

ECE444: Software Engineering

Prototyping, Measurement, TDD

Shurui Zhou

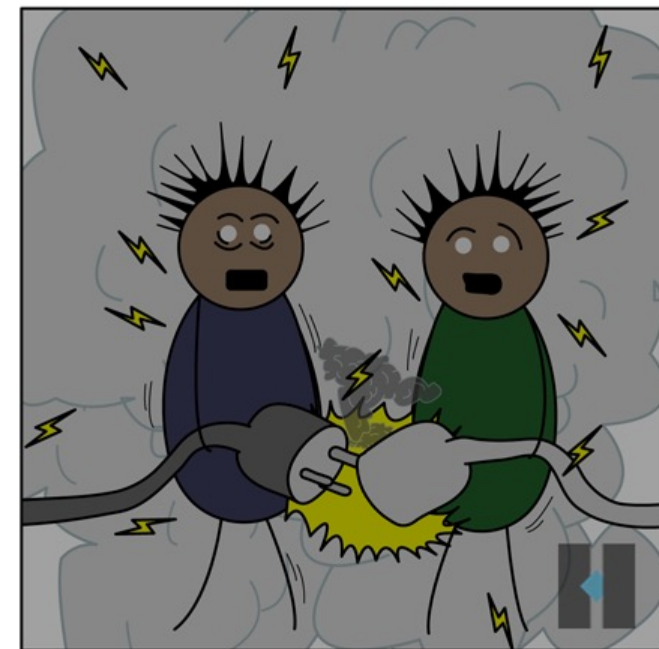
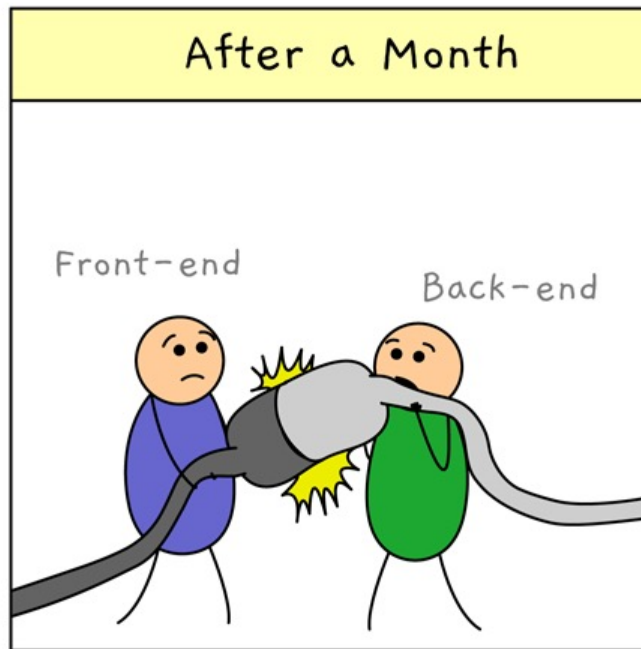
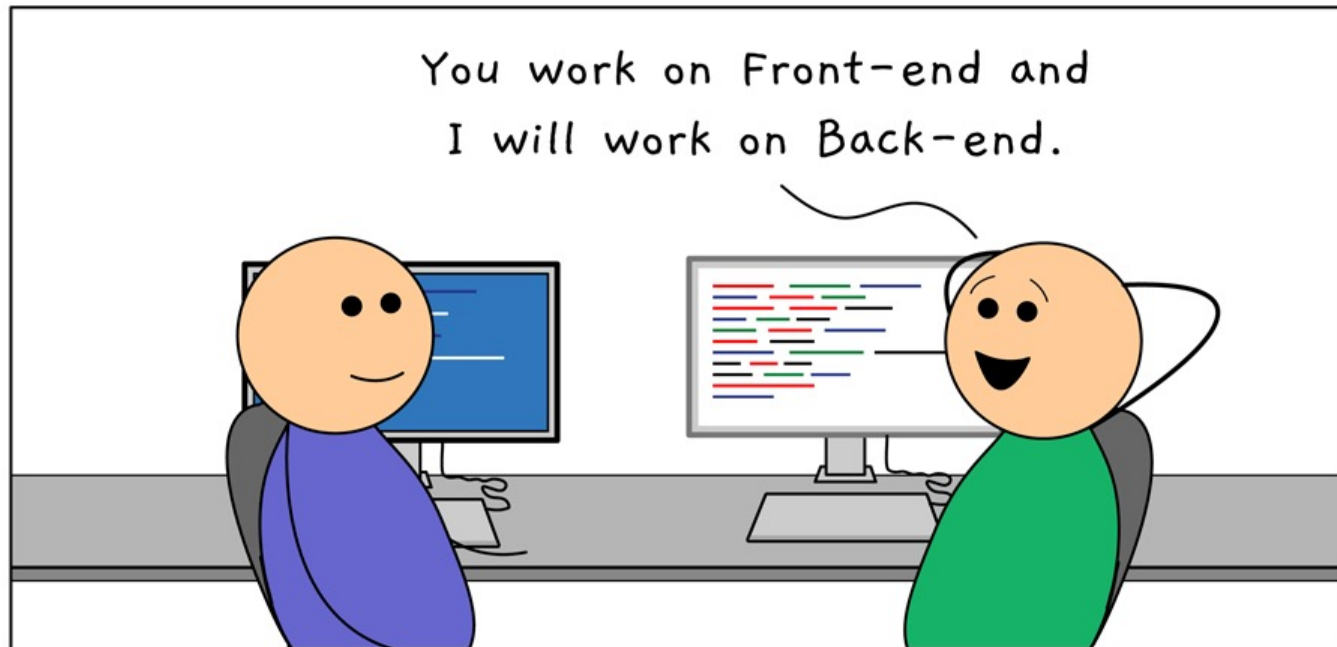


The Edward S. Rogers Sr. Department
of Electrical & Computer Engineering
UNIVERSITY OF TORONTO

Frontend



Backend



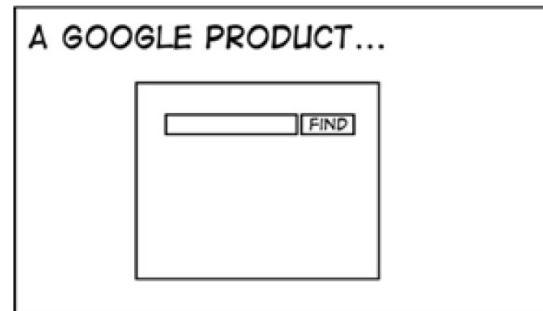
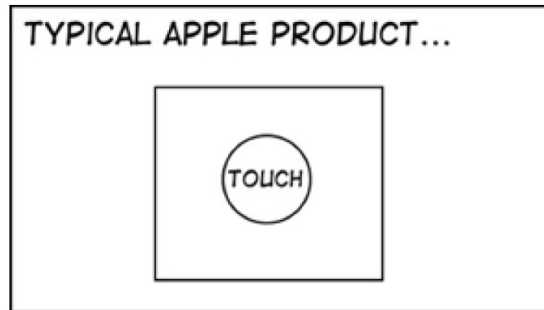
Prototypes, Mockups



Product Requirement Document (PRD)

1. Goals
2. User Personas
3. User Stories
4. Functional Requirements
5. Non-Functional Requirements
6. User interaction and design
7. Questions
8. Out of Scope

How should the product look?



YOUR COMPANY'S APP...

