

# HCI For Small Screens

2

Let's begin with something  
**big**

# How big is big ?



Small screen



3



Big screen



## HCI for Big Screen

1. Hardware
2. UI

What would you use these devices for?



- Smaller Screen
  - complete solution
  - portability
- Bigger Screen
  - flexibility
  - specialization

Bigger Screen = Specialization

## HCI for Big Screen

### 1. Hardware

### 2. UI



5





6



## HCI for Big Screen



For Big Screen

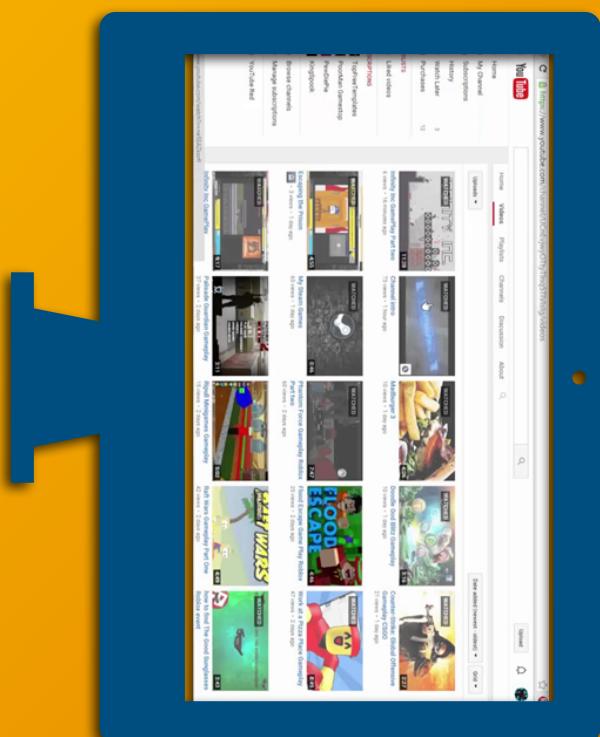
7



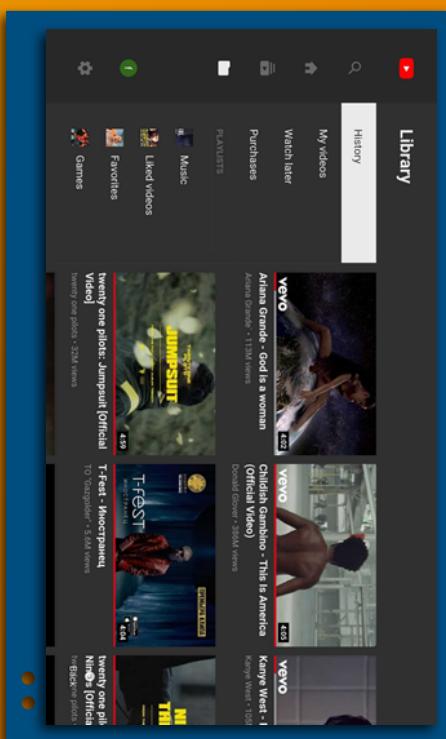
HCI for



# HCI for Big Screen



Youtube



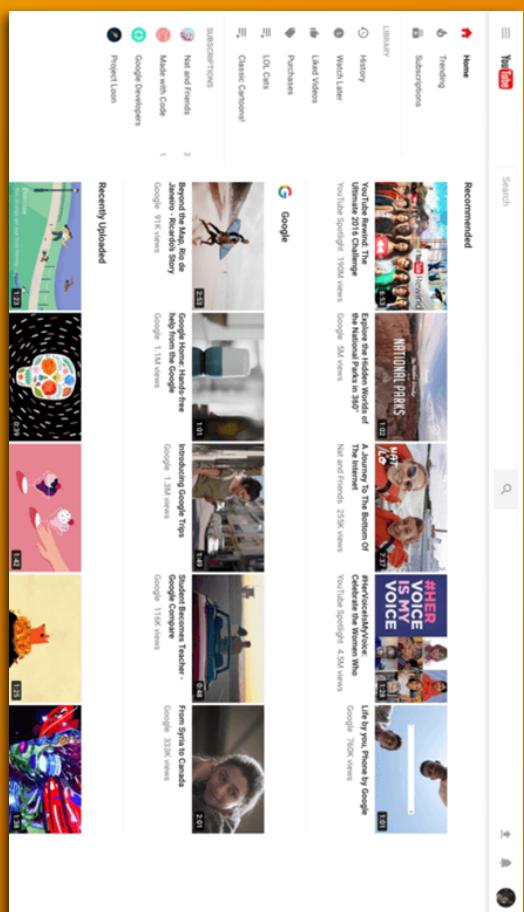
## HCI for Big Screen

- Benefits of Big Screen
  - more information
  - more functions
- Challenge: design



## HCI for Big Screen

- Design Techniques
  - Grouping
  - Grids



# Screen Design



# General information

- Screen design can be understood to be the conceding and creating of the graphical user interface (GUI).
- This concerns primarily the layout.
- Location of the elements such as navigation, text, heading, images, videos, icons, and other.

# Use of Screen Design

- Screen design is not only for websites, mobile websites or apps for smartphones
- The features and possible interaction patterns should be supported by the properties of screen

Hi class.  
Today, we  
have no class  
^^.^.

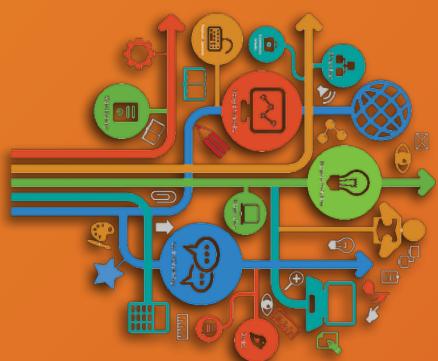
# Content of style guides

14

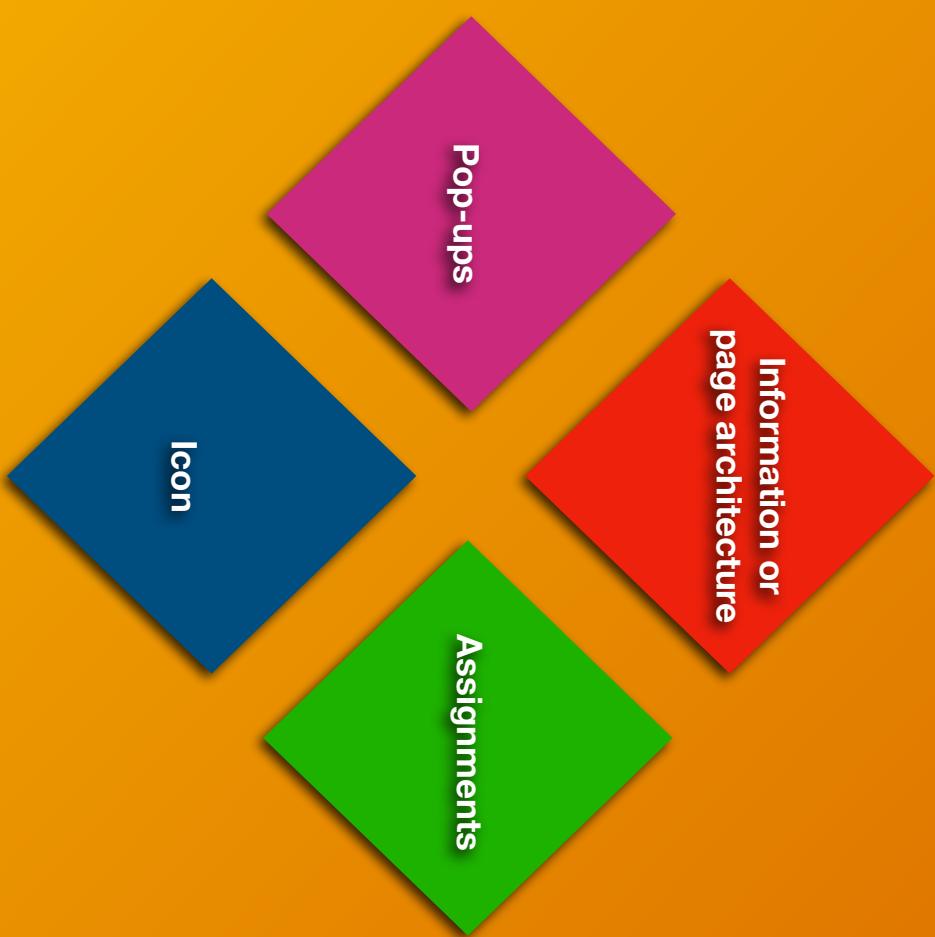
User experience



User Interface



# Content of style guides



# Type Of Functions

16

Panning

Zooming

Multiple views

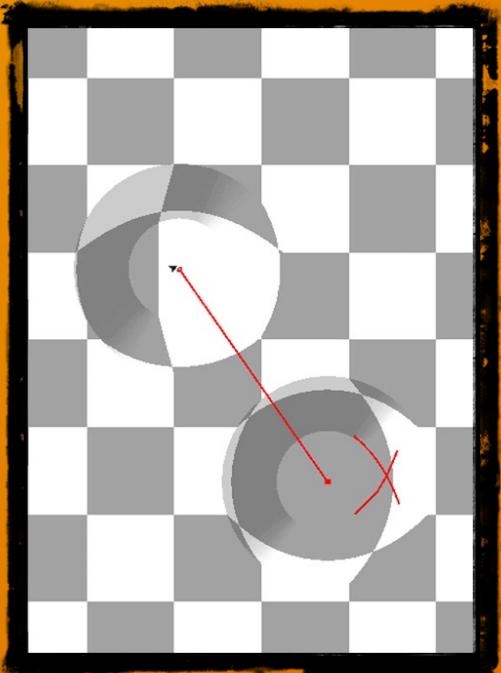
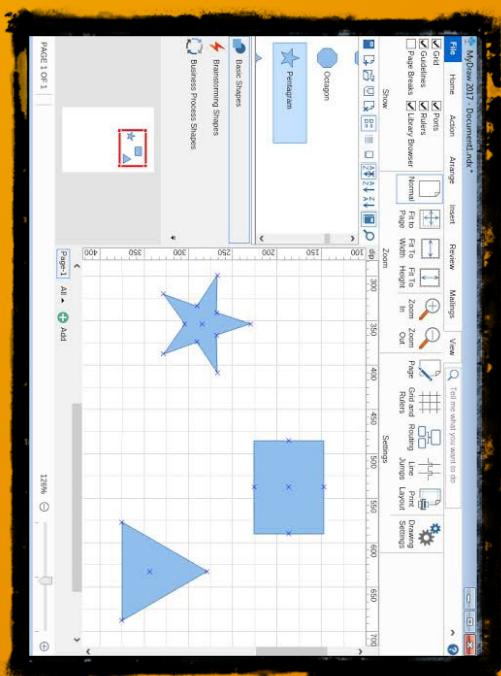
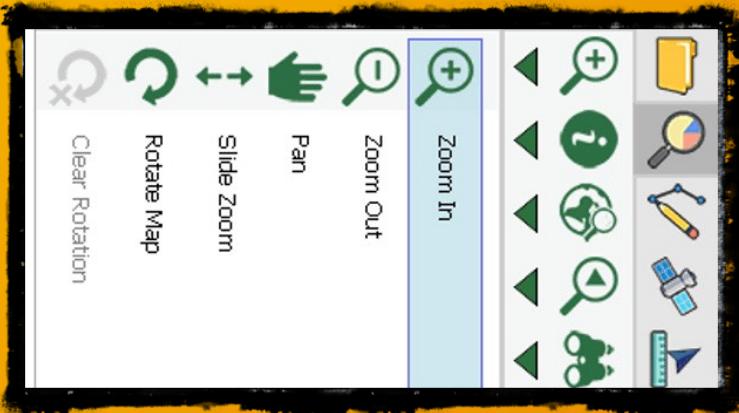
Voice command

