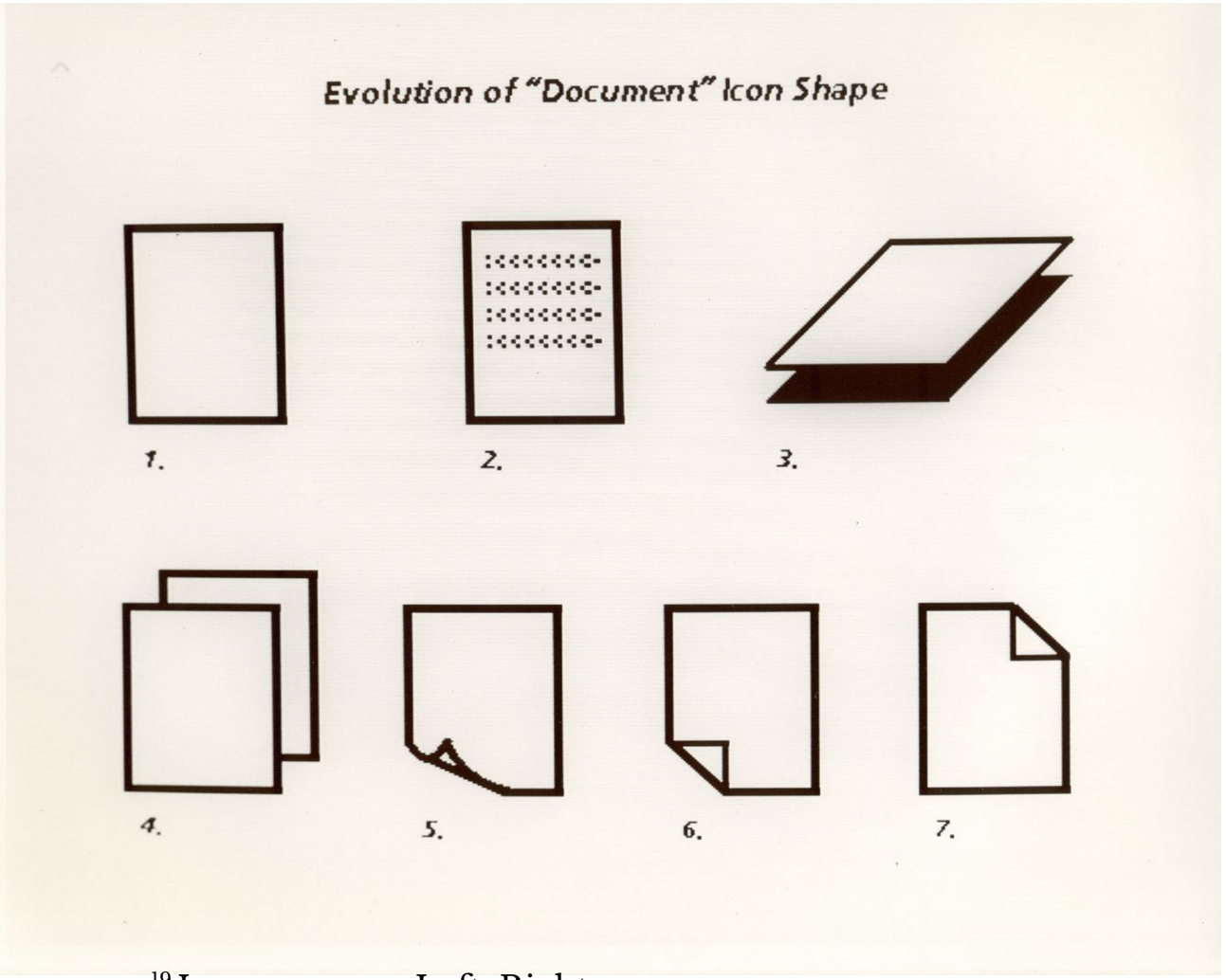
[16] Videos of the Star Interface: Part 1, Part 2

[17] Image source



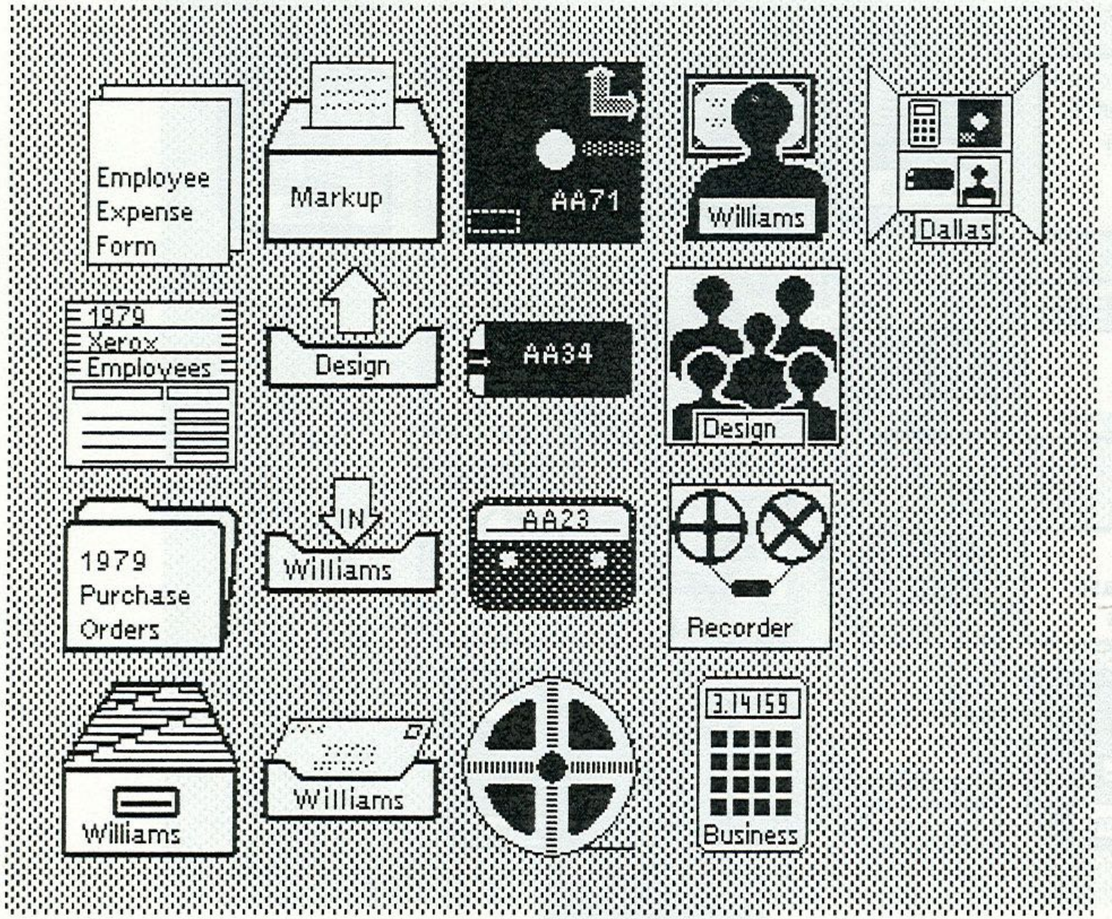


[18] Image source: Left, Right



[19] Image source: Left, Right

Figure 4.
Set 4 (Judd)

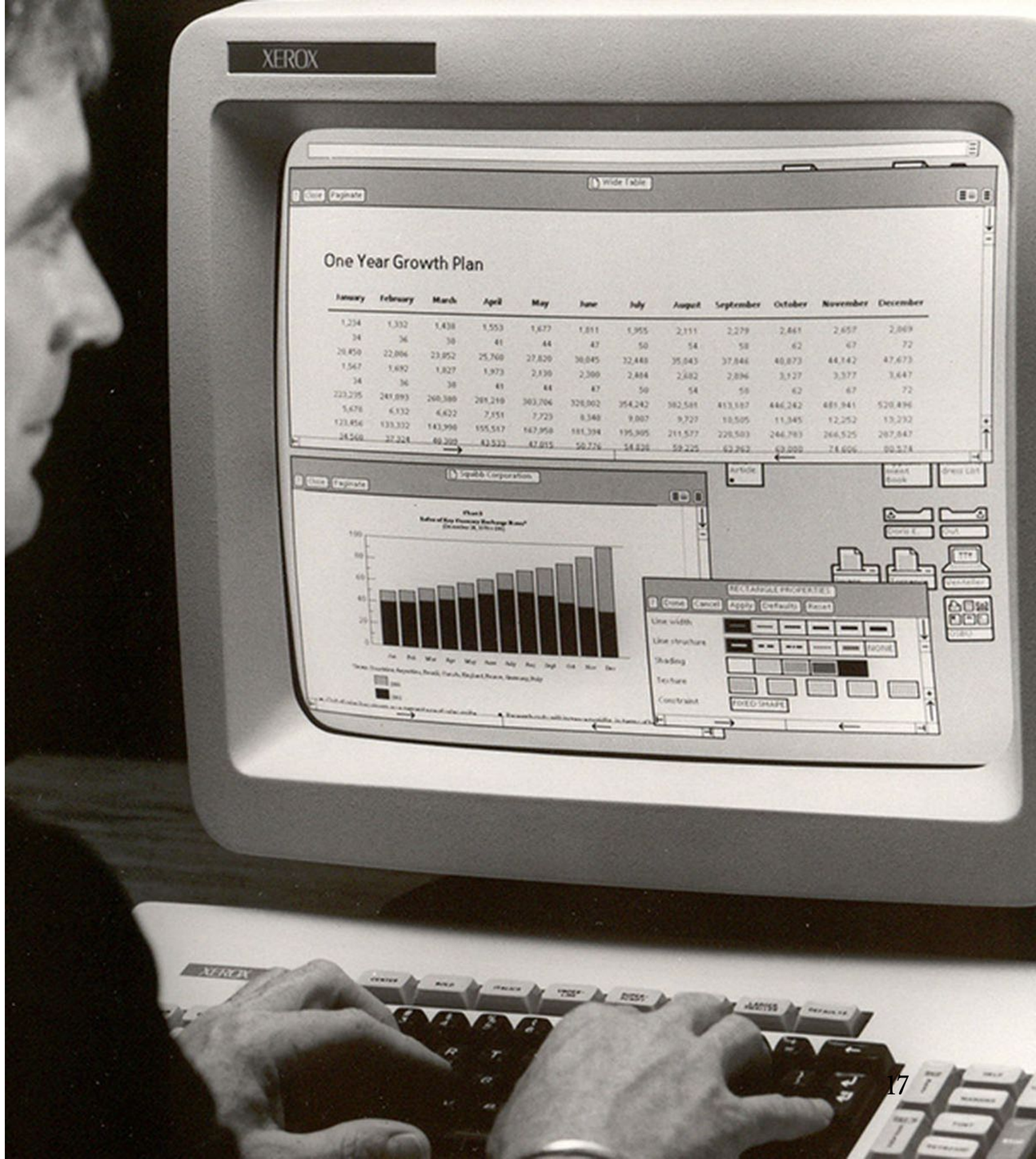


document	printer	floppy disk	user	directory
record file	out-basket	mag. card	group	
folder	in-basket	cassette	recorder	
file drawer	in-basket (with mail)	mag. tape	calculator	

Designing for the Desktop

The WIMP Paradigm[20]

Definition: *Windows*, *icons*, *menus*, and *pointer*, or *WIMP*, is a design paradigm that current desktop interfaces follow that dates back to the Xerox Alto (1973).