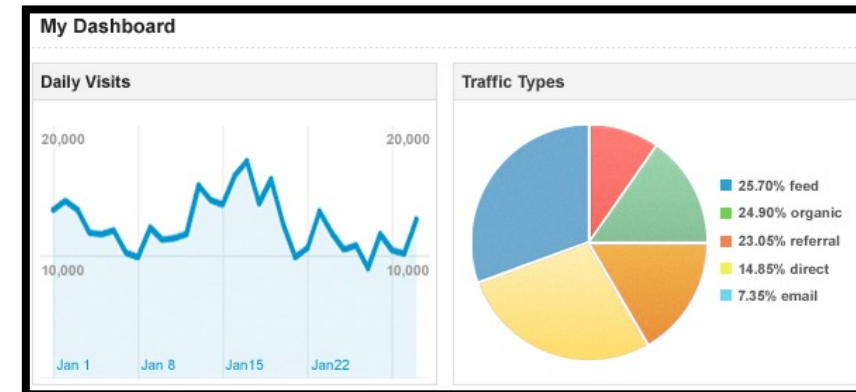
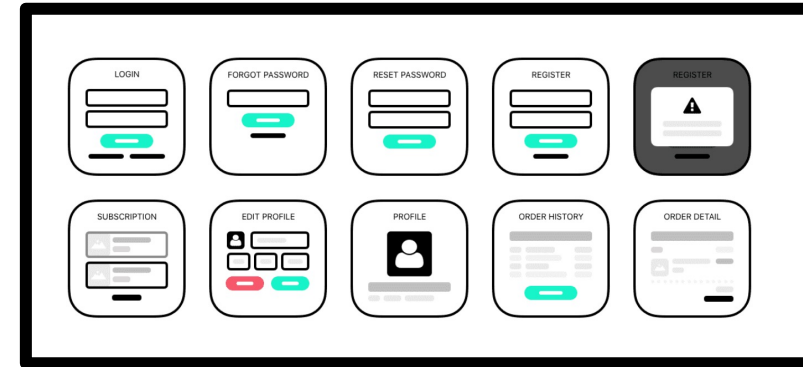
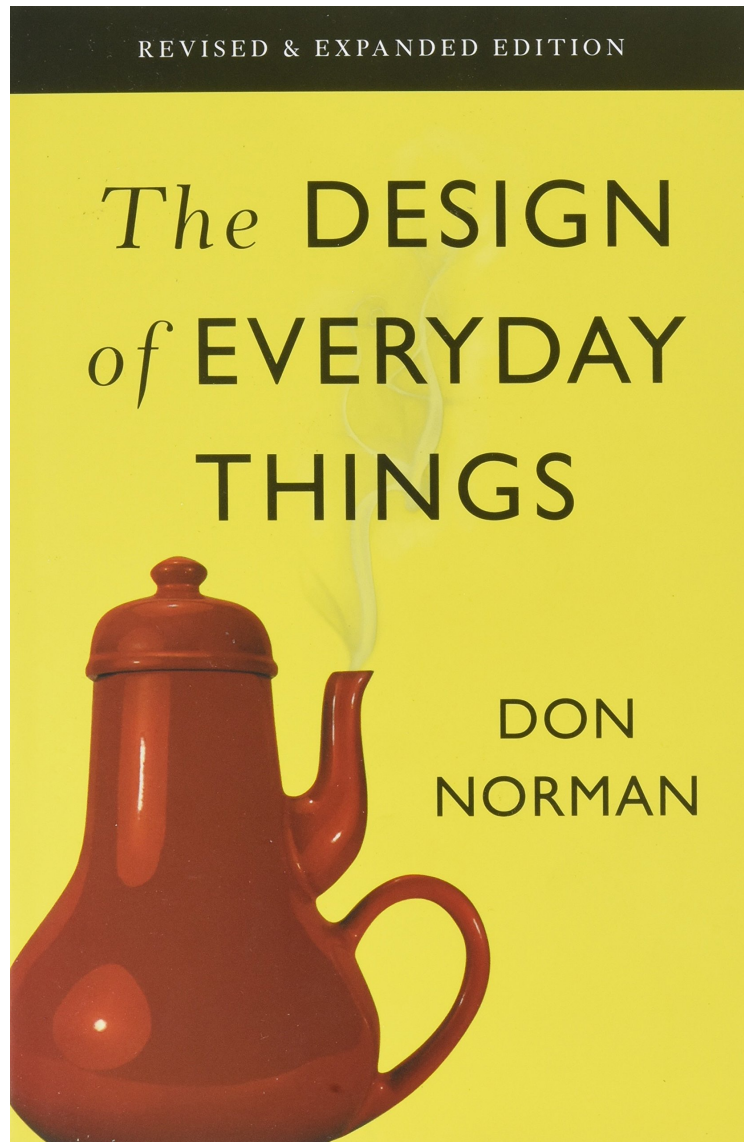
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OKAY APPLY SAVE LINDO HELP DELETE EDIT
SELECT BROWSE ERRORS

STUFFTHATHAPPENS.COM BY ERIC BURKE



<https://www.youtube.com/watch?v=pAOyWFOFhsg>



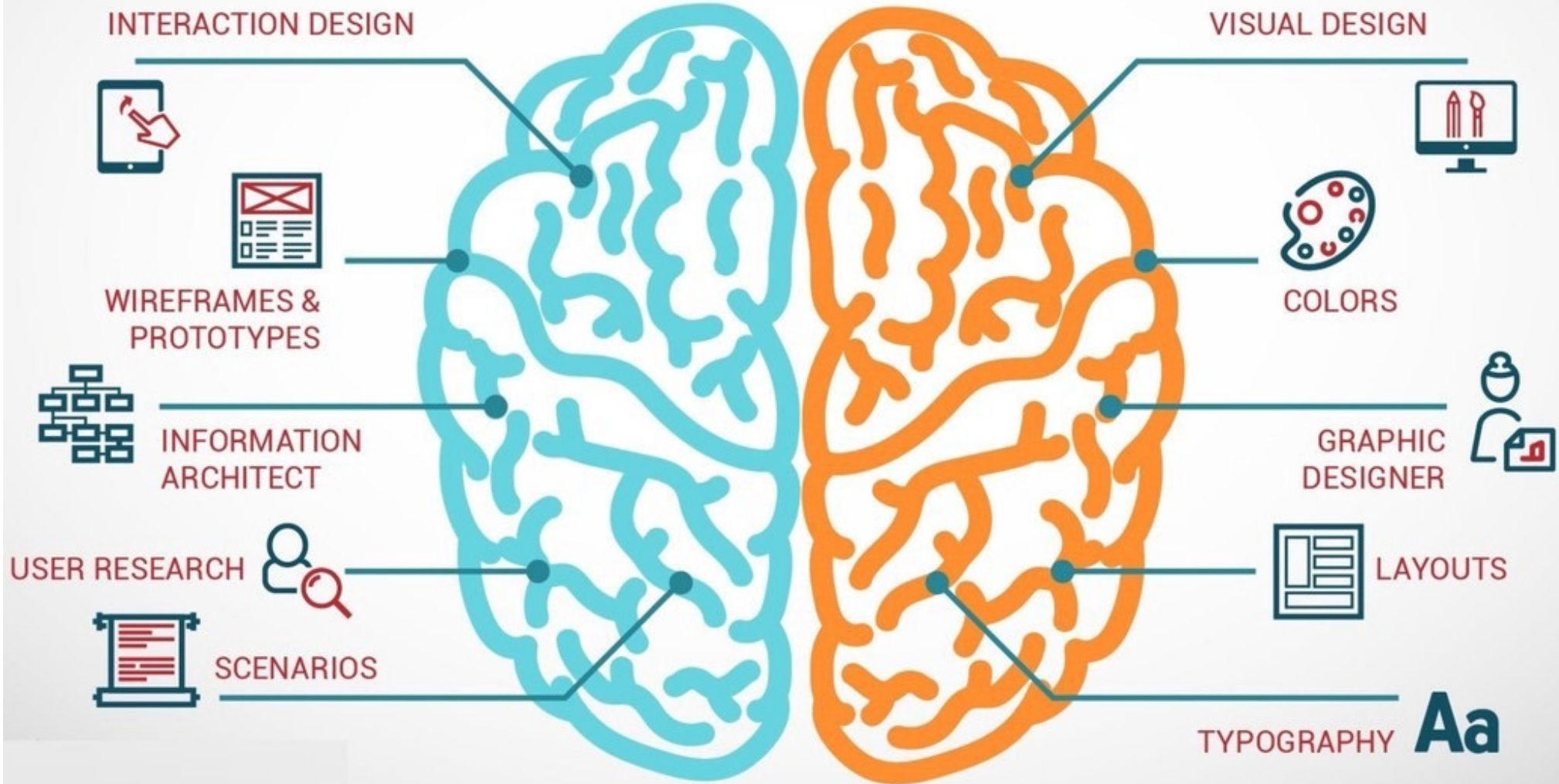
<https://www.youtube.com/watch?v=2O3jNQrulHA>