# Panning

17



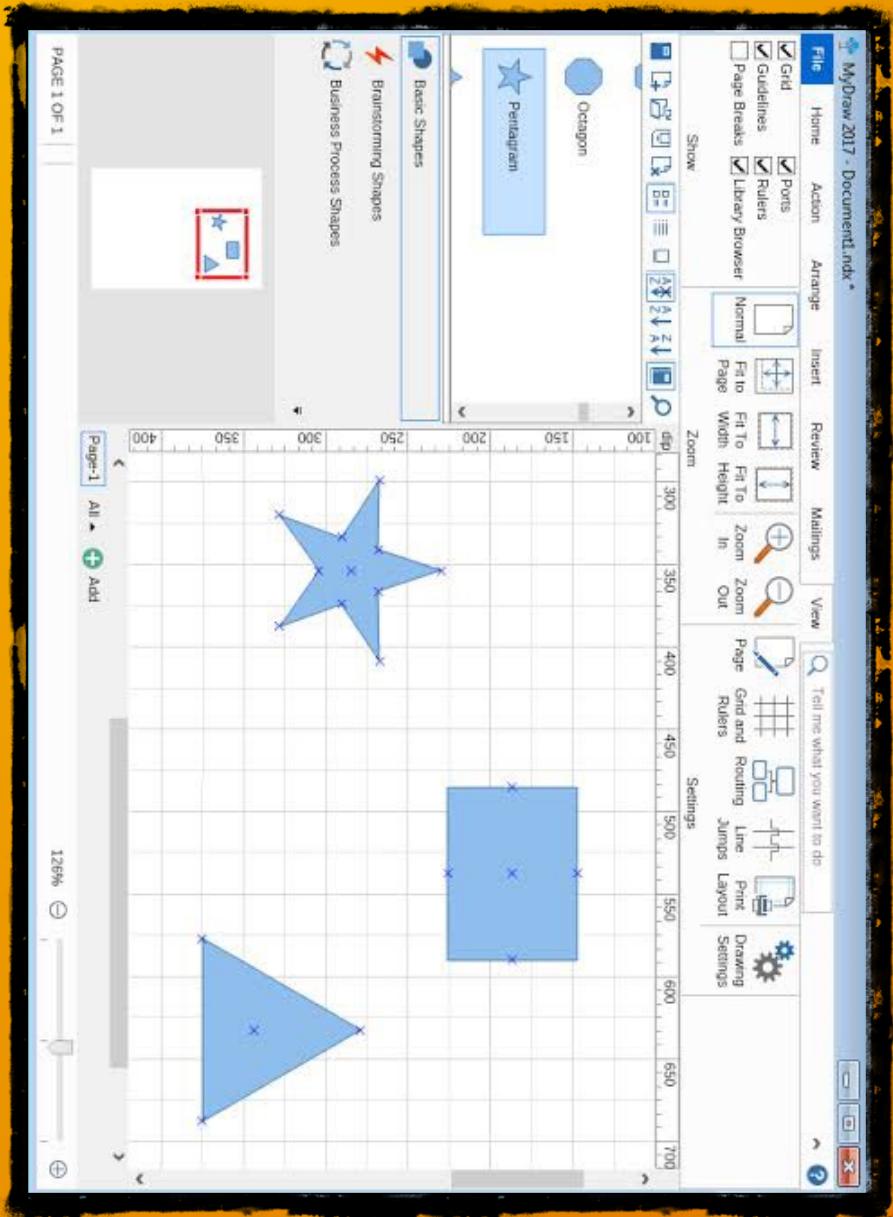
# Zooming



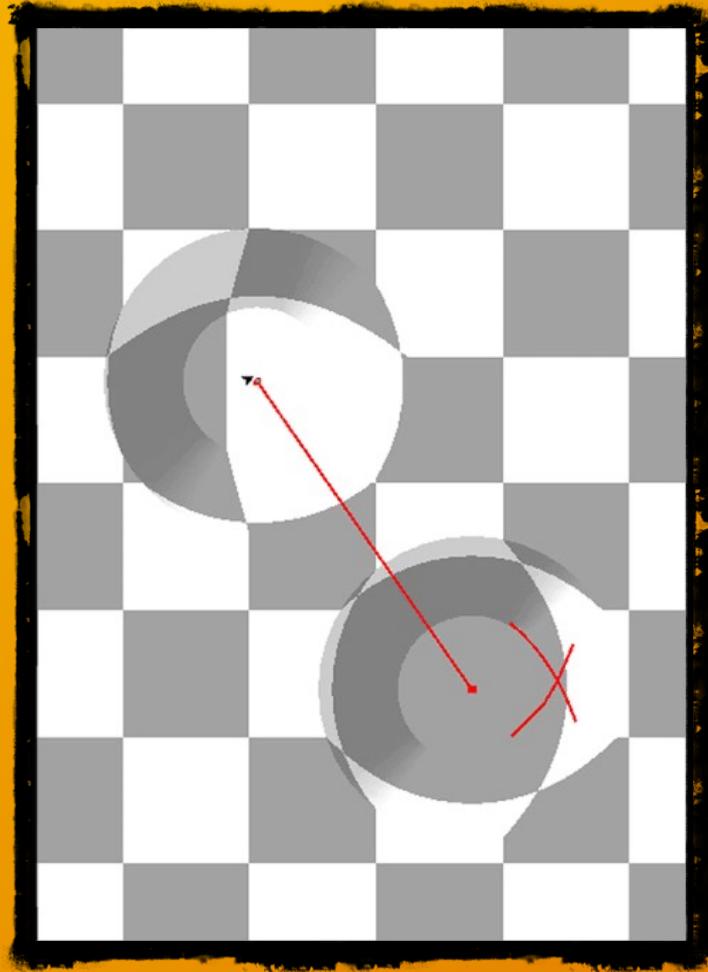
Over view

Panning

Fish eyes



Panning



## Fish eyes

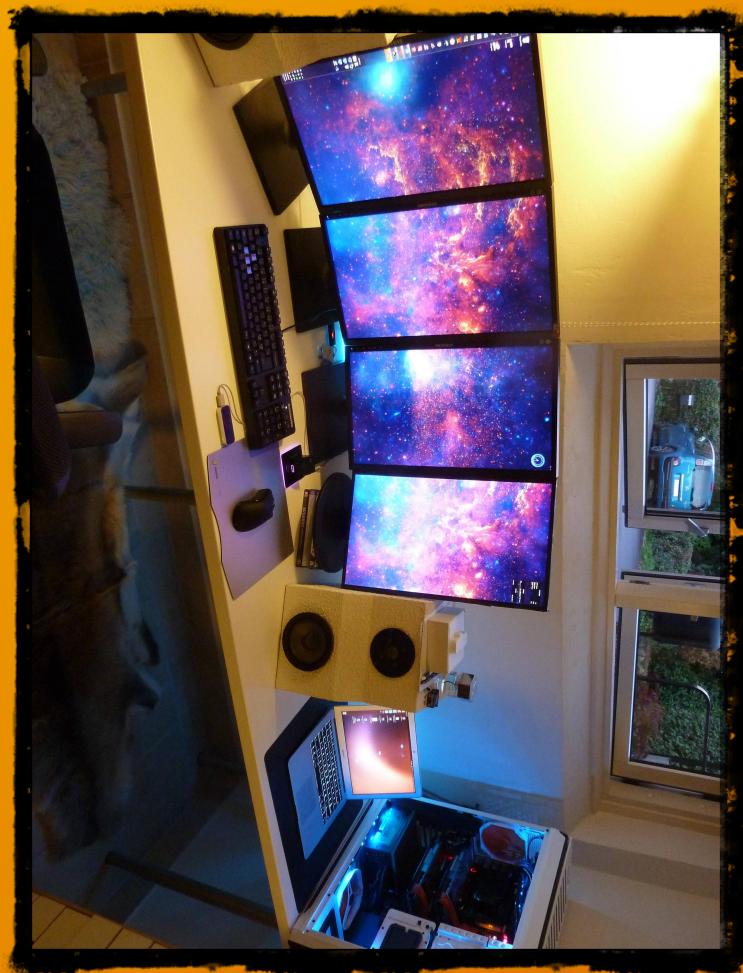
20

of computer vision applications assume that camera model invalid. This is particularly the aim of distortion correction is, therefore, cameras to the pin-hole perspective view fields-of-view, e.g. those cameras with fisheye lenses exhibit severe artefacts. The main other artefacts, such as uneven illumination, distortion, should also be considered. We review and discuss methods of correcting fish-eye cameras and illustrate the effect of multiple types of distortion.

fish-eye cameras  
II RADIAL DISTORTION

# Multiple views

21



# Voice command



# So why is bigger almost always better?

## Camera and photos

A larger display won't improve the pixel quality of your photos but it will definitely improve the composition.

## Video-chatting and Face Time are better,

since the whole point is to make you feel like you're actually there.

## Games

You can follow the action more easily and the larger screen also means your accuracy will improve, since it's easier to see where you should be tapping. Also, icons are more spread out, so you're less likely to hit the wrong button.

## Speaking of spreading out, that larger screen

means more accuracy with your touchscreen on and offline. Whether it's the keyboard or closely packed URL options bigger definitely translates to more accuracy.

## Movies

If you've ever tried to watch a video on your phone, this one is self-explanatory. We don't go to the movies for the grossly overpriced popcorn; we go for that giant screen.

## Android

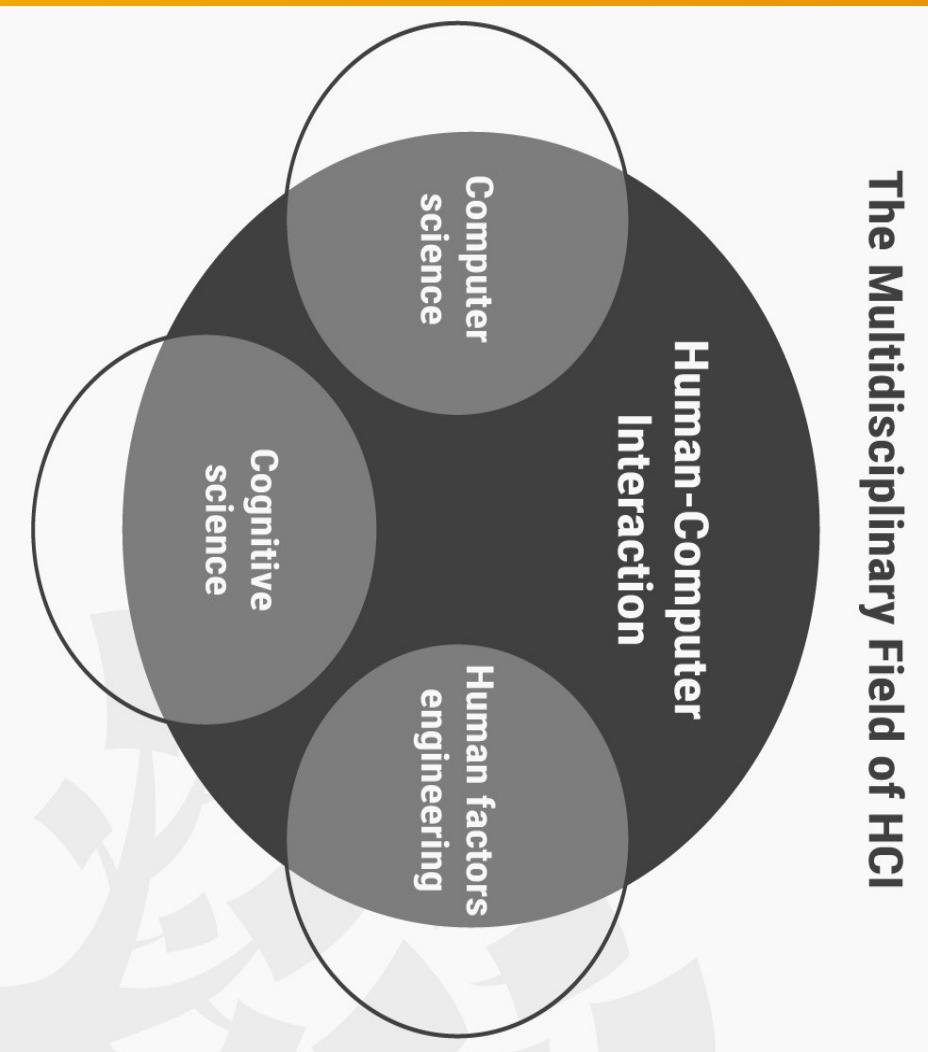
users have a distinct advantage over iPhone users in one area – split screen display. Users can download an app enabling split screen functionality, allowing you to view two apps at once.

# HCI For Web

I will bring the file to

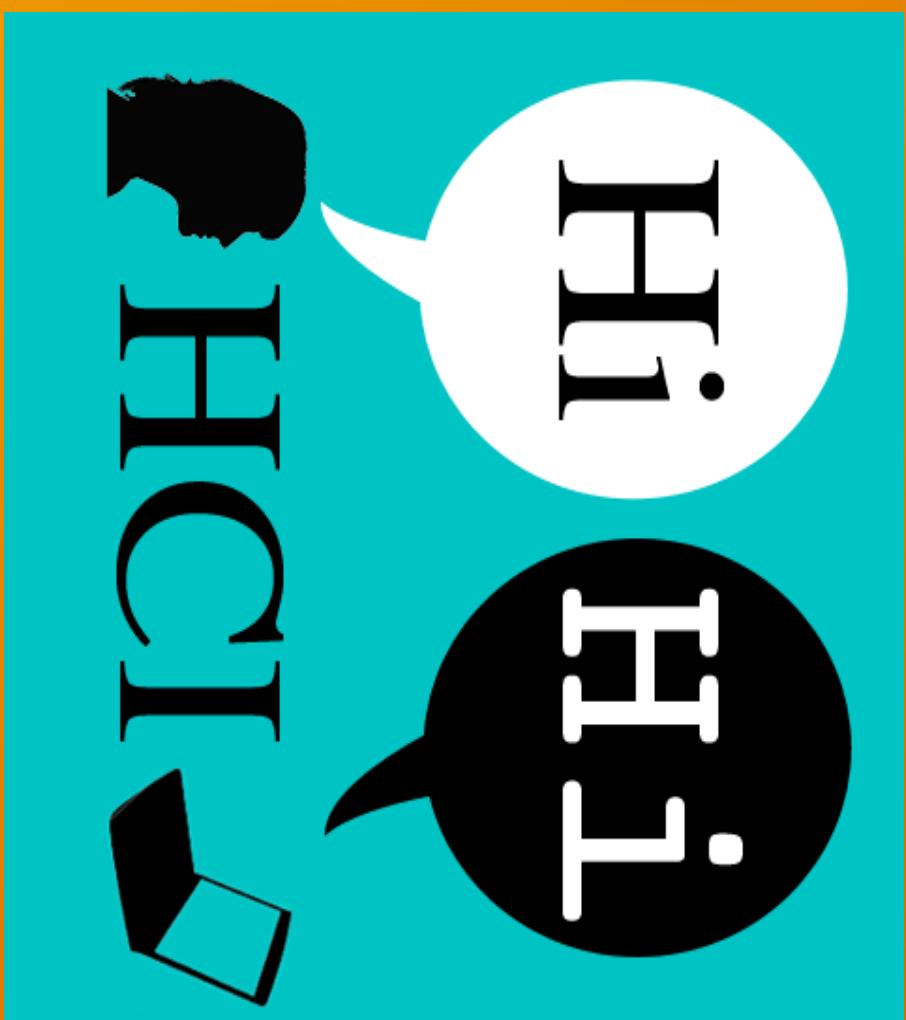
# What is HCI?

