

# Week 11-1

# Interface Implementation

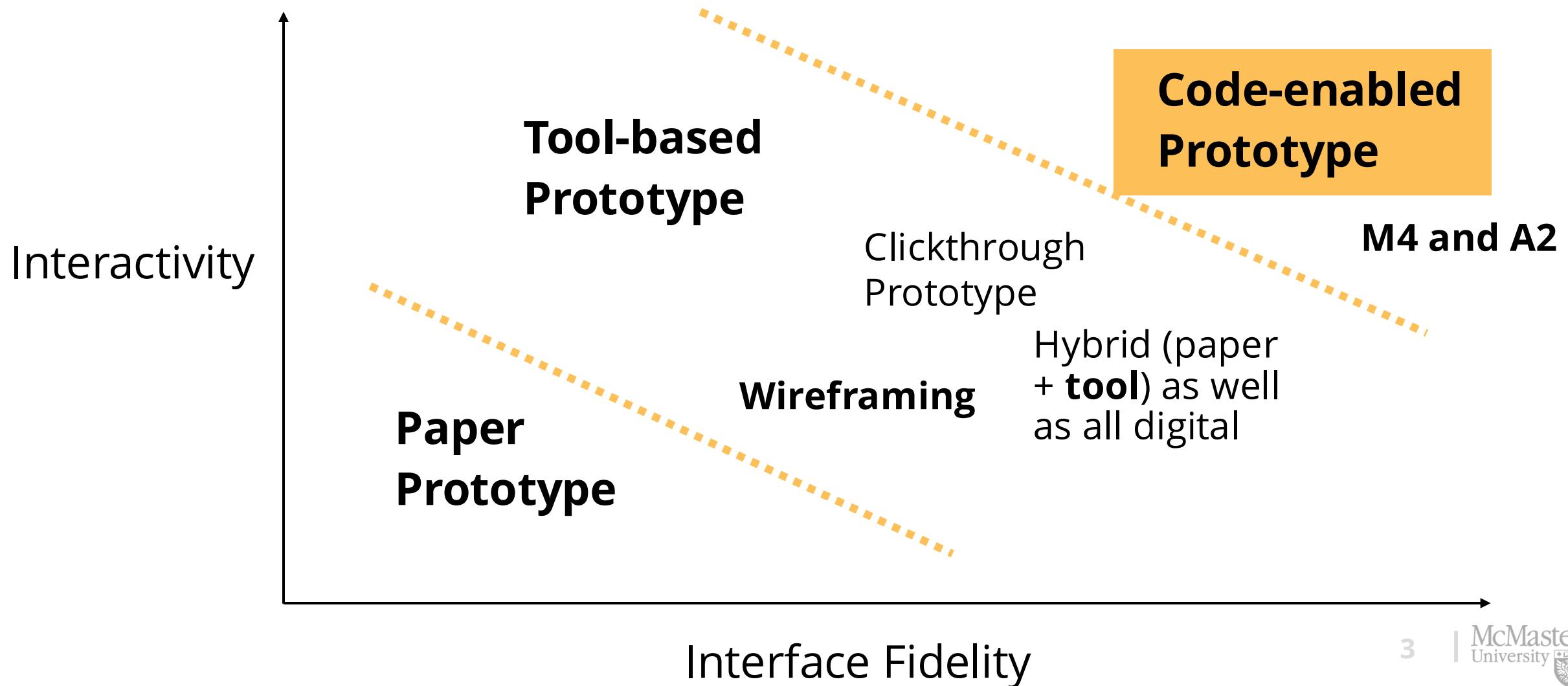
SFWRENG 4HC3/6HC3 Human Computer Interfaces

*\* Slides adapted from previous instructors of COMPSCI/SFWRENG 4HC3/6HC3  
and the CSE 440 from University of Washington*

# Week 11 Overview

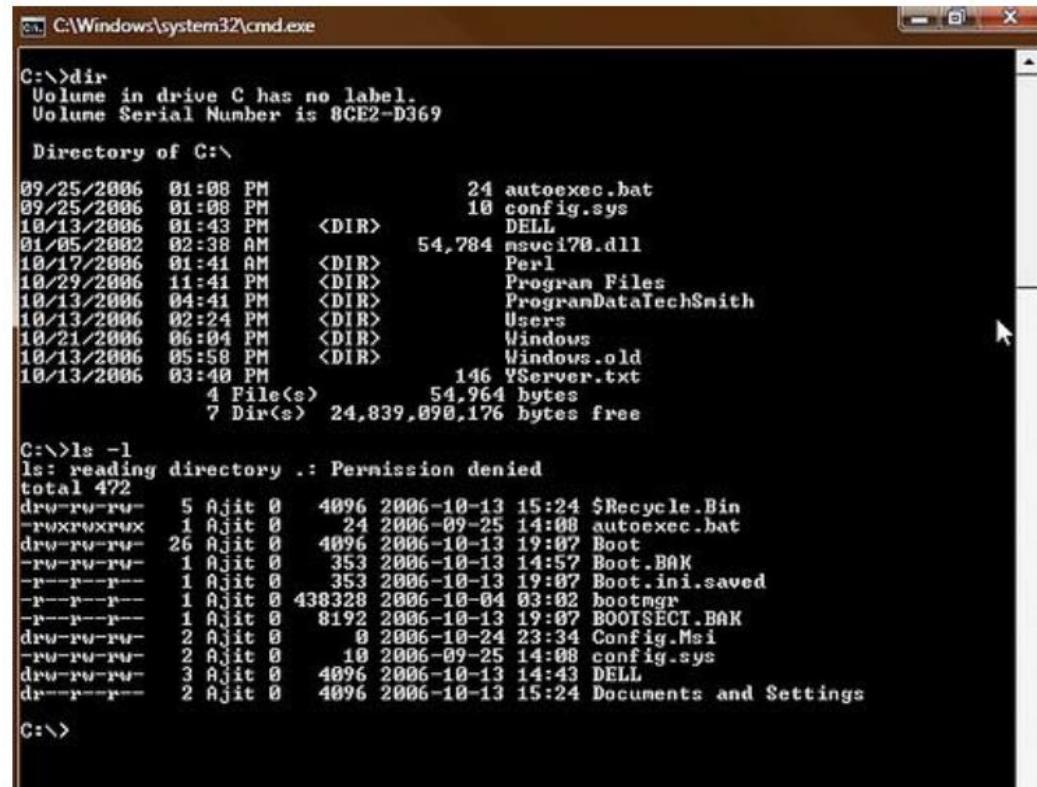
- **Monday**
  - Interface Implementations
  - Interface Design Patterns
- **Wednesday**
  - Interface Types
- **Friday**
  - Interface Types
  - Interaction Types

# Low-High Fidelity Prototypes



# Sequential Programs

- Program takes control, prompts for input
- Person waits on the program
- Program says when it is ready for more input, which the person then provides