UX

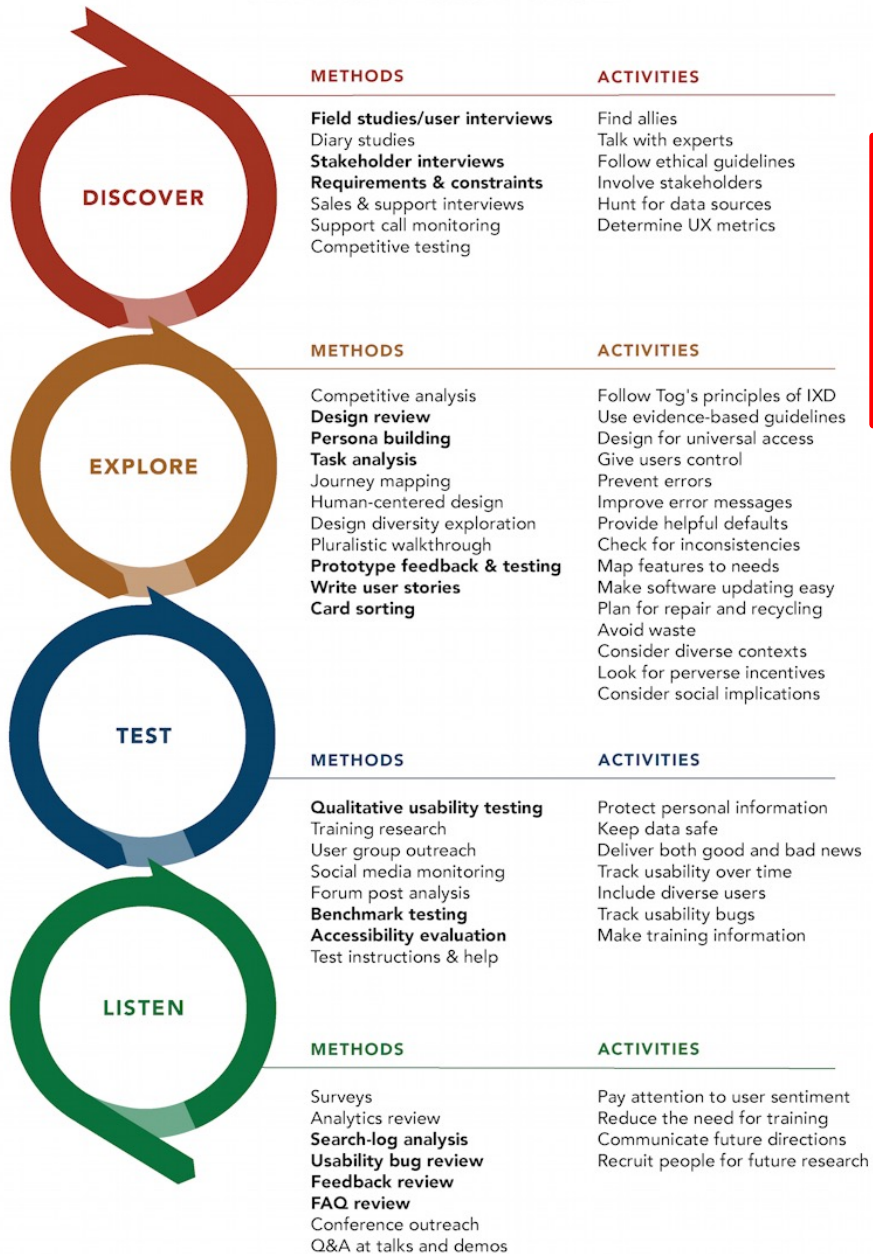
&

UI

DESIGN



UX ACTIVITIES IN THE PRODUCT & SERVICE DESIGN CYCLE



10/28 Open Source
DevOps

Guest Lecture - Designing Usable Machine Learning-Based Applications
(Prof. Jinghui Cheng, Polytechnique Montréal)

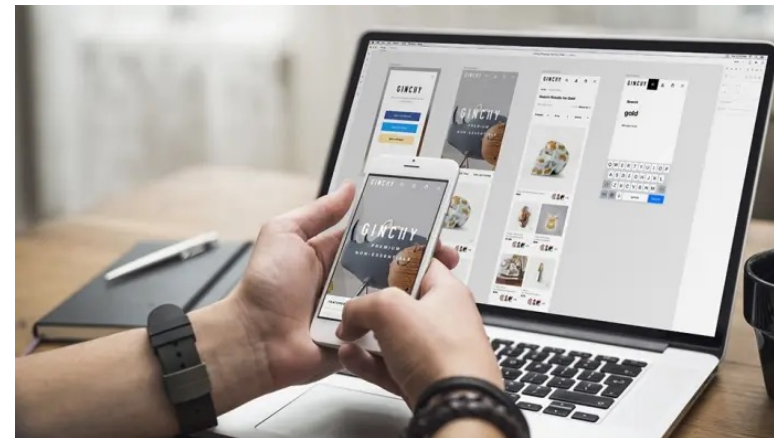
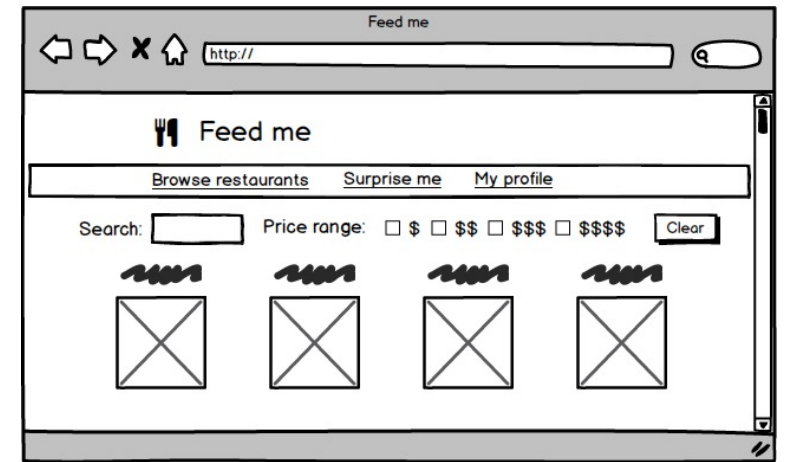
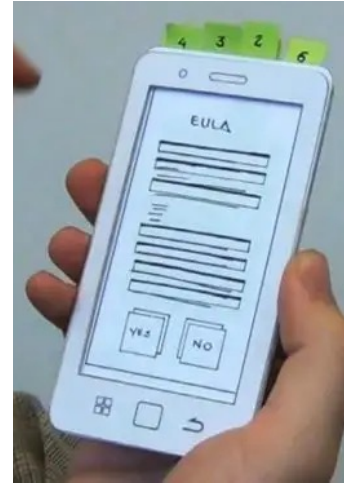
- <https://uxdesign.cc/ui-vs-ux-revisiting-differences-between-frontend-design-aspects-in-2020-and-importance-592ce9ac6360>