The Multidisciplinary Field of HCI



# What is HCI?

- Human Individual user, a group of users working together, a sequence of users in an organization
- Computer
- User interface Interaction Usually involve a dialog with feedback & control throughout performing a task (e.g., user invokes “print” command and then interface replies with a dialog box)



# Lamp

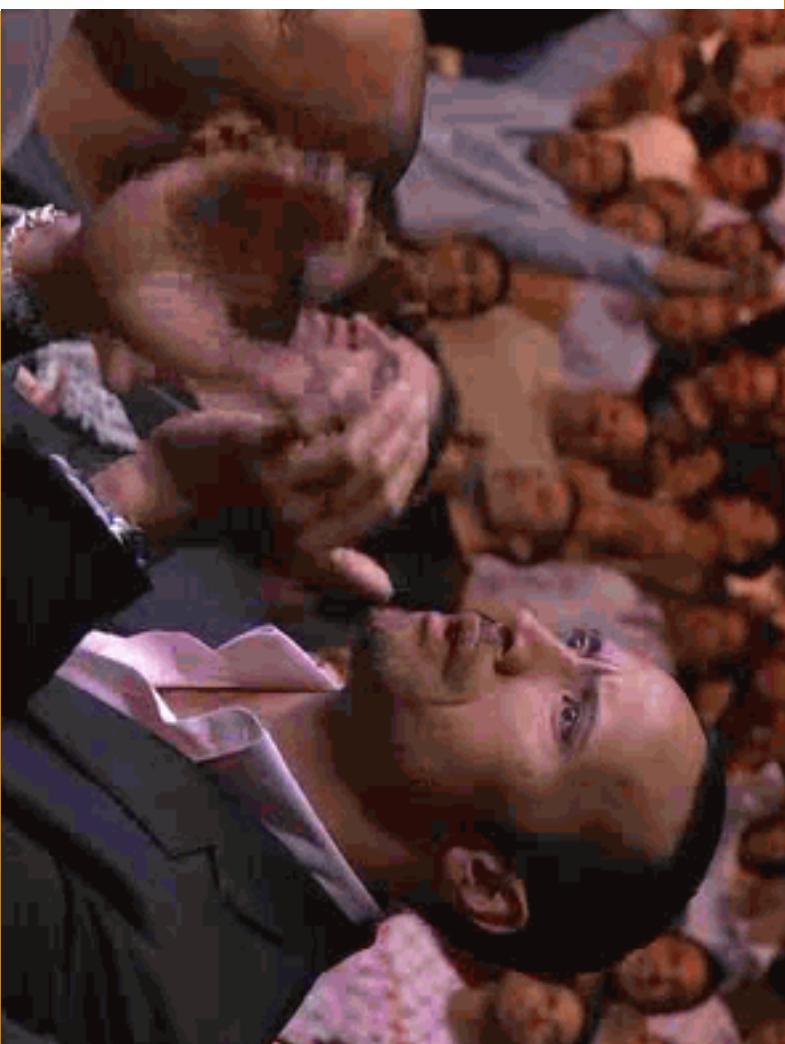
- Function/objective: to illuminate the environment
- Interface: power switch
- Functional part: light bulb
- Interaction: press “On”, light on; press “Off”, light off
- User tasks: turn on the lamp, turn off the lamp



# Why HCI?

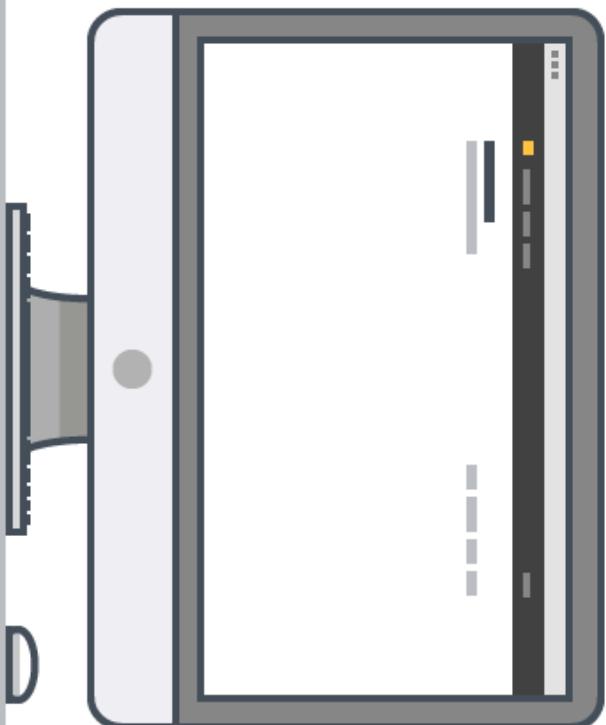
- In the past, computers were expensive & used by technical people only
- Now, computers are cheap and used by non-technical people (different backgrounds, needs, knowledge, skills)
  - ⇒ Computer and software manufacturers have noticed the importance of making user-friendly interfaces: including easy to learn, easy to use, save people time e.g., **Is your washing machine user-friendly?**
  - ⇒ We also desire good user experience
    - e.g., **Do you feel pleasure and satisfaction when using your smart phone?**

# End User Frustrated vs End User Happy



# Evolution of the internet

Why are we so hooked on the web?



≡



How does this make  
you feel?

#### NO INTERNET CONNECTION

Check your internet connection  
and try again



But how did it all begin in the first place?

The answer is:

Autism

We started from the bottom  
with.....

# Static Content

## World Wide Web

The WorldWideWeb (W3) is a wide-area [hypemedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#)

### [What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#) , etc.

### [Help](#)

on the browser you are using

### [Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) , [X11](#) , [Vista](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#) )

### [Technical](#)

Details of protocols, formats, program internals etc

### [Bibliography](#)

Paper documentation on W3 and references.

### [People](#)

A list of some people involved in the project.

### [History](#)

A summary of the history of the project.

### [How can I help ?](#)

If you would like to support the web..

### [Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

*The first webpage consisting on mainly hyperlinks and static text content*

CSS did not become fully widespread until around the early 2000s



[Yellow Pages](#) - [People Search](#) - [City Maps](#) - [News Headlines](#) - [Stock Quotes](#) - [Sports Scores](#)

- Arts - - Humanities, Photography, Architecture, ...
- Business and Economy [Xtra!] - - Directory, Investments, Classifieds, ...
- Computers and Internet [Xtra!] - - Internet, WWW, Software, Multimedia, ...
- Education - - Universities, K-12, Courses, ...
- Entertainment [Xtra!] - - TV, Movies, Music, Magazines, ...

# After the invention of HTML <table> tag

**Find It**

**Product Information**

**Customer Support**

**Technology & Research**

**Developer World**

**Groups & Interests**

**Resources Online**

**About Apple**

**Welcome to Apple**

**BMW**

**Introducing CyberDrive**

**REGISTER 300**

**Mobile, Affordable, & Smart**

**MOVIES FROM MARS**

**Q**

**Takes You Out of This World**

**Breaking News**

**Search** **Advanced Search** **Images** **MP3/Audio** **Video** **777 New AT&T Search Center**

**Find Results on:**  The Web  News  Discussion Groups  Products

**Title:** Select News radio button to search on current headlines.

**any language**

**Smart** **Message Boards** **Free Internet Access** **Email** **Yellow Pages** **People Finder** **Directories** **Local Home Pages**

**Web Directory**

**Business & Travel** **Business & Travel**

**Auto** **Business Services** **Manufacturers**

**Business & Finance** **Business & Finance**

**Computers** **Computers**

**Health & Fitness** **Health & Fitness**

**Home & Family** **Home & Family**

**Internet** **Internet**

**Chat, Email, ICQ/IM** **Chat, Email, ICQ/IM**

**News & Media** **News & Media**

**Online Magazines** **Online Magazines**

**Software** **Software**

**Business Software** **Business Software**

**Word** **Word**

**Database, Excel, SQL Server** **Database, Excel, SQL Server**

**Flash** **Flash**

**Yellow Pages | Directories | Translation | TV** **Yellow Pages | Directories | Translation | TV**

**Reading Tools on the Web**

**Search Guide: How to plan the perfect Valentine's Day**

**Today's Hottest MP3 Searches!**

**1. Satisfied** **4. Something Pumpkins**

**2. Christina Aguilera** **5. Marvin Gaye**

**3. Bob Marley** **6. Korn**

**Search Solutions for Business**

**smart is beautiful**

**300-500 off Retail**

**EuroTalkEnd.com!**

**Holiday Gift Off**

**Business Services**

**Find The Lowest Price:**

**-Sony CLR-BW Media**

**-AOL Bookstore**

**-EBC Digital Galleria**

**Find Your Sponsor:**

**-Click here for your free ad space!**

**Search**

**Villcom (Mainframe)**

**Transite**

**AmyDoll.com**

**Autocad.com**

**Other International Sites**

**Cross-cultural Marketing**



# Remember when Flash was everywhere?

2014:

Flash was never a great web solution, due to lack of accessibility, poor search engine optimization, and other issues. In fact, many devices no longer support Flash. Today, web technologies such as JavaScript or PHP are used to provide interactivity and create a better user experience.

And then in 2007, the iPhone was launched





iPad

iPhone

Watch

TV

Music

Support

Q



## Thoughts on Flash

Apple has a long relationship with Adobe. In fact, we met Adobe's founders when they were in their proverbial garage. Apple was their first big customer, adopting their Postscript language for our new Laserwriter printer. Apple invested in Adobe and owned around 20% of the company for many years. The two companies worked closely together to pioneer desktop publishing and there were many good times. Since that golden era, the companies have grown apart. Apple went through its near death experience, and Adobe was drawn to the corporate market with their Acrobat products. Today the two companies still work together to serve their joint creative customers – Mac users buy around half of Adobe's Creative Suite products – but beyond that there are few joint interests.

I wanted to jot down some of our thoughts on Adobe's Flash products so that customers and critics may better understand why we do not allow Flash on iPhones, iPods and iPads. Adobe has characterized our decision as being primarily business driven – they say we want to protect our App Store – but in reality it is based on technology issues. Adobe claims that we are a closed system, and that Flash is open, but in fact the opposite is true. Let me explain.

First, there's "Open".

Adobe's Flash products are 100% proprietary. They are only available from Adobe, and Adobe has sole authority as to their future enhancement, pricing, etc. While Adobe's Flash products are widely available, this does not mean they are open, since they are controlled entirely by Adobe and available only from Adobe. By almost any definition, Flash is a closed system.

### In 2010, Steve Jobs wrote this signing a death warrant for Flash

Apple has many proprietary products too. Though the operating system for the iPhone, iPod and iPad is proprietary, we strongly believe that all standards pertaining to the web should be open. Rather than use Flash, Apple has adopted HTML5, CSS and JavaScript – all open standards. Apple's mobile devices all ship with high performance, low power implementations of these open standards. HTML5, the new web standard that has been adopted by Apple, Google and many others, lets web developers create advanced graphics,

# Flash

HTML5, CSS3 and JAVASCRIPT were the only technologies allowed on these devices for power and efficiency reasons.

Apple restricts use of technologies required by products like Flash Player. Until Apple eliminates these restrictions, Adobe cannot provide Flash Player for the iPhone or iPod Touch.

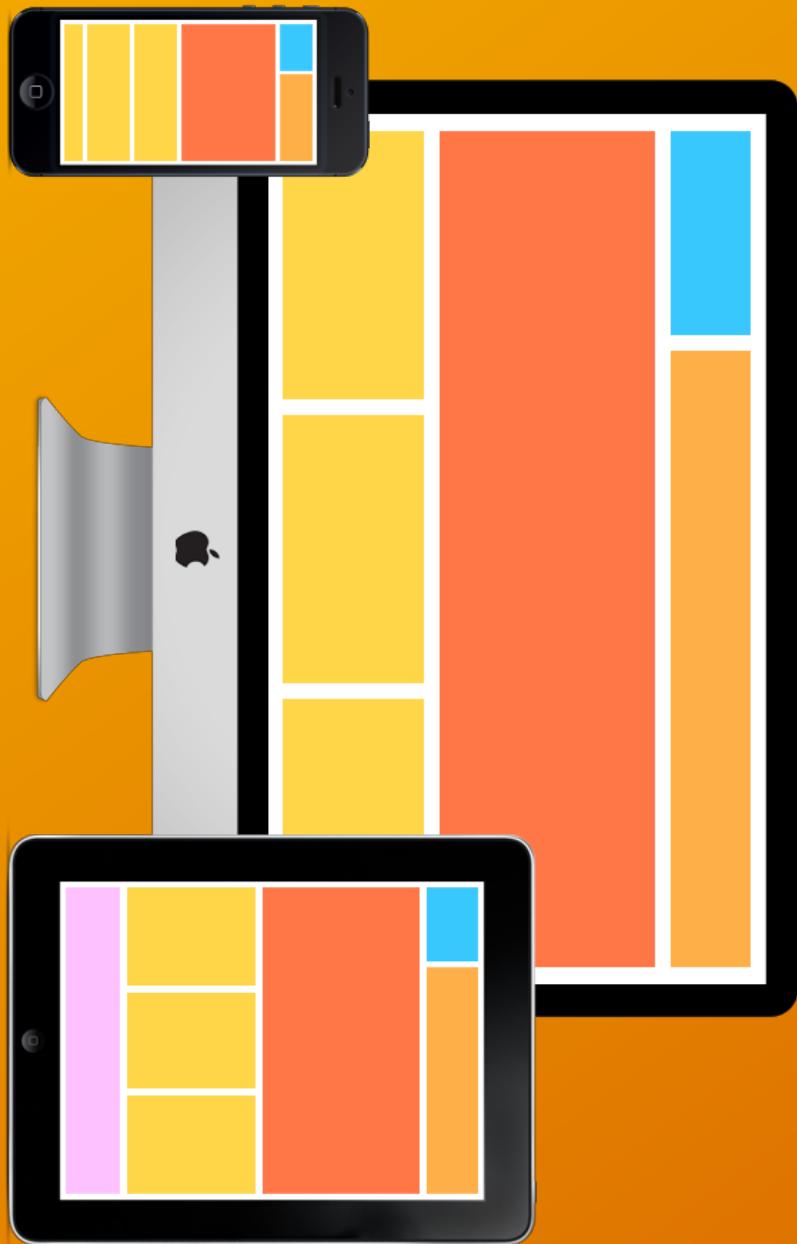
Copyright © 2009 Adobe Systems Incorporated. All rights reserved.

