Building User-Centered Mobile Applications

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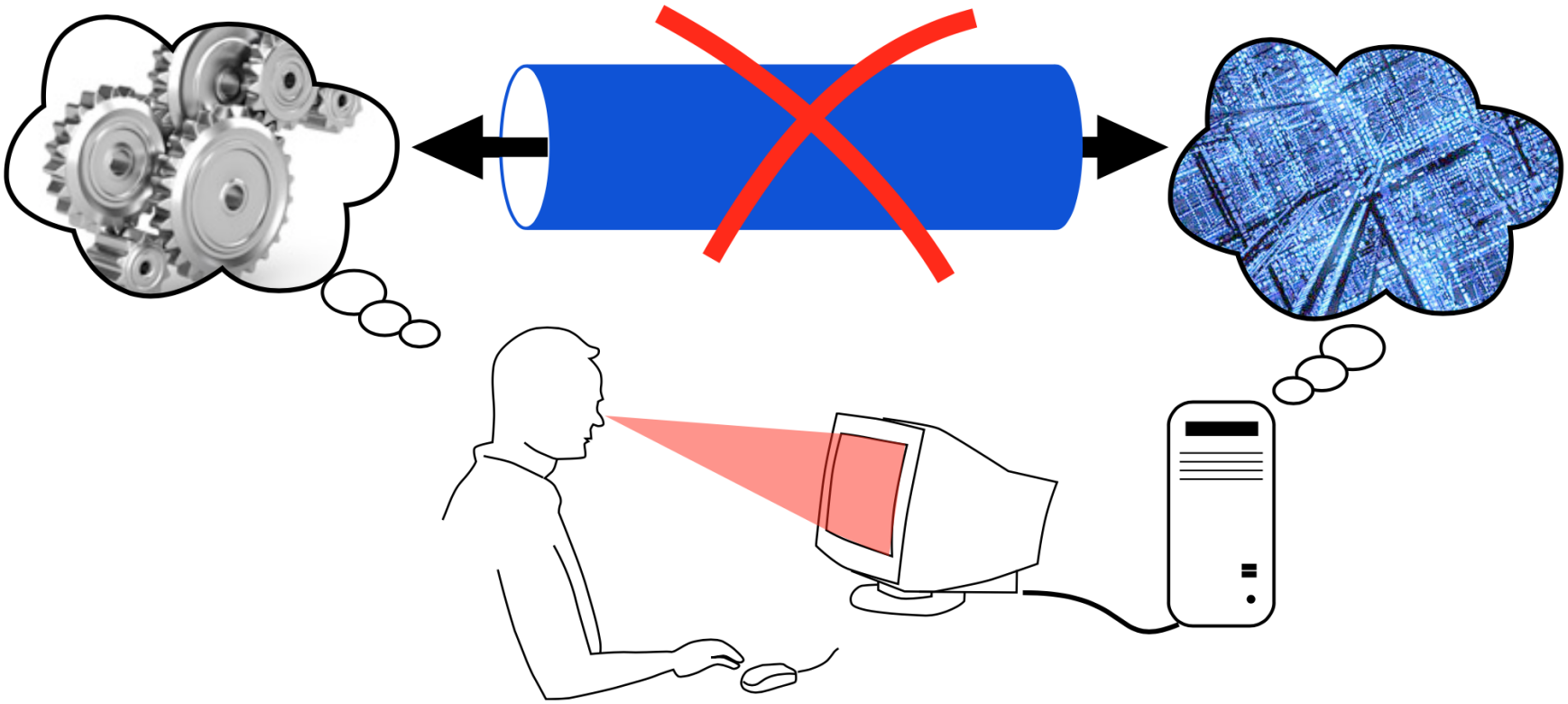
Organization

- Feel free to ask questions anytime.
- Breaks?
- Have something to add? Feel free to discuss.
- The lecture will be interactive, 14 discussion topics are prepared.

Outline

The Problem



It is incompatible interface problem: Computers do not “think” like humans.

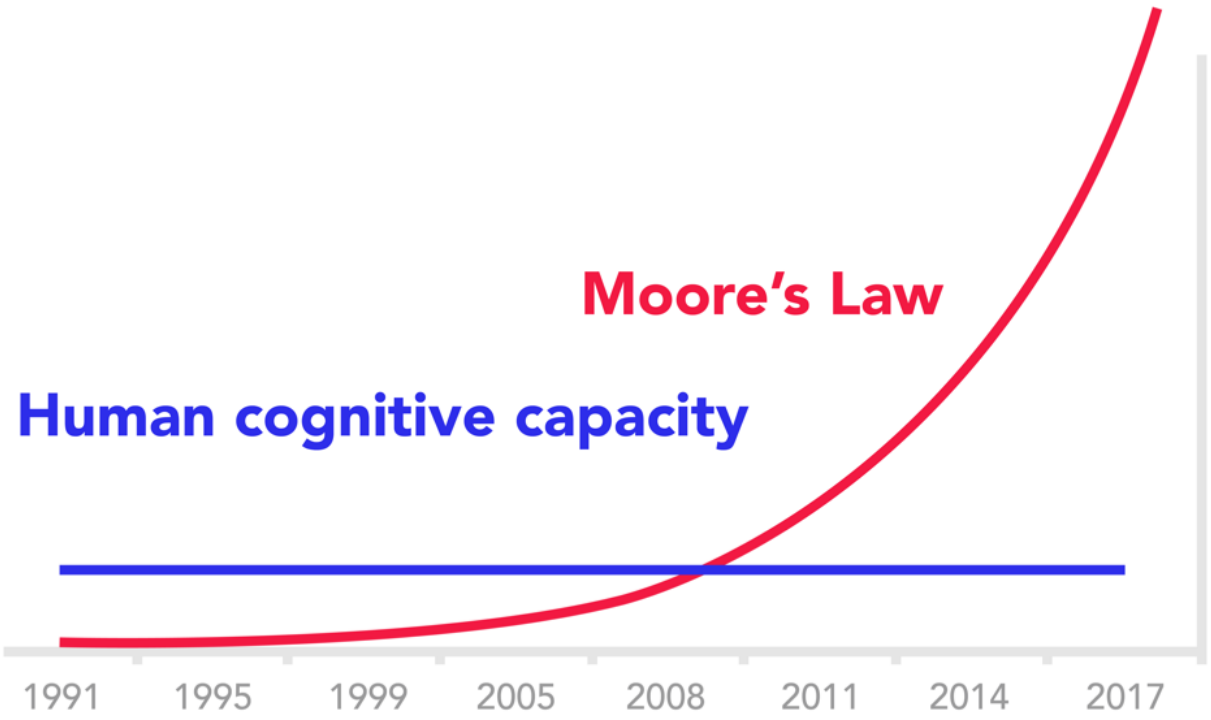
Definitions

- Human-Computer Interaction (HCI)
  - Science field at intersection of computer science, cognitive science, psychology and more.
  - Focused on interfaces between people and computers.
- User experience (UX)
  - Person's emotions and attitudes about using a particular product, system or service.
  - Practical application of HCI.
- Usability = Ease of use and learnability of a human-made object, tool or device.