Mockups, Prototypes, Stories

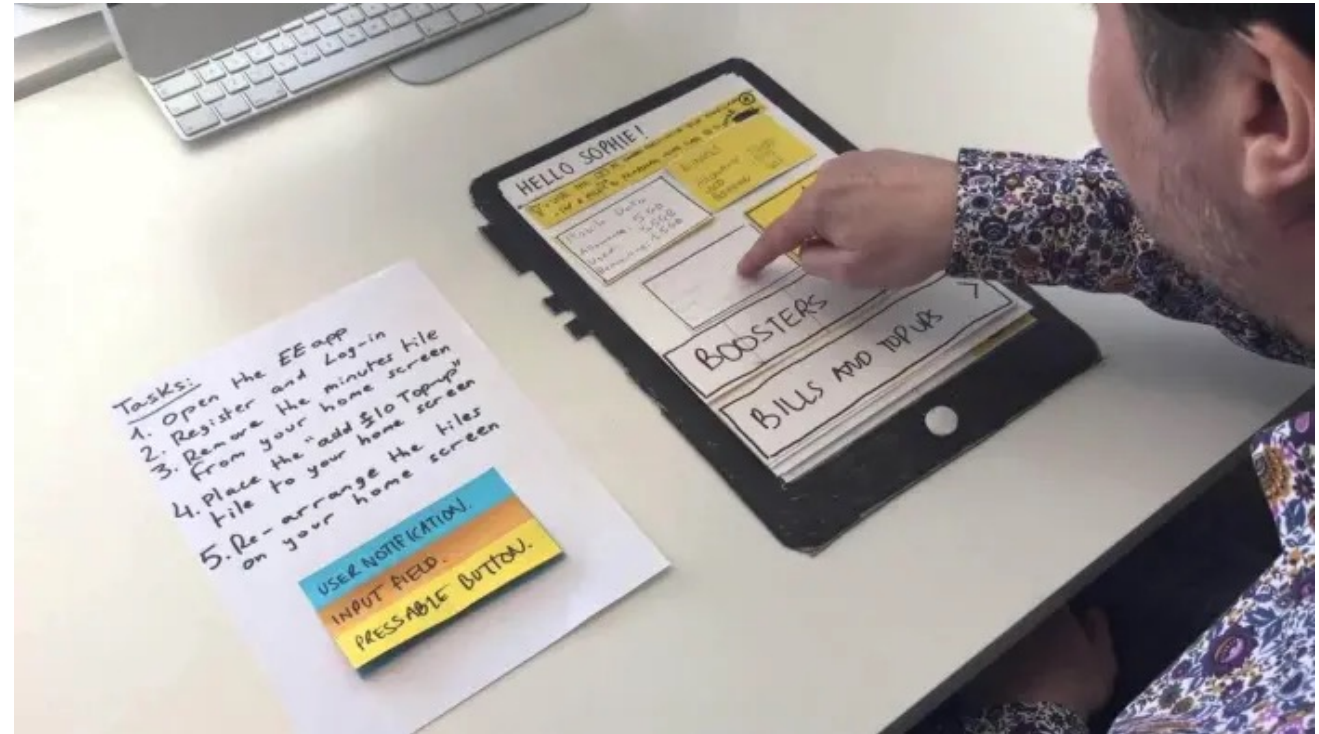
- Humans: better at recognizing whether a solution is correct than solving the problem from a blank page.
- Mock-ups/prototypes help explore uncertainty in the requirements.
 - Validate that we have the right requirements.
 - Elicit requirements at the “borders” of the system.
 - Assert feasibility of solution space.
 - Get feedback on a candidate solution.
- “I’ll know it when I see it”

High-Fidelity and Low-Fidelity Prototyping

- **Low-fidelity prototypes** are often paper-based and do not allow user interactions.
- **High-fidelity prototypes** are computer-based, and usually allow realistic (mouse-keyboard) user interactions.

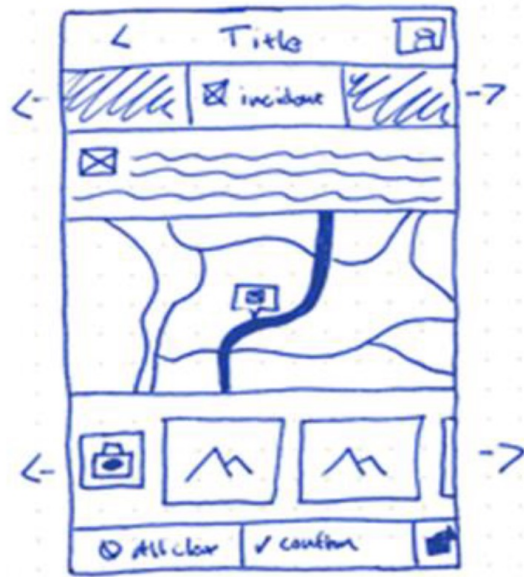


Creating Paper Prototypes



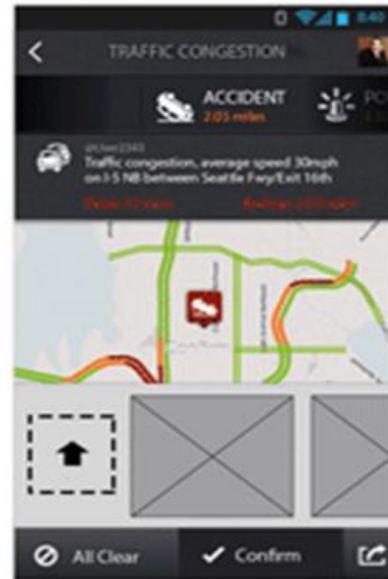
Wireframes, low, and high fidelity prototypes