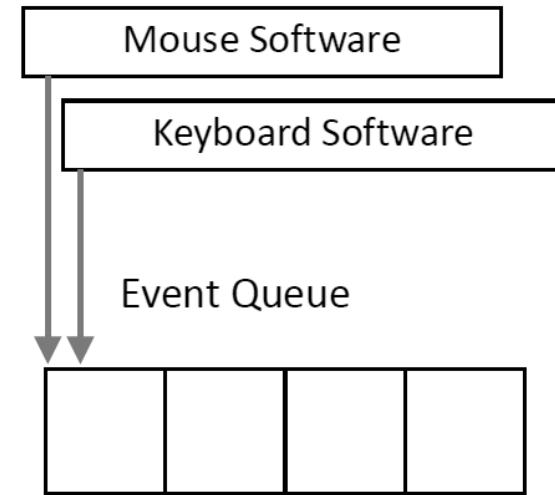
C:\>dir  
Volume in drive C has no label.  
Volume Serial Number is 8CE2-D369  
  
Directory of C:\  
09/25/2006 01:08 PM 24 autoexec.bat  
09/25/2006 01:08 PM 10 config.sys  
10/13/2006 01:43 PM <DIR> DELL  
01/05/2002 02:38 AM 54,784 msvc170.dll  
10/17/2006 01:41 AM <DIR> Perl  
10/29/2006 11:41 PM <DIR> Program Files  
10/13/2006 04:41 PM <DIR> ProgramDataTechSmith  
10/13/2006 02:24 PM <DIR> Users  
10/21/2006 06:04 PM <DIR> Windows  
10/13/2006 05:58 PM <DIR> Windows.old  
10/13/2006 03:40 PM 146 YServer.txt  
4 File(s) 54,964 bytes  
7 Dir(s) 24,839,090,176 bytes free  
  
C:\>ls -l  
ls: reading directory .: Permission denied  
total 472  
drw-rw-rw- 5 Ajit 0 4096 2006-10-13 15:24 \$Recycle.Bin  
-rwxrwxrwx 1 Ajit 0 24 2006-09-25 14:08 autoexec.bat  
drw-rw-rw- 26 Ajit 0 4096 2006-10-13 19:07 Boot  
-rw-rw-rw- 1 Ajit 0 353 2006-10-13 14:57 Boot.BAK  
-r--r--r-- 1 Ajit 0 353 2006-10-13 19:07 Boot.ini.saved  
-r--r--r-- 1 Ajit 0 438328 2006-10-04 03:02 bootmgr  
-r--r--r-- 1 Ajit 0 8192 2006-10-13 19:07 BOOTSECT.BAK  
drw-rw-rw- 2 Ajit 0 0 2006-10-24 23:34 Config.Msi  
-rw-rw-rw- 2 Ajit 0 10 2006-09-25 14:08 config.sys  
drw-rw-rw- 3 Ajit 0 4096 2006-10-13 14:43 DELL  
dr--r--r-- 2 Ajit 0 4096 2006-10-13 15:24 Documents and Settings  
  
C:\>

# Sequential Programs: Basic Setup

```
while true {  
    print "Prompt for Input"  
    input = read_line_of_text()  
    output = do_work(input)  
    print output  
}
```

# Event-Driven Programs

- Flow of the program execution is determined by **events**
  - User interaction: “mouse down”, “item drag”, “key up”
  - Also, messages from operation system, etc.
- All events go into a queue
  - Ensures events are handled in order
- How many event queues does your operating system have?
  - One per top-level application!



# Event-Driven Programs: Basic Setup

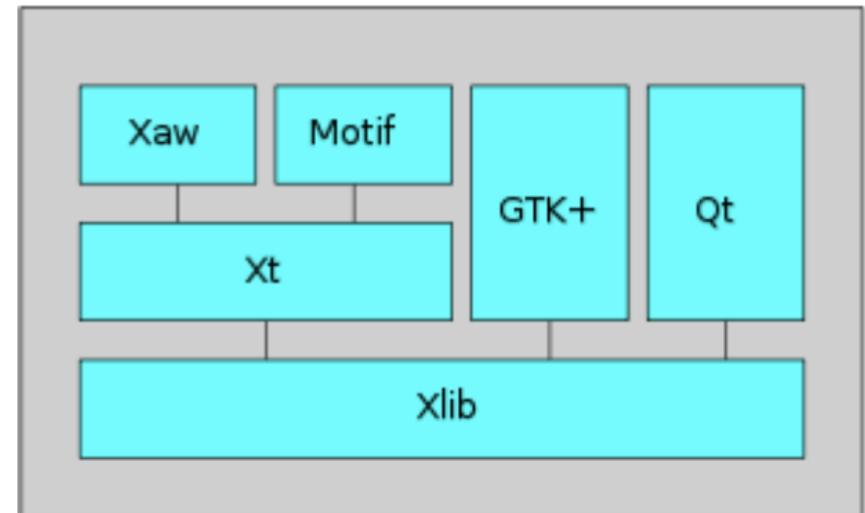
```
do  {  
    e = read_event()           ← Input  
    dispatch_event(e)          ← Processing  
    update_display()           ← Output  
} while (e.type != QUIT)
```

# Event-Driven Programs: Basic Setup

In the 1990s:

“One of the most complex aspects of Xlib programming is **designing the event loop**, which must take into account **all of the possible events** that can occur in a window.”

Nye & O'Reilly, X Toolkit Intrinsics Programming Manual, vol. 4, 1990, p. 241.



# Toolkits for Interface Implementation

We use **toolkits** because they

- Identify common or important practices
- Package those practices into a framework
- Make it easy to follow those practices
- Make it easier to focus on our application

What other **benefits**?

- Faster = more iterative design
- Implementation is generally better in the toolkit
- Consistency across applications using same toolkit

# Web Toolkit: Example

Raw event handling and Document Object Model (DOM) manipulation via JavaScript

```
var myElementsArray =  
document.querySelectorAll('.btn');  
  
myElementsArray.forEach(function(element, index{  
    element.addEventListener("click", function() {  
        //inside my click event!  
    }) ;  
}) ;
```

# Web Toolkit: Example

...or Vue.js

```
// JavaScript
function warn(message, event) {
  // now we have access to the native event
  if (event) { event.preventDefault() }
  alert(message)
}

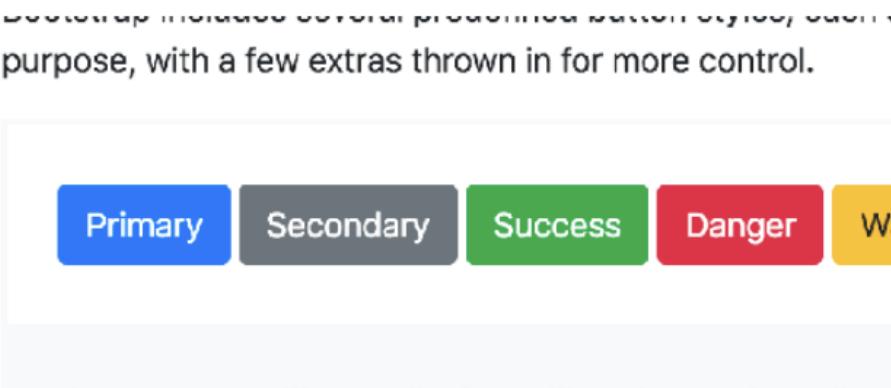
<!-- HTML -->
<button @click="warn('Form cannot be submitted yet.', $event)"> Submit </button>
```

# Web Toolkit: Example

Another level up: interactions, widgets, components, and templates

Examples: Material UI, Bootstrap (on various web development frameworks)

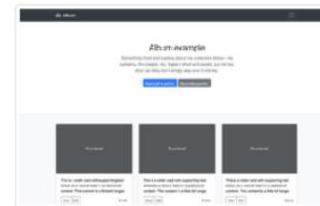
Bootstrap includes several pre-built button styles, each purpose, with a few extras thrown in for more control.



```
<button type="button" class="btn btn-primary">Pr
```

## Custom Components

Brand new components and templates to help folks quickly get started with Bootstrap and demonstrate best practices for adding onto the framework



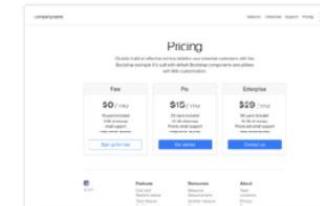
### Album

Simple one-page template for photo galleries, portfolios, and more.