And for the fact that websites built by Adobe Flash couldn't be tracked by search engines. Therefore, websites were slower



The era of responsive design  
And now we are here!

# Responsive Design



Dynamic content that looked great on any sized screen

# Dynamic Content



Rubbel

?

NEW

LIBRARY

EDIT

SAVE

SHARE

BASIC

+

Auto-Fix

\*

Crop

Tt

Rotate

Exposure

Colors

Sharpen

Resize



PeopleNow

Log in

Don't have an account? [Sign Up](#)

Email Address

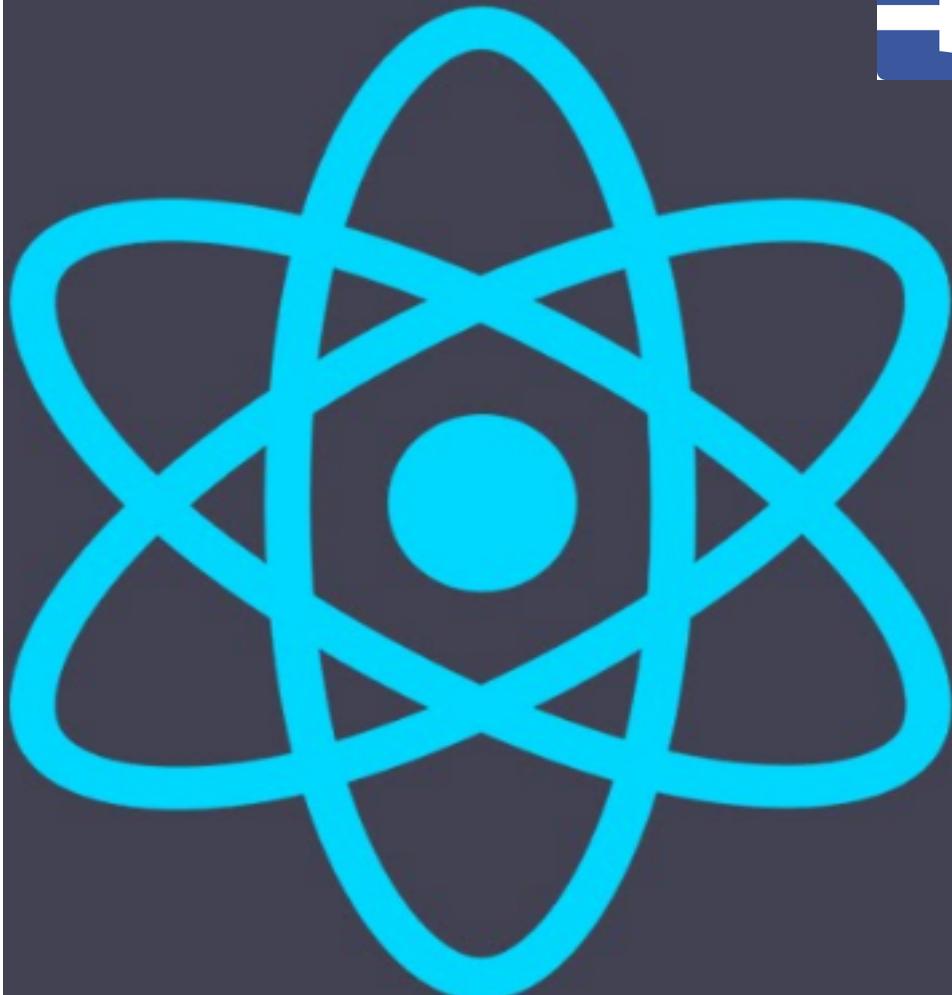
Password

[Forgot password?](#)

LOG IN



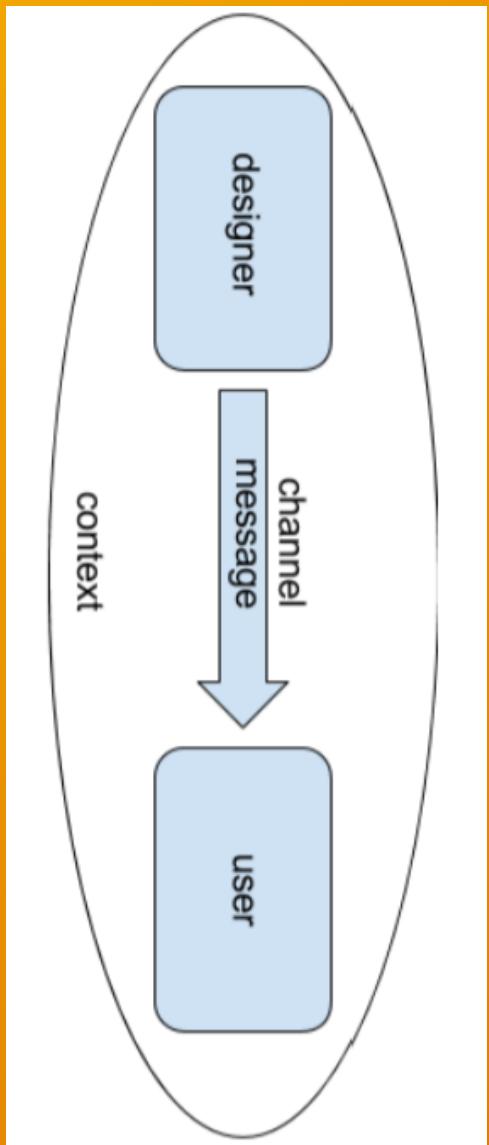
So whats next for the web?



- What is HCI for Web
- Designing for Usability and Accessibility
  - Principles of visibility
  - The Principle of System Feedback
  - The Principle of Simplicity
  - The Principle of Consistency
  - The Principle of Tolerance
  - Designing for Accessibility
  - The Principle of Structure
  - The Gestalt Principle of Proximity
  - The Gestalt Principle of Similarity
  - The Gestalt Principle of Continuity
  - The Gestalt Principle of Closure
  - The Gestalt Principle of Symmetry
  - The Gestalt Principle of Figure/Ground
- Implementation of UI Guidelines in Web Design



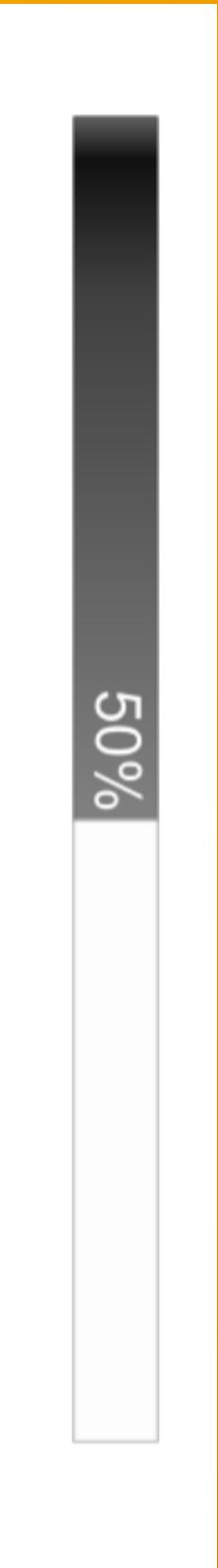
- Designing for Usability and Accessibility
  - Design
    - Early Computers
      - windowed display, a graphical user interface, networking, hyperlinks, audio and video ‘conferencing’, dynamic file linking, shared-screen collaboration and a mouse



- Designing for Usability and Accessibility
  - Principles of visibility
    - Visibility is achieved when systems' status, consequences of actions and methods of use are obvious.

Bachelor of Science (Computer Science) (Curriculum 2014)			
A. General Education Courses		30 CREDITS	
<b>Language Courses</b>			12/12 CREDITS
✓	BG1001	ENGLISH I	3 A
✓	BG1002	ENGLISH II	3 A
✓	BG2000	ENGLISH III	3 A
✓	BG2001	ENGLISH IV	3 A-
<b>Humanities Courses</b>			3/3 CREDITS
✓	GE2101	WORLD CIVILIZATION	3 A-
<b>Social Science Courses</b>			6/6 CREDITS
✓	GE2202	ETHICS	3 A
✓	MGT1101	INTRODUCTION TO BUSINESS	3 B+

- Designing for Usability and Accessibility
  - The Principle of System Feedback
    - The principle of feedback means that it should be obvious to the user when the system function has been triggered.



50%

- Designing for Usability and Accessibility
  - The Principle of Simplicity
  - The principle of simplicity means that the UI of the system should be designed simplistically

The Rockaways Are Devastated  
and They Need Your Help.

RSVP TO VOLUNTEER

- Designing for Usability and Accessibility
  - The Principle of Simplicity
  - Another choice

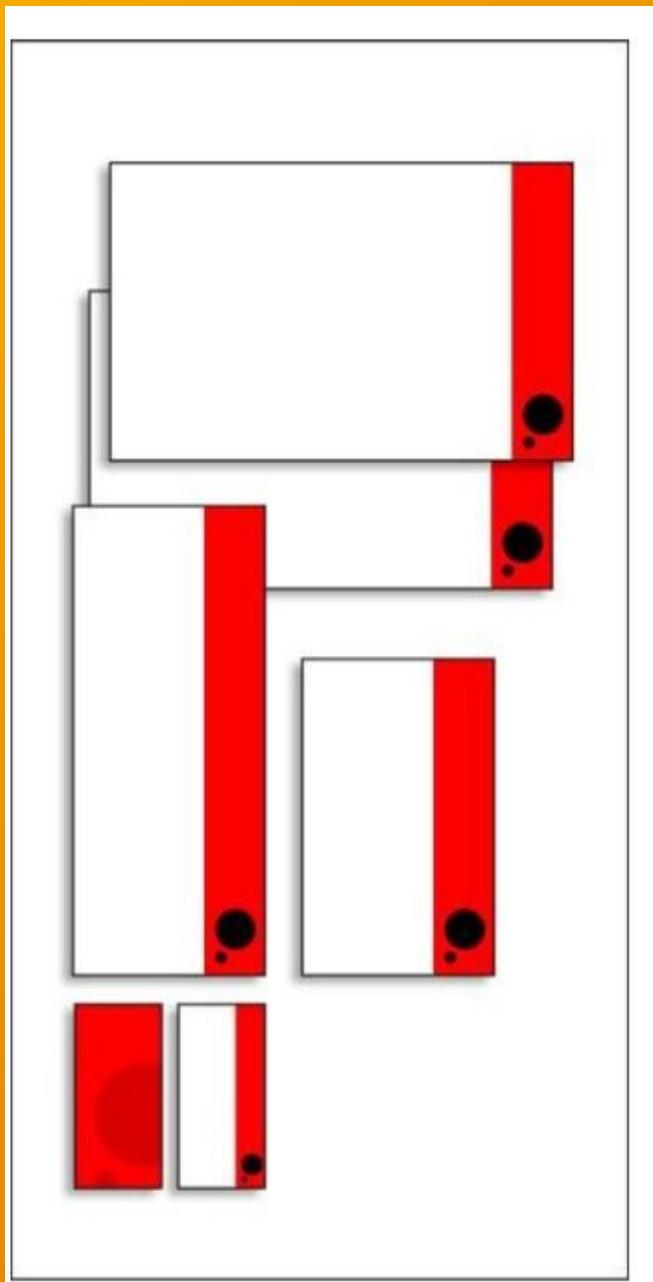


Hamburger Menu

Increases conversion rate

✓ Good

- Designing for Usability and Accessibility
  - The Principle of Consistency
    - similar items are arranged in the same way.
    - Aesthetic consistency is presented through style and appearance



- **Designing for Usability and Accessibility**

## The Principle of Tolerance

- The principle of tolerance means that the UI should prevent the user from making errors while using the product
- Slip/mistakes

A screenshot of a GitHub sign-up form. The form includes fields for Username, Email, and Password. The Username field contains "travisjeffery". A red error message "Username is already taken" is displayed next to it. The Email field contains "tj@travisjeffery.com". Another red error message "Email is Invalid or already taken" is displayed next to it. Below the form, a note says "Use at least one letter, one numeral, and seven characters." At the bottom, there is a large green "Sign up for GitHub" button.