Wireframe



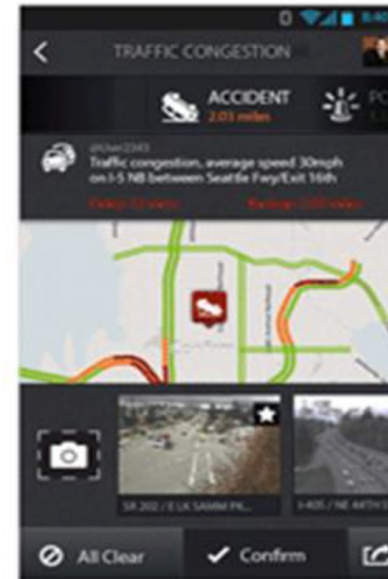
Real state allocation

Low fidelity prototype



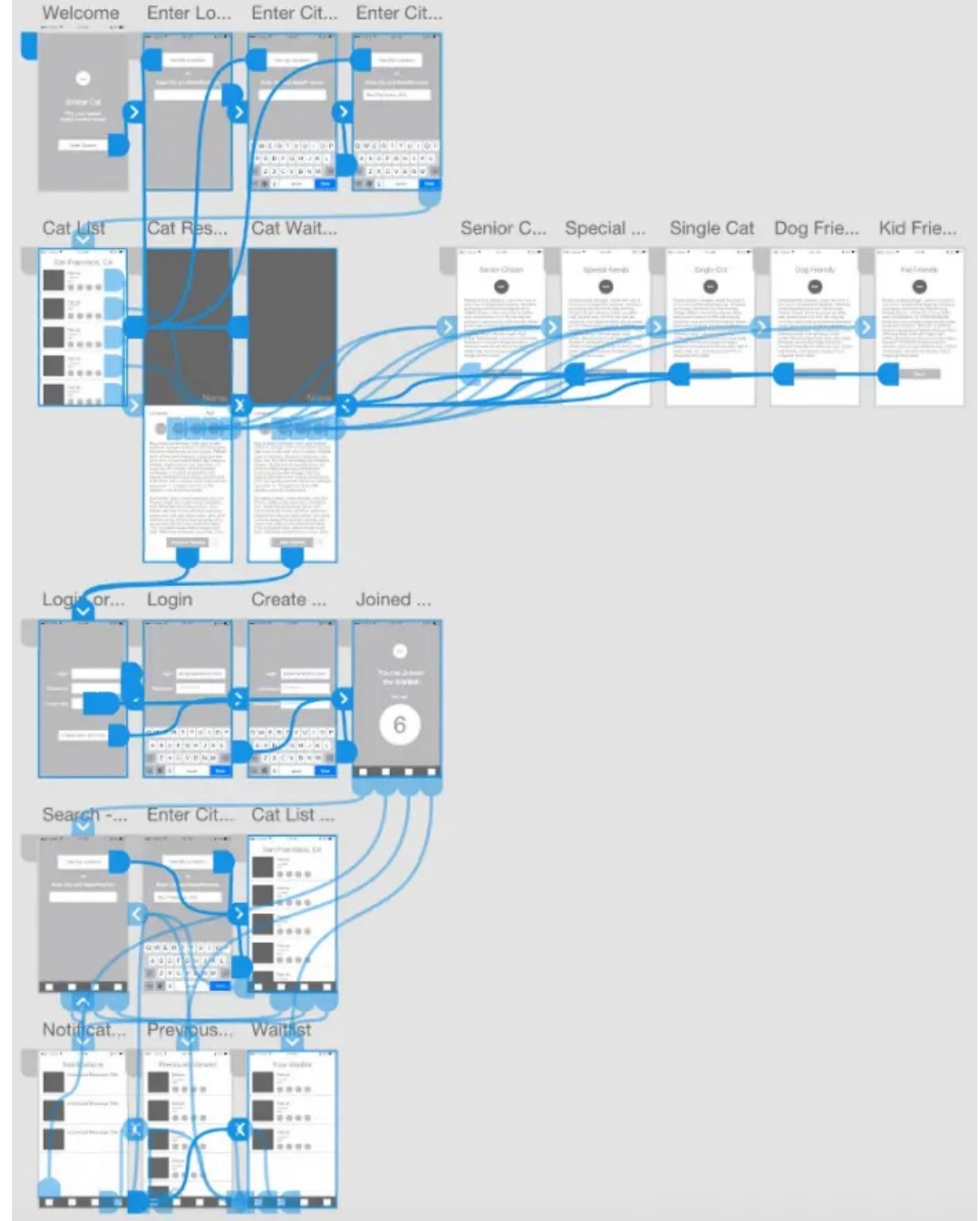
Colors and fonts

High fidelity prototype



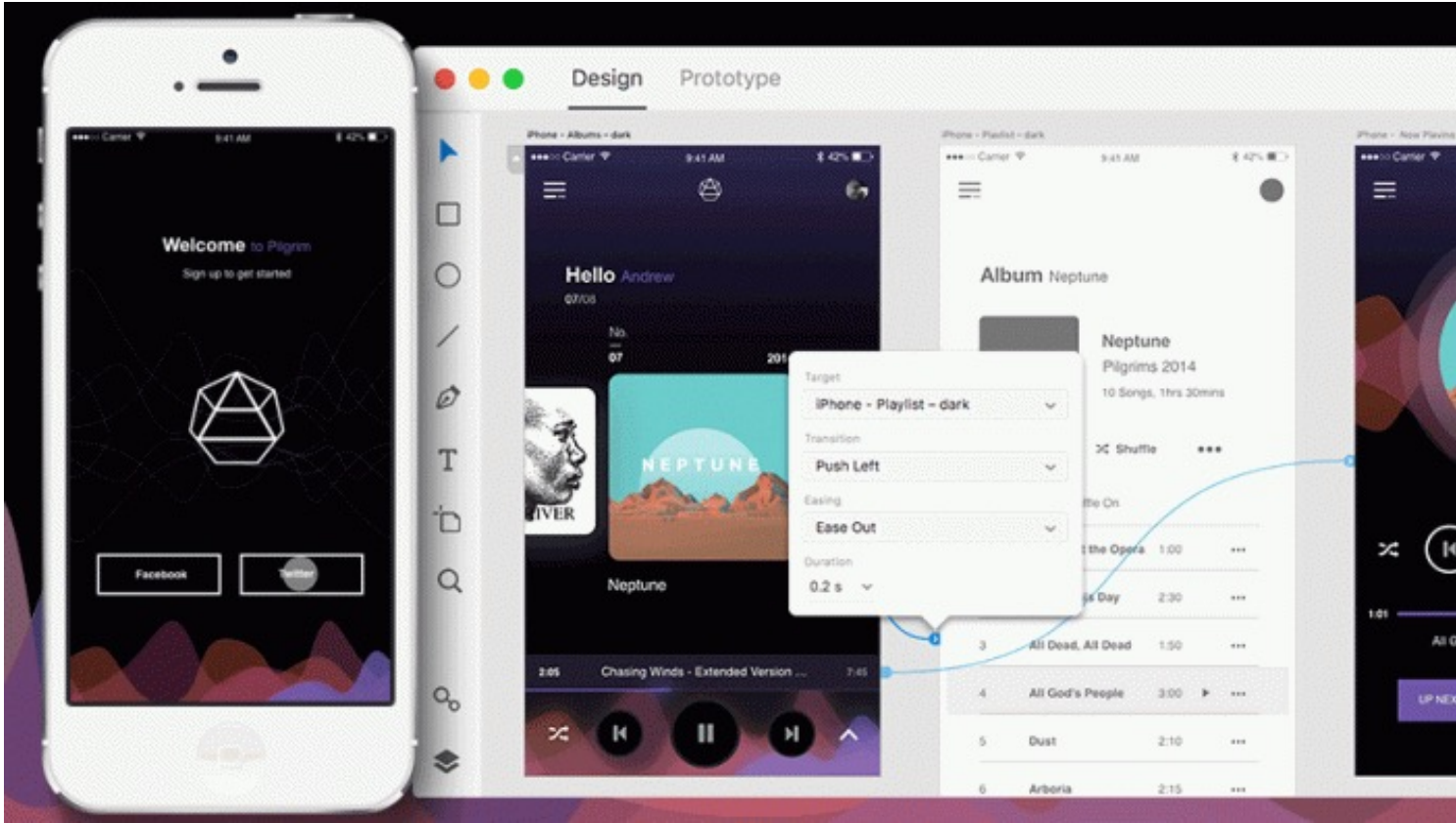
Navigation & mock results

An example of a low-fidelity prototype made in Adobe XD.