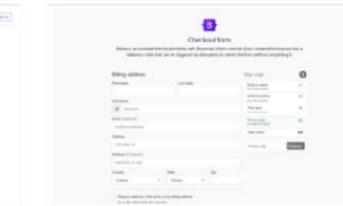
### Cover

A one-page template for building simple and beautiful home pages.



### Pricing

Example pricing page built with Cards and featuring a custom header and footer.



### Checkout

Custom checkout form showing our form components and their validation features.



### Product

Lean product-focused marketing page with extensive grid and image work.

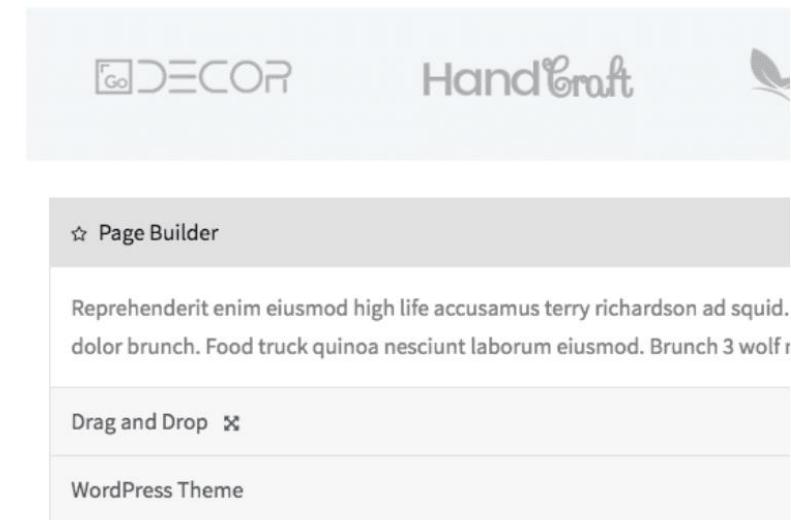
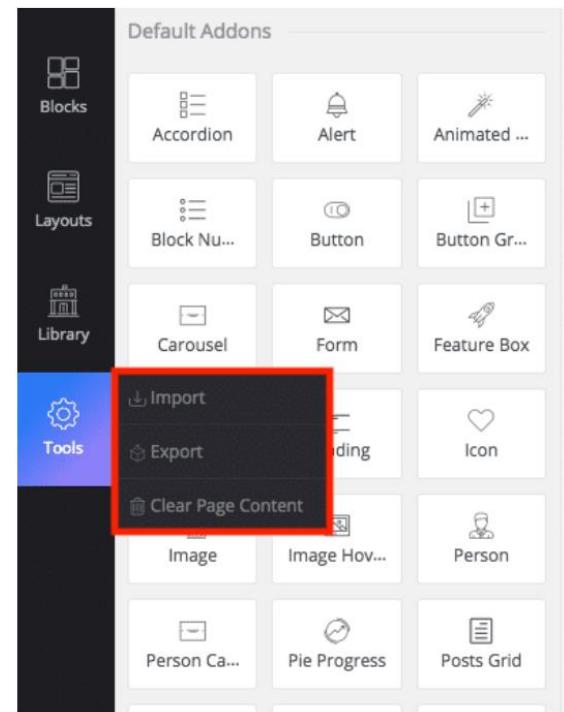


### Dashboard

Basic admin dashboard shell with fixed sidebar and navbar.

# Web Toolkit: Example

GUI Builder: Wix,  
Wordpress,  
Squarespace, Webflow,  
Framer



# Interactive Web Visualization: Example

Raw JavaScript

d3.js (JavaScript library)

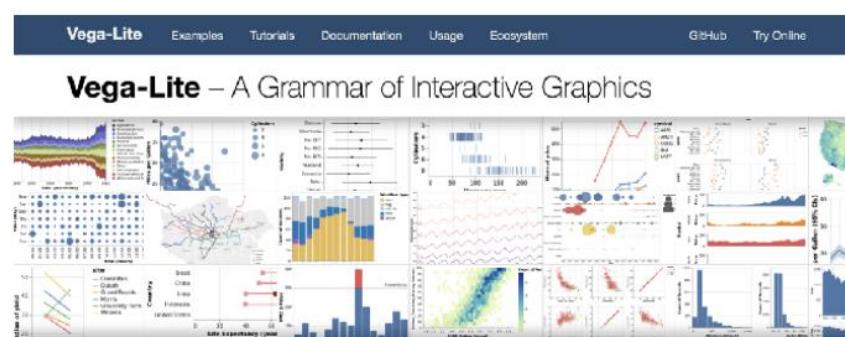
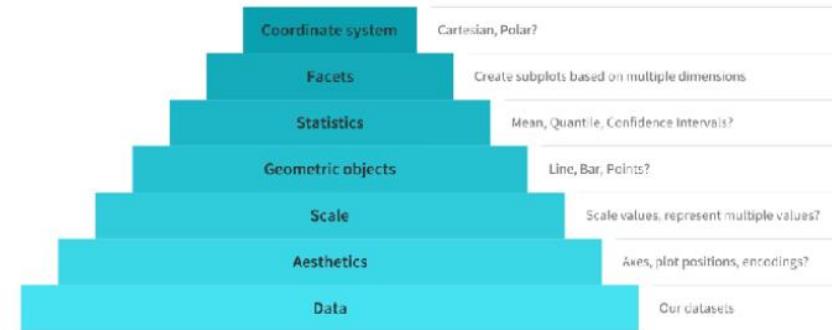
Vega (visualization grammar)

Vega-Lite (simplified grammar)

Voyager (web-based GUI builder)



Major Components of the Grammar of Graphics



# Animation Toolkit: Example

There are some common animation techniques used in the example here.