Discussion 1

Why is focus on UX in IT increasing? What is the key reason?

Increasing Importance of UX



Increasing Importance of UX

- Processor time has become cheaper than human time.
  $\rightarrow$ Optimising for people not computers
- Cheaper computers mean much broader audience.
- Today, it is easier to adapt computes to people than vice versa.

Discussion 2

What technologies might be used in the future to take mobile UX to the next level? How?

State of the Art and Future HCI Technologies

- Voice recognition, intelligent assistants
- Artificial Intelligence, Machine Learning
- Augmented reality? 3D displays? Virtual reality?

Developers And User Experience?

- Traditional responsibility of designer or dedicated UX designer.
- Developer often does not know user's needs because they are not communicated.
- *Developer knows UI capabilities and constraints of the platform.*

- Some designers are used to think about static screens. Developer must consider interactions, transitions, animations etc.
- *Increasing UX requirements on mobile developers.*

Discussion 3

What are key qualities of good/usable user interface?

The Goal

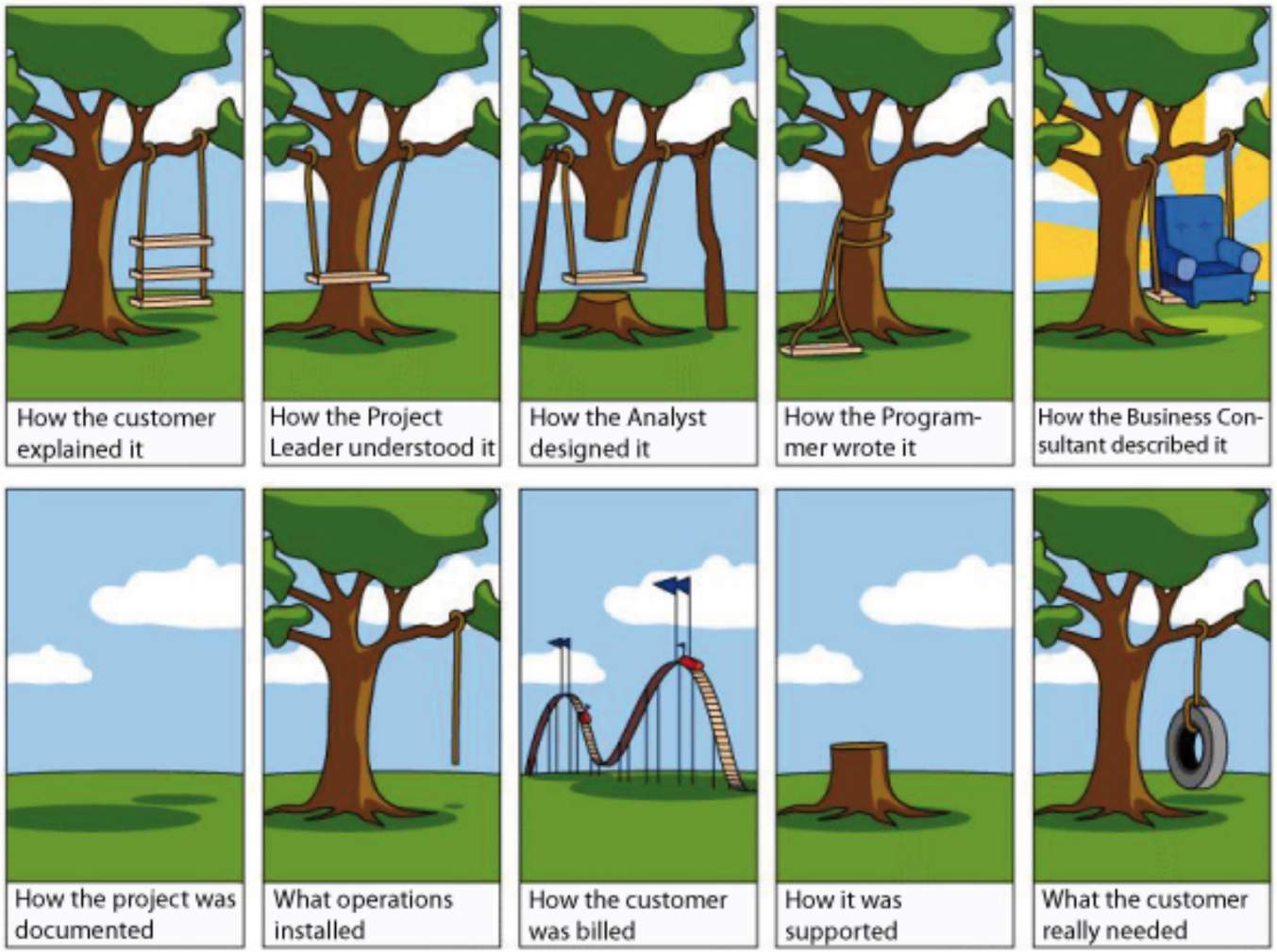
Interactive systems that are well suited to users' needs.

- Not boss's needs
- Not developer's needs - *"I can easily add animation here"*
- Not user's wishes - *"... it would be great to have e-mail client in my browser"*

Users' Needs: Defined & Measurable

1. Allow users to do what they need to do. Aim accurately.
2. Learning curve.
3. Users efficiency: Time to do particular task.
4. Number of errors made. How critical consequences?

Making It Simple Is Difficult



UX Design Method in Short

Key Steps

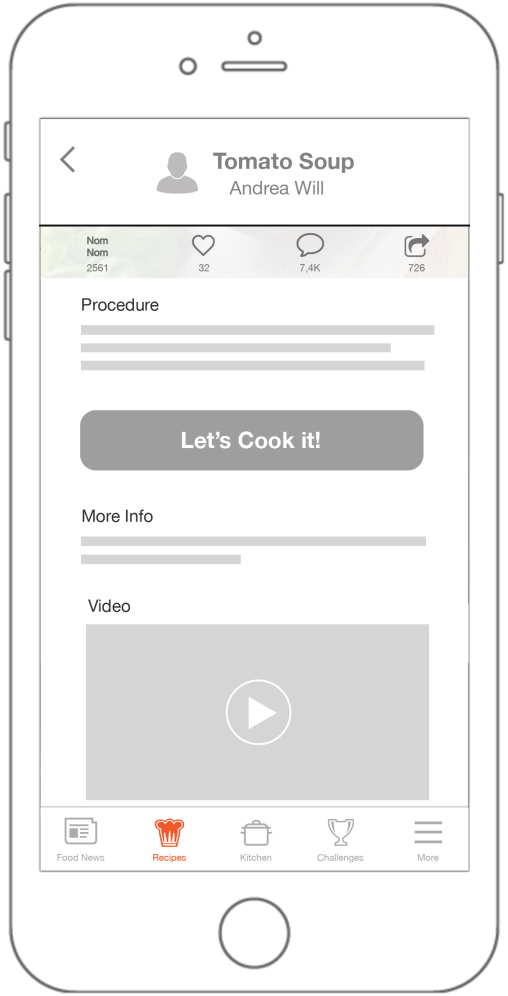
1. Observe, study users needs, existing/legacy systems, understand, specify
2. Analyse, brainstorm, create
3. Prototype
4. Evaluate, test - *with users*
5. Iterate, repeat 1-5

- Key principle: Stay user centred.
- Guessing can lead to bad results. Focus on steps 1. and 4. whenever possible!
- Many techniques for each step.