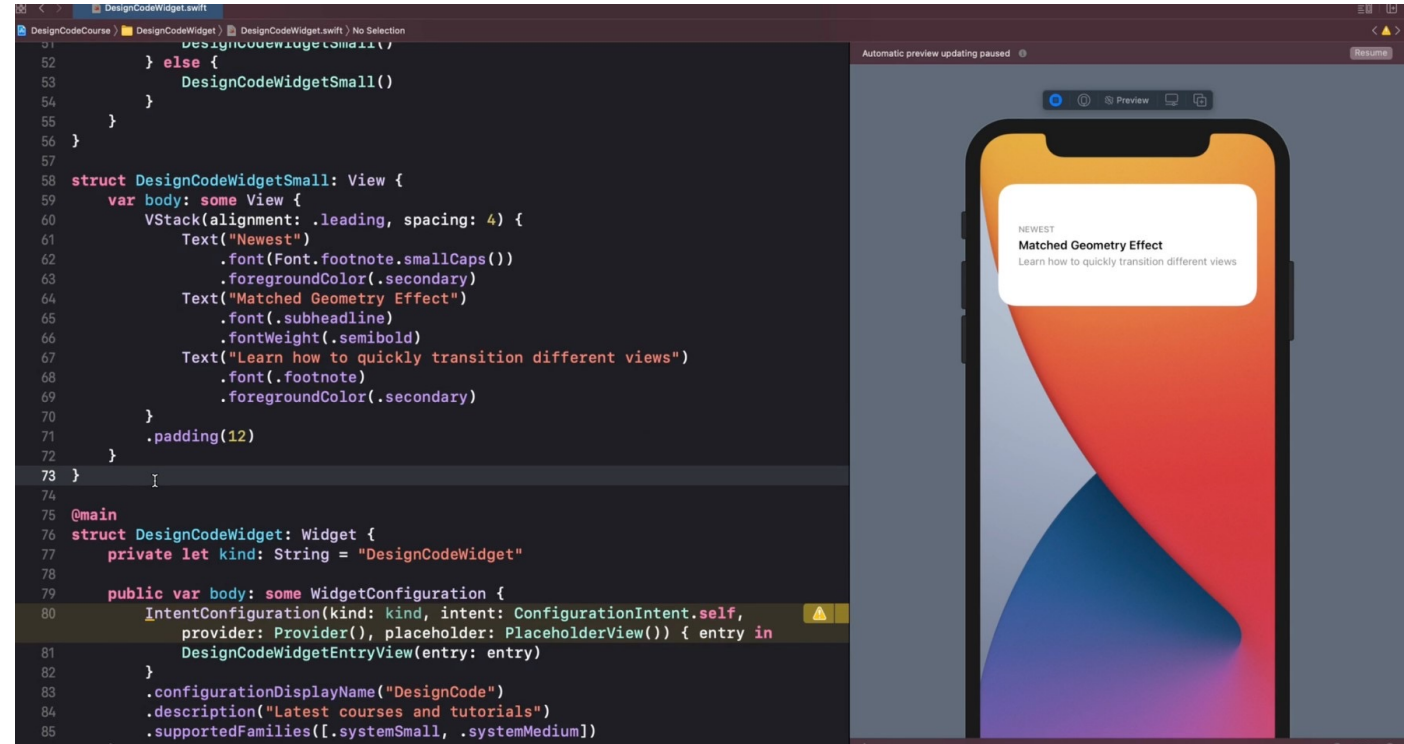
<https://blog.adobe.com/en/publish/2017/11/29/prototyping-difference-low-fidelity-high-fidelity-prototypes-use.html#gs.d4vv0c>

A high-fidelity interactive prototype created in Adobe XD and mirrored on an iPhone.



Coded prototypes

- A hi-fi, coded prototype is a solution that is pretty close to the ready-to-release version of a product.
- An example -- a rich interactive sandbox that allows test participants to explore a product's different features.
- Tools: SwiftUI, Framer or CSS



Wireframe, Prototype, Mockup

	Fidelity	Cost	Use	General traits
Wireframe	low fidelity	\$	Documentation, quick communication	Sketchy, black, white & grey representation of the interface
Prototype	middle to high fidelity	\$\$\$	User testing, reusable backbone of the interface	Interactive
Mockup	middle to high fidelity	\$\$	Gathering feedback and getting buy-in from stakeholders	Static visualization

<https://designmodo.com/wireframing-prototyping-mockuping/>

	HIGH-FIDELITY PROTOTYPE	LOW-FIDELITY PROTOTYPE
Interactivity		
Clickable links and menus	Yes: Many or all are clickable.	No: Targets do not work.
Automatic response to user's actions	Yes: Links in the prototype are made to work via a prototyping tool (e.g., InVision, PowerPoint).	No: Screens are presented to the user in real time by a person playing "the computer."
Visuals		
Realistic visual hierarchy, priority of screen elements, and screen size	Yes: Graphics, spacing, and layout look like a live system would look (even if the prototype is presented on paper).	No: Only some or none of the visual attributes of the final live system are captured (e.g., a black-and-white sketch or wireframe, schematic representation of images and graphics, single sheet of paper for several screenfuls of information). Spacing and element prioritization may or may not be preserved.
Content and Navigation Hierarchy		
Content	Yes: The prototype includes all the content that would appear in the final design (e.g., full articles, product-description text and images).	No: The prototype includes only a summary of the content or a stand-in for product images.

Rapid prototyping

- Throw-away: developed to learn more about a problem, not intended for actual use.
- Evolutionary: intended to be incorporated into the final product.



<https://images.app.goo.gl/D54VKKtS4Bpgob3W8>

Summary

Personas

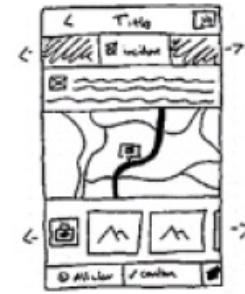


Scenarios

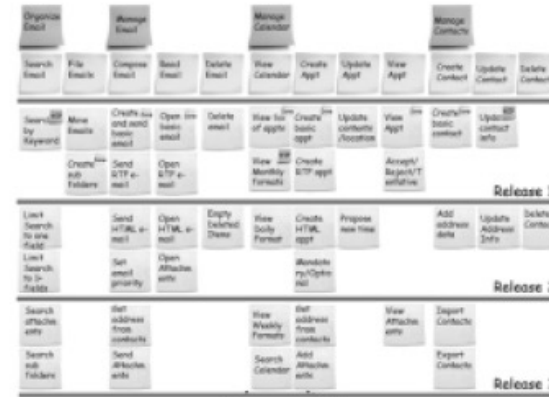
Persona data	Routine tasks
Design implication	Make user's most common tasks clear and apparent in the most visible area of the screen
Persona data	Infrequent user
Design implication	Provide wizards or defaults for the most common tasks
Persona data	Frequent interruptions
Design implications	Implement mechanisms to pause and recover from where the task was left off?
Persona data	Bright noisy environment
Design implications	Make warnings clearly visible, use high contrast. Do not use audible feedback
Persona data	Low computer skills

Design tactics

		Roles		
		User	Admin	Parent
Personas	Peter	X		X
	Roberto			
	Mary	X		
Scenarios	S1	X		
	S2	X		
	Sk			X
	Sn		X	