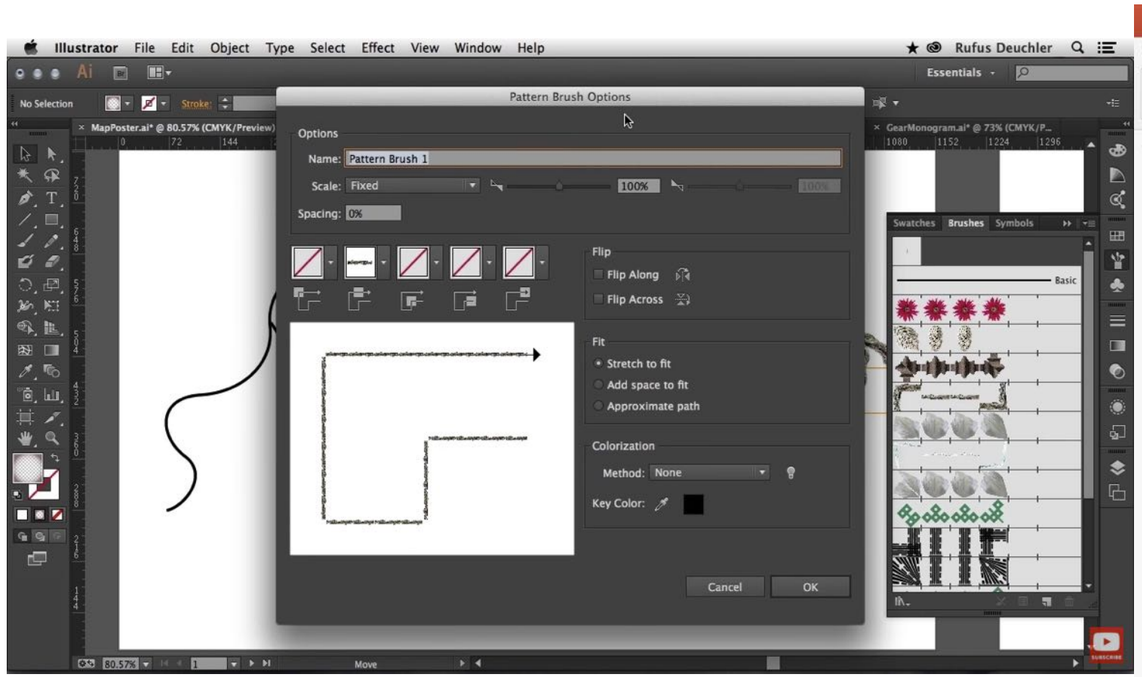


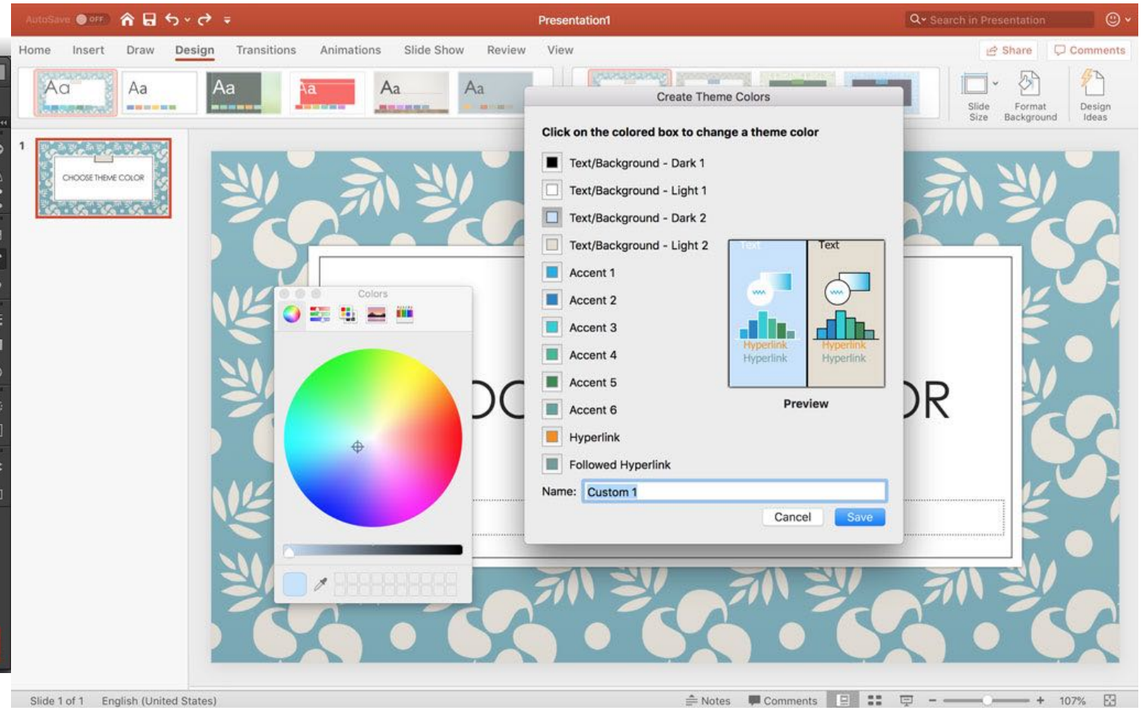
[20] Image source

Elements of the WIMP Paradigm: *Windows*

Definition: Windows are resizable containers of individual applications.

Primary windows contain elements for the main functionality of the application, such as a canvas. *Secondary* windows support main windows through modal panes, dialog boxes, etc.

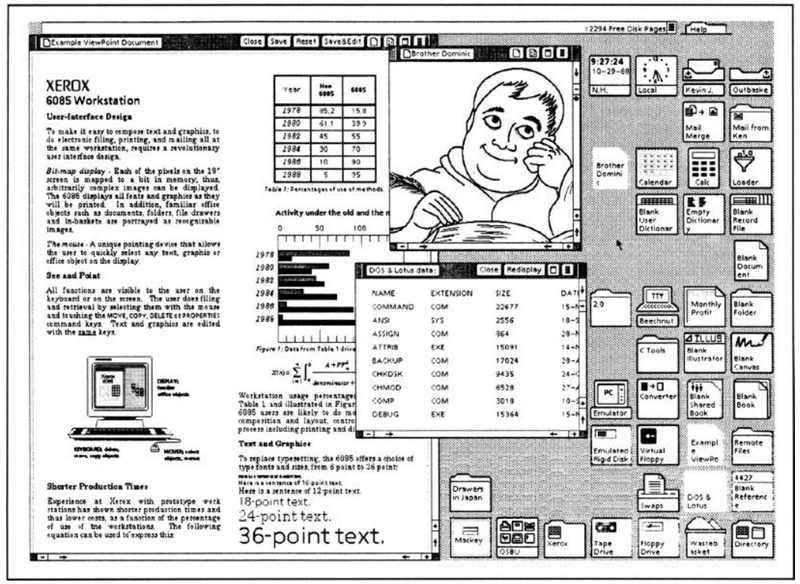


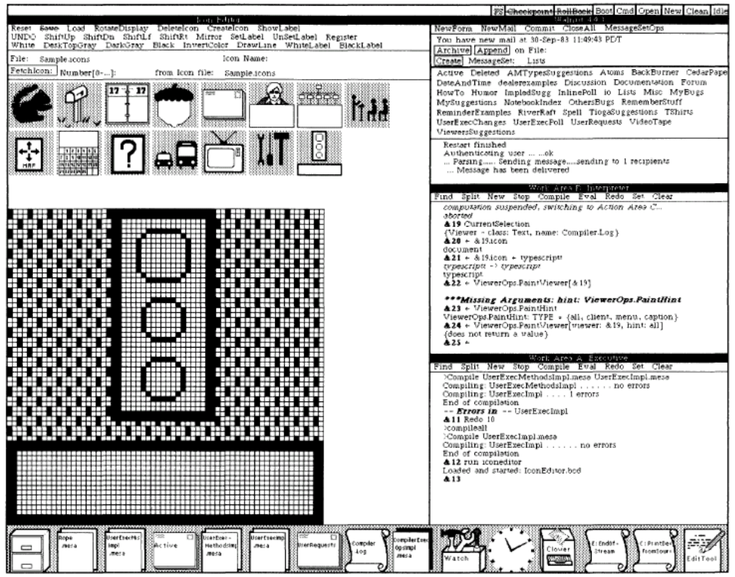


[21] Image source: Left, Right

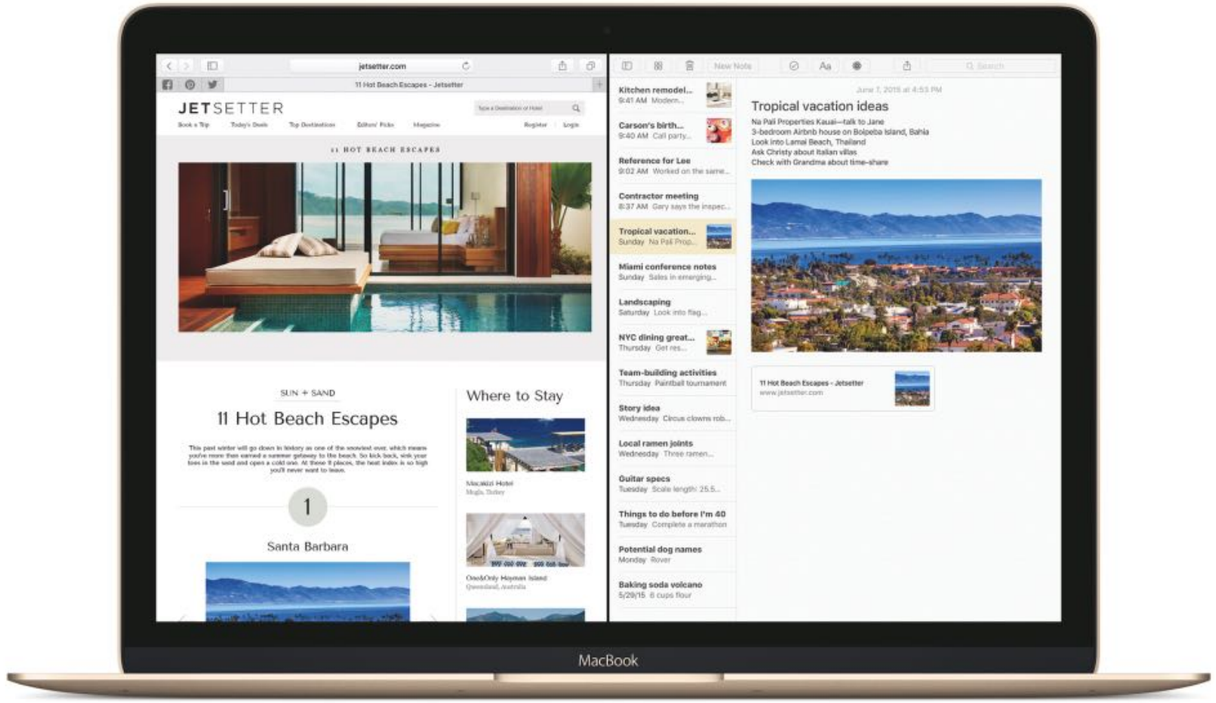
Window Organization[22]

Definition: Windows can be organized in a way that overlaps several windows or tiles them across the screen.

