Principles of GUI Design and Programming

Designing for platforms

Contents

- Designing for the desktop
- Designing for the web
- Designing for mobile

Sovereign posture applications

- Large applications
- Provide a wealth of functionality
- Usually occupy the full screen
- Stay on screen for a long period
- Good examples are
  - MS word
  - MS outlook
- Most users are of intermediate skill level

Sovereign posture applications

- Since these applications are used for long periods
  - Use a minimalist visual style
  - They will use the same menus and controls and become familiar with them, so less adornment is needed
- You have the screen real estate for rich visual feedback
  - Status bar at screen bottom
  - Status indicators in title bar
  - System status indicators provided throughout interface

Sovereign posture inputs

- you can
  - Assume the user is seated using a big screen
  - Provide smaller controls and input areas
  - Put most used controls in main toolbar
 - Put less often used controls at the sides or bottom of the screen
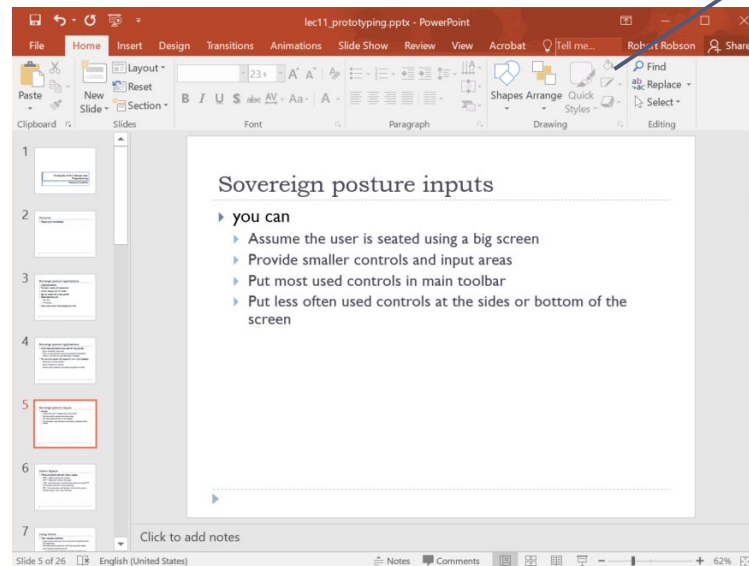
Frequent tools

Occasional tools

Transient posture

- Application appears, does its job, then disappears
- Highly focused on a single task
- Since it is not on screen for long, users do not get familiar with it
- Often invoked by another application to
  - Select a colour
  - Select a file
  - Pick a font

Everything in a single window

Larger controls

Built-in help

Remembers previous choices
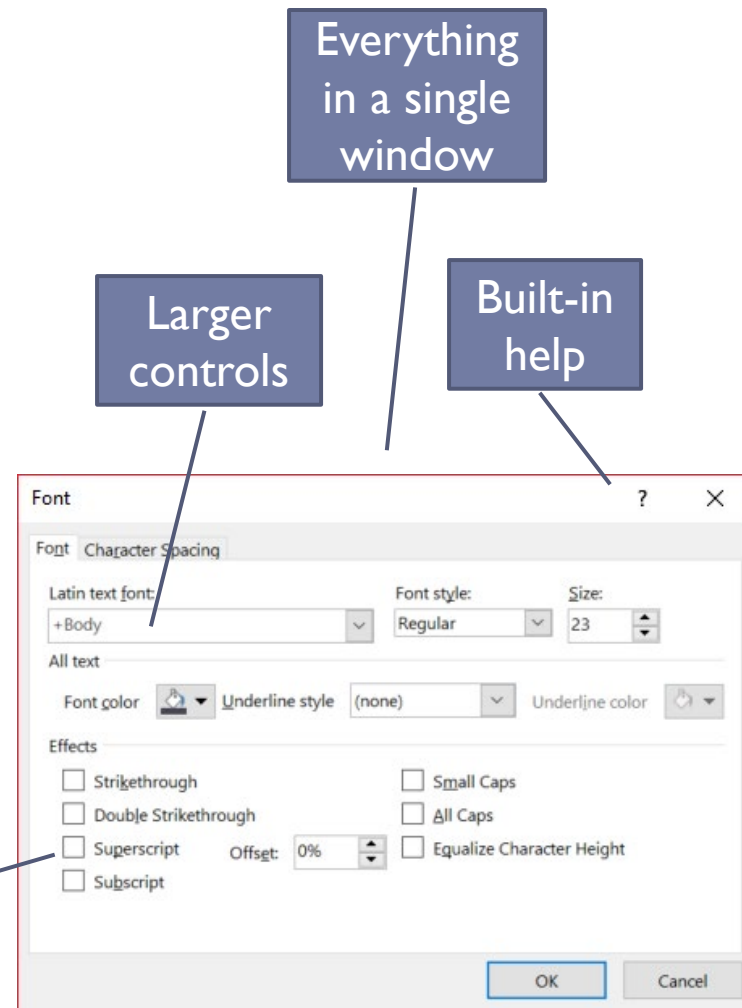
Daemonic posture

- Background applications which do not normally interact with the user
  - Print spooler
  - Internet daemon
- Usually only communicate with the user when something goes wrong
  - Error message needs to be clear since user might not know the daemon exists

Designing for the web

- The introduction of the web
  - Made many more people aware of UI design
  - Removed years of advancement in UI toolkits
  - Introduced the problem of structuring hyperlinked information

- This has been improved with the introduction of
  - AJAX,
  - JavaScript
  - HTML 5

Informational web sites

- These sites focus on providing information to the users with little or no interactivity
- These sites are concerned with
  - Look & feel
  - Information layout
  - Links to related information
- Information is displayed as a mix of sovereign and transitory
  - Sovereign
    - Important, frequently accessed
  - Transitory
    - Less frequently accessed

Transactional websites

- Offer high interactivity with the user
- Etail sites depend on ease of navigation
- Present as much information as possible to minimize navigation
- Most balance sovereign vs. transient postures
- Search engines are almost entirely transient

Web applications

‣ Highly interactive

‣ Similar functionality to a desktop application

‣ Many still use server query/response model

‣ Newer applications are asynchronous

‣ Can be built to have an interface as good as a desktop application

‣ Web applications are favoured because

  ‣ The UI does not need to be developed for multiple platforms

  ‣ It supports mobile workforce and users

  ‣ Available anywhere on the internet

  ‣ Facilitates collaboration

Web applications

- Popular misconceptions
  - We applications are easier to build
    - They are often more difficult to build than desktop apps
  - Because users are familiar with the web, they know how to use these applications
    - They are often more complex than many websites and exceed what users have encountered before
- Due to the complexity of web applications, they are often of sovereign posture

Mobile applications

- Mobile platforms include
  - Smart phones
  - Tablets
- Most of the applications are transitional in posture due to their use and the size of the device

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Desktop – menus

In menu bar

Cascades save space but reduce visibility, decreasing in use

Accelerator keys can be assigned to items

Grayed out

Can have check Items for on/off

Access keys can make selections CTRL-T G

Table   Window   🔅   Help

Draw Table

Insert   ▶   Table...
Delete   ▶
Select   ▶   Columns to the Left
Merge Cells   Columns to the Right
Split Cells...
Split Table   Rows Above
                               Rows Below

AutoFit and Distribute   ▶
Heading Rows Repeat   Cells...