# Animation Toolkit : Example

Objects with mass must  
**accelerate and decelerate**

Interesting frames are typically  
**at ends, tweaks perception**  
**to emphasize these poses**

Slow in and Slow out

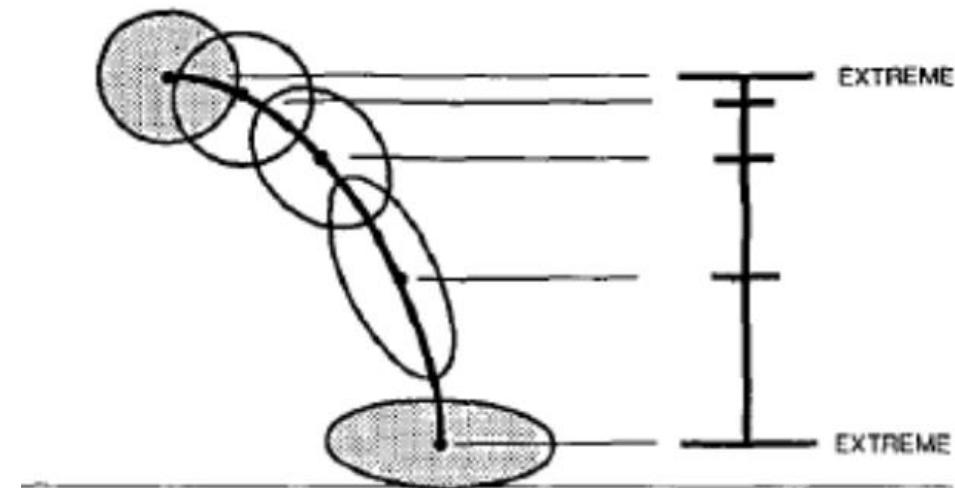


FIGURE 9. Timing chart for ball bounce.

# Animation Toolkit: Example

What can UI design/toolkits also **learn from animation?**

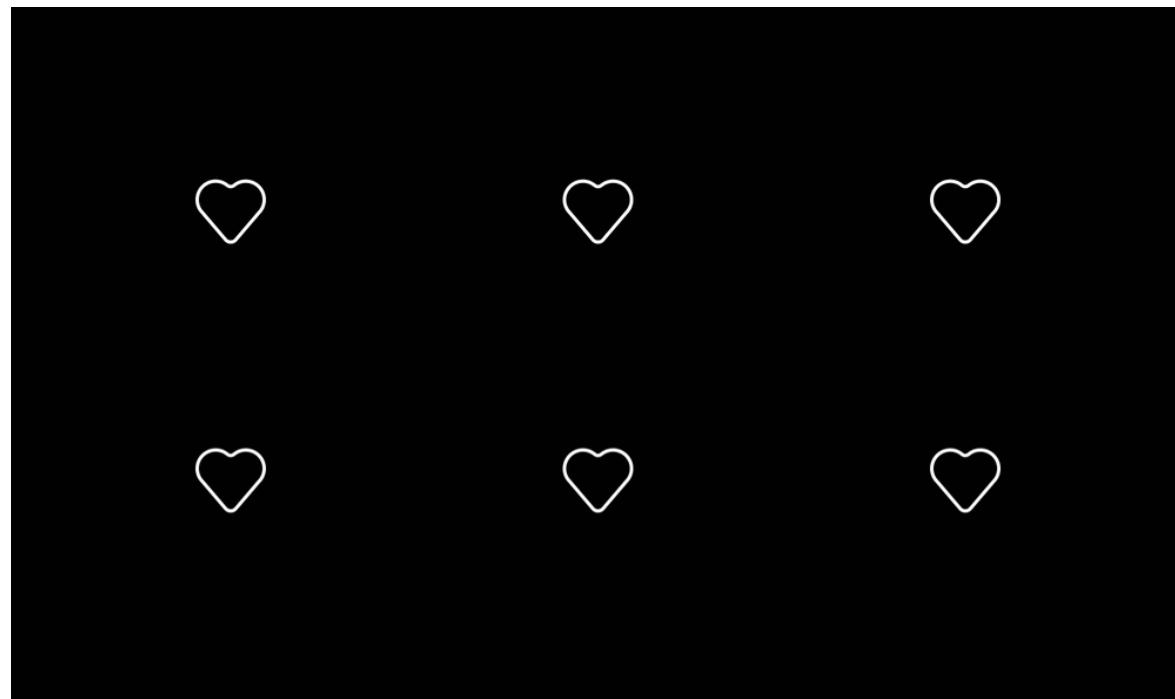
- **Solidity:** Desktop objects should appear to be solid objects
- **Exaggeration:** Exaggerate physical actions to enhance perception
- **Reinforcement:** Use effects to drive home feeling of reality

Using principles of animation makes it **easier** for the user to **track objects** and understand **what is changing** on the screen.

Bay-Wei Chang and David Ungar. 1993. Animation: from cartoons to the user interface. In Proceedings of the 6th annual ACM symposium on User interface software and technology (UIST '93).

# Animation Toolkit: Example

- Animation is now in almost every major UI toolkit out there!
  - Relating to perception
- Apps also have their unique animation design
  - Also known as micro interaction design/motion design
- Spotify's Heart design example:  
<https://spotify.design/article/bringing-the-spotify-heart-to-life>



# Toolkits for Interface Implementation

- Raw JavaScript might be enough for your project, but if you are looking into additional wrapper (framework):
  - Vue.js
  - React.js (more advanced web dev)
- For HTML/CSS toolkit (available in different frameworks as well):
  - Bootstrap
  - Material UI
- For graphical builder:
  - Wix
  - Webflow

# UI Toolkits: Bootstrap

<https://getbootstrap.com/>

- Responsive
  - Breakpoints
  - Grid
- Forms
- Components
  - Buttons
  - Card
  - Carousel

The screenshot shows the Bootstrap website's grid system documentation page. The top navigation bar includes links for Docs, Examples, Icons, Themes, and Blog, along with a search bar and social media icons. The main content area features a heading 'Grid system' with a sub-section 'Example'. It explains the twelve-column flexbox grid and its responsive tiers. A sidebar on the right lists various Bootstrap components and features.

**Getting started**

- Introduction
- Download
- Contents
- Browsers & devices
- JavaScript
- Webpack
- Parcel
- Vite
- Accessibility
- RFS
- RTL
- Contribute

**Customize**

- Overview
- Sass
- Options
- Color
- Color modes
- Components
- CSS variables
- Optimize

**Layout**

- Breakpoints
- Containers
- Grid

**Grid system**

Use our powerful mobile-first flexbox grid to build layouts of all shapes and sizes thanks to a twelve column system, six default responsive tiers, Sass variables and mixins, and dozens of predefined classes.

GitLab is the only place where enterprises build mission-critical software.  
ads via Carbon

**Example**

Bootstrap's grid system uses a series of containers, rows, and columns to layout and align content. It's built with [flexbox](#) and is fully responsive. Below is an example and an in-depth explanation for how the grid system comes together.

New to or unfamiliar with flexbox? [Read this CSS Tricks flexbox guide](#) for background, terminology, guidelines, and code snippets.

Column	Column	Column
--------	--------	--------

HTML

On this page

**Example**

- How it works
- Grid options
- Auto-layout columns
- Equal-width
- Setting one column width
- Variable width content
- Responsive classes
- All breakpoints
- Stacked to horizontal
- Mix and match
- Row columns
- Nesting
- CSS
- Sass variables
- Sass mixins
- Example usage
- Customizing the grid
- Columns and gutters
- Grid tiers

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# What is a design pattern?