Wireframes & Prototypes



Story map

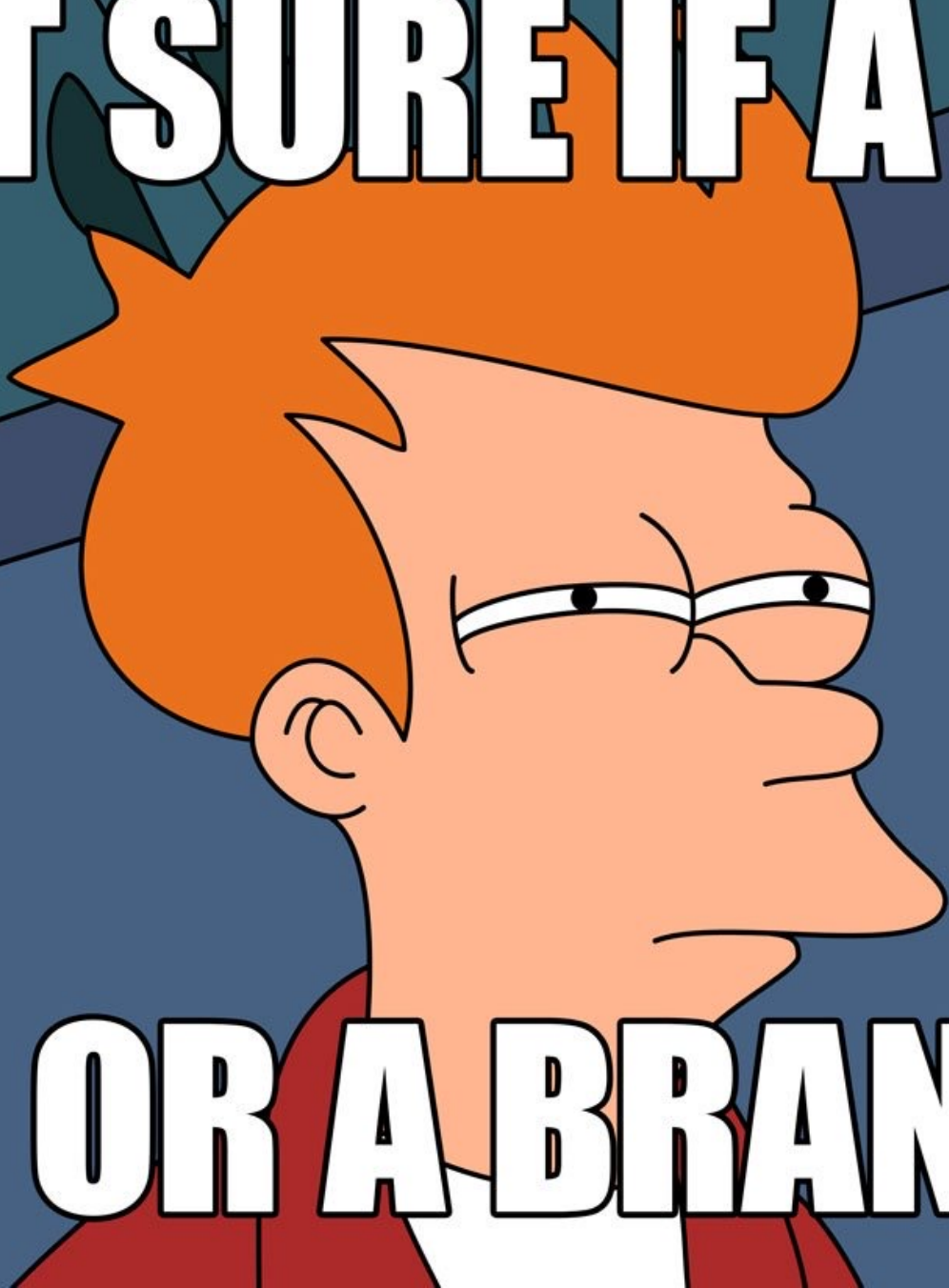
As a user I want see a list of movies of a given genre