Convert   ▶
Sort...
Formula...
Gridlines

Table Properties...
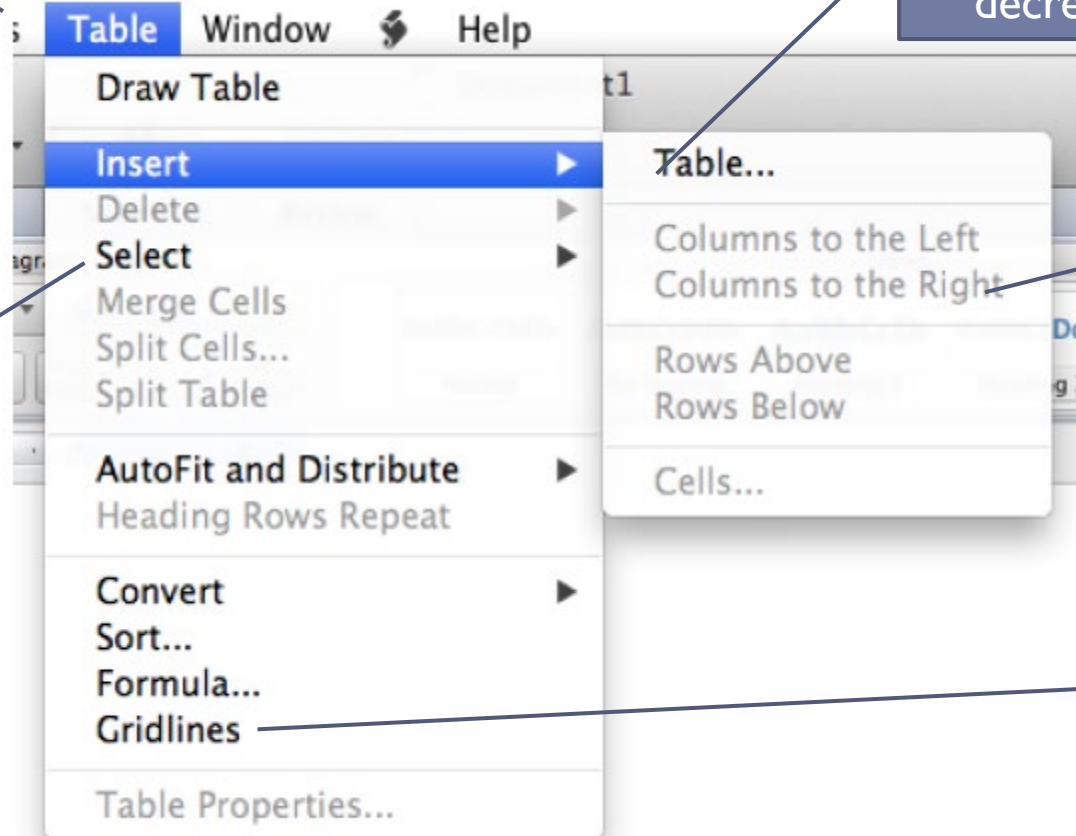
Desktop – toolbars

Fast access to commands for experienced users

Each toolbar is modeless

Can often be repositioned and docked

Can be customized

Can pop-up based on context

Often have tooltips for help

Icon buttons

Desktop – tool palettes

Palette of tools to be selected and used

Usually affect the current selection

Desktop – mouse usage

Less suited for large movements or switching back and forth to keyboard

Buttons can be combined with mod keys

Primary selection

Uses the same fine motor skils as dawing

Scroll wheel reduces movement to scrollbar

Multiple buttons can be clicked individually or in chords

Often for context menus
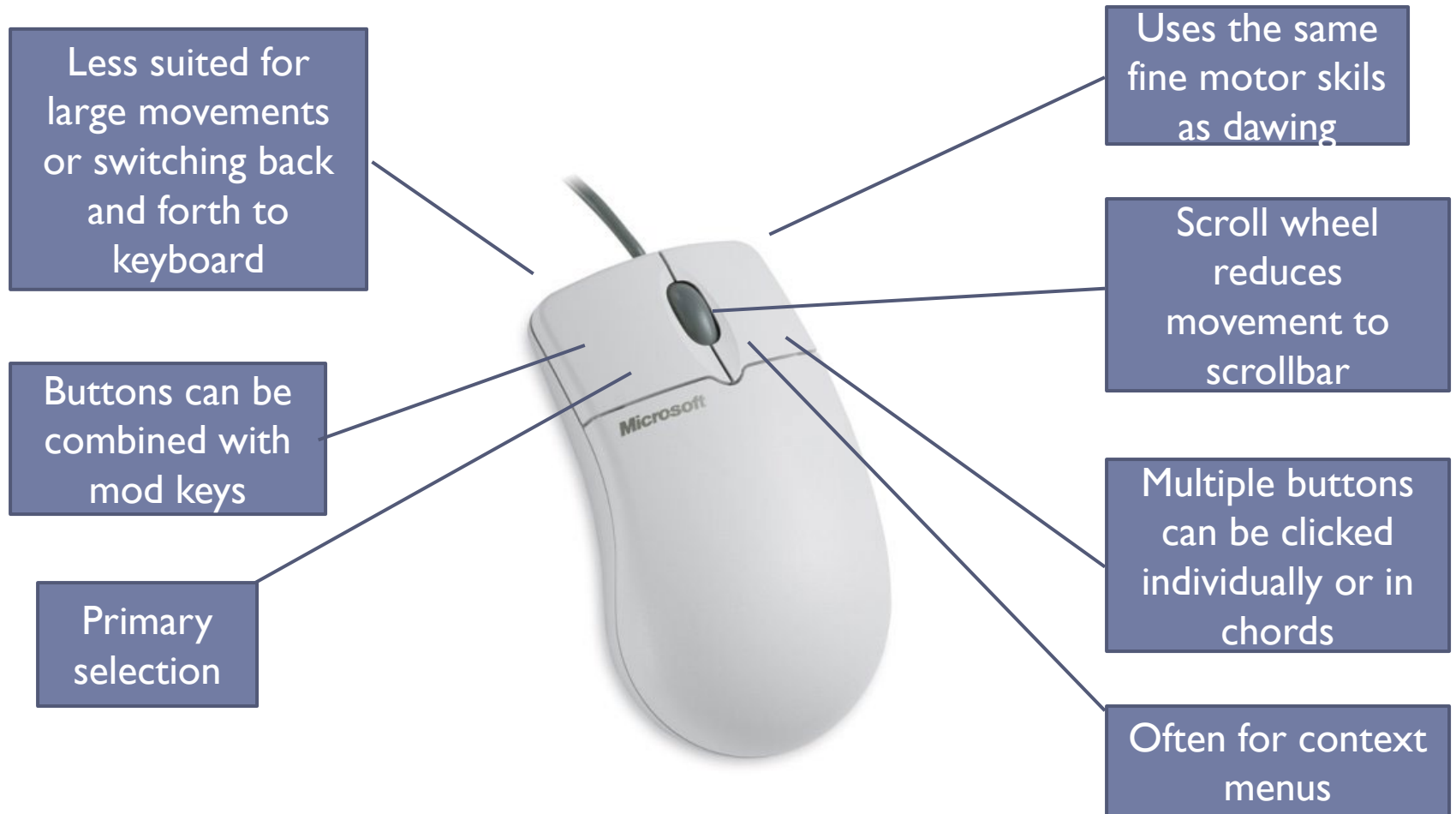
Desktop – commands

print	a.txt, b.txt
verb	Object(s)

This is the order used in English and we know when the List of objects is ended. The end is less obvious in a graphical environment

a.txt, b.txt	print
Object(s)	verb

This order is often easier in a graphical environment since the use of the verb indicates the end of the list of objects.