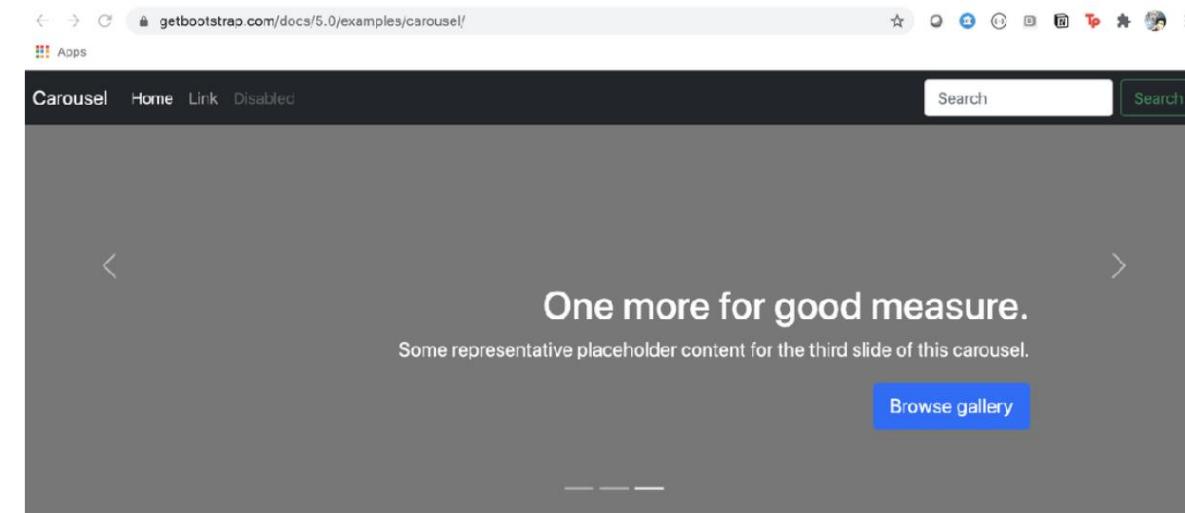
“... a general repeatable solution to a commonly-occurring usability problem in interface design...”

- Different from design principles in that they provide abstractions of tangible **solutions**, as opposed to guidelines to follow.
- Patterns often **incorporate principles**.
- UI toolkits oftentimes incorporate patterns.

# Design Pattern: Example

## UI Toolkit: Bootstrap

- ...includes the **design pattern**:
  - picture carousel landing page
- ...can incorporate important **design principles** such as:
  - flexibility and efficiency of use  
(a heuristic we will talk later)



# Design Pattern: Activity

Here is a really old website! Take **2 minutes** to see if you can **spot some interface design patterns**. What are some patterns that are still used today?

NEW: Counting Crows: Hard Candy \$11.88 Save 37%!

my account cart help eBay home sign in

half.com by eBay

Home Books Music DVDs/Movies Video Games Computers & Software Electronics Everything Else...  
Gift Certificates Wish List Pre-Orders Sell Your Stuff New Users  
Search: All Categories go

The Smartest Place to Buy and Sell Books, Music, Computers, Electronics, DVDs & more...

Welcome

Learn about Buying  
Learn about Selling  
Register Now!  
Announcement Board  
Updated Jun 13, 2002

DESKTOP LIQUIDATION CENTER as low as \$249!

New CD Releases! only \$11.88

More Hot New Releases!

Red Hot Price for the Chili Peppers' New CD: \$11.88!  
Evolving after the popularity of *Californication*, the Chili Peppers release a new album featuring the hit song "By the Way".

	Our Price	List Price
Weezer, Weezer	\$6.99	\$18.97
Gutterflower, Goo Goo Dolls	\$9.00	\$18.98
The Slim Shady LP, Eminem	\$2.98	\$18.97
Echoes, Pink Floyd	\$11.54	\$24.97
18, Moby	\$10.99	\$18.98

In-Stock Now!

Movies

Just Released: *The Royal Tenenbaums* for \$18.45  
Wes Anderson (*Rushmore*) directs a motley crew of talented actors in this hysterical comedy about the rise and fall of an eccentric family.

	Our Price	List Price
Monsters Ball (DVD)	\$11.25	\$24.99

Advance Orders

The Simpsons: Complete 2nd Season (DVD) \$34.97 Save 30%!

The Sopranos: Complete 3rd Season (DVD) \$67.99 Save 32%!

Tom Clancy: Red Rabbit (Hardcover) \$19.40 Save 33%!

In Computers

Gateway Desktop Under \$400! \$399.00

Includes an 800MHz Intel Celeron processor, 256MB RAM, 20GB hard drive, DVD-ROM drive, and more!

Save Over \$100 on Dell Latitude CPx! \$639.00

Get the best quality at the best price with the Dell Latitude CPx featuring an Intel Pentium III® 500 MHz processor, 256 MB RAM and 12 GB hard drive.

Gateway Desktop Under \$500 \$499.00

Includes a 1GHz Intel Pentium III processor, 256MB RAM, 20GB hard drive, CD-RW drive, 250MB ZIP Drive, and more!

More great deals...

# Design Pattern: Activity

**Logo:** Site logo in top-left corner, probably clickable to get to homepage

The screenshot shows the homepage of half.com, a site for buying and selling books, music, computers, electronics, DVDs & more. The logo 'half.com by ebay' is at the top left, with a red box highlighting it. The top navigation bar includes links for my account, cart, help, ebay home, and sign in. Below the navigation is a menu bar with Home, Books, Music, DVDs/Movies, Video Games, Computers & Software, Electronics, and Everything Else... The main content area features a 'New CD Releases!' section with a CD cover for 'Counting Crows: Hard Candy' priced at \$11.88. It also highlights 'The Smartest Place to Buy and Sell Books, Music, Computers, Electronics, DVDs & more...'. Other sections include 'Advance Orders' for TV shows like 'The Simpsons' and 'The Sopranos', and 'In Computers' for desktops under \$400 and \$500. A sidebar on the left lists categories such as Books, Music, Movies/DVDs, and Games.

**New CD Releases!**  
only **\$11.88**

**Red Hot Price for the Chili Peppers' New CD: \$11.88!**  
Evolving after the popularity of *Californication*, the Chili Peppers release a new album featuring the hit song "By the Way".

	Our Price	List Price
Weezer, Weezer	\$6.99	\$18.97
Gutterflower, Goo Goo Dolls	\$9.00	\$18.98
The Slim Shady LP, Eminem	\$2.98	\$18.97
Echoes, Pink Floyd	\$11.54	\$24.97
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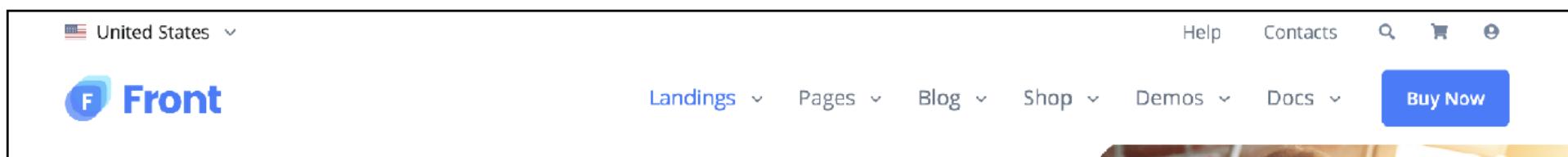
**Just Released: The Royal Tenenbaums for \$18.45**  
Wes Anderson (*Rushmore*) directs a motley crew of talented actors in this hysterical comedy about the rise and fall of an eccentric family.