UX Design Method in Short

- Know your audience → personas
- Priority tasks *for your users* (quantify frequency) → use cases (task centred design)
- Find out context of your users (knowledge, environment, situation, ...)

Prototyping Evaluating



Thanks to Let's Cook for permission to use the sample.

Discussion 4

Why scrolling feels intuitive on mobile devices?

Principles to Keep in Mind in Creative Phases

- Associations, familiar experiences, metaphors
  - From real world
  - From digital/virtual world
- Internal integrity of the system
- Consistency with platform
- Providing feedback for actions
- Similarity to existing system known to users
  - Legacy systems, real world processes, pen & paper

How to think about UX

- Critically, analytically, creatively
- *You are not your user*
  - The users do not know what you do
- UX is everywhere not only on screen
  - You can observe, be critical and learn almost everywhere
- Question common, typical solution
- Experiment, evaluate assumptions

Discussion 5

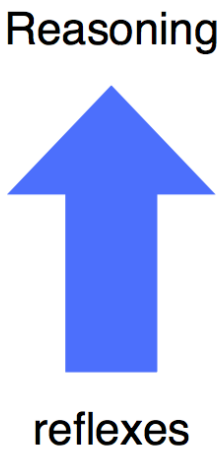
Is there something wrong about folder based (hierarchical) file systems from UX perspective?

Discussion 6

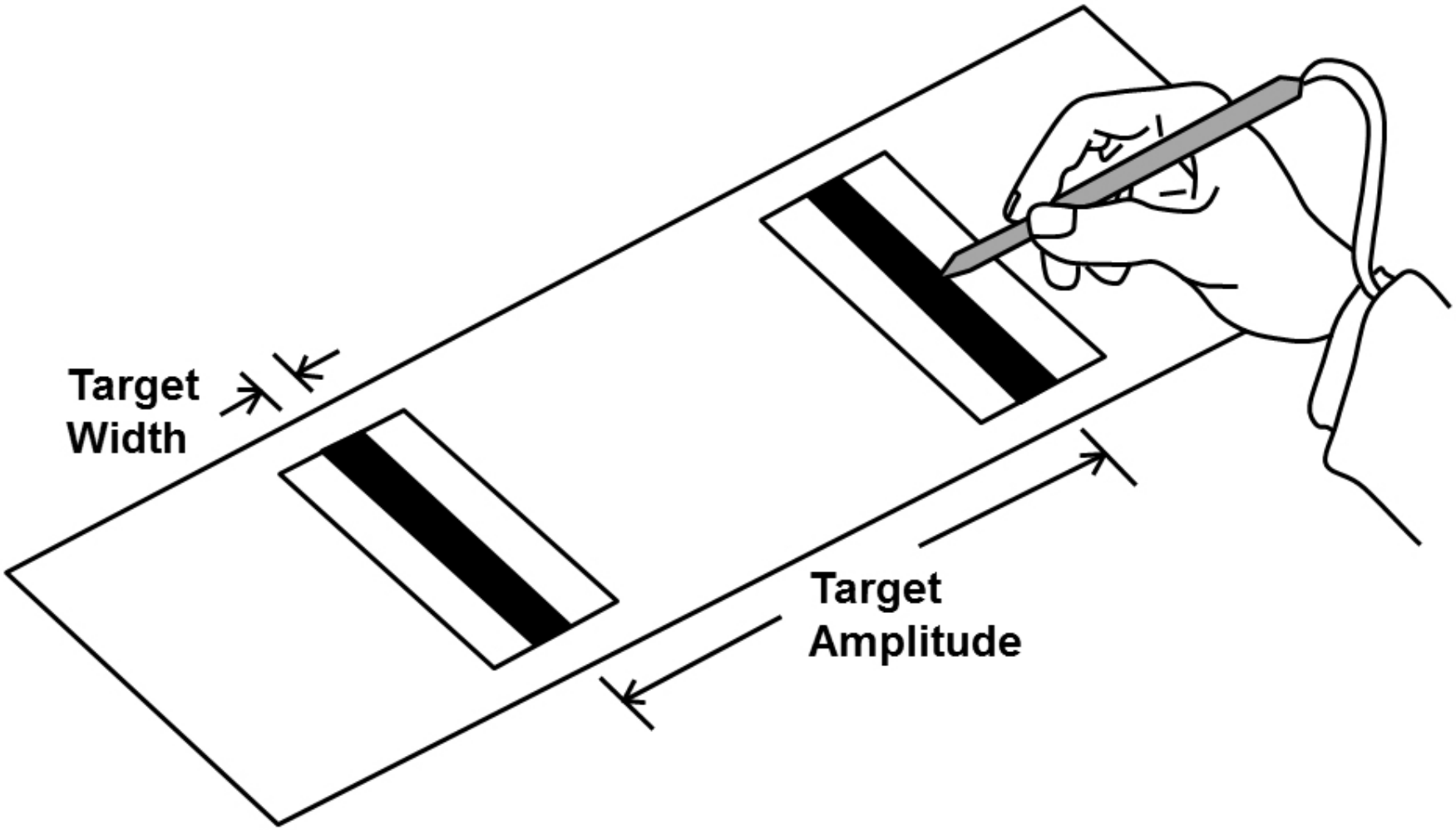
What is human "clock rate" (perception speed) ?

How Humans Perceive, Learn and React

- Fastman can perceive event with duration 50 ms, reacts in 30 ms
- Short-term memory capacity is 7 ± 2 "chunks"
- Cognitive models: Theory of Action, Rasmussen's model, The Model Human Processor, Fitts' Law, ...