Desktop – object selection

Selected files highlighted

Select with rectangle

Screen Shot 2014...2 AM

franklin.jpg

franklin3.jpg

untitled folder

Documents

franklin2.jpg

Franklin 4.png

File-14-02-2 014-...6.pdf
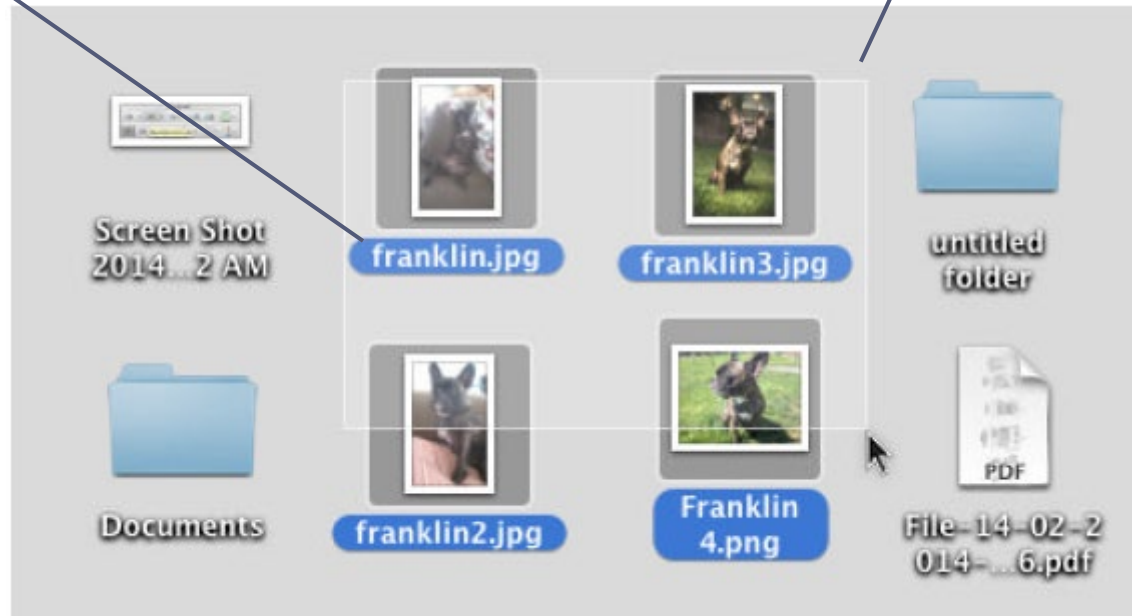
SHIFT-CLICK to select a range
CTRL-CLICK to add/subtract to/from selection

Desktop – drag and drop

This is underutilized in desktop applications.

Only recently has the web supported this interaction causing people to be unfamiliar with it.

In MS Word, text can be dragged within the document. Dragging off top or bottom of edit area causes auto scrolling.

Item(s) selected and dragged to target

Cursor shows drop targets
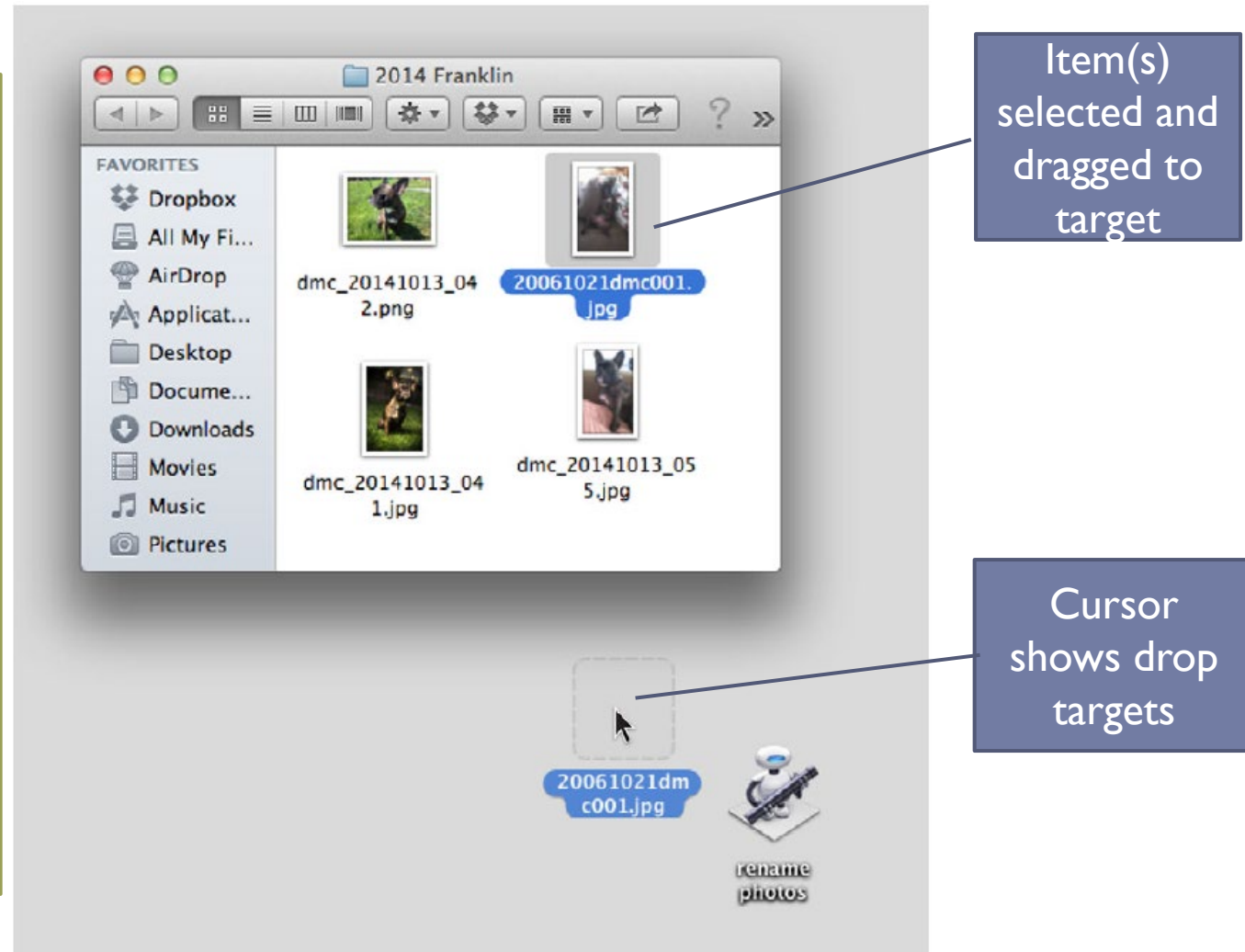
Desktop – modal tools

User selects a tool and the interface changes to a mode for that tool

The mode can change after one use of the tool or continue until a new tool is selected

This works well for a small number of tools but does not scale well to a larger number of tools.