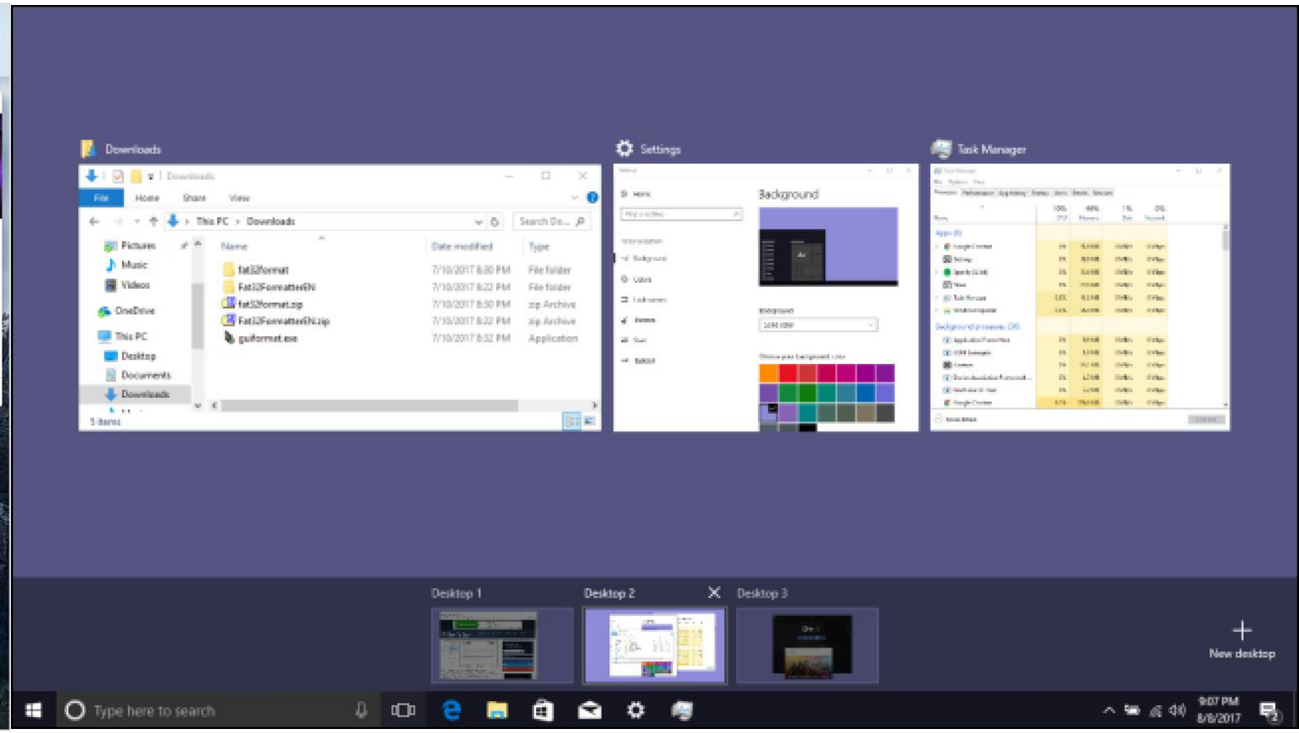




[22] Image source: Left, Right



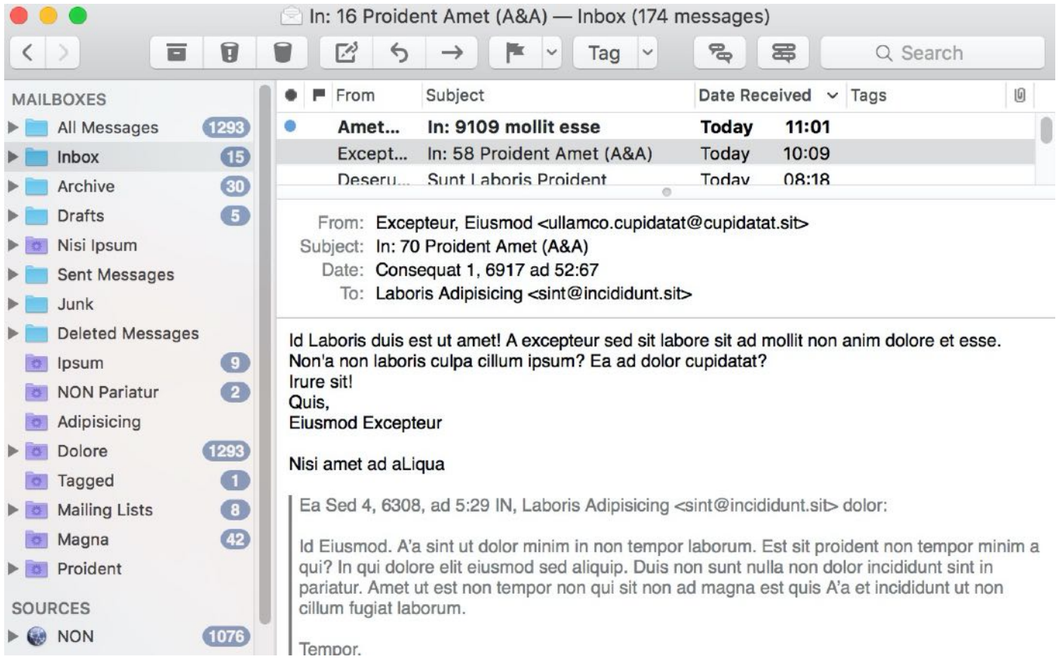
[23] Image source: Left, Right

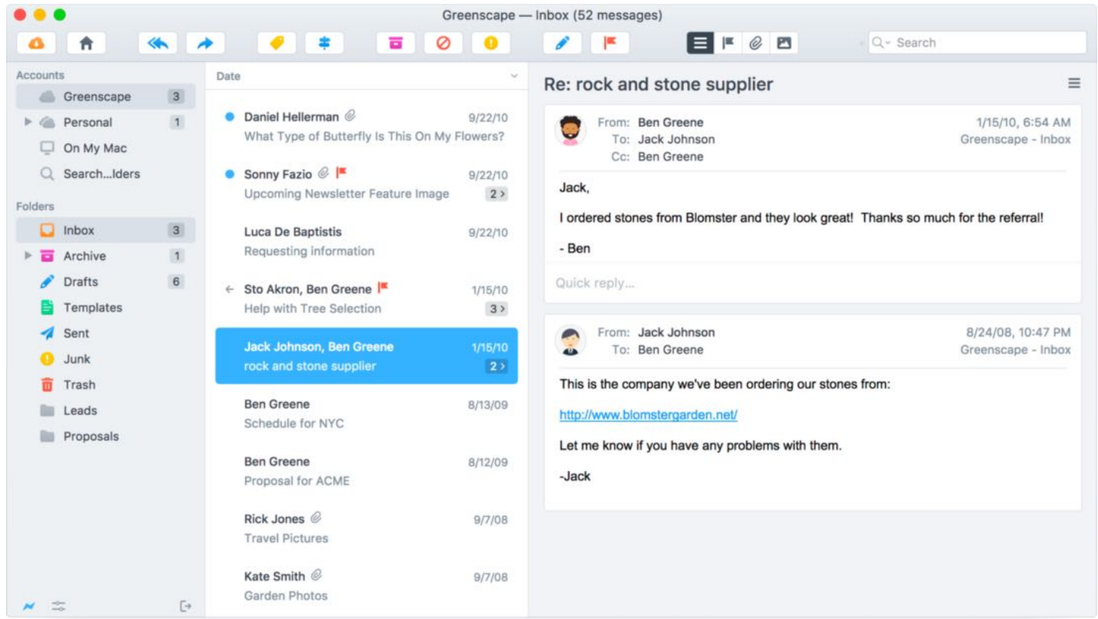


[24] Image source: Left, Right

Window Structures[25]

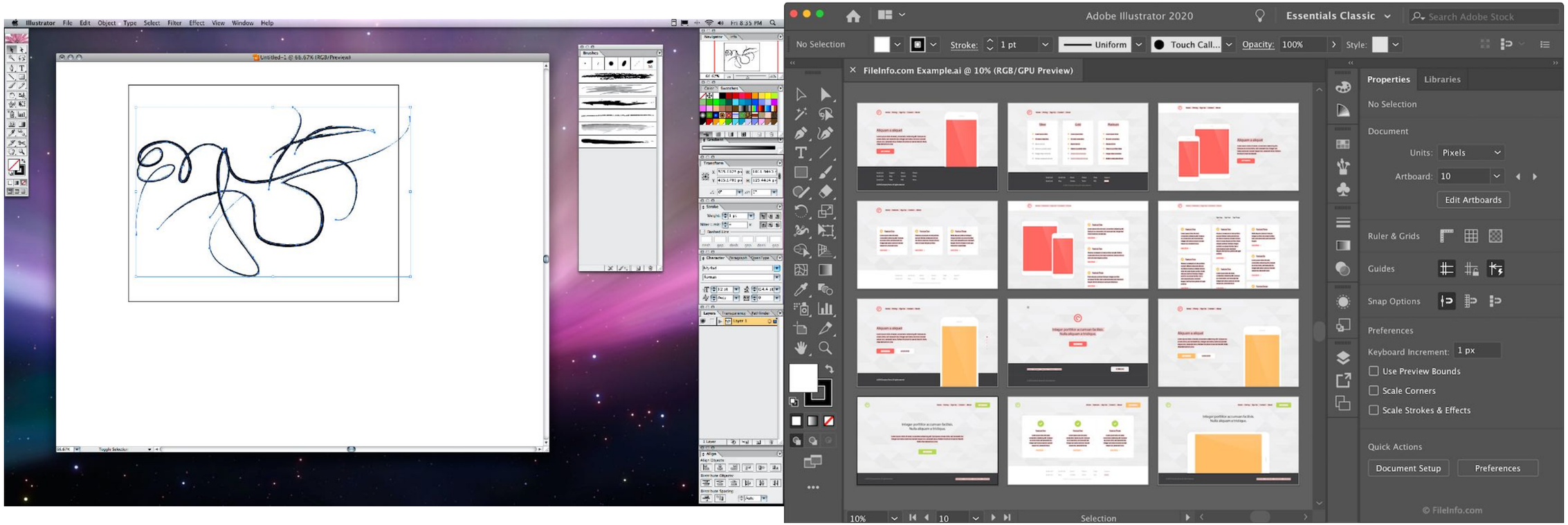
Windows bring together dedicated *panes* in different configurations.