Username

travisjeffery

Username is already taken

tj@travisjeffery.com

Email is Invalid or already taken

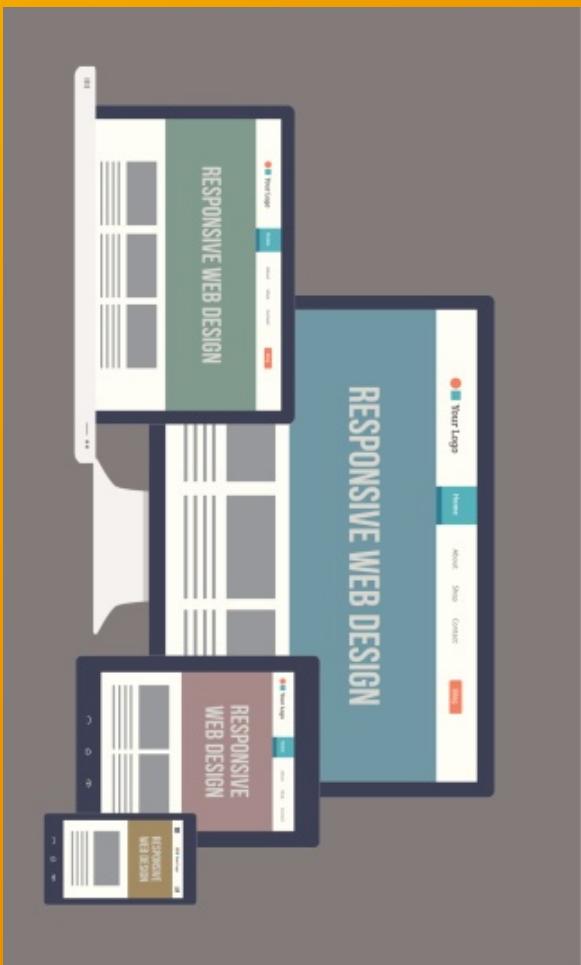
Create a password

Use at least one letter, one numeral, and seven characters.

**Sign up for GitHub**

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy policy](#). We'll occasionally send you account related emails.

- Designing for Usability and Accessibility
- Designing for Accessibility
- One of the main tasks of the designer is to make web content accessible for a wide range of users including those with special needs
- Any Platform



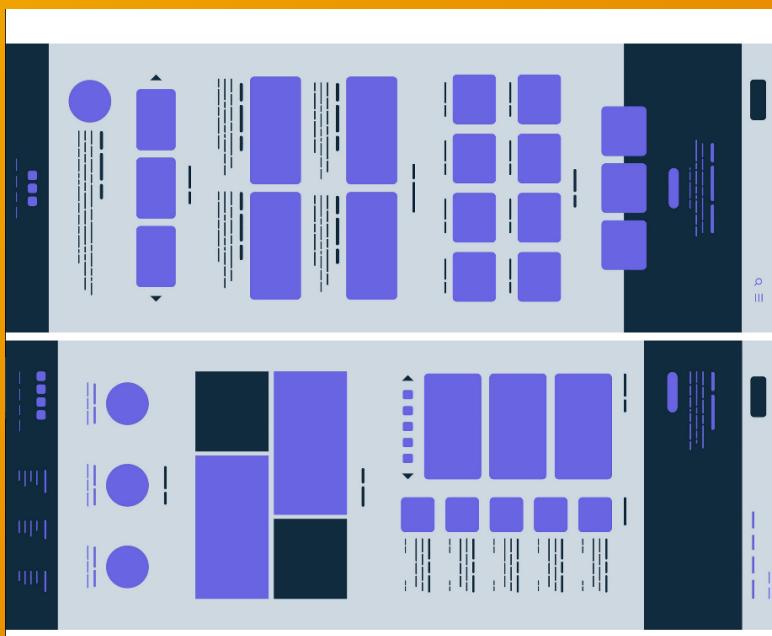
- **Designing for Usability and Accessibility**
  - Designing for Accessibility
    - One of the main tasks of the designer is to make web content accessible for a wide range of users including those with special needs
    - Content Perceptibility



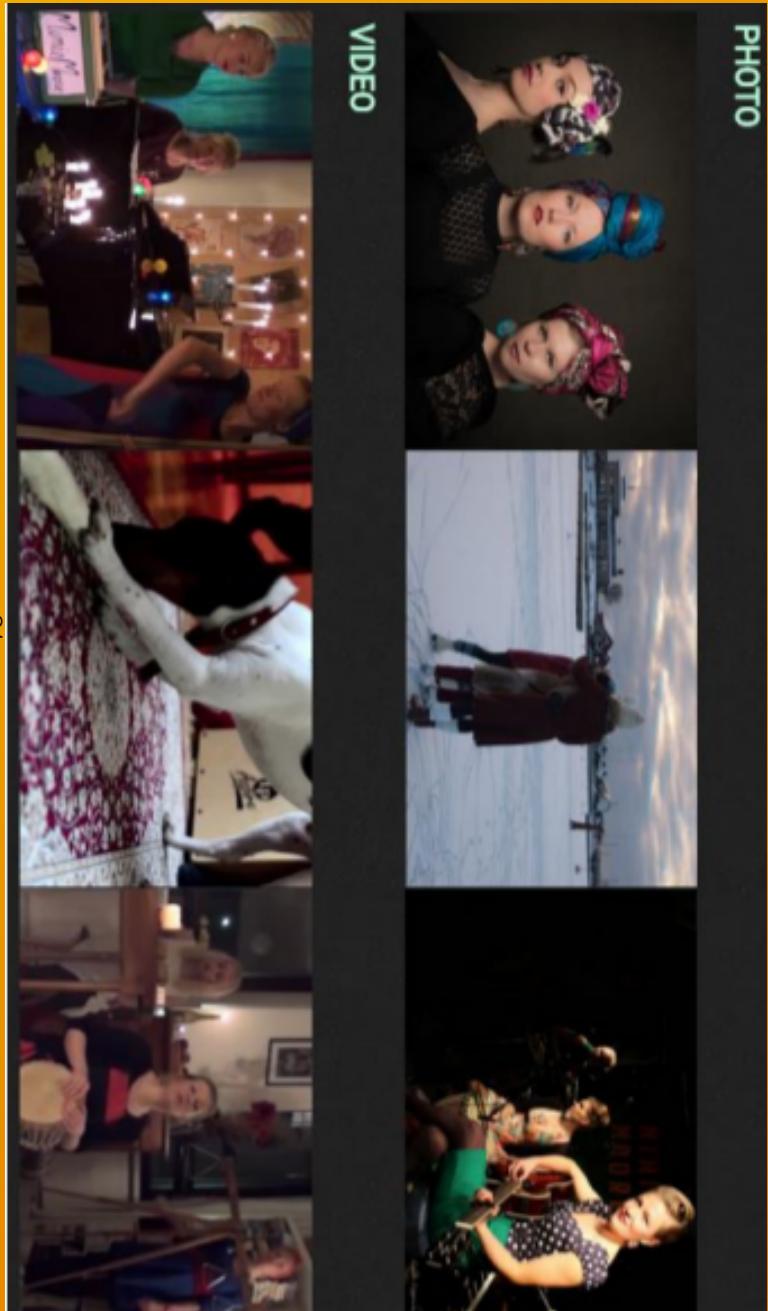
- Designing for Usability and Accessibility
  - Designing for Accessibility
    - One of the main tasks of the designer is to make web content accessible for a wide range of users including those with special needs
    - Operability
      - Physical Abilities e.g suffering from hand movement restriction related diseases

- Designing for Usability and Accessibility
  - The Principle of Structure
    - Structure requirements are connected with visibility, simplicity, consistency and accessibility principles
    - people's vision is designed to see structure
    - Gestalt principles

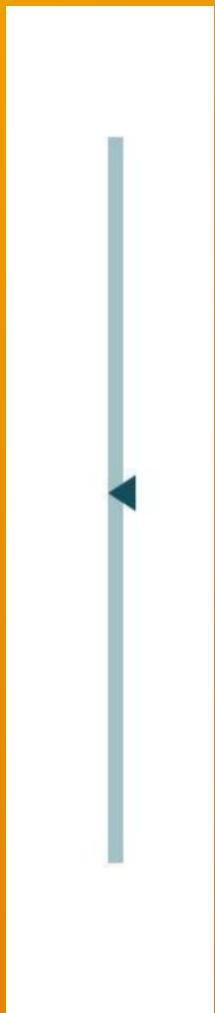
- Designing for Usability and Accessibility
  - Gestalt principles
- The Gestalt Principle of Proximity  
that elements close together are perceived as a single group or chunk, and are interpreted as being more related than elements that are farther apart



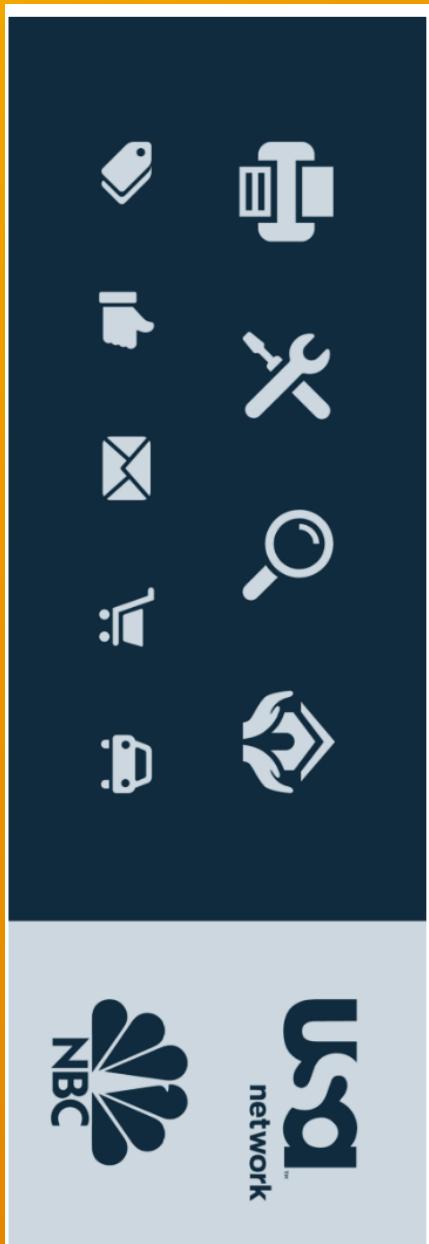
- Designing for Usability and Accessibility
  - Gestalt principles
- The Gestalt Principle of Similarity similar elements are perceived as a single group or chunk, and are interpreted as being more related than dissimilar elements



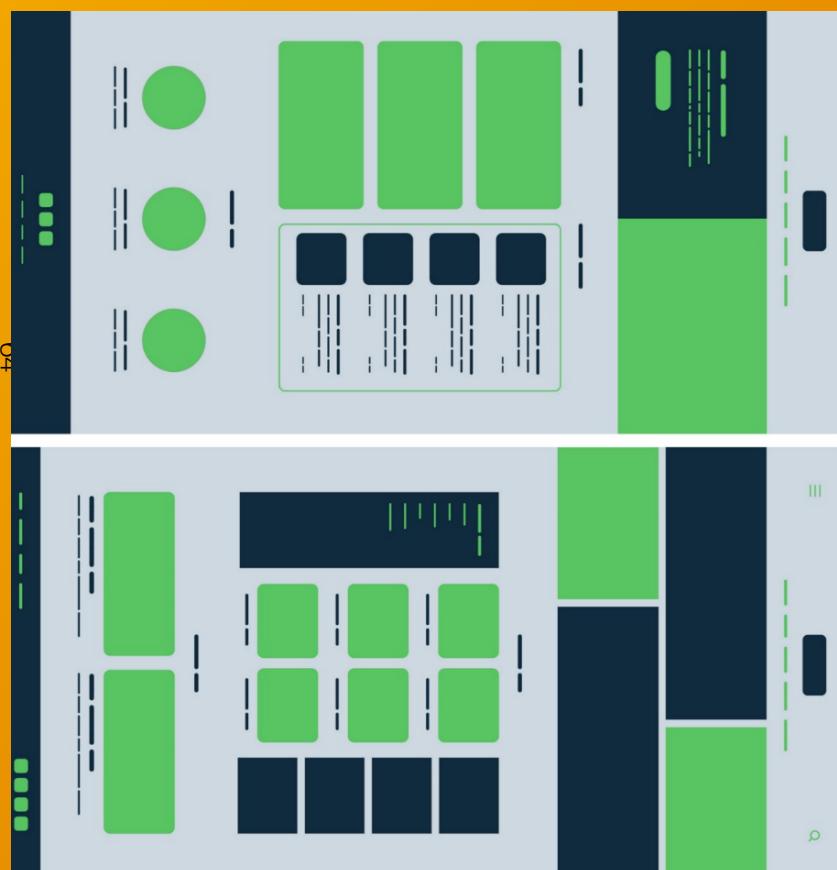
- Designing for Usability and Accessibility
  - Gestalt principles
  - The Gestalt Principle of Continuity
    - our visual perception is biased to perceive continuous forms rather than disconnected segments