Mobile – stacks

The stack is a natural form factor for many mobile devices.
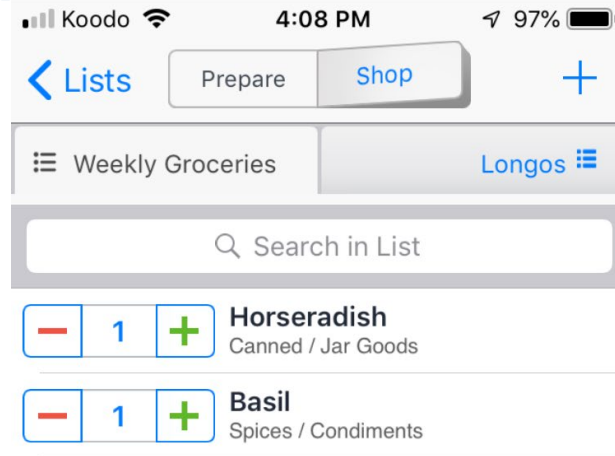
navigation

Content
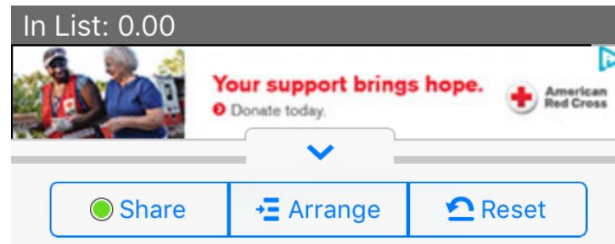
ads

controls

Mobile – carousels

Carousels are useful in mobile applications where you need to scroll through several screens.
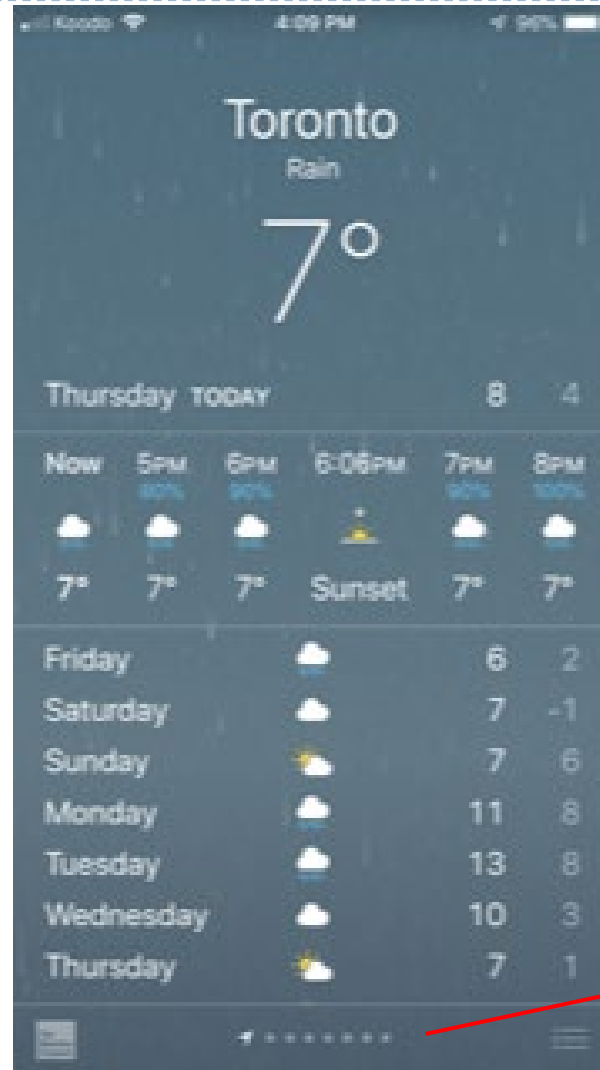
Carousel control to move to other screens

Mobile – orientation

- Applications can reformat display depending on orientation
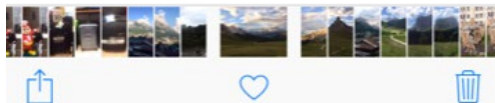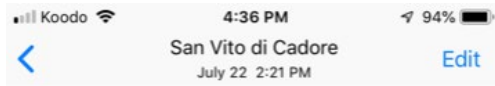
Tablets – stacks and index panes

Link to stack of mailboxes
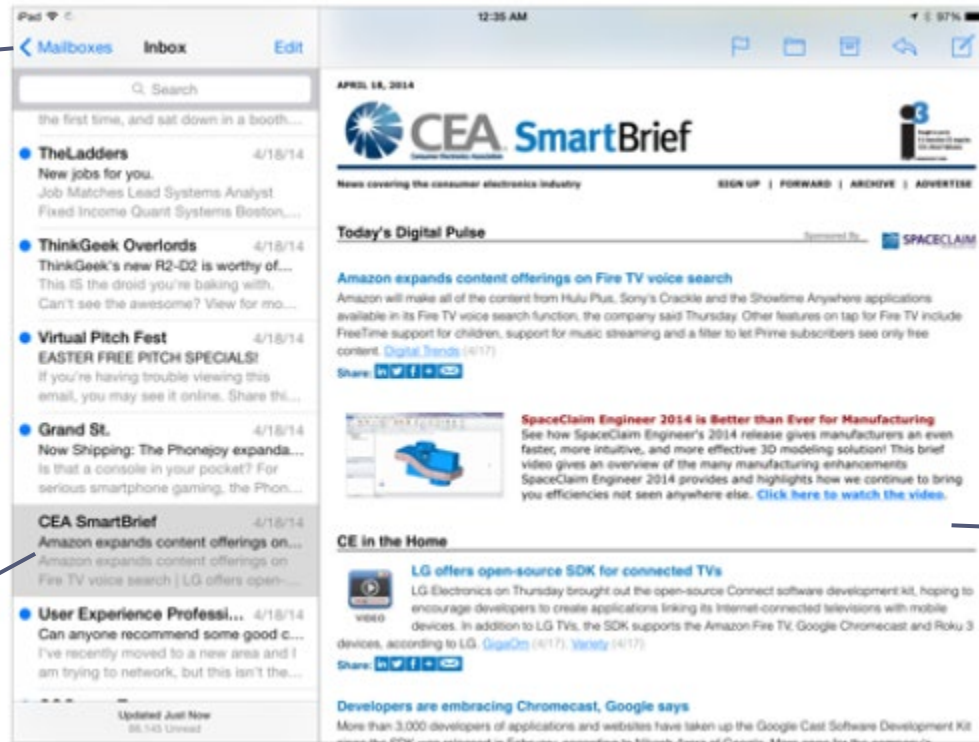
Content pane showing selection detail

Index pane

Mobile – touch screens

‣ Make sure
  ‣ Controls are scaled correctly to be clicked by a finger
  ‣ Be forgiving of accidental drag and drop
  ‣ Pop-up panels should be clearly labeled
  ‣ Keep the workflow as linear as possible

Mobile – browsing lists
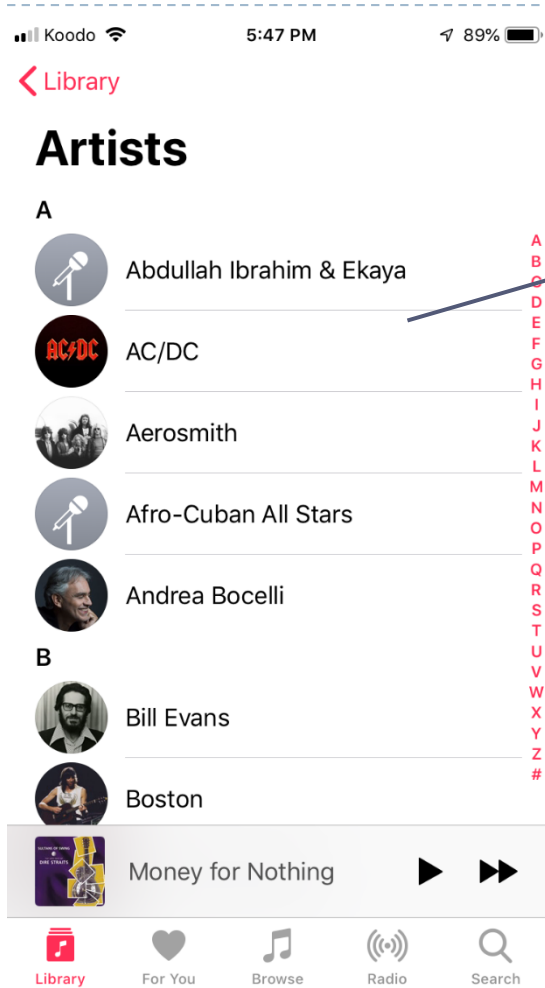
Finite or infinitely scrolling