[25] Image source: Left, Right

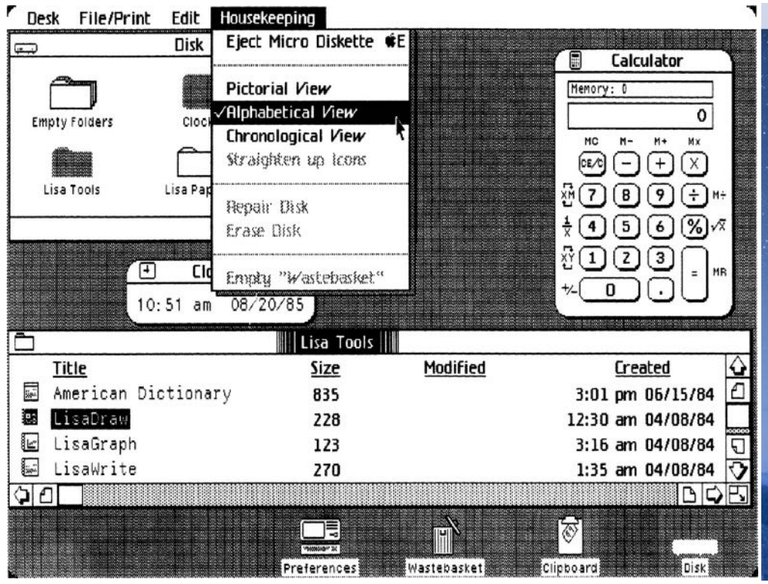
Secondary windows can be *docked*, *stacked*, and *floating*.[26]

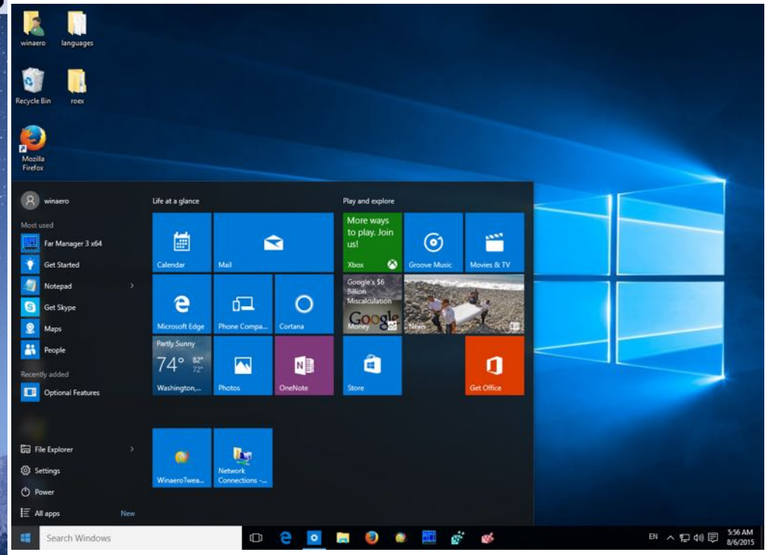


[26] Image source: Left, Right

Menus[27]

Definition: Menus list all the functions of the an application. Menu lists serve *educational* and *reference* purposes.

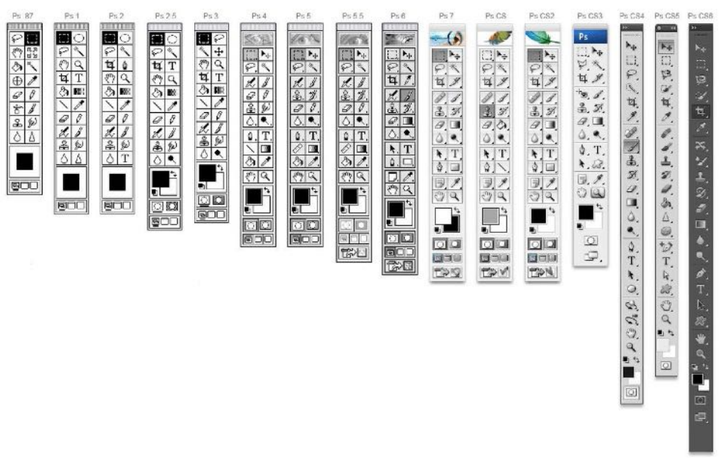


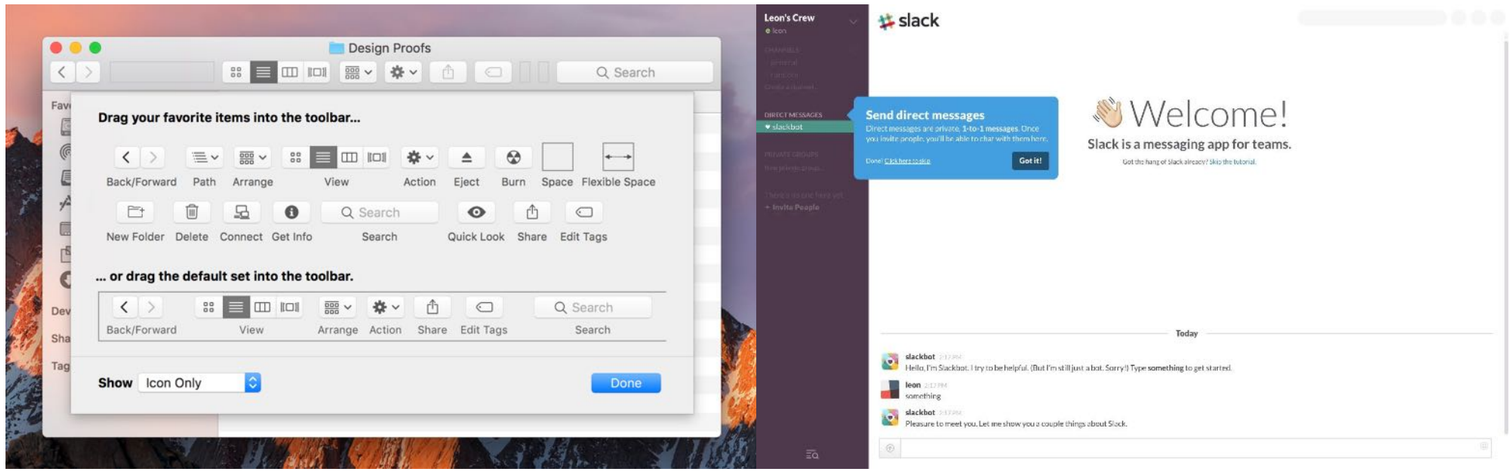


[27] Image source: Left, Center, Right

Toolbars, Palettes, Sidebars, & Tooltips[28]

Definition: *Toolbars*, *palettes*, *sidebars*, and *tooltips* facilitate (visual and manipulation) access to frequently used functions.

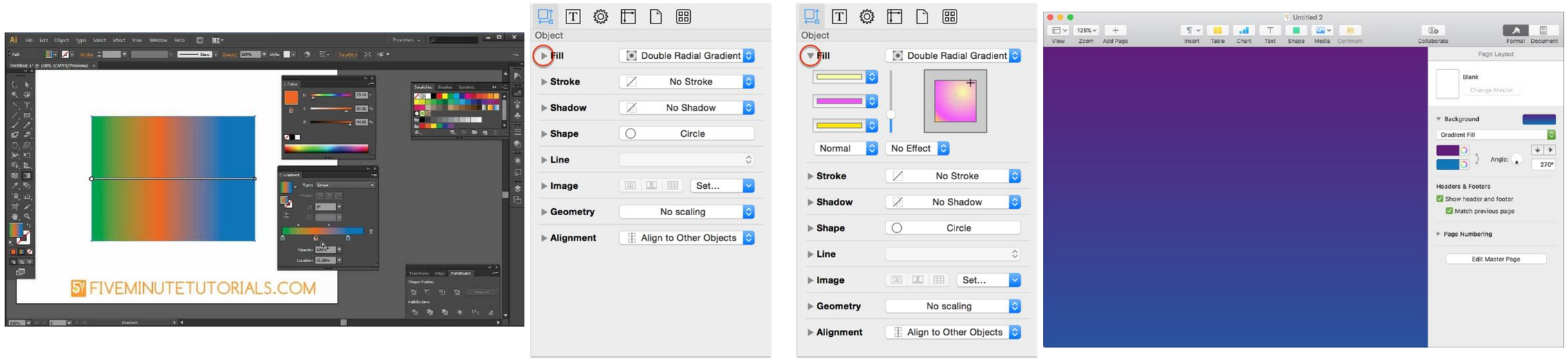




[28] Image source: Left, Center, Right

Tool Palettes[29]

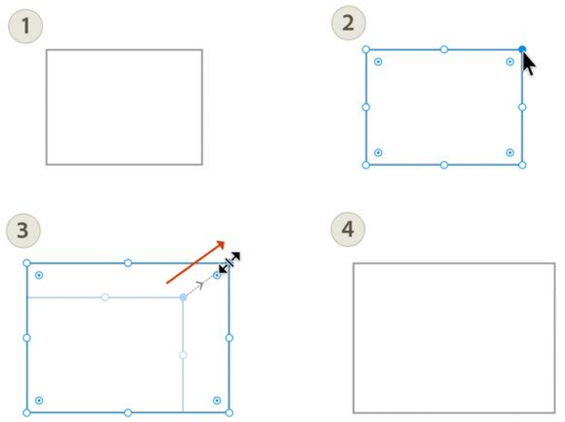
Definition: Tool palettes provide *advanced controls* for a particular function rather than frequently accessed functions.

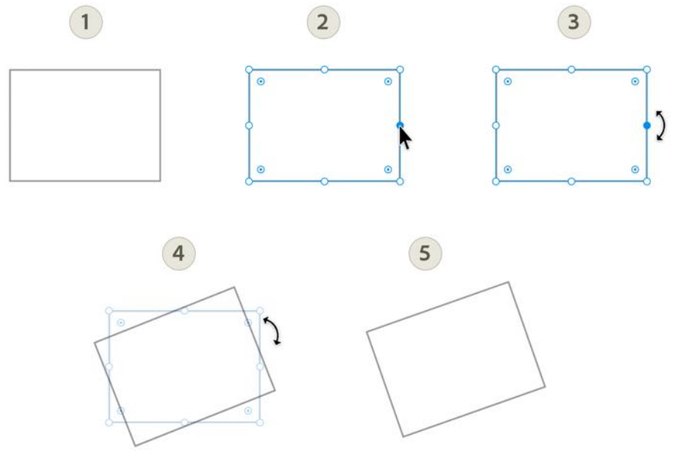


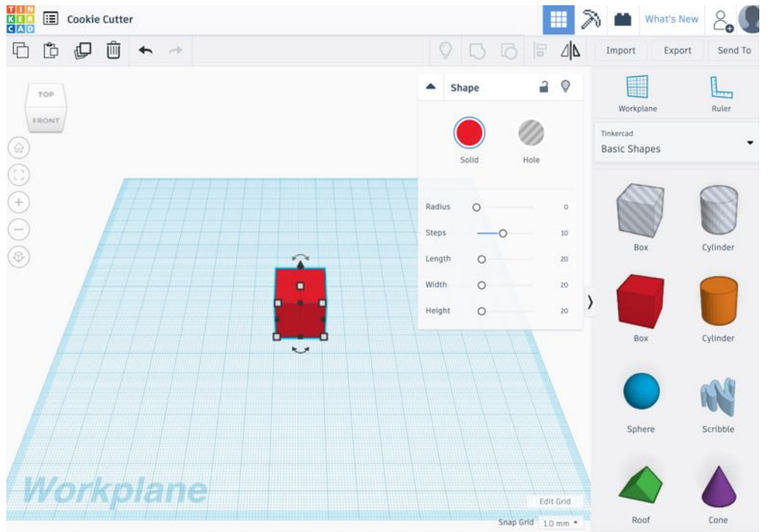
[29] Image source: Left, Center, Right

Pointing[30]

Definition: *Pointing* on an application canvas enables a range of advanced capabilities for *direct manipulation*.







