

Mobile Interfaces

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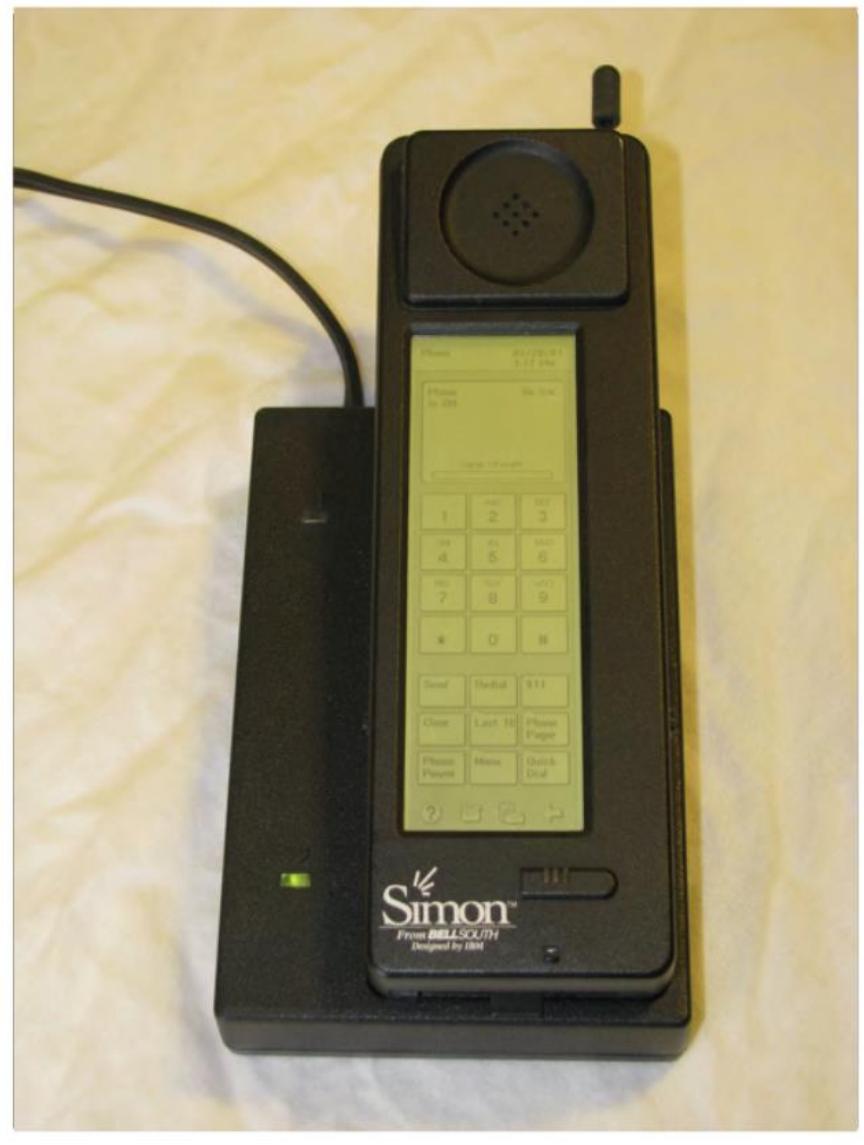
11/21/2019

Why Android and iOS are the most dominant mobile OSs today?

Why Symbian (Nokia), Meego (Intel + Nokia), Windows Phone (Microsoft), Palm (HP) failed?

A Quiz About Today's Topic

- The world's first smart phone
- A phone that not only let you make a phone call but also let you have your calculator and email and take notes and so on and so forth.
- It only had two buttons and the whole front of the phone was just a great big touch screen.
- The interface came up in graphics.
 - If you wanted to enter text a graphical keyboard came up, and if you wanted to go to your address book you just touched the icon for that.