Usually represents media objects or applications

Tapping often drills down to detail
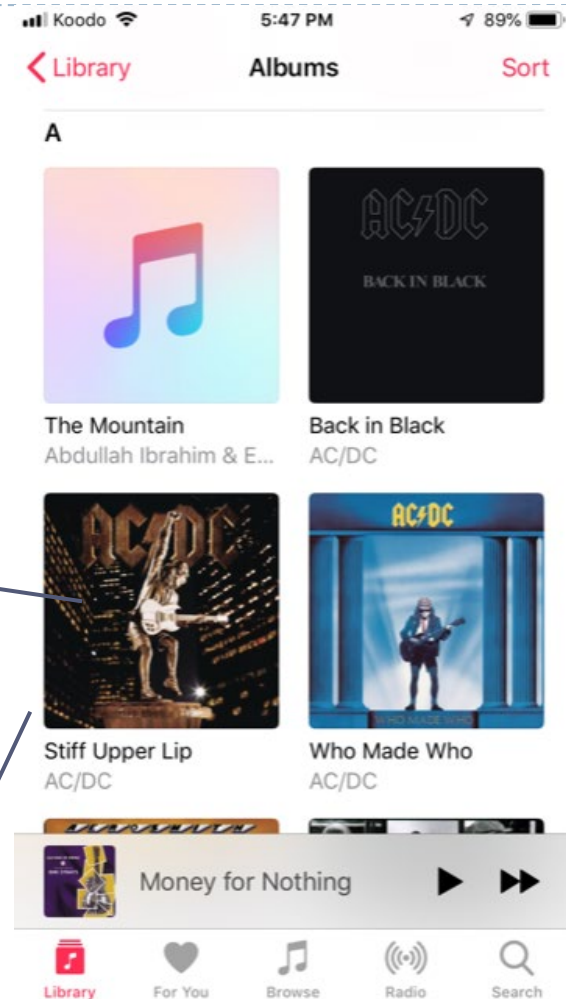
list

grid

Mobile – carousels
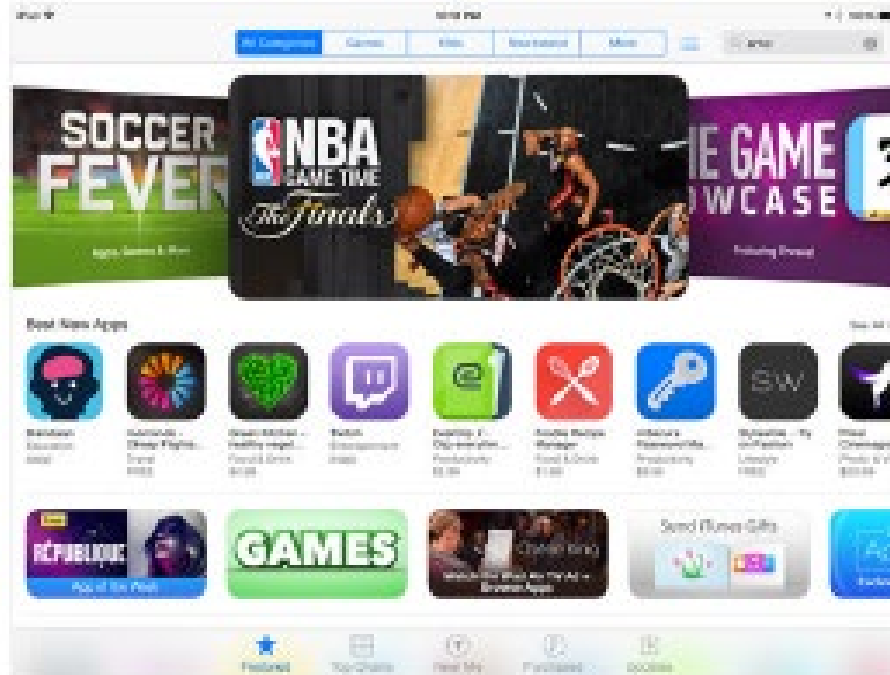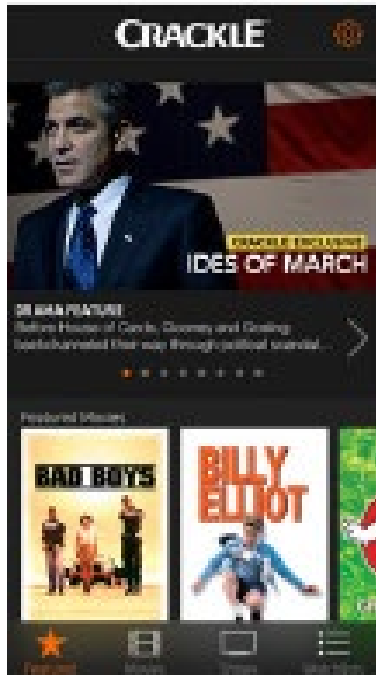
Displays a limited number of selections in a circular rotating list so that when the end is reached, it starts at the beginning again.

Mobile – swimlanes

Swimlanes combine a carousel with a grid

This is a vertical stack of carousels

Mobile – cards

A card combines text and visuals in a chunk
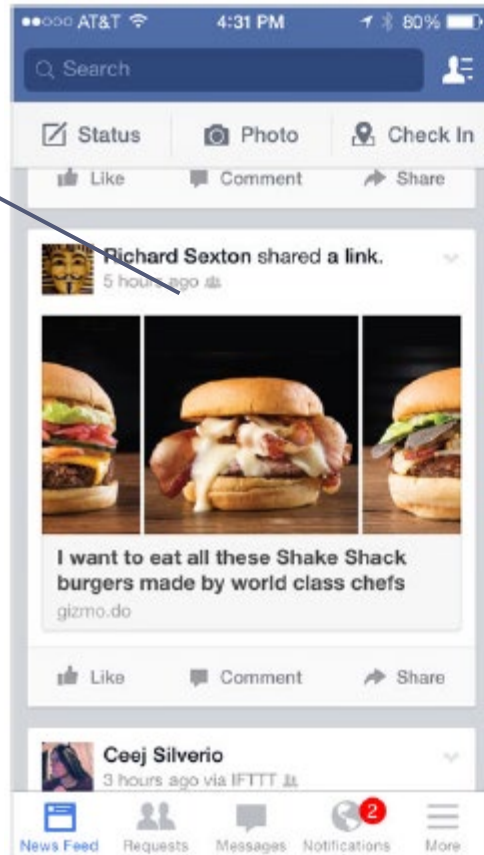
Each card is a self-contained interactive object
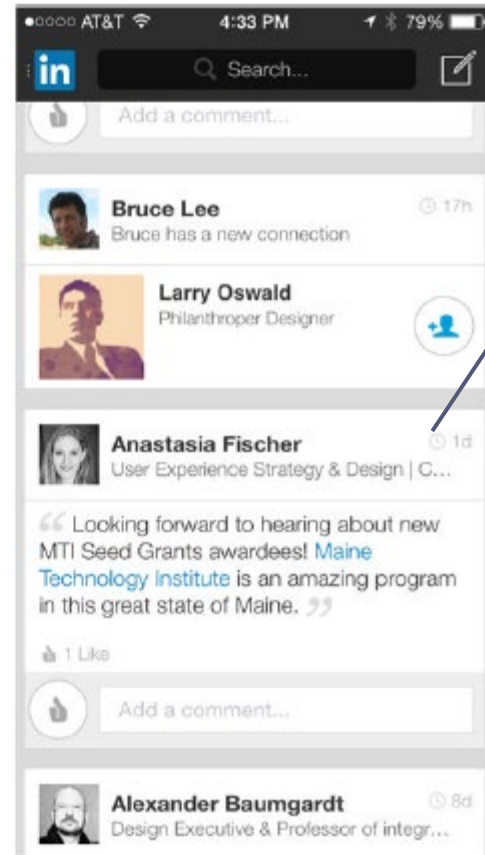
Mobile – tab bars