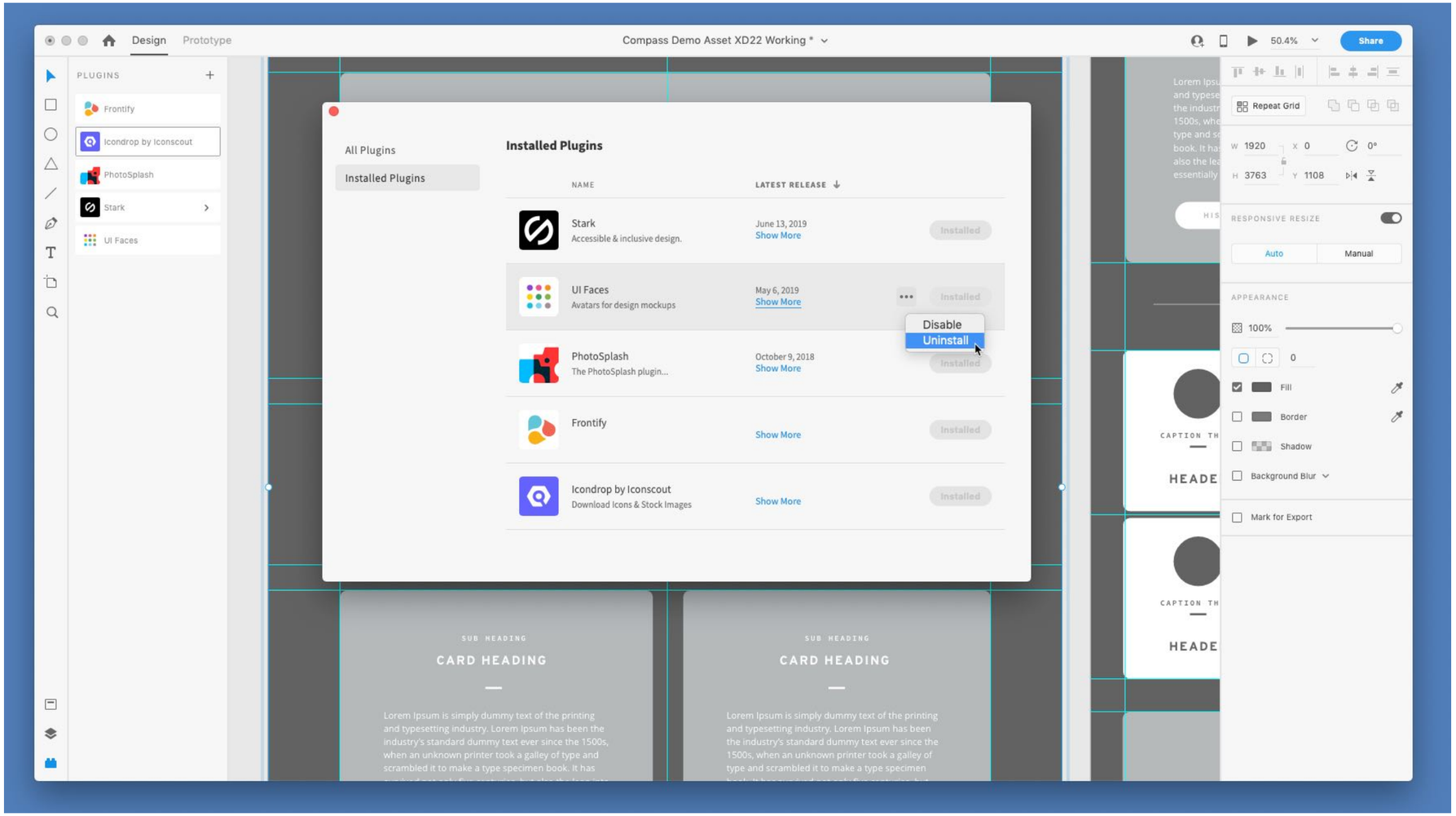
[30] Image source: Left, Center, Right

Quiz 1

Complete the Canvas quiz.

In-Class Activity 1: Desktop Application Deconstruction

Image Source


Design
Prototype
Compass Demo Asset XD22 Working *
50.4%
Share
PLUGINS
Frontify
Icondrop by Iconscout
PhotoSplash
Stark
UI Faces
All Plugins
Installed Plugins
Installed Plugins
NAME
LATEST RELEASE
Stark
Accessible & inclusive design.
June 13, 2019
Show More
Installed
UI Faces
Avatars for design mockups
May 6, 2019
Show More
Installed
Disable
Uninstall
PhotoSplash
The PhotoSplash plugin...
October 9, 2018
Show More
Installed
Frontify
Show More
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Icondrop by Iconscout
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Show More
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SUB HEADING
CARD HEADING
Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has
SUB HEADING
CARD HEADING
Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen
Repeat Grid
W 1920
X 0
0°
H 3763
Y 1108
RESPONSIVE RESIZE
Auto
Manual
APPEARANCE
100%
0
Fill
Border
Shadow
Background Blur
Mark for Export
CAPTION TH
HEADE
CAPTION TH
HEADE

Designing for the Web

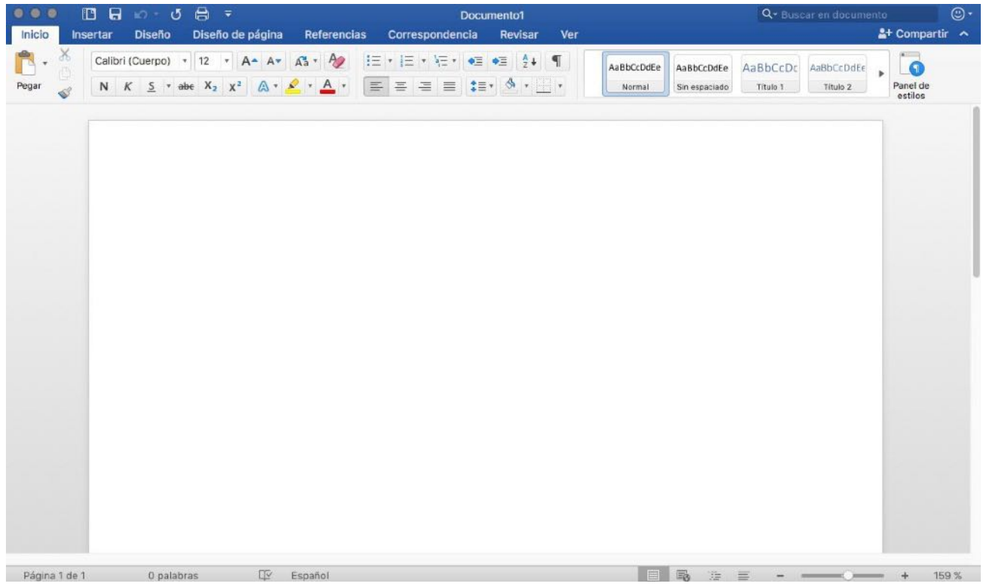
Desktop Applications vs. Websites

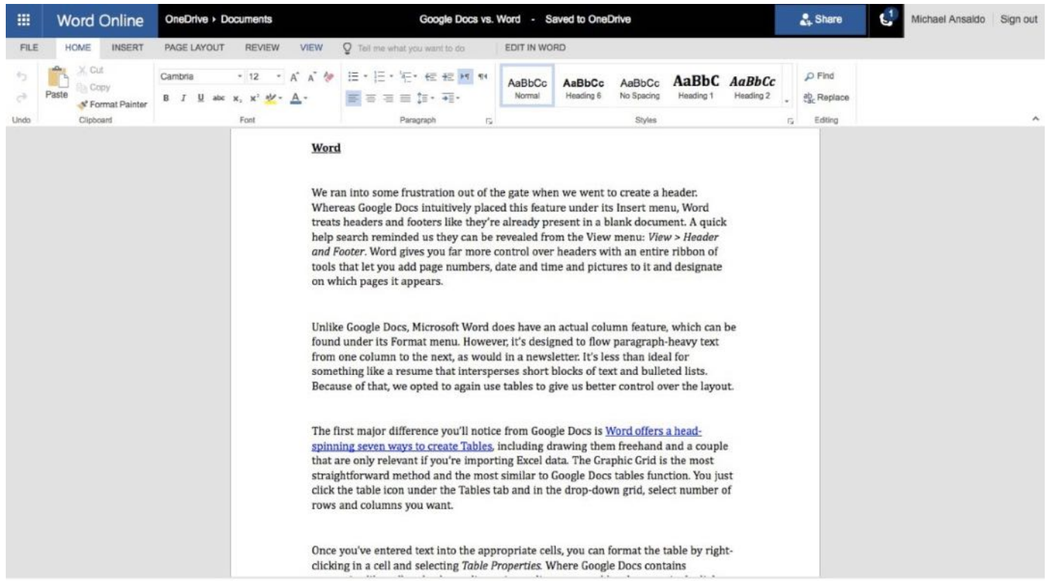
Desktop applications: Dynamic, persistent *screens* and supporting *components* that enable users to perform complex tasks.

Webpages: Interconnected *pages* with *aids* that help users navigate and access a large body of content.

Web Applications[31]

Definition: Single-page applications (SPAs) provide the functions of a desktop application on a webpage following the conventions of desktop applications.





[31] Image source: Left, Right

The Page

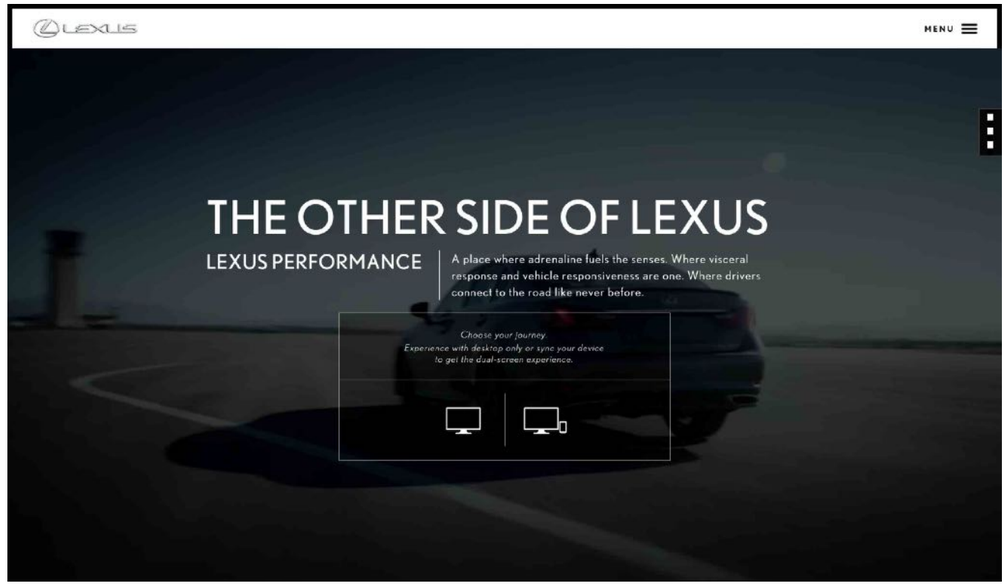
Since its inception, the *page*, has been the building block of web content.

If the web is made out of pages, how do we organize and help users navigate them?

Using *primary* and *secondary* navigation aids.