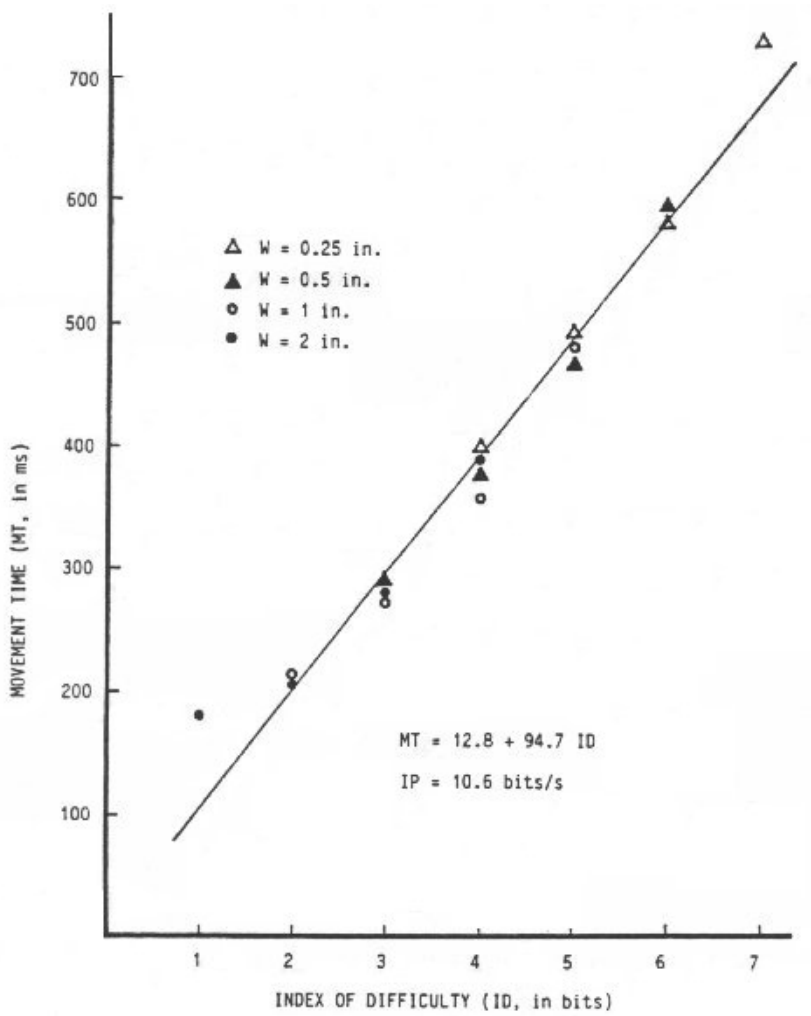


Fitt's Law Experiment



MacKenzie, I. S. (1992). Fitts' law as a research and design tool in human-computer interaction. *Human-Computer Interaction, 7, 91-139.*

Fitt's Law



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Related Course at FI MU

Interested? There much more to learn and try.

PV182 Human Computer Interaction

Discussion 7

Where are key differences in desktop and mobile UX?

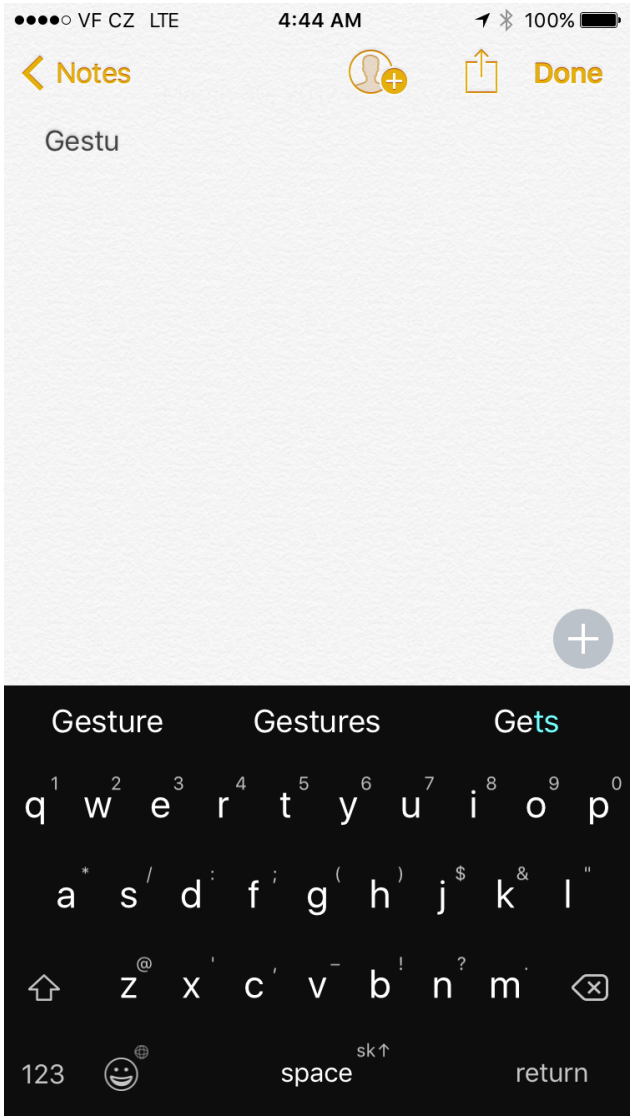
Mobile vs. Desktop UX

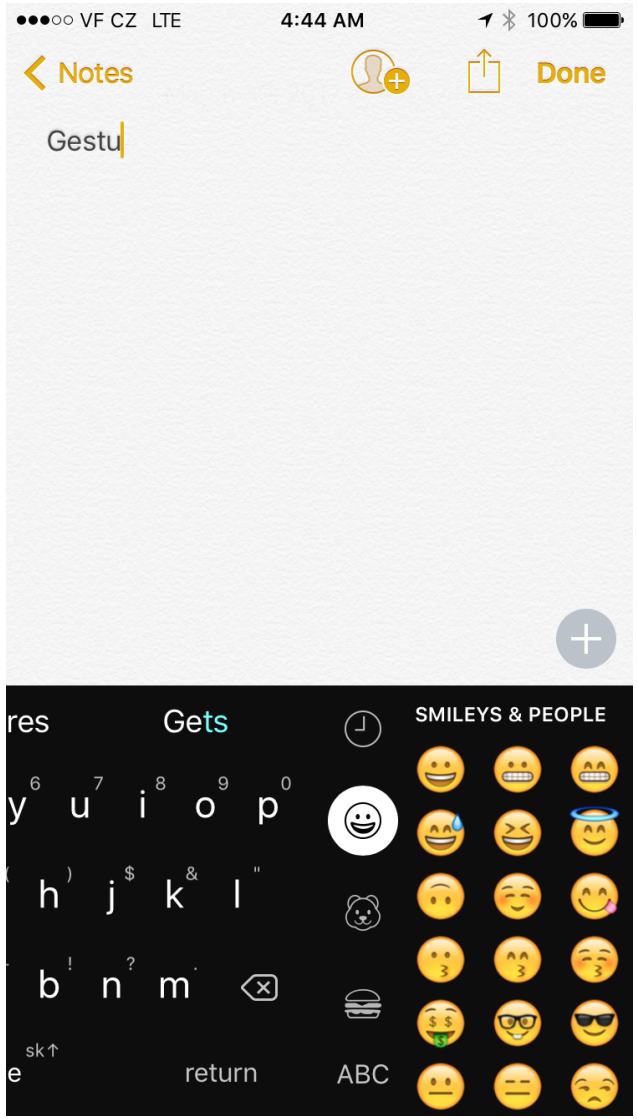
- Touch screen
  - Control/input elements change dynamically
  - Gestures are easiest with touch screen
- Small screen $\rightarrow$ Challenging
- Usage patterns: It's mobile
  - fast tasks
  - on the go, different environments, conditions
  - new types of tasks
- Specific device capabilities