Let you change the content of the main view
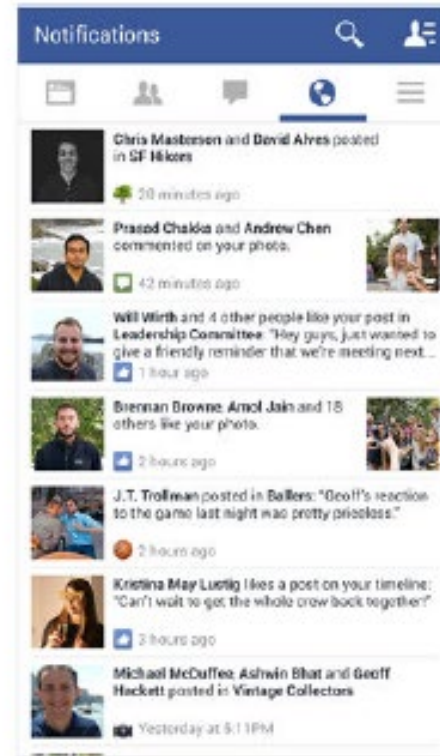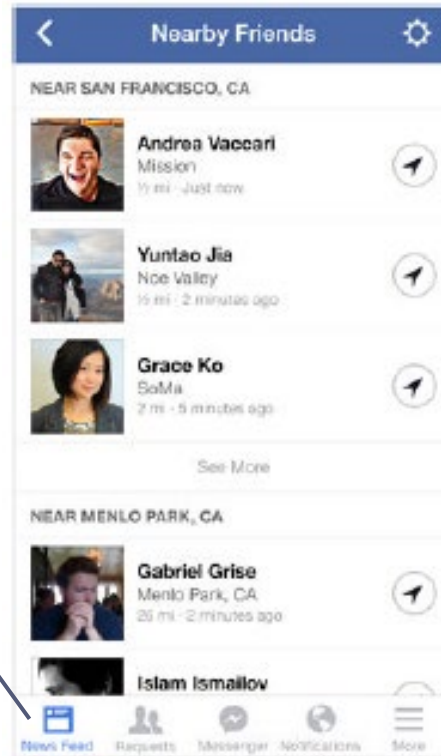
Mobile – more controls
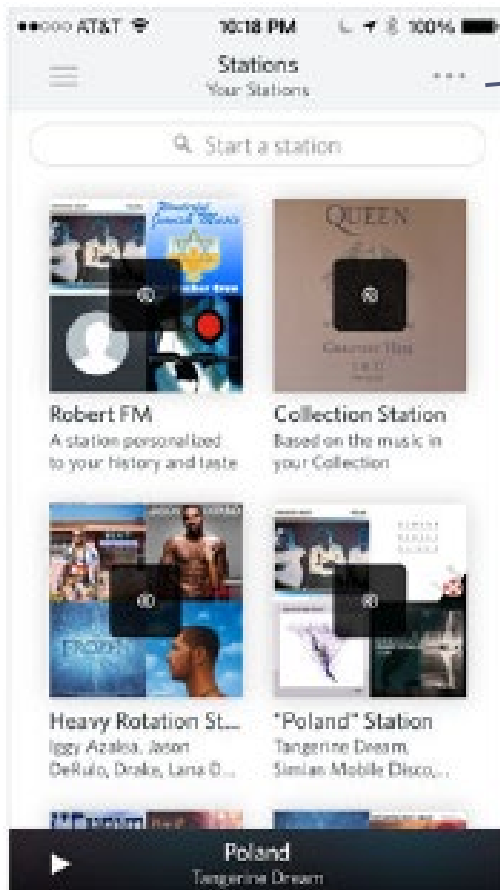
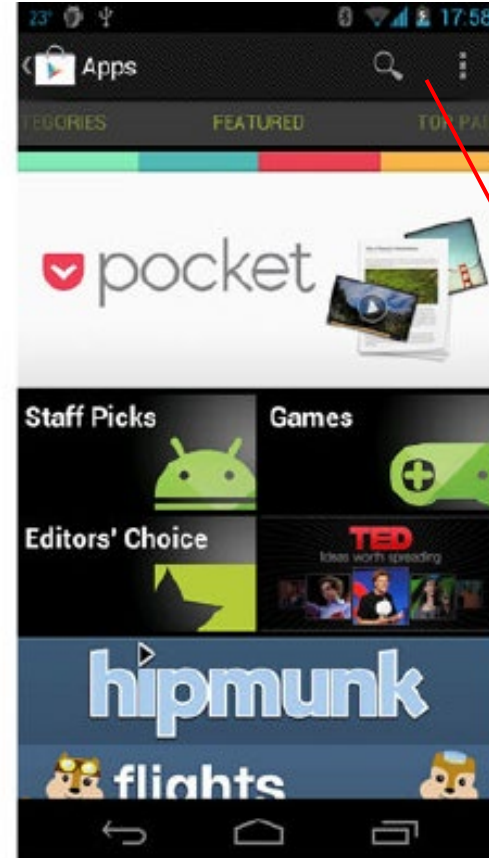Insufficient space for controls so the more symbol is used