IBM Simon
1992



IBM

System 360

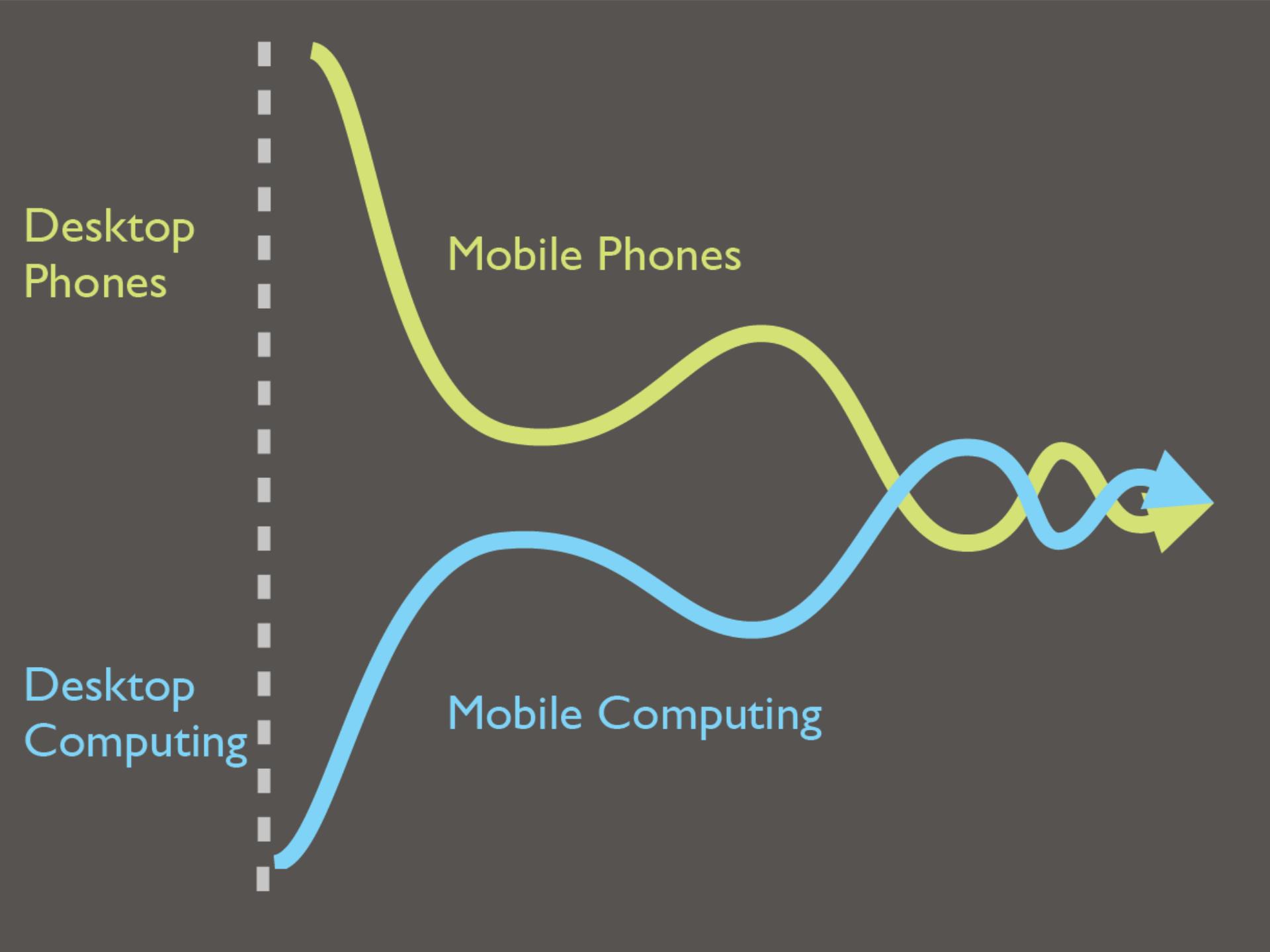




iPhone

Unlocked by AT&T in California. Assembled in China.
iPhone AT&T 3G, 16GB. FCC ID: 2AC2-E2985A. IC: 2794-E2985A