Primary Navigation Aids[32]

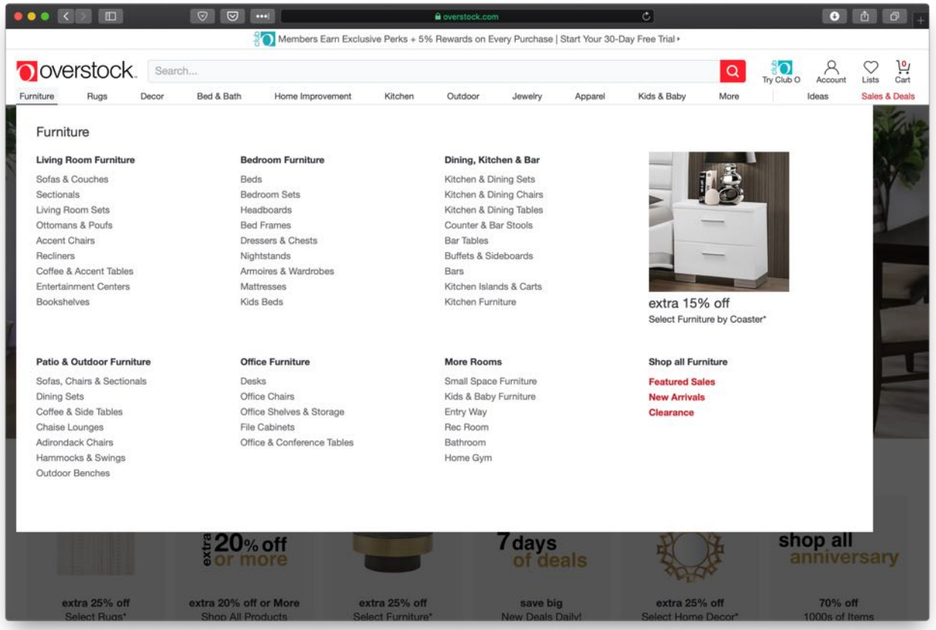
Definition: Primary navigation aids take the form of menus/menubars and reflect the major areas or sections of a website.

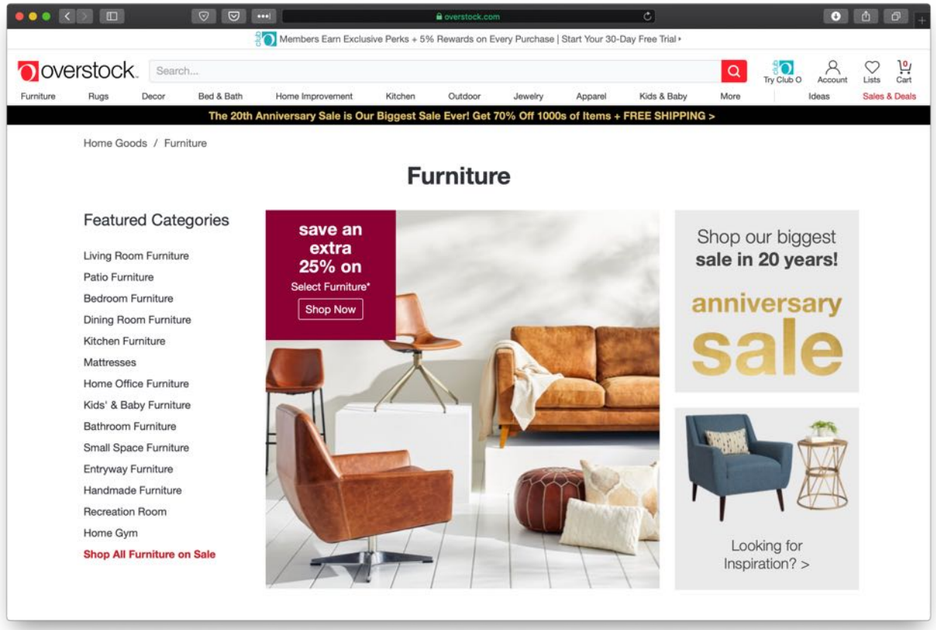


[32] Image source: Left, Right

Secondary Navigation Aids

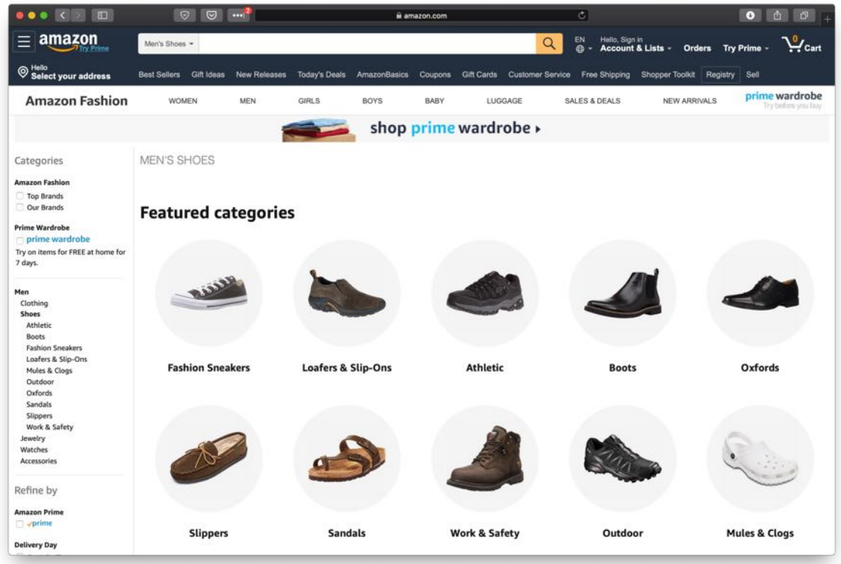
Definition: Secondary navigation aids provide comprehensive links to specific content on the site as *fat navigation*, *left-hand navigation*, *footer navigation*, etc.

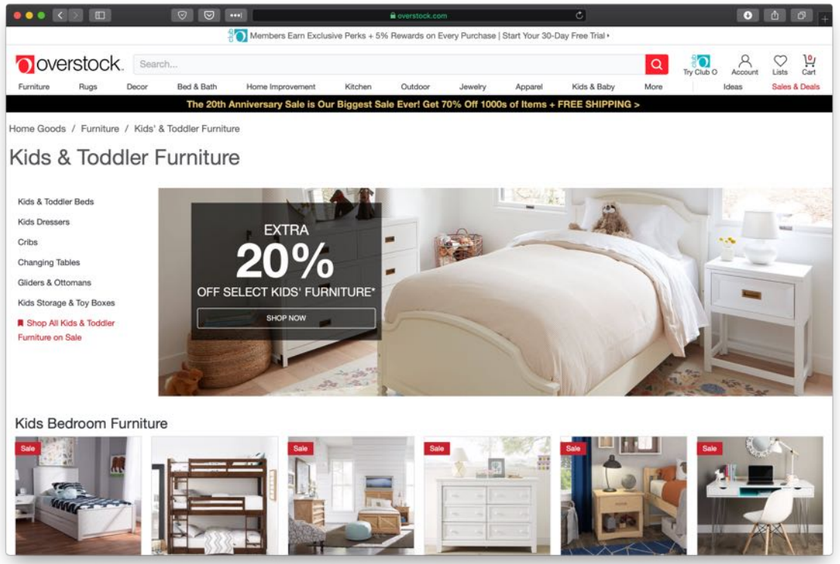




How do we get home?

A key problem in complex sites is to get back to previous pages or other pages that are higher in the navigation hierarchy. *Breadcrumbs* and *hierarchical lists* are solutions to this problem.





Quiz 2

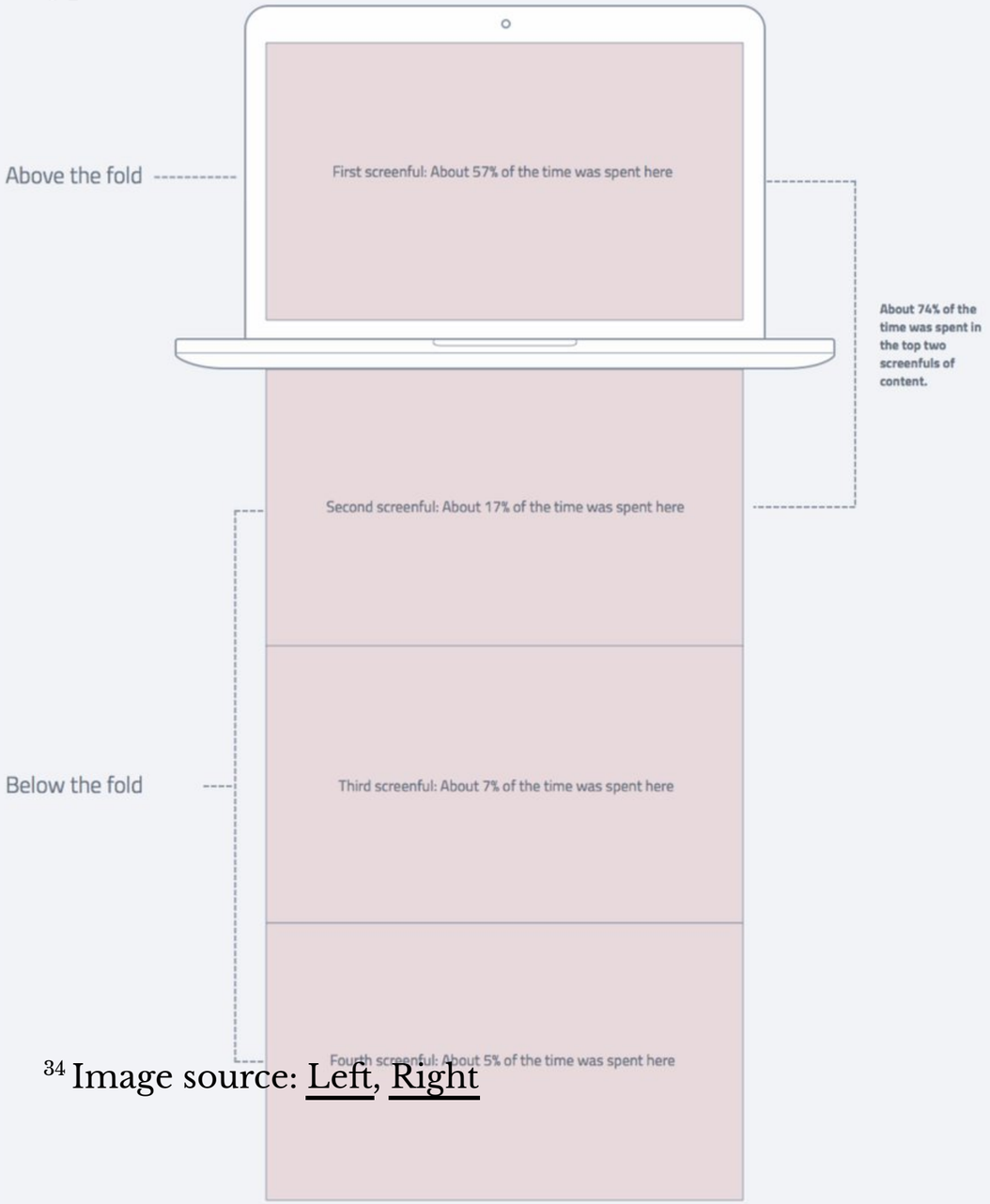
Complete the Canvas quiz.