Expands to show
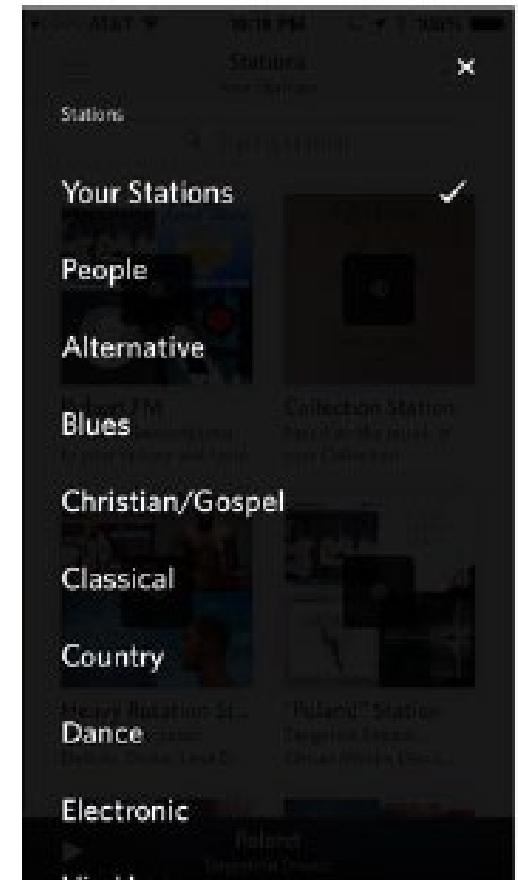
Mobile – nav bars

Bar showing where you are and how to return
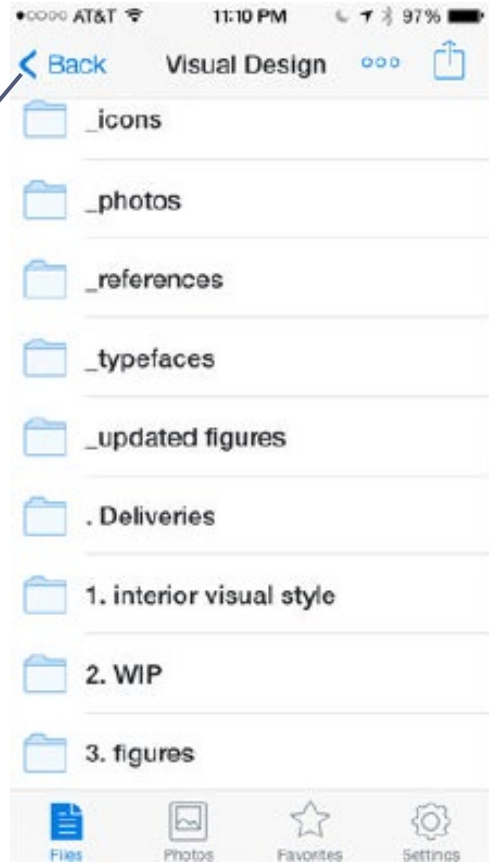
Might contain other buttons

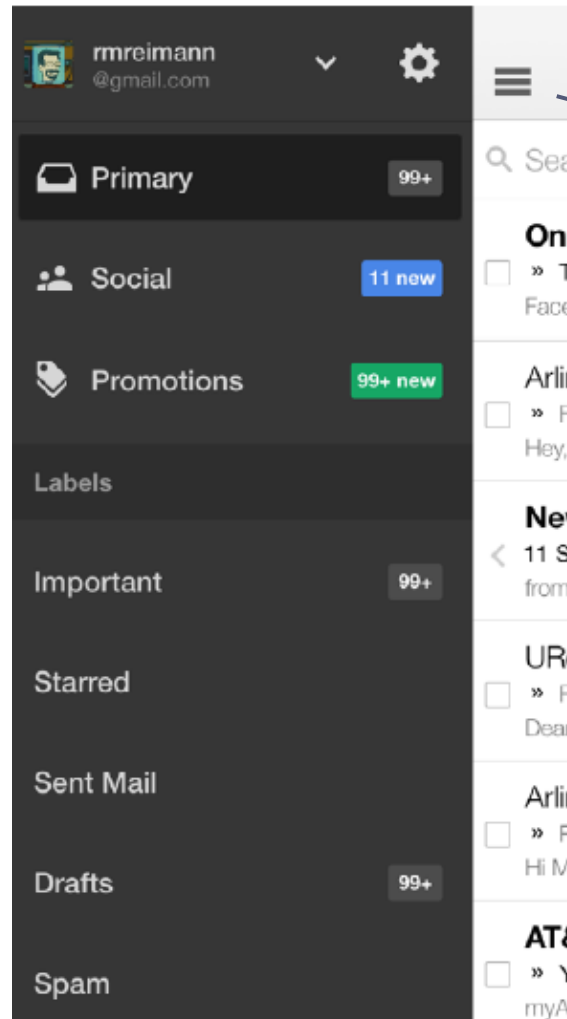# Mobile – tool bars/palettes

Nav bar

Tool bar

Mobile – menu bars

- This is a desktop idiom best avoided on mobile
  - It is unexpected
  - Hides too many controls buried in the menus

- A tool carousel is a better choice since it makes what is available visually apparent