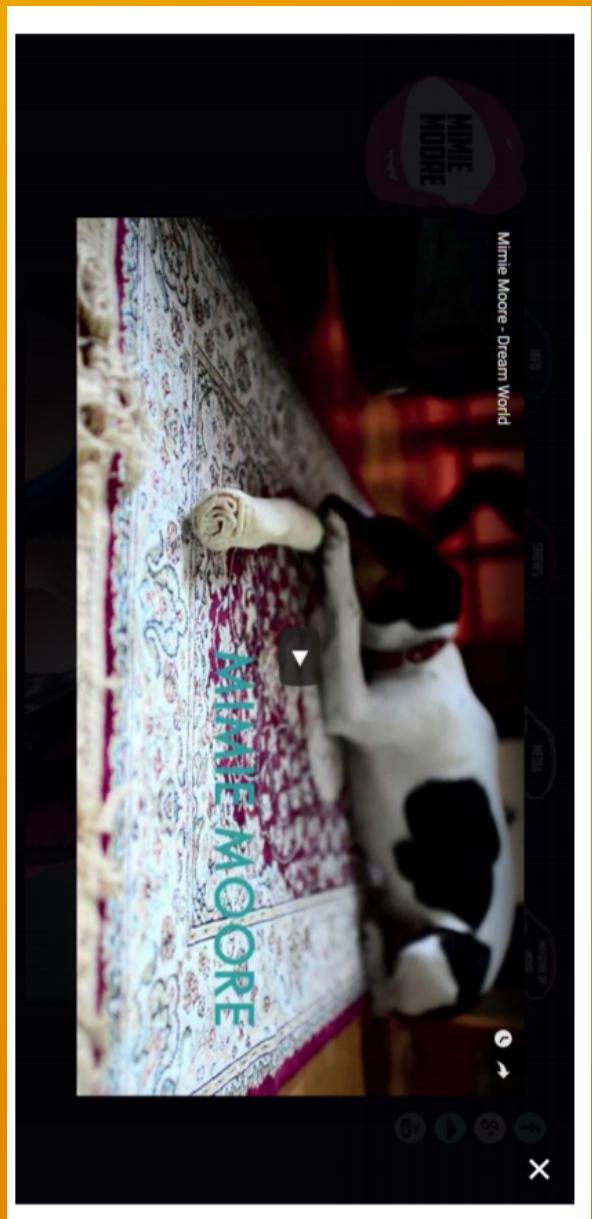
- Designing for Usability and Accessibility
- Gestalt principles
  - The Gestalt Principle of Closure
    - we tend to ‘close’ or complete lines or objects that are not, in fact, closed showing one whole object and the edges of others ‘behind’ it is enough to make users perceive a stack of objects



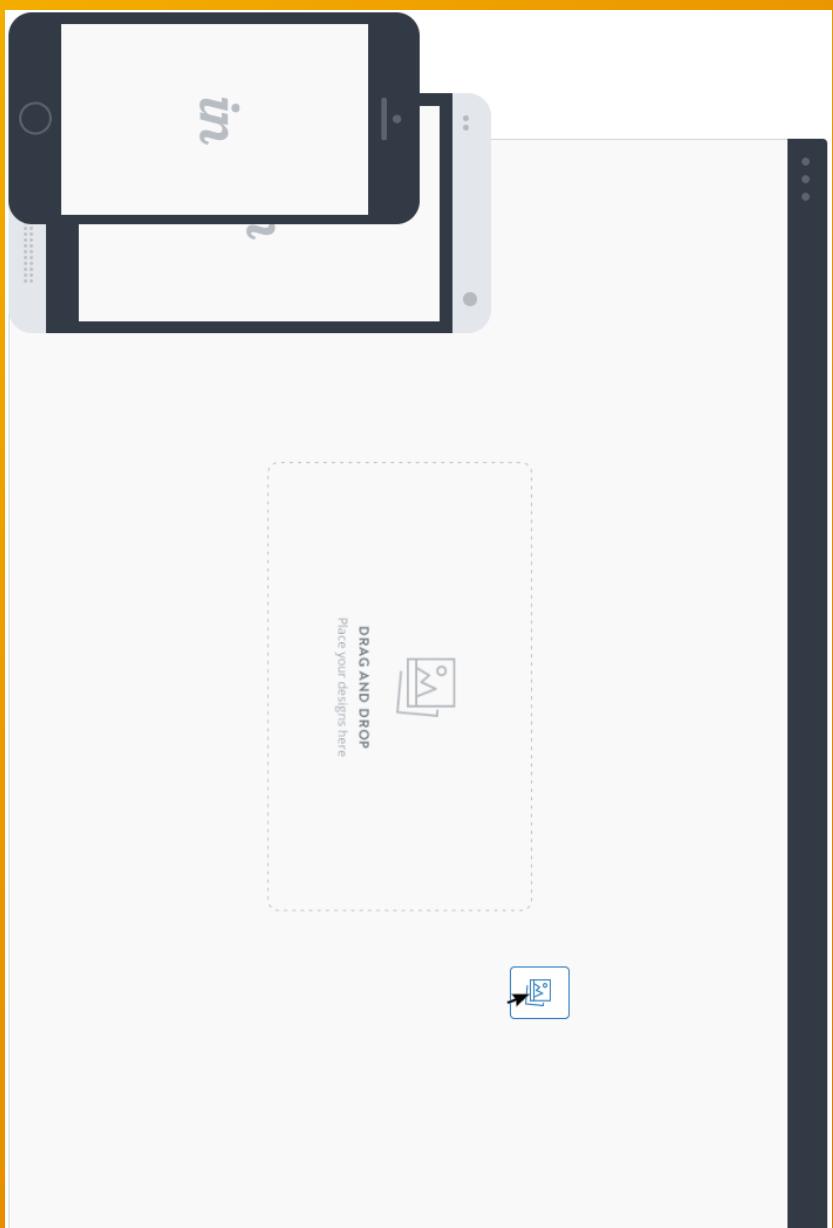
- Designing for Usability and Accessibility
  - Gestalt principles
- The Gestalt Principle of Symmetry
  - automatically organizes and interprets the data so as to simplify it and give it symmetry



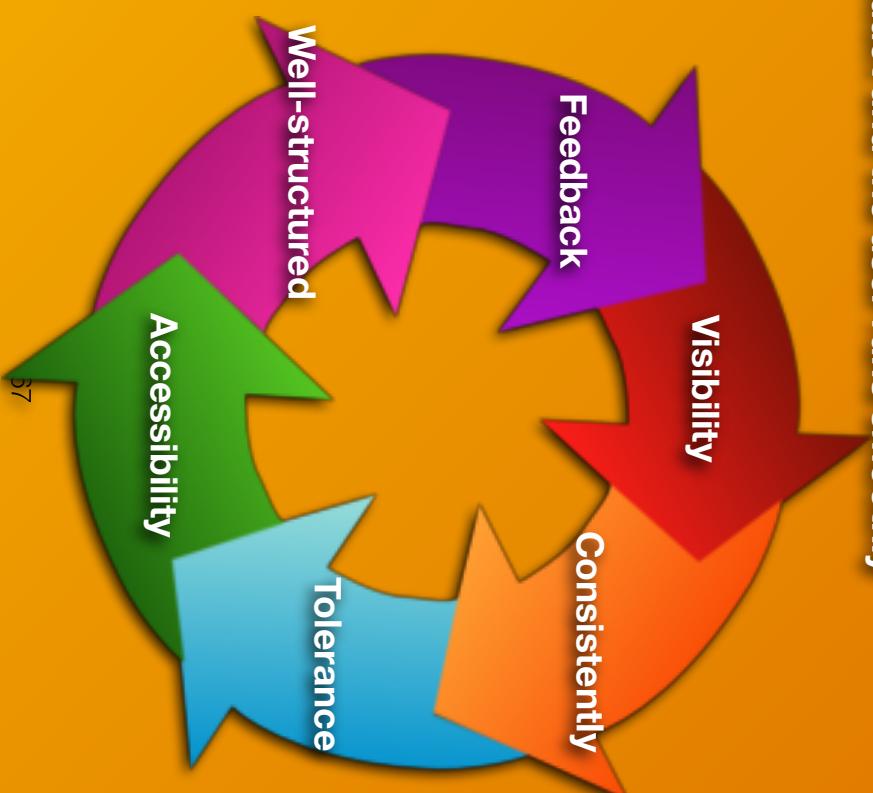
- Designing for Usability and Accessibility
- Gestalt principles
  - The Gestalt Principle of Figure/Ground
    - visual elements are always seen in relation to a visual field



- Designing for Usability and Accessibility
  - Gestalt principles
  - The Gestalt Principle of Figure/Ground
    - Background Videos



- Designing for Usability and Accessibility
- Implementation of UI Guidelines in Web Design
- Design of UI is a way of communication between the user and the designer who ensures that interaction between the product and the user runs smoothly



# Design for Native vs Multi- Platform Application



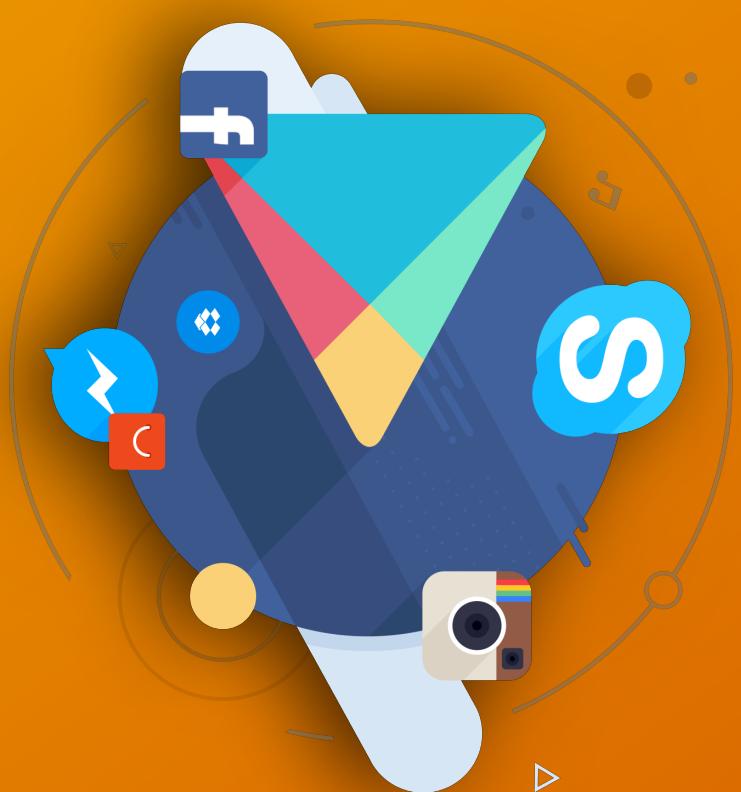
# Contents

- Native Platform
  - What is Native Platform?
  - Features that come with Native Platform
  - Merits and Demerits
  - Design
  - iOS vs Android
- Multi / Cross Platform
  - What is Cross Platform?
  - Features that come with Cross Platform
  - Merits and Demerits
  - Design
- Native vs Cross Platform



# Before we Begin

- Did you know that the mobile app market is expected to reach \$190 Billion by the year 2020?
- As of 2017 there are over 3.2 million apps on the android play store and over 2 million apps on Apple's own app store.
- Or should we kill 2 birds with 1 stone by developing cross platform apps?



# What is Native Platform?

They use platform-specific programming languages such as Kotlin or Java to develop android and Swift to develop iOS.



- Native apps are created specifically to run on targeted platforms with support of native technologies and hardware components such as calendar, camera, etc.
- Apps are are natively built generally can work without the requirement of web availability.
- They are quick in tackling the intensity of the processor.

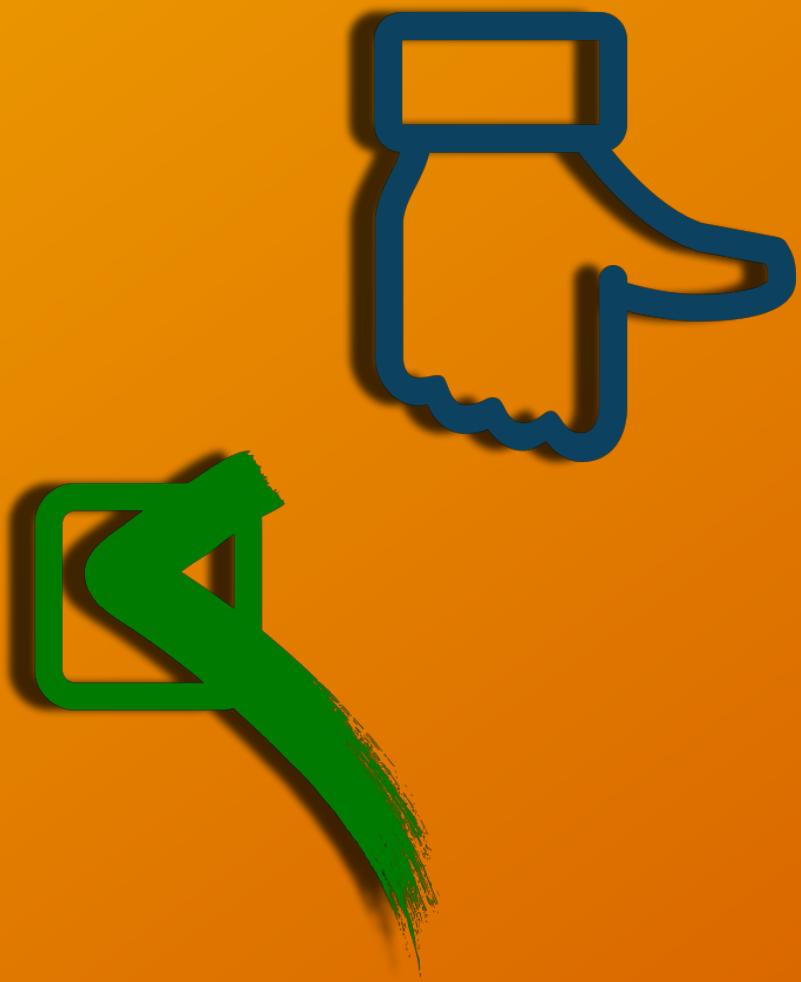
# Features for Native Built Apps

- Built in features:
- GPS
- Camera
- Security:
  - Fingerprint Scanner
  - Face Recognition
  - 4 digit password
- User familiarity
- Convenience
- Efficiency



# Merits Of Native Application

- Speed and lesser consumption of battery.
- Can work with device in-built features such as camera, NFC, etc.
- Can be easily found on the native app stores.
- These apps are secured and fully compatible as they are authorized by the app stores.