Organizing Page Content: The Fold[33]

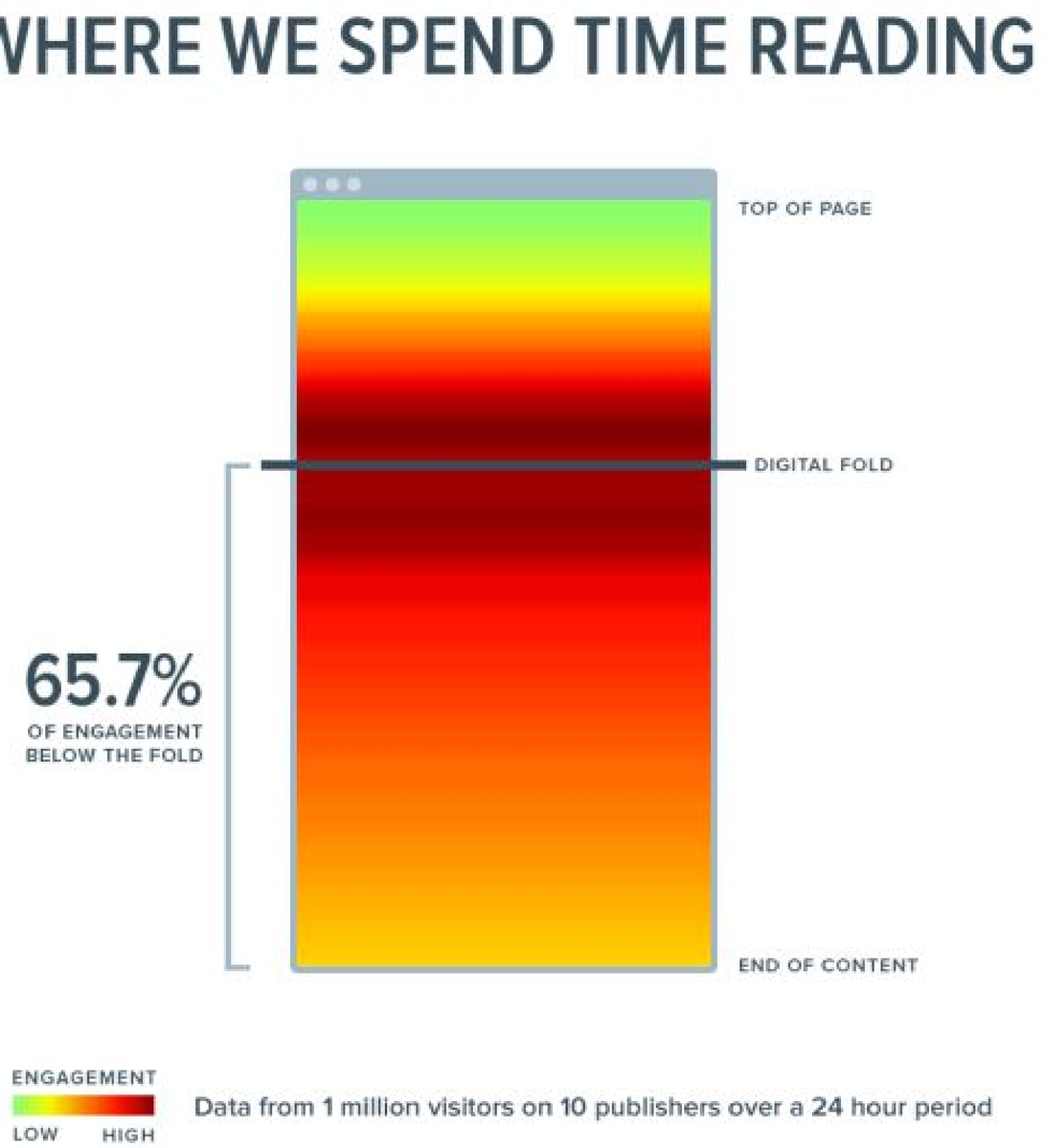
Definition: The *fold* is the dividing line between the area that is visible when a page first loads and the remainder of the page.

[33] Image Source

34



[34] Image source: Left, Right



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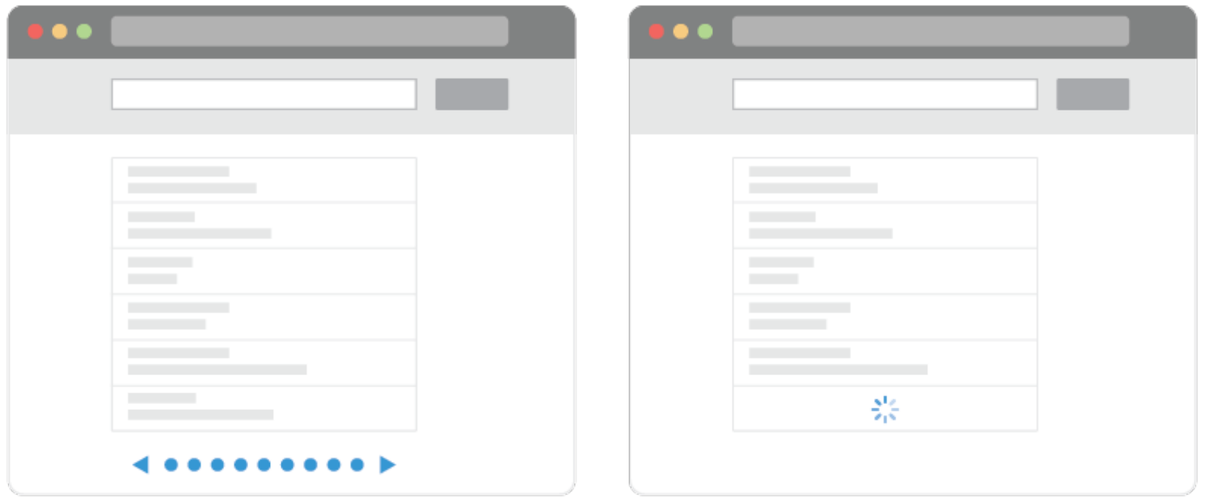
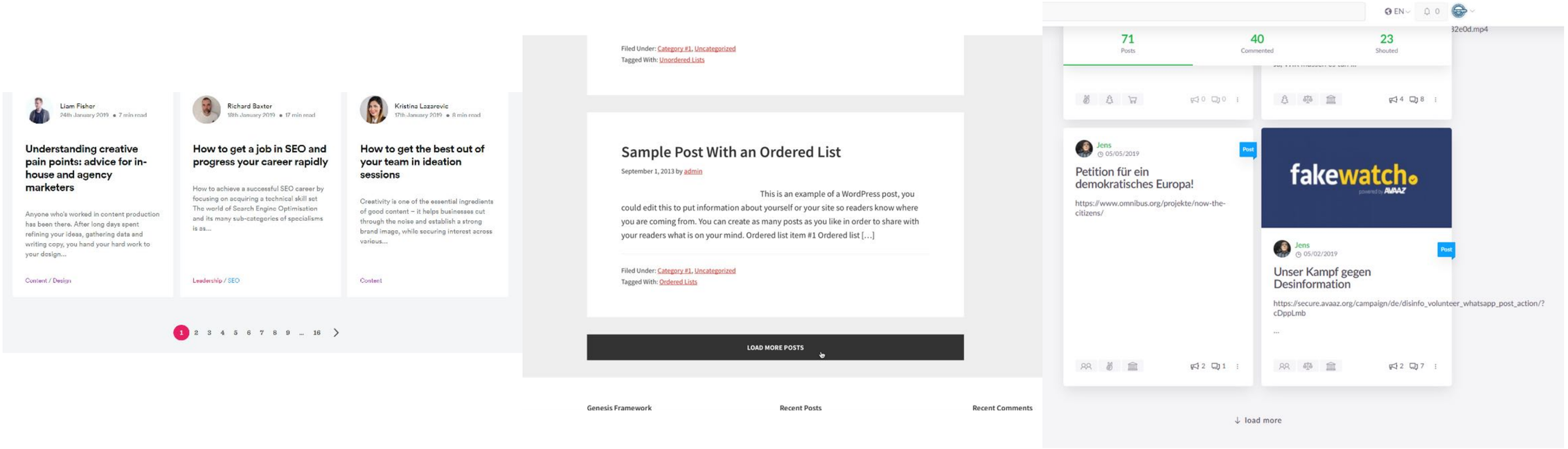
Organizing Page Content: Fitting It All in[35]

Large volumes of content is either broken into discrete pages through *pagination* or incrementally loaded through *infinite scroll*.



[35] Image Source

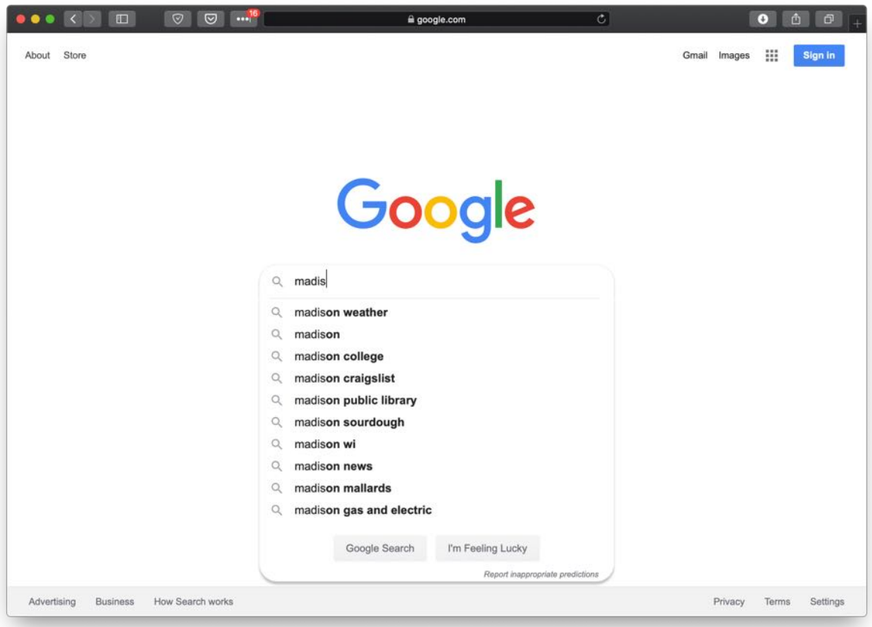
Examples of pagination and infinite scroll:[36]