Mobile – drawers

Drawers often contain customization and slide out of view when not needed
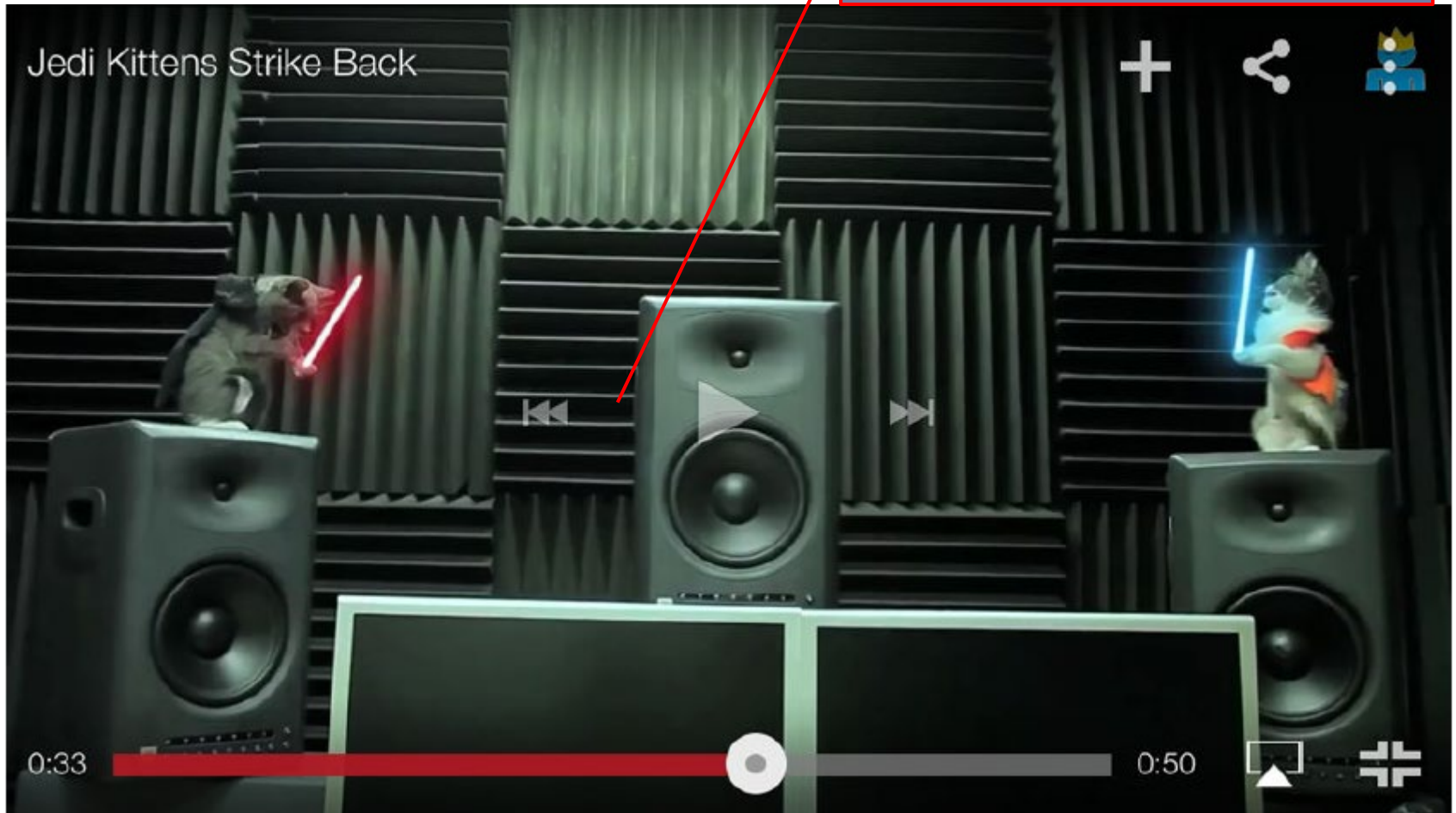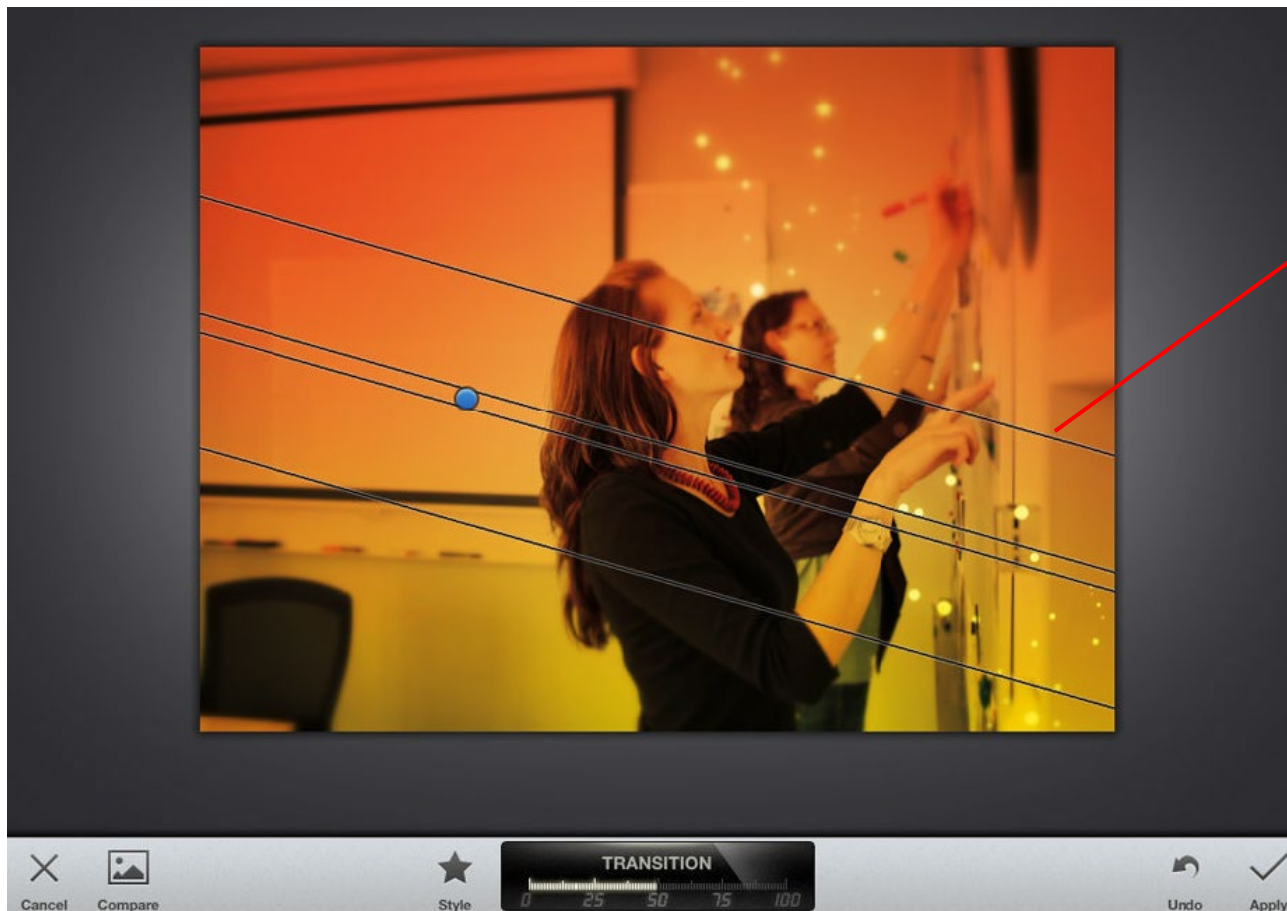
Hamburger menu causes drawer to slide out

Mobile – tap to reveal controls

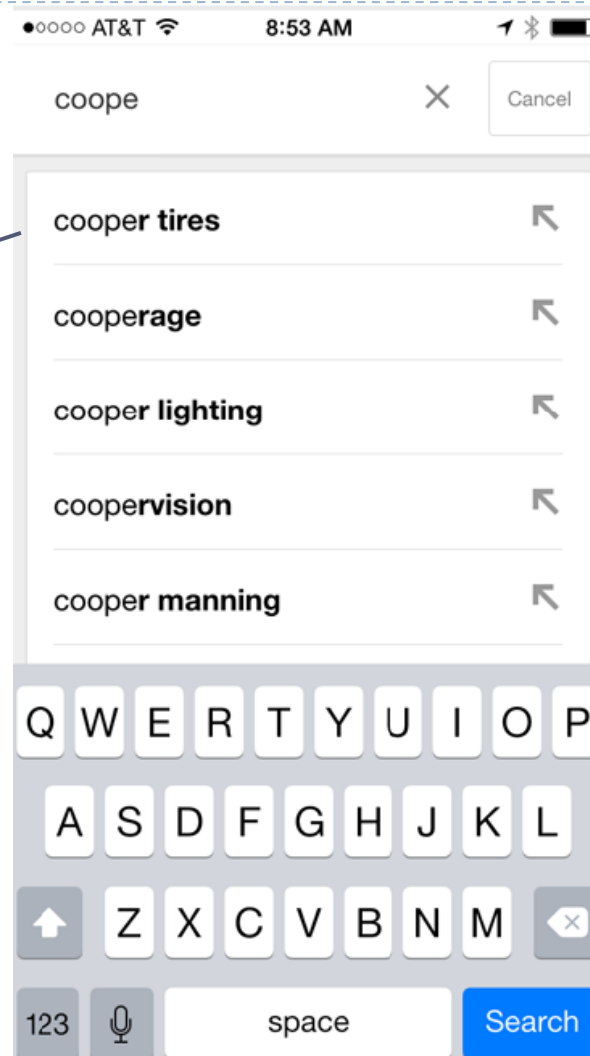Controls are revealed when you tap the application

Mobile – direct manipulation controls

Transition controls are shown on the object and can be manipulated directly

Mobile – searching

Tap ahead speeds searchesby giving you a list of matching terms

Tap ahead is a special form of the more general auto complete facility available on many interfaces.

Voice search can also be used on mobile devices.

Mobile – filtering

Results can be filtered to zero in on the area of interest

While many apps implement filtering, few let you filter the results of filtering so that you can drill down to the results you want in an exploratory fashion.

Mobile – help

- Help can be provided via
  - Guided tours
    - Lead the user through the most commonly used operations
  - Overlays
    - A transparent overlay with help information pointing out the important sections
  - Tooltips
    - Popup textual or graphical help when the user hovers over a control

Mobile – gestures

Point, click, drag, multi-finger drag, pinch, expand, rotate

Mobile – integration

There is nothing like IFTTT to respond to events in one app and have it do something in another app. There is no way to easily send data from one app to another without programming.

Limited ability to send content to other apps