Discussion 8

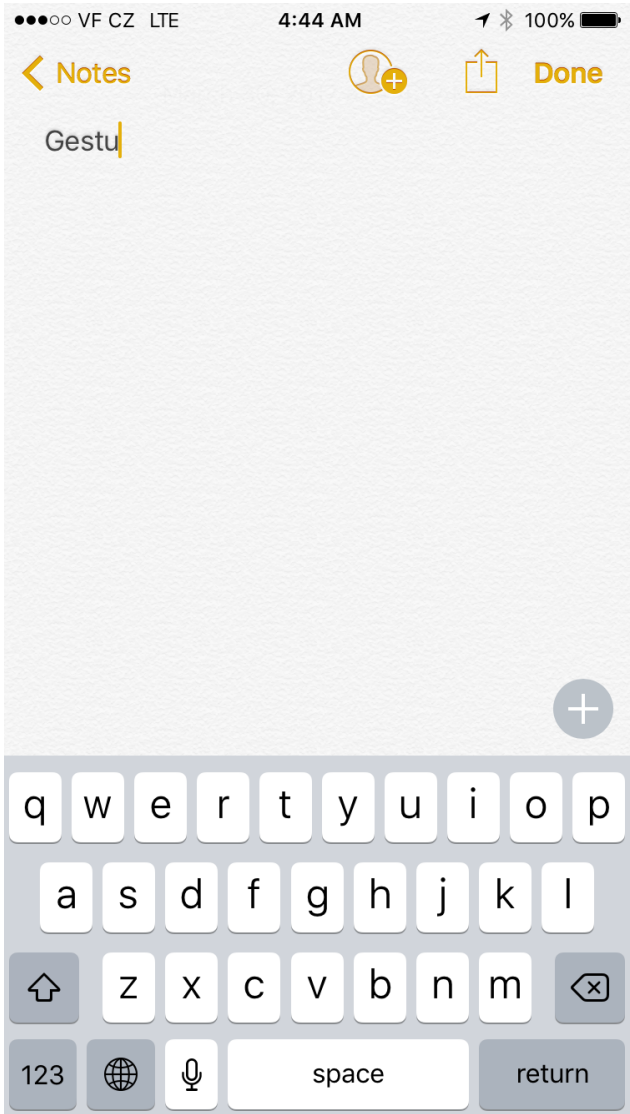
What are pros and cons of scrolling mobile keyboard to switch character sets? Please compare with to traditional swich button.

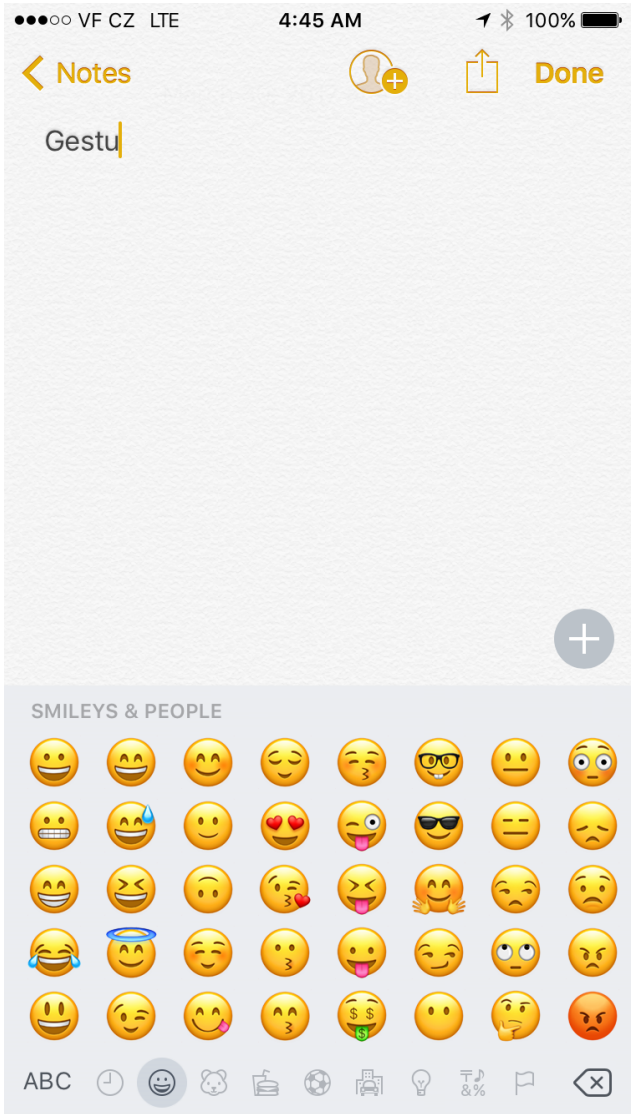
Scrollable Keyboard - Example of Using Gestures





Comparison with Standard Keyboard





Discussion 9

What is the key difference between mobile platforms (iOS, Android, WP) in terms of UX?

Mobile Interface Guidlines

- iOS Human Interface Guidelines
- Android: Material Design (Patterns, Motion, Layout, ...)
- Windows Phone?

Want to be great developer? Read it.