	Our Price	List Price
Monster's Ball (DVD)	\$11.25	\$24.99

# Design Pattern: Activity



**Navbars:**  
navbar and  
search at the  
top, account  
settings, cart in  
top right



# Design Pattern: Activity

The screenshot shows the homepage of half.com. A red box highlights the left sidebar, which contains sections for Welcome, Categories, and various promotional banners for Desktop Liquidation Center, Books, Music, Movies/DVDs, and Games.

- Welcome
  - Learn about Buying
  - Learn about Selling
  - Register Now!
- Categories
  - Books: Textbooks, Fiction, Biography, Cooking, Business, & more...
  - Music: Rock, Hip Hop/Rap, Country, Pop, eBay items, & more...
  - Movies/DVDs: Action, Comedy, Children's, Romance, Animation, & more...
  - Games: PS2, Xbox, GameCube, Dreamcast, N64, & more...

The screenshot shows the homepage of Shopper.. A sidebar on the left lists catalog options: Home, Catalog, Shop, Pages, and Blog. To the right is a large image of a person wearing a t-shirt with '50%' printed on it.

- Home
- Catalog
- Shop
- Pages
- Blog

The screenshot shows the Books section of Amazon. A sidebar on the right provides facets for browsing:

- Popular in Books
  - Award Winners
  - Bargain Books
  - Best Books of the Month
  - Best Books of 2020
  - BHM: Books To Read Right Now
  - Celebrity Picks
  - Books in Spanish
  - Children's Books
  - Deals in Books
  - Prime Book Box
  - Top 20 Lists in Books
- More in Books
  - 100 Books to Read in a Lifetime
  - Amazon Book Review
  - Amazon Books on Facebook
  - Amazon Books on Twitter
  - Amazon Books Stores
  - Amazon First Reads
  - Book Club Picks
  - From Page to Screen
  - Start a New Series
- Textbooks
  - Textbooks Store
  - Textbook Rentals
  - Kindle eTextbooks
- Kindle & Audible
  - Audible Audiobooks
  - Kindle eBooks
  - Kindle Deals
  - Kindle Unlimited
  - Prime Reading
- New Releases
  - Last 30 days
  - Last 90 days
  - Coming Soon

Sidebars  
faceted  
browsing

# Design Pattern: Activity

The screenshot shows the homepage of half.com, a eBay subsidiary. A red box highlights the left sidebar, which contains a 'Welcome' section with links to buying and selling guides, an announcement board, and a desktop liquidation center. Below this is a 'Categories' section with links to Books, Music, Movies/DVDs, and Games. Another red box highlights the top navigation bar, which includes links for Home, Books, Music, DVDs/Movies, Video Games, Computers & Software, Electronics, Everything Else..., Gift Certificates, Wish List, Pre-Orders, Sell Your Stuff, and New Users. A search bar is also present.

The “L” shape navigation

The screenshot shows the homepage of the Group for User Interface Research. A red box highlights the top navigation bar, which includes links for Home, Projects, People, Publications, and Links. Another red box highlights the left sidebar, which contains a 'DENIM and SILK' section with links to Denim Lab, Documentation, Support, Records, Publications, and More Projects. A 'Gateway Deal' section is also visible.

# Design Pattern: Activity

Announcement Board  
Updated Jun 13, 2002

DESKTOP LIQUIDATION CENTER as low as \$249!

Categories

- Books  
Textbooks, Fiction, Biography, Cooking, Business, & more...
- Music  
Rock, Hip Hop/Rap, Country, Pop, eBay items, & more...
- Movies/DVDs  
Action, Comedy, Children's, Romance, Animation, & more...

More Hot New Releases!

Music

Red Hot Price for the Chili Peppers' New CD: \$11.88!  
Evolving after the popularity of *Californication*, the Chili Peppers release a new album featuring the hit song "By the Way".

In-Stock Now!	Our Price	List Price
Weezer, Weezer	\$6.99	\$18.97
Gutterflower, Goo Goo Dolls	\$9.00	\$18.98
The Slim Shady LP, Eminem	\$2.98	\$18.97
Echoes, Pink Floyd	\$11.54	\$24.97
18, Moby	\$10.99	\$18.98

Movies

ROYAL TENENBAUMS Just Released: *The Royal Tenenbaums* for \$18.45  
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The Sopranos: Complete 3rd Season (DVD) \$67.99 Save 32%!  
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Get the best quality at the best price with the Dell Latitude CPx featuring an Intel Pentium III® 500 MHz processor, 256 MB RAM and 12 GB hard drive.

Gateway Desktop Under \$500 \$499.00  
Includes a 1GHz Intel Pentium

**Tables:** Tabular view of data.  
Alternate colors of rows, etc.

## Striped rows

Use `.table-striped` to add zebra-striping to any table row within the `<tbody>`.

#	First	Last	Handle
1	Mark	Otto	@mdo
2	Jacob	Thornton	@fat
3	Larry	the Bird	@twitter

# Design Pattern: Activity

**Grid Layout:** with header, 3 columns, and a main center column

These layouts have been with us since paper newspapers and pamphlets!



The screenshot shows the homepage of half.com, a eBay subsidiary. The layout is a grid with the following structure:

- Header:** Includes the half.com logo, a search bar, and navigation links for Home, Books, Music, DVDs/Movies, Video Games, Computers & Software, Electronics, and Everything Else...  
Gift Certificates, Wish List, Pre-Orders, Sell Your Stuff, and New Users.
- Left Column (Categories):** Welcome, Learn about Buying, Learn about Selling, Register Now!, Announcement Board (Updated Jun 13, 2002), Desktop Liquidation Center (as low as \$249!).
- Center Column (Main Content):**
  - New CD Releases!** Only \$11.88. Features an image of the album "By the Way" by Red Hot Chili Peppers.
  - Music** category listing: Weezer, Gutterflower, The Slim Shady LP, Echoes, 18, Moby.
  - Movies** category listing: ROYAL TENENBAUMS, Just Released: The Royal Tenenbaums for \$18.45.
  - In-Stock Now!** section listing: Weezer, Gutterflower, The Slim Shady LP, Echoes, 18, Moby.
- Right Column (Side Content):**
  - Advance Orders:** The Simpsons: Complete 2nd Season (DVD) \$34.97 Save 30%!
  - In Computers:** Gateway Desktop Under \$400! \$399.00, Includes an 800MHz Intel Celeron processor, 256MB RAM, 20GB hard drive, DVD-ROM drive, and more!
  - Gateway Desktop Under \$500** \$499.00, Includes a 1GHz Intel Pentium III processor, 256MB RAM, 20GB hard drive, CD-RW drive, 250MB ZIP Drive, and more!