# Demerits Of Native Application

- As the apps are supported on multiple devices, the maintenance cost comes with it.
- The process of getting the app approved by the app store can be long and tedious.
- Relatively more expensive proposition to the developer.

DISADVANTAGE

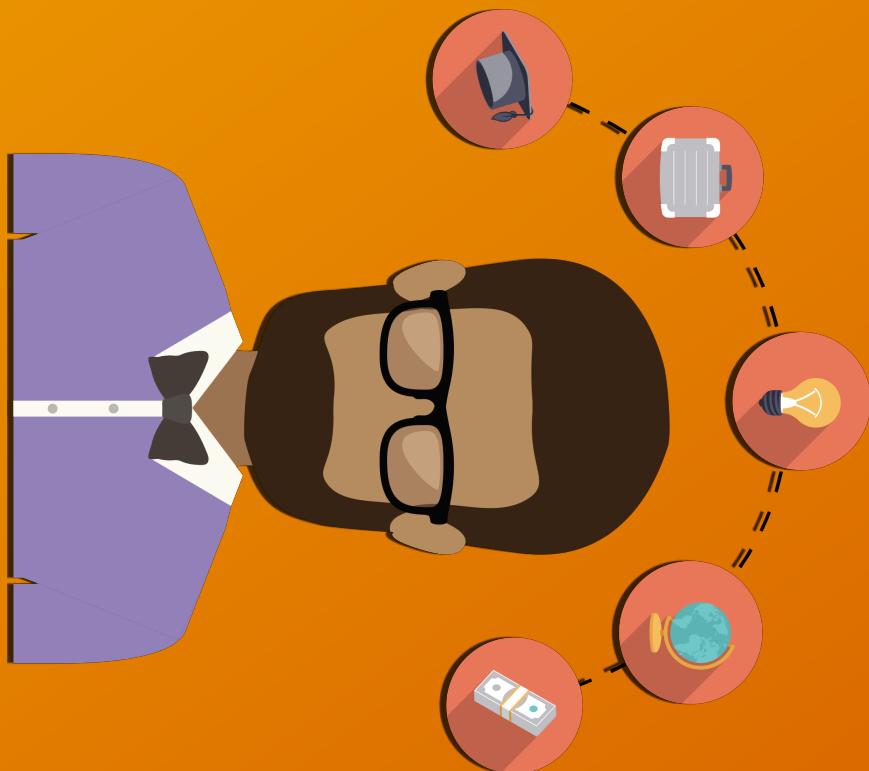


# Design Elements



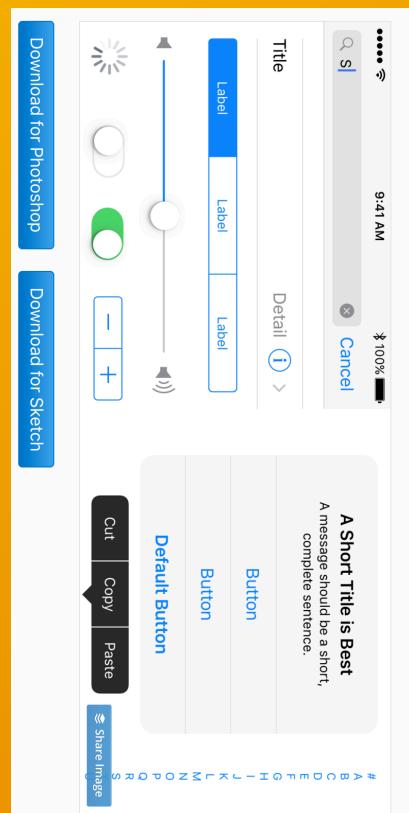
# The Stepping Stone

- Choose a native platform that you want to design/develop an app for. Then choose a reliable tool to start designing/developing.  
Eg: Xcode or Android Studio.
- Get customer personas and pain points from sample users through surveys and or interview. Make sure to focus on benefits that you can provide to the users.
- Plan what color combination you want to use in the app itself. Also keep scalability in mind.