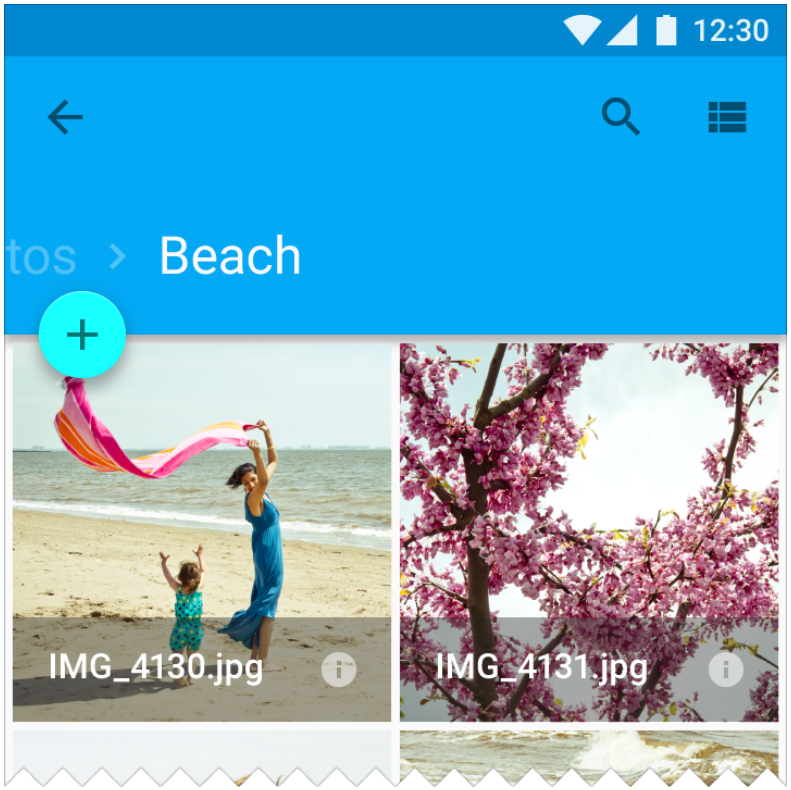
Mobile Interface Guidelines - Examples

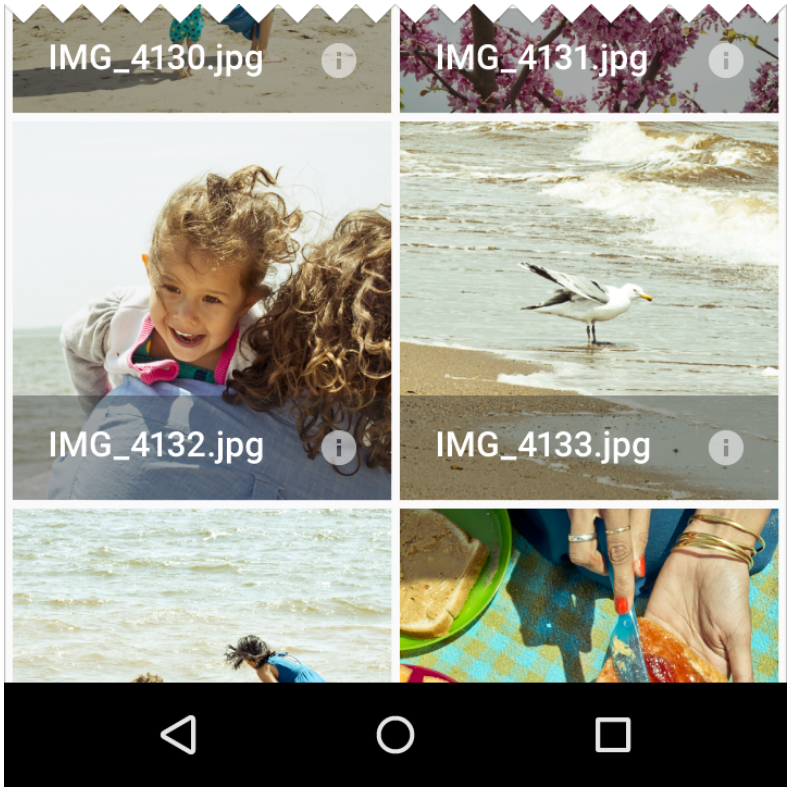
- General principles
  - Balance between enabling users and avoiding unwanted outcomes
  - Fast apps, imediate feedback
  - Sense of depth, layers
- More specific
  - Types of navigation
  - Delay sign-in
  - Suppress settings and file system (replace by lists/tables)
- Very specific
  - Minimumbutton area
  - How to format dates
  - How to use components

Discussion 10

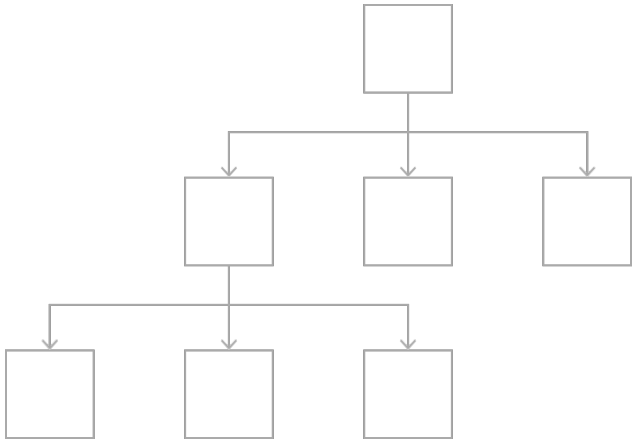
What is the difference between back and up navigation button on Android? Is there UX issue related to it?