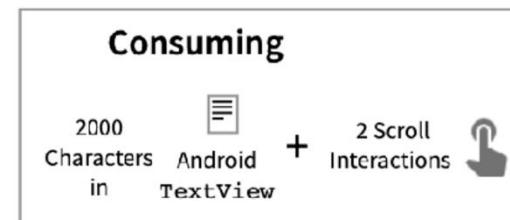
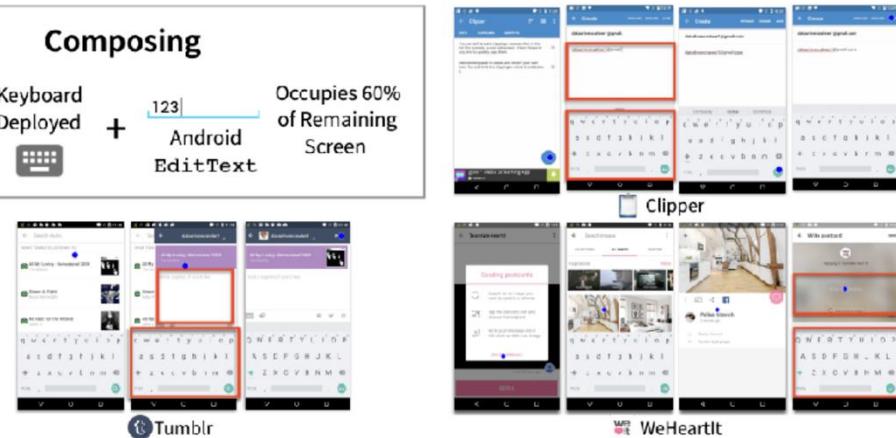
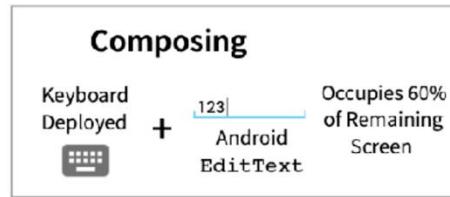
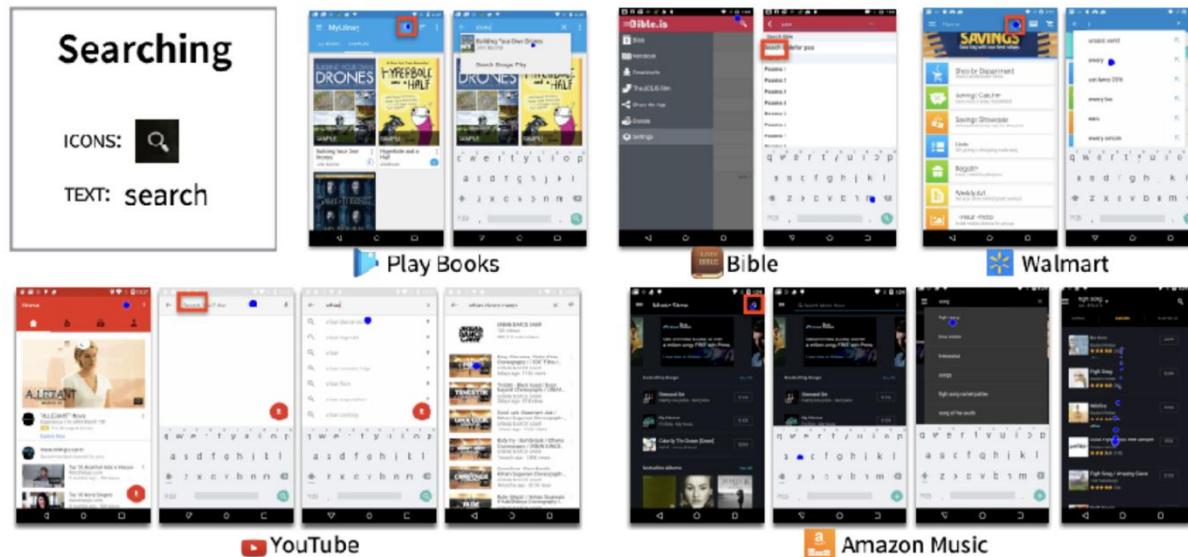
# Design Pattern: Common User Flows

- Shopping checkout: shipping -> billing -> summary -> place order
- **User flows** are an important component of user experience (UX) design and consists of a **sequence of UI states** that represent **semantically meaningful tasks** such as searching or composing.

The screenshot shows a web page from half.com, which is a service provided by eBay. At the top, there's a navigation bar with the half.com logo and a search bar. Below the navigation, a yellow header bar indicates the current step: "Step 1 - Choose Shipping Address". To the right of this, it shows "Checkout" and a progress bar with three steps: "1 Shipping" (highlighted in red), "2 Billing", and "3 Place Order". A "Secure Shopping" badge with a lock icon is also present. The main content area is titled "Ship my order to:" and contains a form field with the address: "Jason Hong, 387 Soda Hall Computer Science UC Berkeley, Berkeley, CA 94720". There is a "Use This Address" button next to the field. Below this, there's an "OR" option and a "Enter a new shipping address:" section with fields for "Name" and "Street address".

# Design Pattern: Common User Flows

## Common mobile app UI flows



Deka, Biplab, Zifeng Huang, and Ranjitha Kumar. "ERICA: Interaction mining mobile apps." *Proceedings of the 29th Annual Symposium on User Interface Software and Technology*. 2016.

# Design Pattern & Design System

- **Design/UI Patterns**

- Components
- Templates

- **Building Blocks**

- Color Schemes
- Icons/Image Assets

- **Rules**

- Implementation Guidelines
- Do's and Don'ts

**Example:**

Fluent (Microsoft)

Material Design (Google)

Carbon Design System (IBM)

# Design System: Material Design

<https://m3.material.io/>

- **Styles**
  - Elevation
  - Motion
- **Components**
  - FAB
  - Cards

Overview Applying elevation Tokens

Elevation is measured as the distance between components along the z-axis in density-independent pixels (dps).

The diagram illustrates the concept of elevation in Material Design. On the left, two purple rectangular surfaces are shown on a light gray background. Surface 1 is at the bottom left, and Surface 2 is at the top right. On the right, a 3D perspective view shows the same surfaces. A vertical scale on the left indicates elevation levels: 1dp, 8dp, and a midpoint. A horizontal scale at the bottom indicates the height difference between the surfaces: 1dp (from the bottom) and 7dp (from Surface 1 to Surface 2). A callout points to the 7dp mark with the text "The difference in elevation between the two surfaces is 7dp, as viewed from the side".