User story

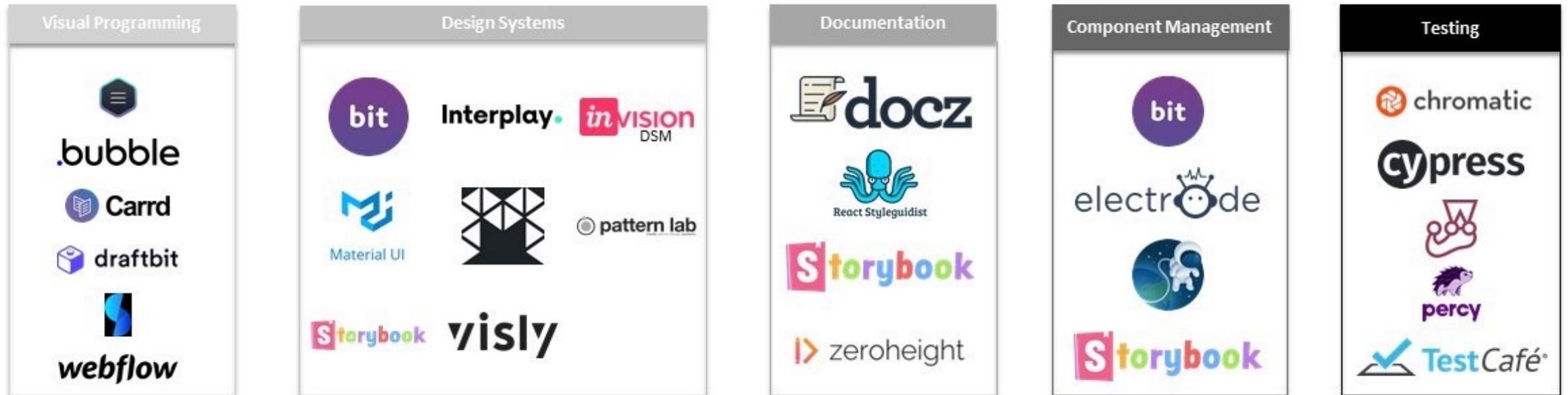


NOT SURE IF A LOGO

OR A BRAND

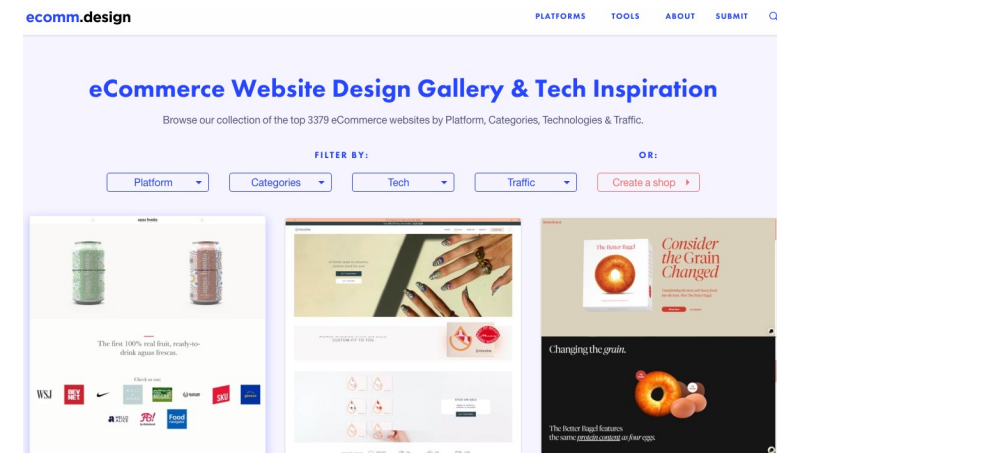
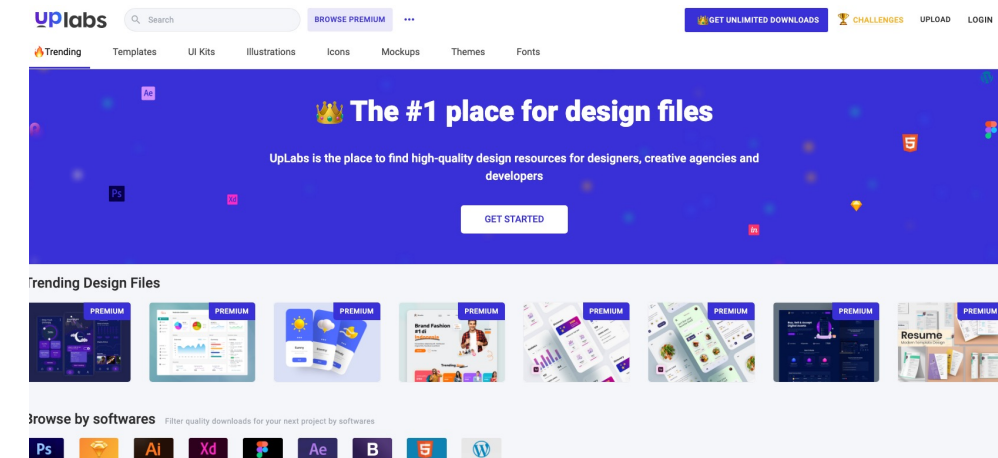
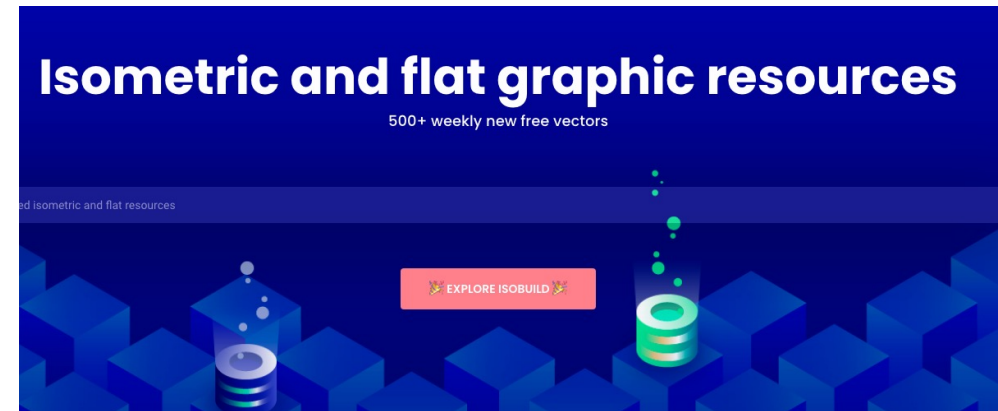


Design and Front-end Engineering Landscape



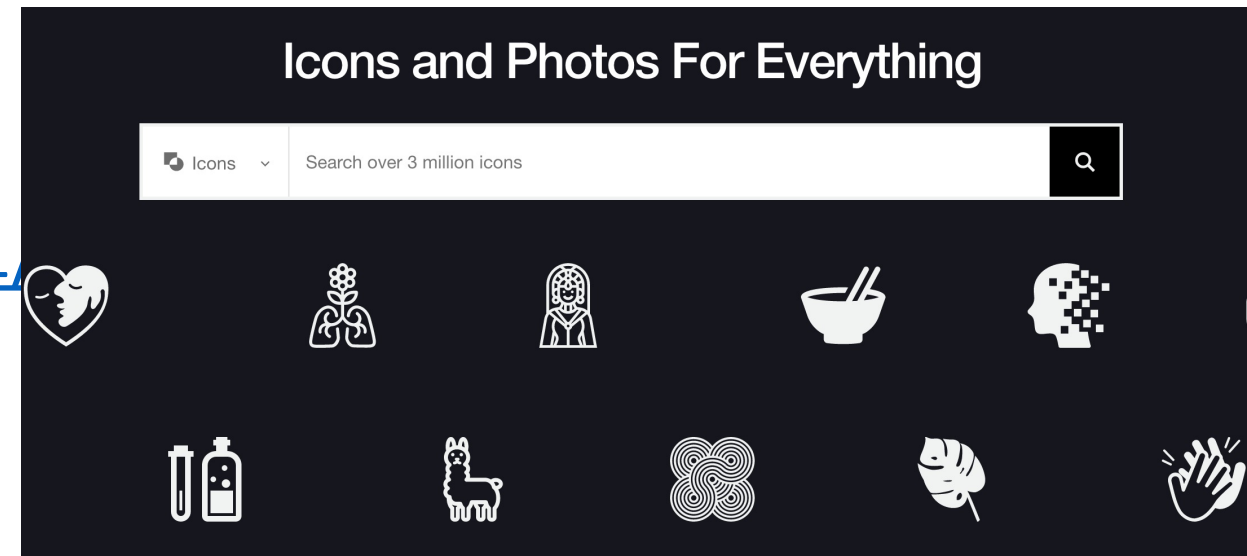
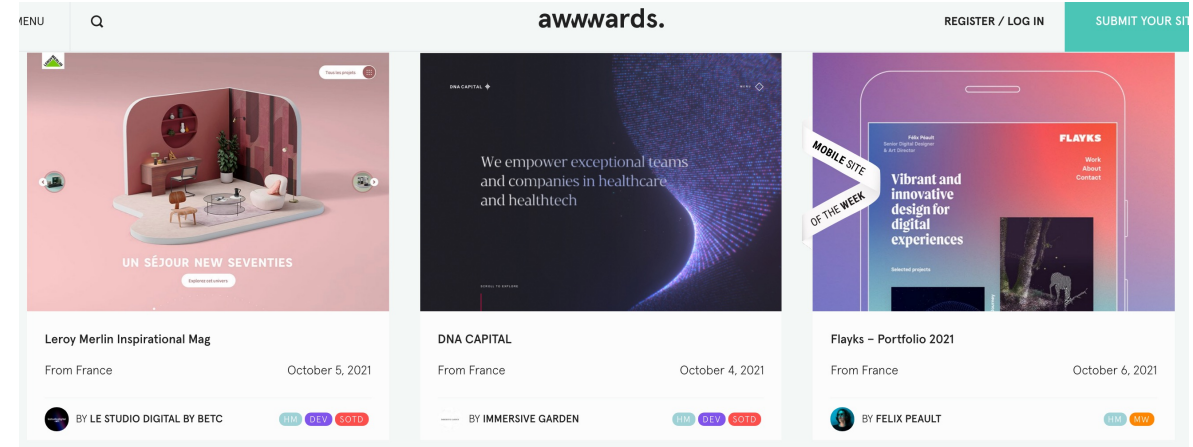
Resources (UI design)

- <https://www.myfonts.com/WhatTheFont/>
- <https://isoflat.com/>
- <https://www.uplabs.com/>
- <https://products.ls.graphics/paaatterns/>
- <https://ecomm.design/>



Resources

- <https://www.awwwards.com/>
- <https://design-milk.com/>
- <https://thenounproject.com/>
- <https://www.bestfolios.com/home>
- <https://uxdesign.cc/>
- <https://thefwa.com/awards/page/1>



WHEN CLIENT EMAILS ASKING FOR MORE REVISIONS...