Android Up and Back Navigation

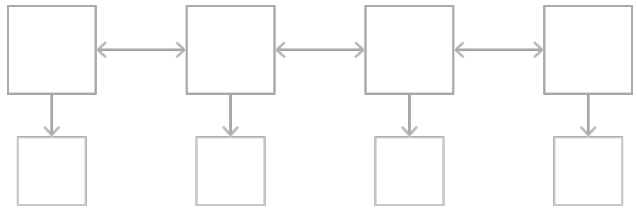




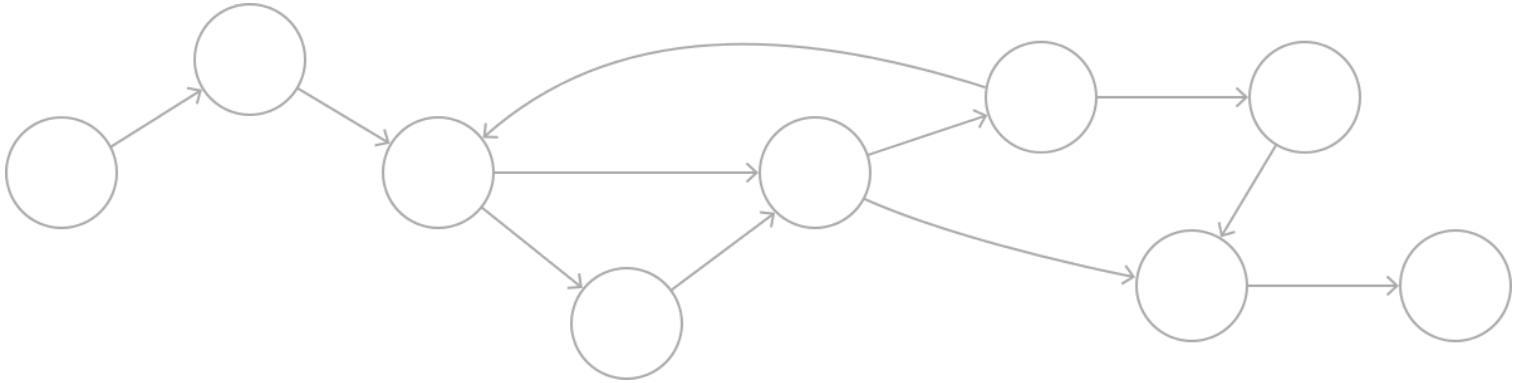
Types of Navigation



Hierarchical

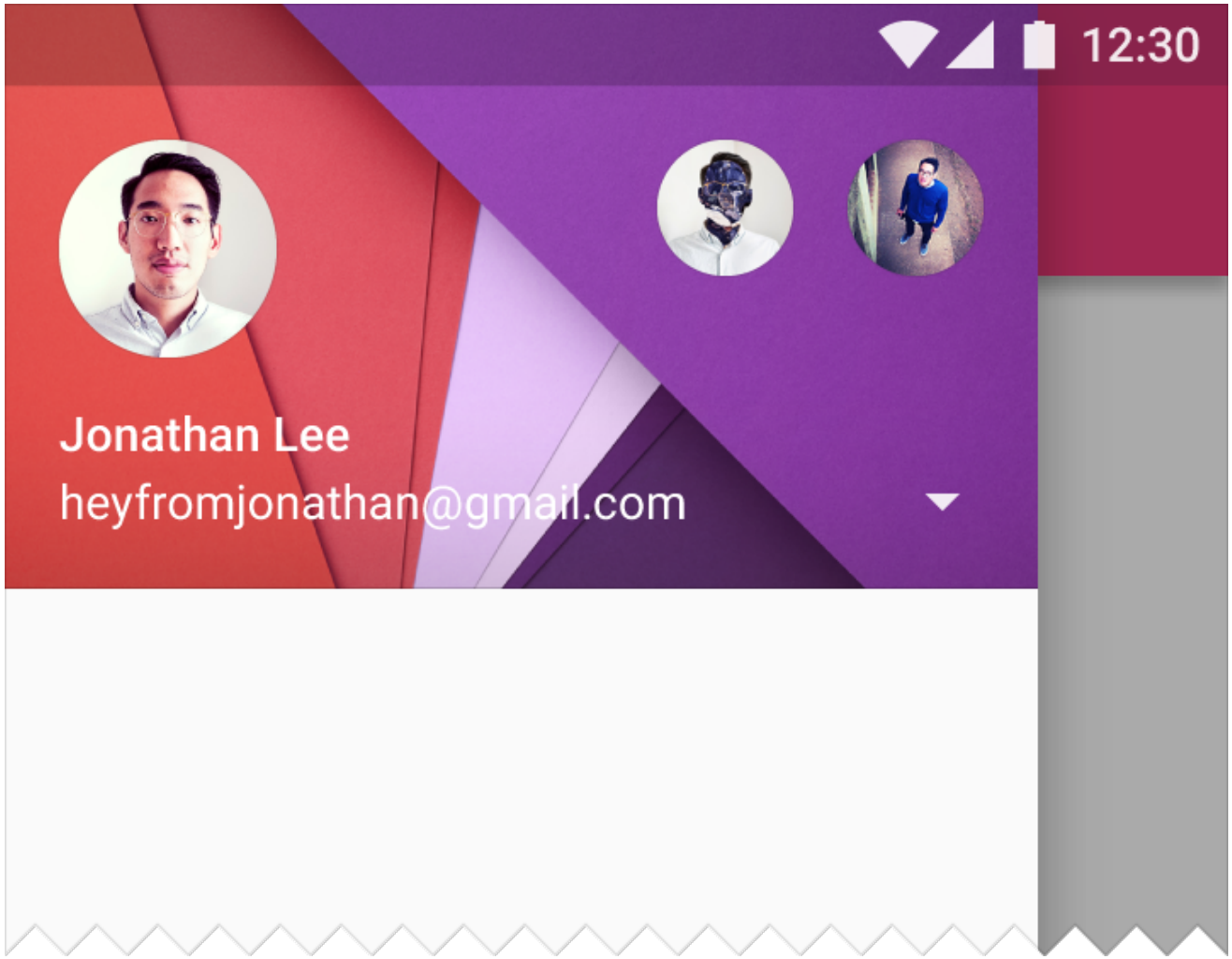


Flat

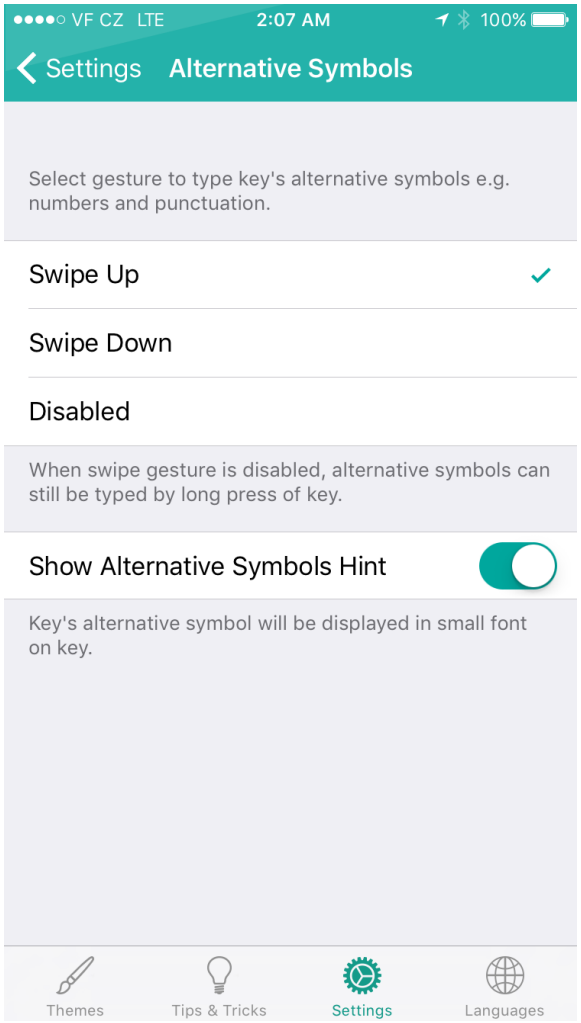


Content-driven or experience-driven

Navigation Drawer



Combining Navigation Types



Navigation

- Notion of location
- To use hamburger or not to use hamburger ?
  - "Hamburger" = side menu :)
  - Breaks notion of location - where is the active screen located?