On this page

**Elevation**

What's new

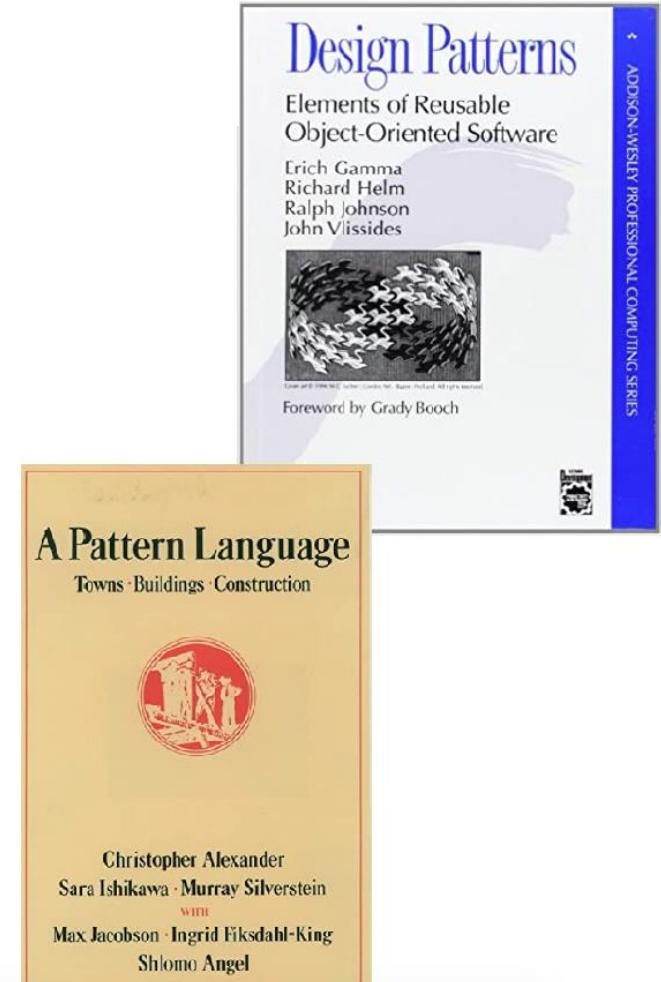
All surfaces and components have elevation values

1 One surface at 1dp elevation and another surface at 8dp elevation, as viewed from the front

2 The difference in elevation between the two surfaces is 7dp, as viewed from the side

# Design Pattern in General

- Very popular in **software engineering and OOP** after the mid 90s.
  - **Model-View-Controller** (MVC) is a common software design pattern for developing UIs.
- A 1970s book talks about “**pattern languages**” and relates it to architecture and the planning of cities and towns. This book later influenced **software engineering and the first wiki**.



# UI Patterns for Your Project

- **Don't need to reinvent the wheel!**
- You want to focus on where your UI is interesting and innovative, not in the login flow (probably)
- **Find patterns for your high-fidelity prototype**
  - <https://ui-patterns.com/patterns>
  - Many more out there!

## Design patterns



User Interface Design patterns are recurring solutions that solve common design problems. Design patterns are standard reference points for the experienced user interface designer.

Design patterns provide a common language between designers. They allow for debate over alternatives, where merely mentioning the name of a design pattern implicitly carries much more meaning than merely the name.

Dive into the patterns below to learn a common language of web design.

### User Interface Design Patterns

Getting input	Navigation	Dealing with data	Social
<b>Forms</b> Password Strength Meter Morphing Controls Structured Format Expandable Input Drag and drop Keyboard Shortcuts Data Builders	<b>Tabs</b> Navigation Tabs Module Tabs <b>Jumping in hierarchy</b> Shortcut Dropdown Breadcrumbs Fat Footer	<b>Tables</b> Table Filter Sort By Column Alternating Row Colors <b>Formatting data</b> Frequently Asked Questions (FAQ) Dashboard	<b>Reputation</b> Collectible Achievements Testimonials Leaderboard <b>Social interactions</b> Activity Stream Reaction



### Become a confident designer

Practical cards to quickly understand and apply complex concepts that will move your product forward

Stop winging it and bring hard facts about we behavior, decide, and take action to the table.

[Get our cards](#)

# Design Pattern: Why

- Design is about **finding solutions** to problems
- Many problems are **shared**
- Some solutions are **better** than others
- Designers often **reinvent** because they don't realize a pattern exists
  - Sometimes it's better to **reuse** a common solution for a common problem (cognition!)
- Design patterns are **a tool for knowledge sharing**

# Design Pattern: Creativity

- Patterns come from **successful examples**
  - Sites that are so successful that lots of people are familiar with their paradigms
  - Interaction techniques/metaphors that work well across many sites (e.g., shopping carts)
- Not too general and not too specific
  - You need to specialize to your needs •
- Patterns let you focus on the hard, unique problems of your design situation
- Patterns help design without over-constraining

# Design Pattern: Pre-Patterns

- Patterns require **broad** adoption and examples
  - **Many** version of the same basic idea
  - Shown **successful** in many contexts
  - That is what makes them patterns
- This is challenging in **novel** domains
- Pre-patterns are based in weaker evidence
  - Can help **speed diffusion** of techniques and results
  - Can help see **relationships** among ideas

# Pre-Patterns, Anti-Patterns, Dark Patterns

- When you see advice, **consider its depth**
  - Result of an individual study
  - Pre-pattern based on some meta-analysis
  - Established pattern
- Be aware of misapplying patterns
- And be aware of anti-patterns (e.g., “Click here”)
- Don’t recreate dark patterns
  - **Unethical patterns** that trick users

The image shows a screenshot of a shopping cart interface from a website. At the top, there's a red banner with the text "TODAY'S SALE! - VALID ONLINE ONLY - \*Up To 45% Off + Free Local Delivery". Below the banner, three steps are outlined: 1. Delivery Info, 2. Billing Info, and 3. Review & Place Order. A blue line connects these steps. Below the steps, a message says "Need assistance? We are here to help! Call us any time at 877-638-3303". There's also a link to "Log in" and a note about applying points. The shopping cart itself has two items: "Dreaming of Tuscany" (Qty: 1, Price: \$52.99, Subtotal: \$52.99) and "Greeting Card Service" (Qty: 1, Price: \$3.99, Subtotal: \$3.99). The "Greeting Card Service" item is highlighted with a red border.

Item	Qty	Price	Subtotal
Dreaming of Tuscany Selected: "As Shown" 2nd choice: similar as possible, same look and feel	1	\$52.99	\$52.99
Greeting Card Service Selected: "STANDARD"	1	\$3.99	\$3.99

Below the shopping cart, there are five icons representing different dark patterns:

- NAGGING**: A person icon with a red circle and a double-headed arrow around it.
- OBSTRUCTION**: A person icon with a red vertical bar and a star icon.
- SNEAKING**: A person icon with a dashed arrow pointing into a shopping cart.
- INTERFACE INTERFERENCE**: A person icon with multiple overlapping red lines.
- FORCED ACTION**: A person icon with a red arrow pointing to a group of people.

Descriptions for each pattern:

- NAGGING**: Redirection of expected functionality that persists beyond one or more interactions.
- OBSTRUCTION**: Making a process more difficult than it needs to be, with the intent of dissuading certain action(s).
- SNEAKING**: Attempting to hide, disguise, or delay the divulging of information that is relevant to the user.
- INTERFACE INTERFERENCE**: Manipulation of the user interface that privileges certain actions over others.
- FORCED ACTION**: Requiring the user to perform a certain action to access (or continue to access) certain functionality.

Kai Lukoff, Alexis Hiniker, Colin M. Gray, Arunesh Mathur, and Shruthi Sai Chivukula.  
2021. What Can CHI Do About Dark Patterns? In Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '21)

# Week 11 Overview

- **Monday**
  - **Interface Implementations**
  - **Interface Design Patterns**
- **Wednesday**
  - Interface Types
- **Friday**
  - Interface Types
  - Interaction Types