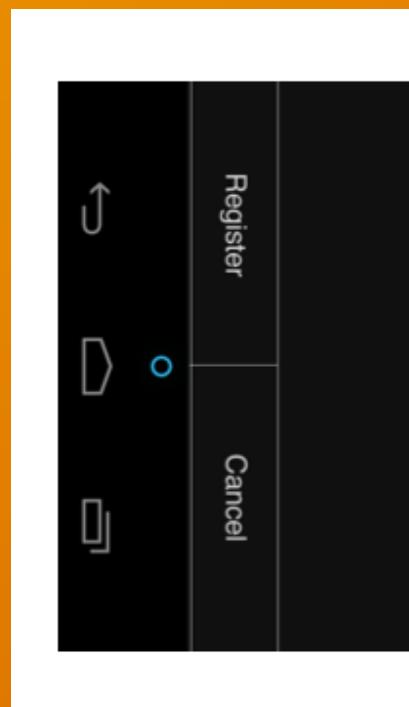


# Buttons

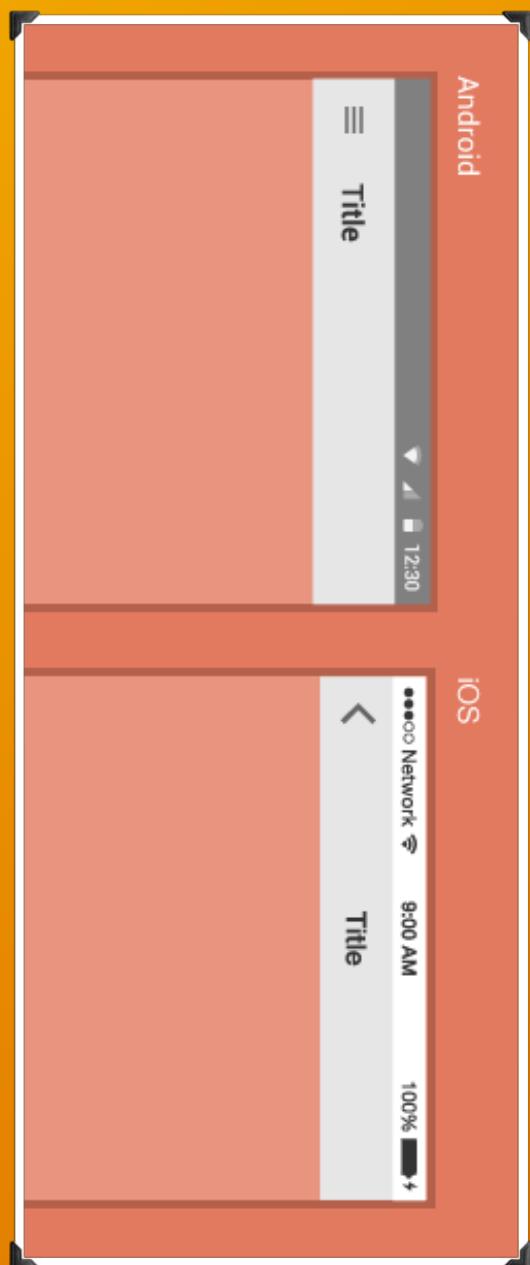
iOS



Android



# Global Elements



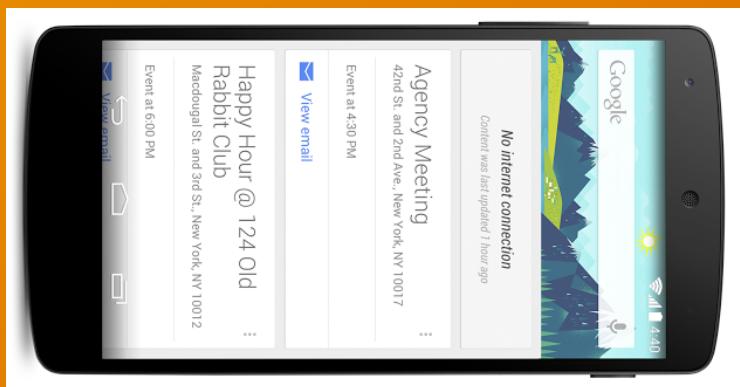
# Cards

iOS



80

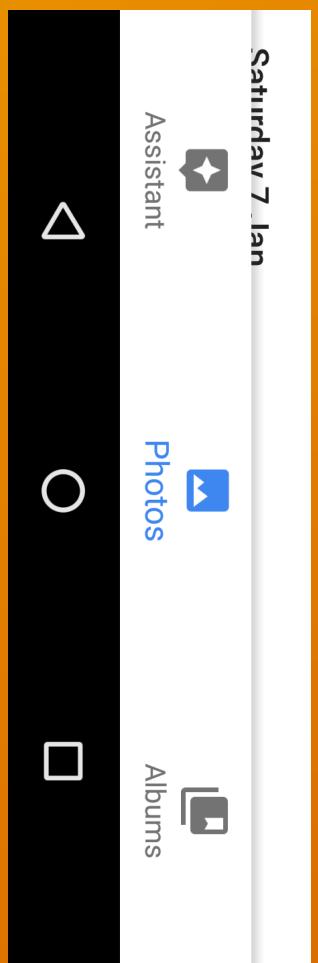
Android



# Tab Bar

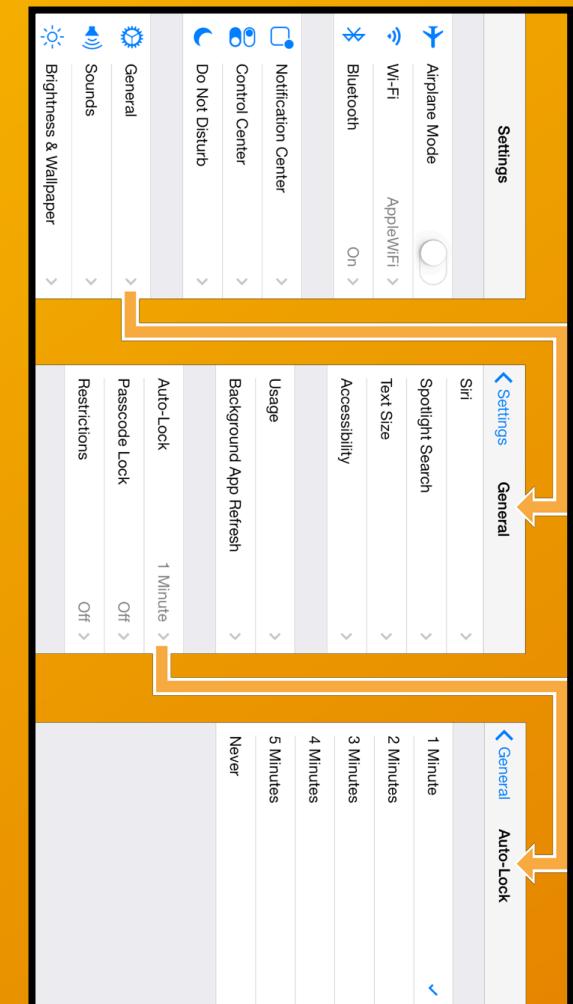


iOS



Android

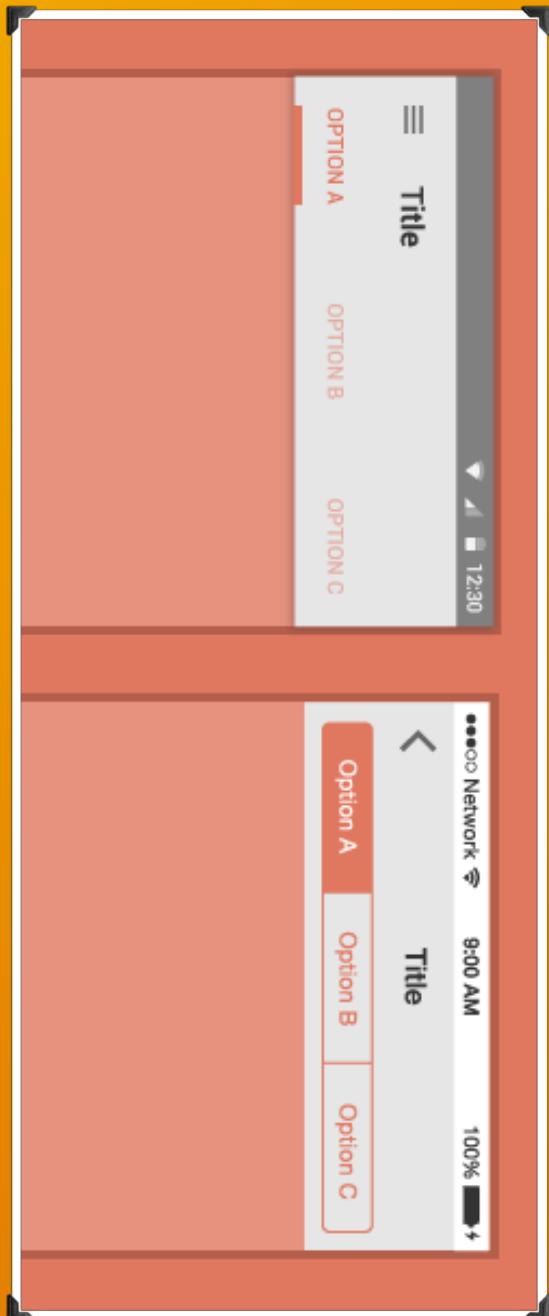
# Navigation



iOS

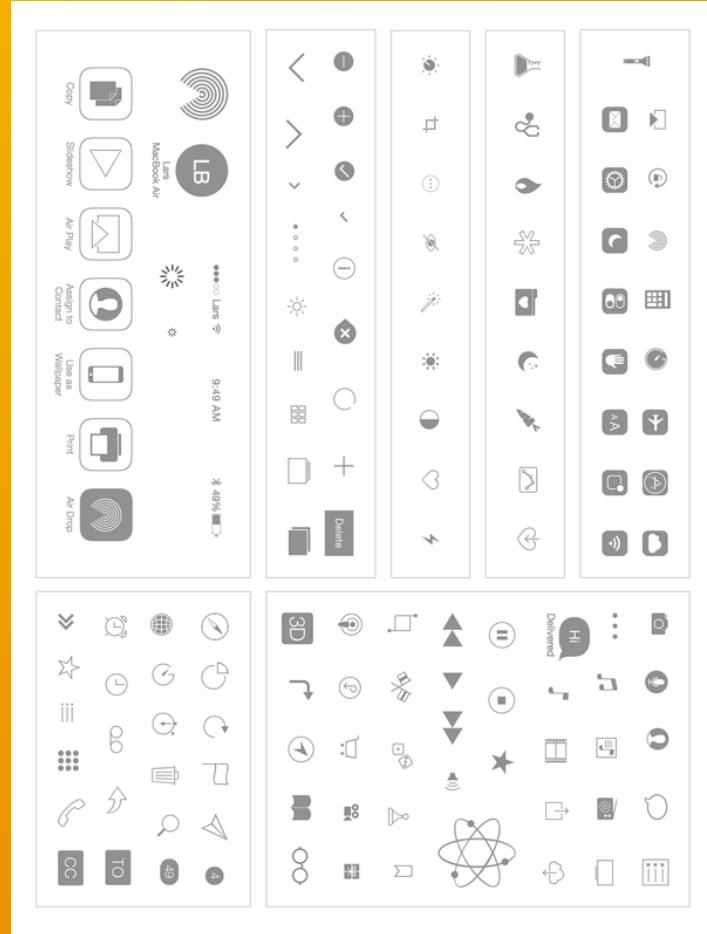
Android

# Segment Control



# Icons

ios



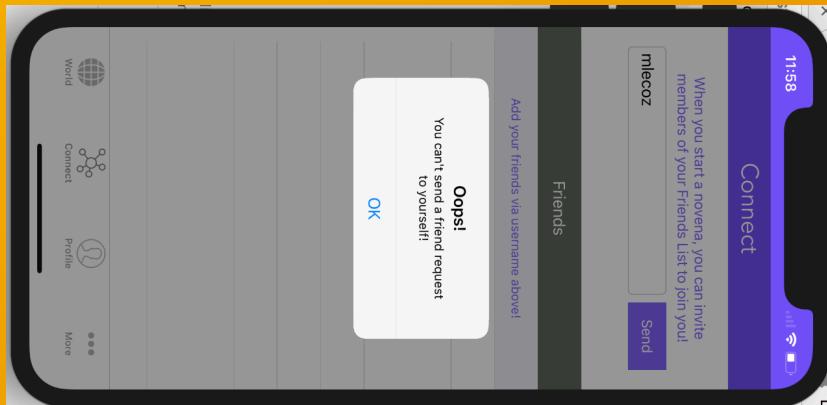
84

Android



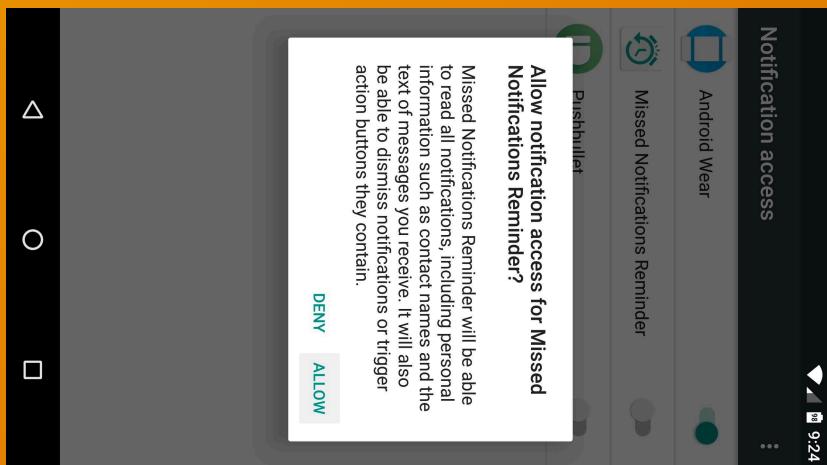
# Alerts

ios



85

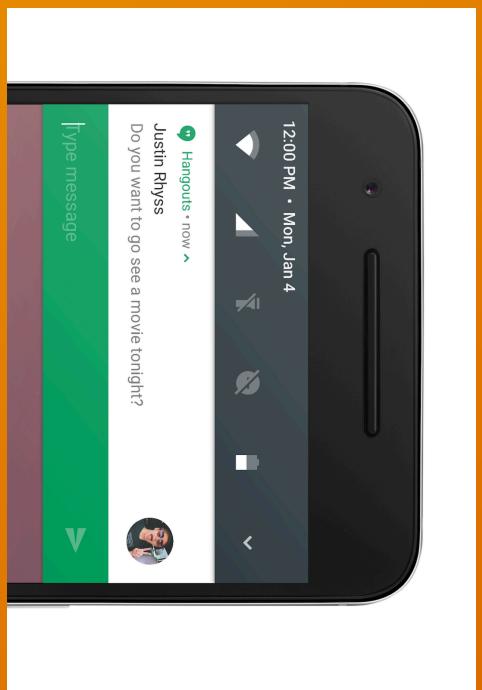
Android



# Notification



ios



Android

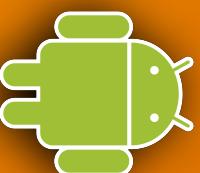
# iOS vs Android

The Difference in their Design

87



# Two Big Tycoons and Their Differences



- Fixed to Apple's iPhones and iPads only.
- Fewer devices to care while designing.
- No back button available. Works with navigation.
- OS provides clarity and has a symmetry vision.
- Limited customization.
- Open Source.
- Keep in note of many devices when designing.
- The Legendary Back button.
- Focus on motions and is more graphic intentioned.
- Customization like widgets.

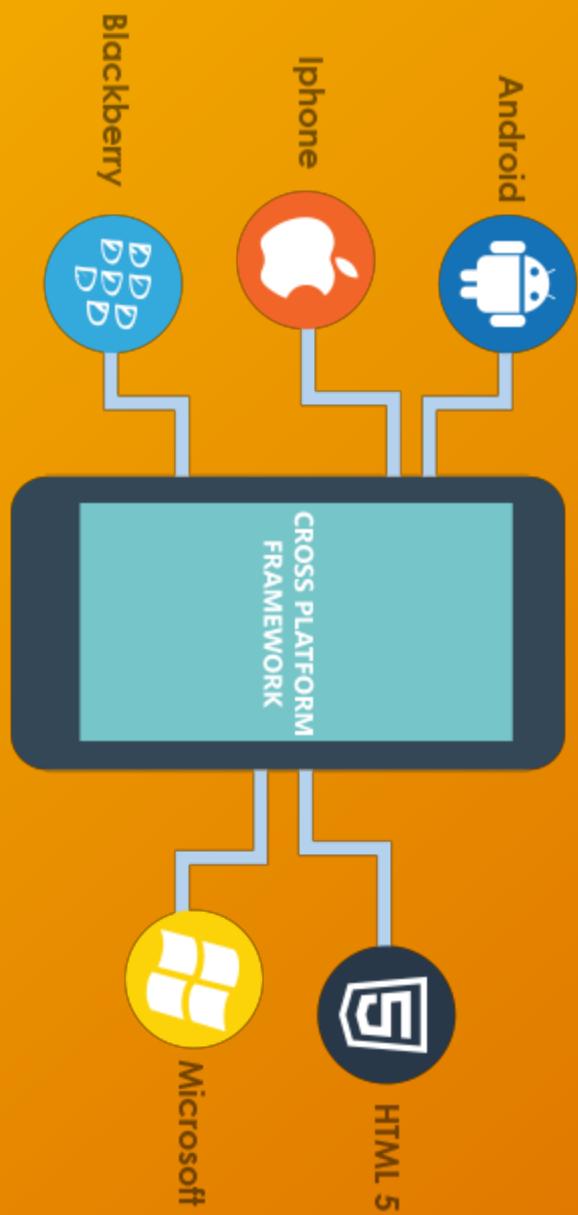
# Types of Application Development

Silo Approach

Xamarin Approach

Blackbox Approach

# What is a Cross / Multi-Platform?



# What is a Cross / Multi-Platform?

A "product" that can work across multiple platforms or operating environments.



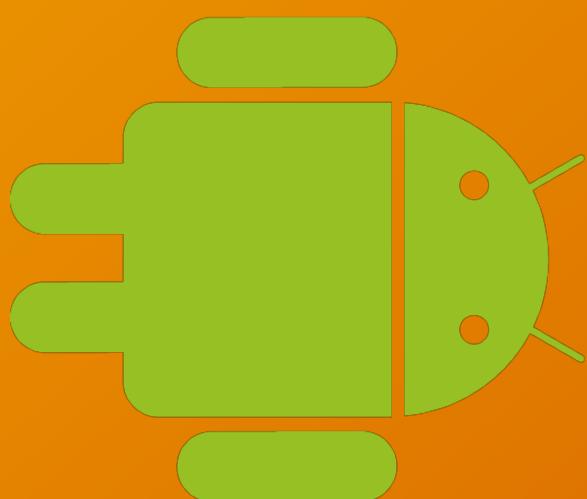
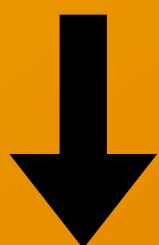
# What is a Cross / Multi-Platform?

Native



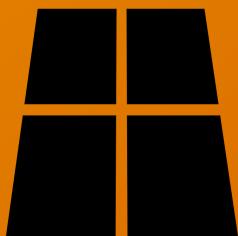
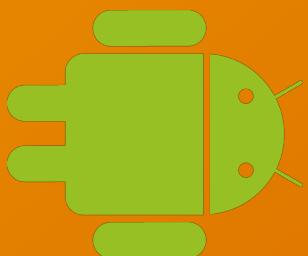
# What is a Cross / Multi-Platform?

Native



# What is a Cross / Multi-Platform?

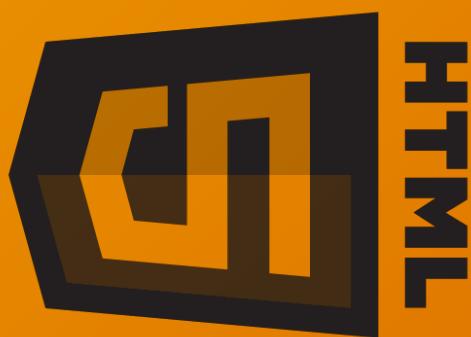
Cross Platform



# Types of Cross Platforms

Native Cross Platforms

Hybrid Cross Platforms



# Native Cross Platform Apps

Xamarin Traditional Approach

Xamarin Android

Xamarin iOS

UWP

Android UI

iOS UI

Windows UI

Shared C# Logic

# Native Cross Platform Apps

## Pros of Traditional Approach

- Xamarin provides wrapper class for all the APIs to be used by Android or iOS developers.
- C# developer can design and develop for both platforms.

## Cons of Traditional Approach

- Requires the developers to have some basic ideas of the Native platforms.
- UI has to be created separately for different platforms.

# Native Cross Platform Apps

Xamarin Cross Platform Approach

Xamarin Android

Xamarin iOS

UWP

Xamarin Forms

Shared C# Logic

# Native Cross Platform Apps

## Pros of Native Cross Platform

- Faster Development Time.
- Native Apps developed with the same UI from Xamarin Forms.

## Cons of Native Cross Platform

- Limited to platform specific tasks.

# Hybrid Cross Platform Apps

HTML, Javascript, CSS, Bootstrap etc.

Application



# Hybrid Cross Platform Apps

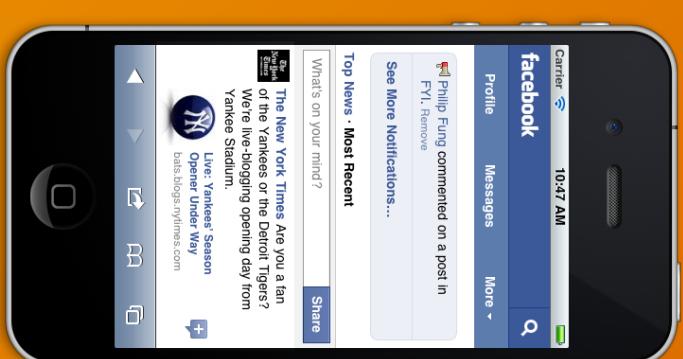
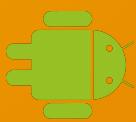
## Pros of Native Cross Platform

- Fast Development Process.
- No need to learn a new language.

## Cons of Native Cross Platform

- Performance Slow.
- Not suitable for enterprise app development.

# Examples of Cross Platforms



# Native vs Multi Platform

## User Interface

Native

- Better User Interface

Multiple

- User experience issues



# Native vs Multi Platform

## Performance

Native

- High performance

Multiple

- Low performance



# Native vs Multi Platform

## Development

Native

- Costly and time consuming

Multiple

- Affordable and time-saver



# Workshop Time !!!

## Prototyping

- Design a Photo Gallery (Eg: Instagram, Pinterest) mobile / web application based on your persona.
- Record estimated clicks and time.
- You have 30 minutes to design.
- Then you would test your prototype with us. ( 10 minutes )
- Finally present your prototype for the BIRTHDAY BOY.

Thank You!!