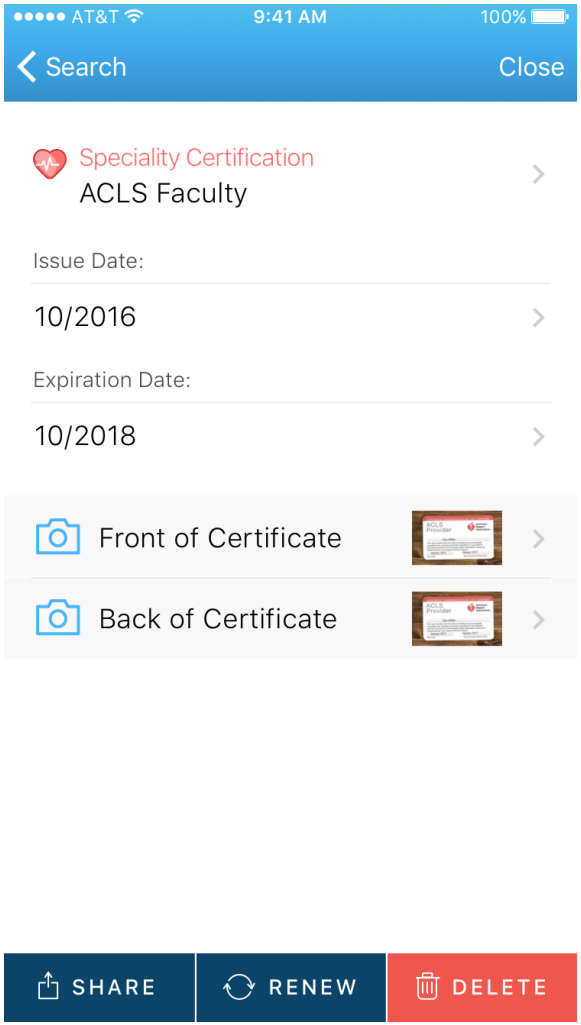
Animation and Motion

- In real world there are no immediate transitions
- Natural feeling is important
  - Elements should have momentum, accelerate and decelerate, respond to gravity, interact, ...
- Duration: Fixed duration vs. fixed speed
- Motion provides meaning: hints function, gives feedback, focus, notion of location

Discussion 11

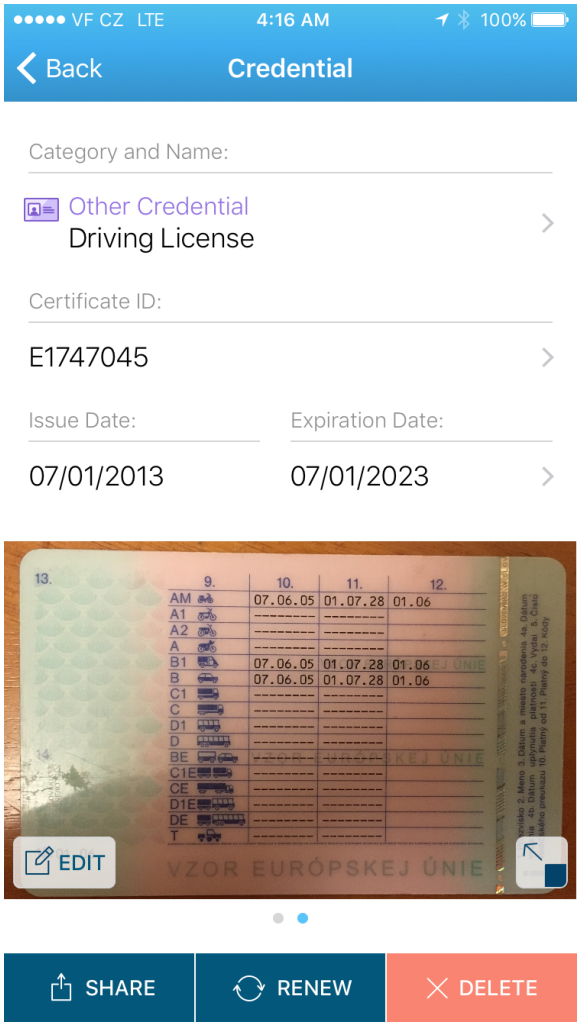
What might be problematic about icons on following slide considering global audience?

Using Icons



Thanks to Mile One LLC for permission to use the sample (working version).

People Perceive Icons Much Faster Than Text

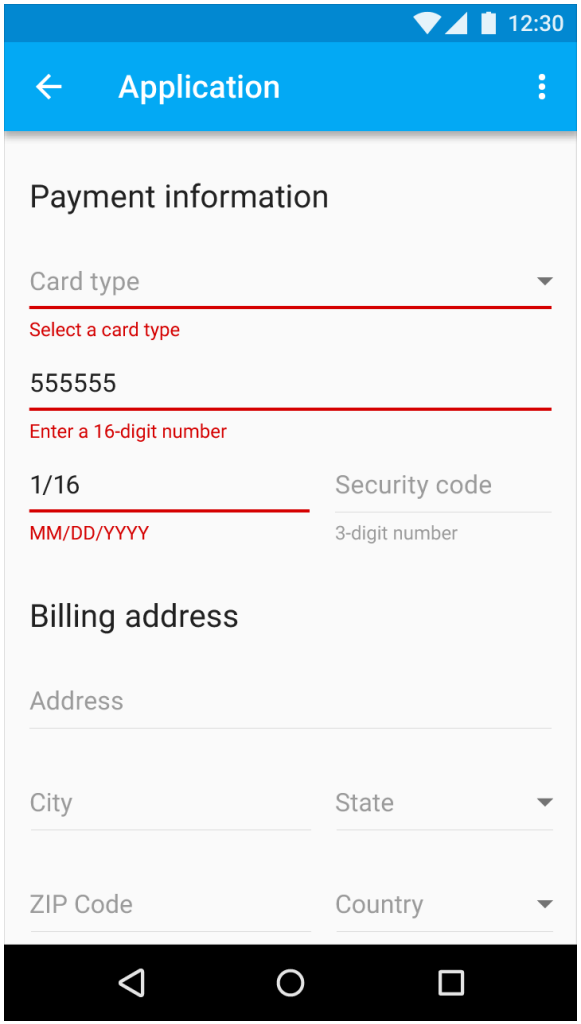


Thanks to Mile One LLC for permission to use the sample (production version).

Common Problems

- Trying to squeeze too much on one screen $\rightarrow$ modality, focus
- Error handling
- Harder than normal data entry - often makes big difference in UX
  - Guess input values
  - Shortcuts (e.g. emoji)
  - Use right keyboard type
- Accesebility
- Keep it simple. E.g. consider sending message via Facebook rather than implementing in-app chat
- Displaying complex data - tables and lists

Handling Errors - Example



Discussion 12

How would you design mobile calculator for visually impaired?

Specific Interactions Enabled by Device Capabilities

- 3D touch
- Fingerprint sensor
- Voice control
- Haptic feedback (be careful about overuse)

Discussion 13

Is there a usability issue with iPhone home button?

Some Advices

- Localize
- Please, no save buttons
  - Consider undo and redo operations
- *Study guidelines* and follow them
- Prefer native components
- Inform users about latency $\rightarrow$ activity indicators
- Some useful tools: UsabilityHub, Invision, Moquaps, ...

Discussion 14

How could your programming UX be improved?

Many Thanks to...

Gaëlle Calvary & François Bérard

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Summary

Questions?

Thank you