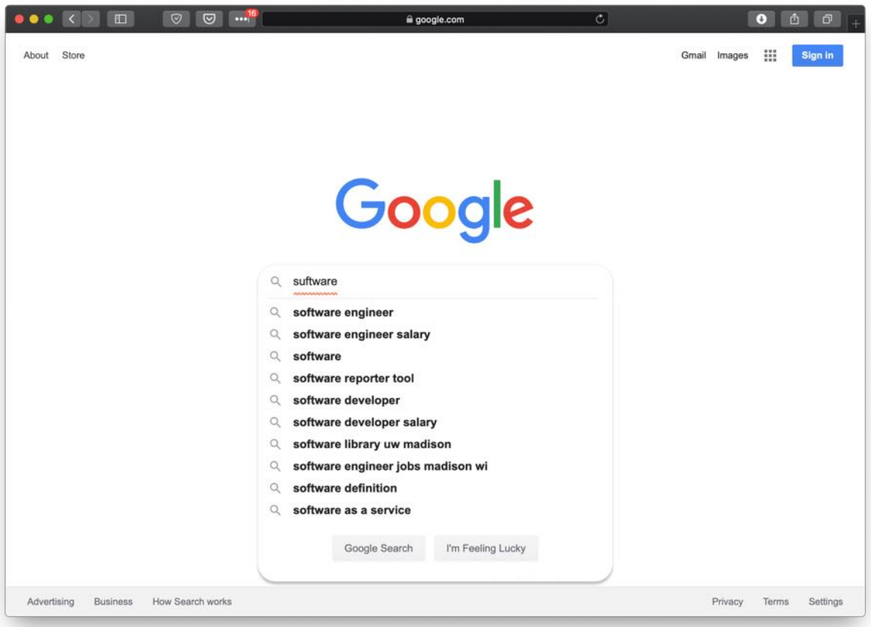


[36] Image source: Left, Center. Right

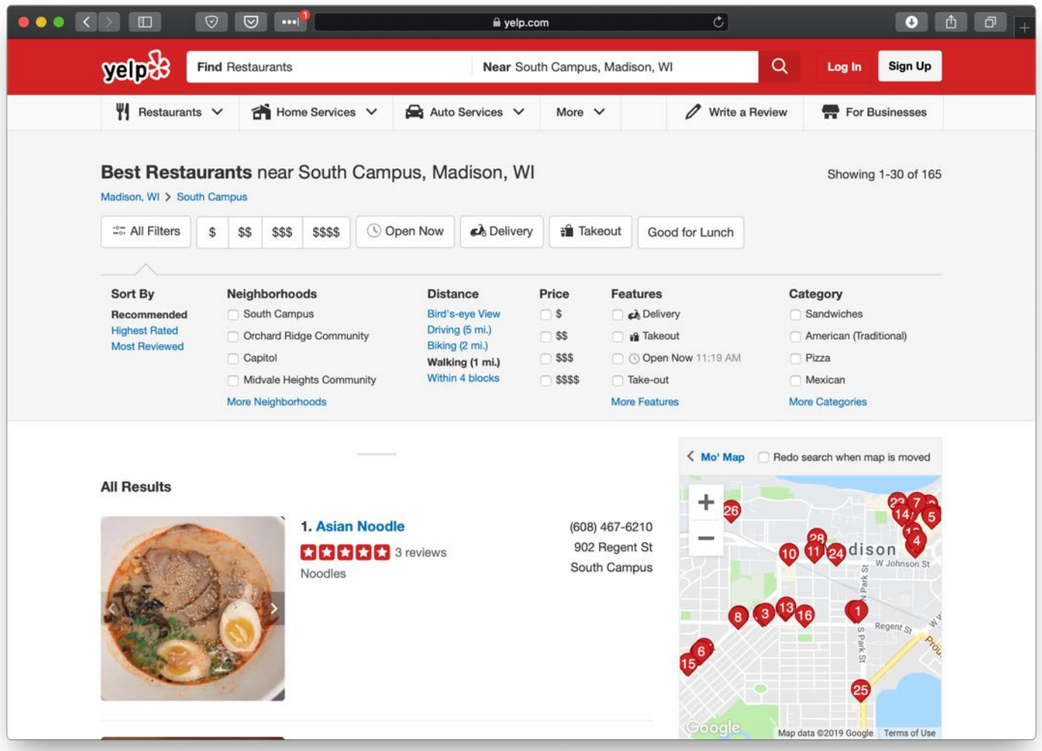
Search

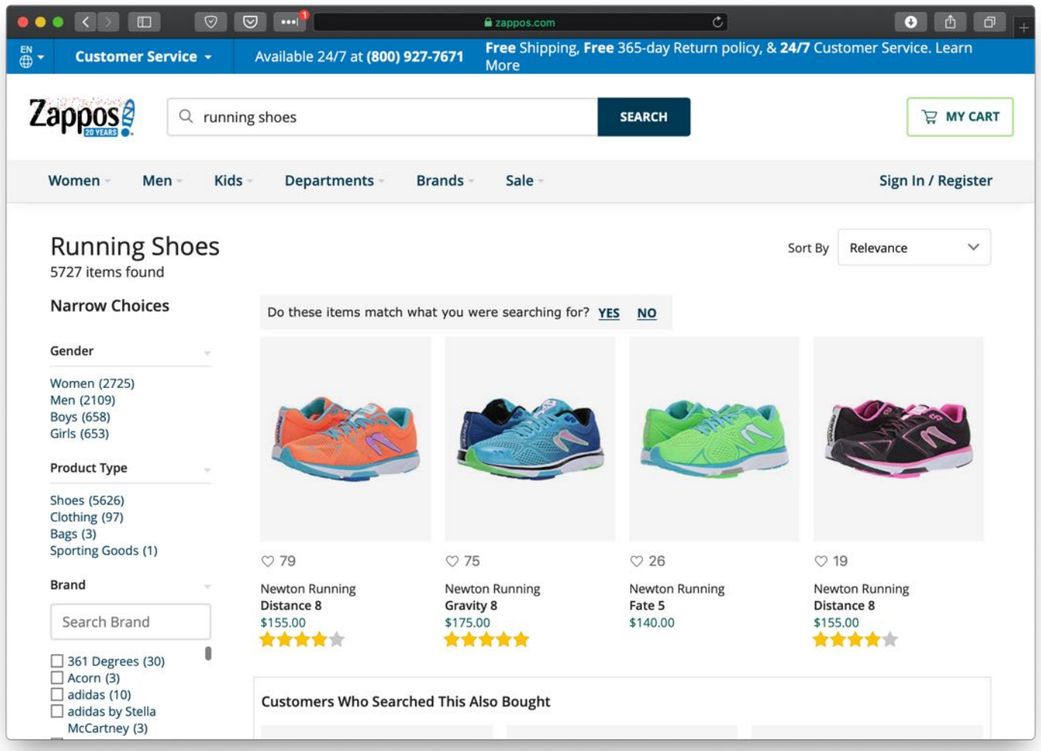
Definition: Search, an alternative to page navigation, provides users with listings of content based on a search query.





Faceted search helps users narrow down a search once results are returned based on a simple query by providing functions to sort and filter the results.



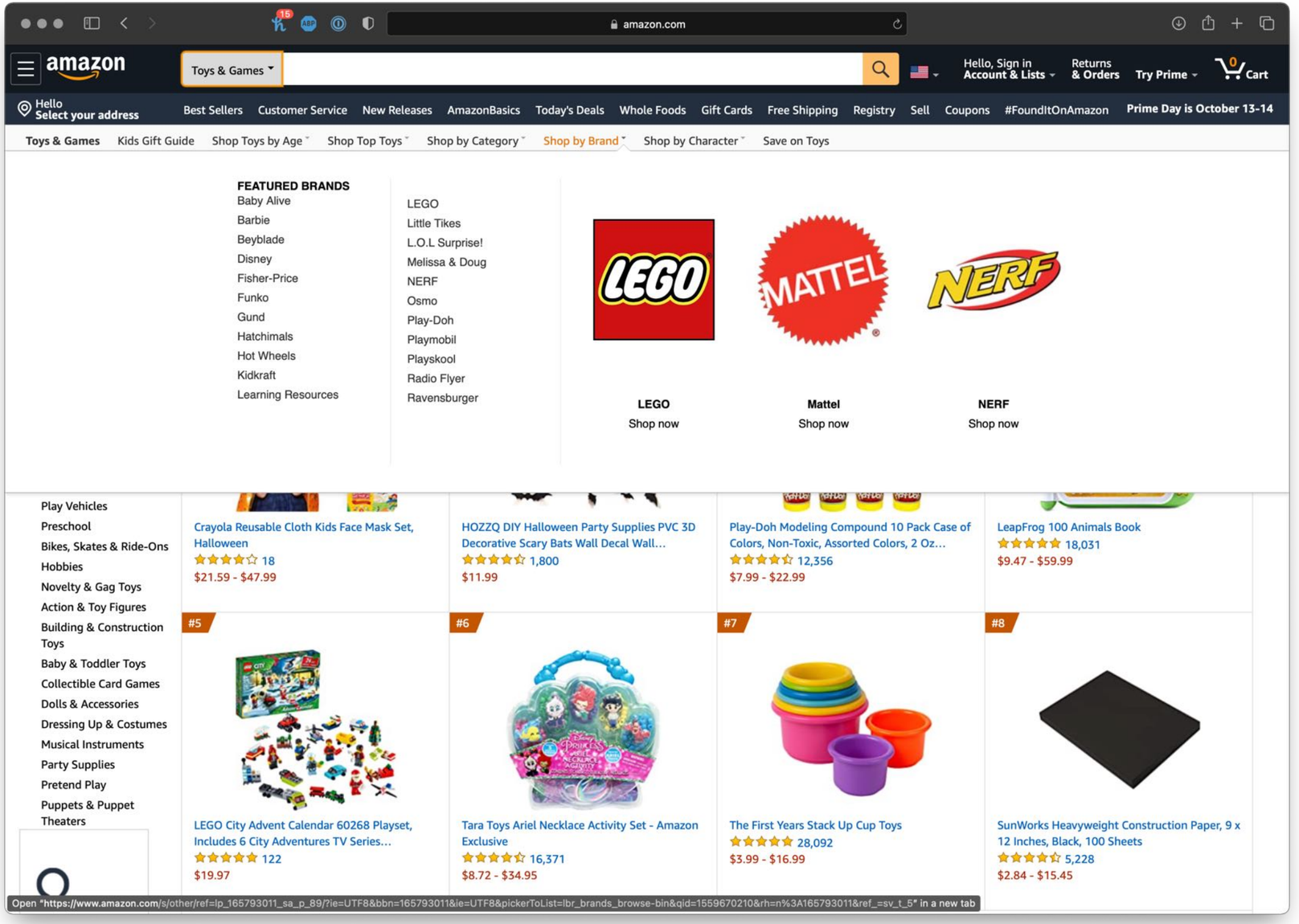


Quiz 3

Complete the Canvas quiz.

In-Class Activity 2: Web Application Deconstruction

Image Source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Returns
& Orders
Try Prime
Cart
Hello
Select your address
Best Sellers
Customer Service
New Releases
AmazonBasics
Today's Deals
Whole Foods
Gift Cards
Free Shipping
Registry
Sell
Coupons
#FoundItOnAmazon
Prime Day is October 13-14
Toys & Games
Kids Gift Guide
Shop Toys by Age
Shop Top Toys
Shop by Category
Shop by Brand
Shop by Character
Save on Toys
FEATURED BRANDS
Baby Alive
Barbie
Beyblade
Disney
Fisher-Price
Funko
Gund
Hatchimals
Hot Wheels
Kidkraft
Learning Resources
LEGO
Little Tikes
L.O.L. Surprise!
Melissa & Doug
NERF
Osmo
Play-Doh
Playmobil
Playskool
Radio Flyer
Ravensburger
LEGO
Shop now
Mattel
Shop now
NERF
Shop now
Play Vehicles
Preschool
Bikes, Skates & Ride-Ons
Hobbies
Novelty & Gag Toys
Action & Toy Figures
Building & Construction Toys
Baby & Toddler Toys
Collectible Card Games
Dolls & Accessories
Dressing Up & Costumes
Musical Instruments
Party Supplies
Pretend Play
Puppets & Puppet Theaters
Crayola Reusable Cloth Kids Face Mask Set, Halloween
18
$21.59 - $47.99
HOZZQ DIY Halloween Party Supplies PVC 3D Decorative Scary Bats Wall Decal Wall…
1,800
$11.99
Play-Doh Modeling Compound 10 Pack Case of Colors, Non-Toxic, Assorted Colors, 2 Oz…
12,356
$7.99 - $22.99
LeapFrog 100 Animals Book
18,031
$9.47 - $59.99
#5
LEGO City Advent Calendar 60268 Playset, Includes 6 City Adventures TV Series…
122
$19.97
#6
Tara Toys Ariel Necklace Activity Set - Amazon Exclusive
16,371
$8.72 - $34.95
#7
The First Years Stack Up Cup Toys
28,092
$3.99 - $16.99
#8
SunWorks Heavyweight Construction Paper, 9 x 12 Inches, Black, 100 Sheets
5,228
$2.84 - $15.45
Open "https://www.amazon.com/s/other/ref=lp_165793011_sa_p_89/?ie=UTF8&bbn=165793011&ie=UTF8&pickerToList=lbr_brands_browse-bin&qid=1559670210&rh=n%3A165793011&ref_=sv_t_5" in a new tab

What we learned today?

- A brief history of user interfaces
- Platform-specific design
  - Designing for the desktop
  - Designing for the web