FCC CE WiFi



Mobile Telephony



Early car phone 1960s

A social history of the mobile telephone
with a view of its future

H Lacohee, N Wakeford, I Pearson
BT Technology Journal, Vol 21 No 3, July 2003

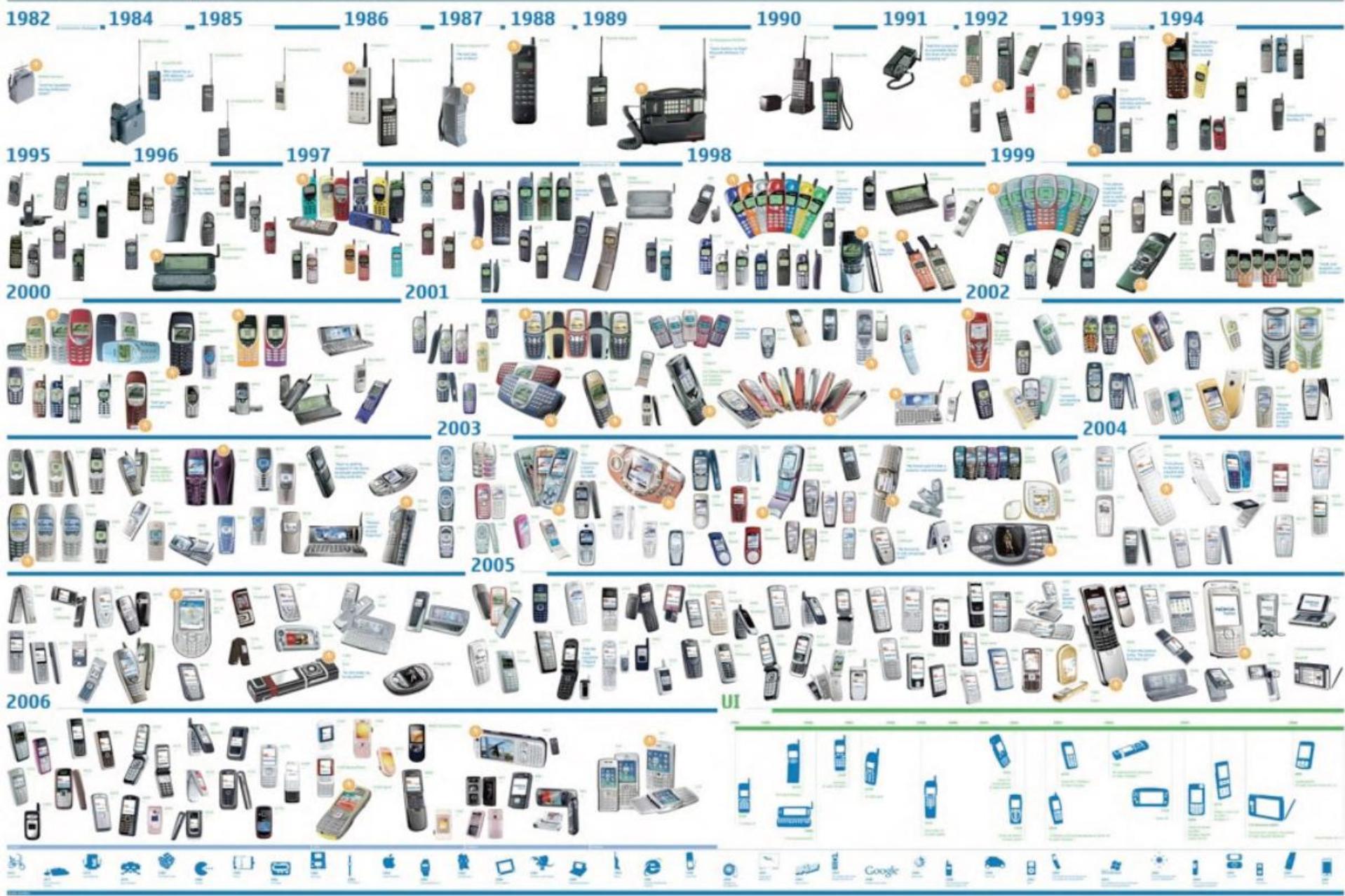


Martin Cooper
Motorola DynaTac
(1973/83)



Wall Street
(1987)

Know our past. Create the future...



Mobile Computing



Osborne 1 (1981)

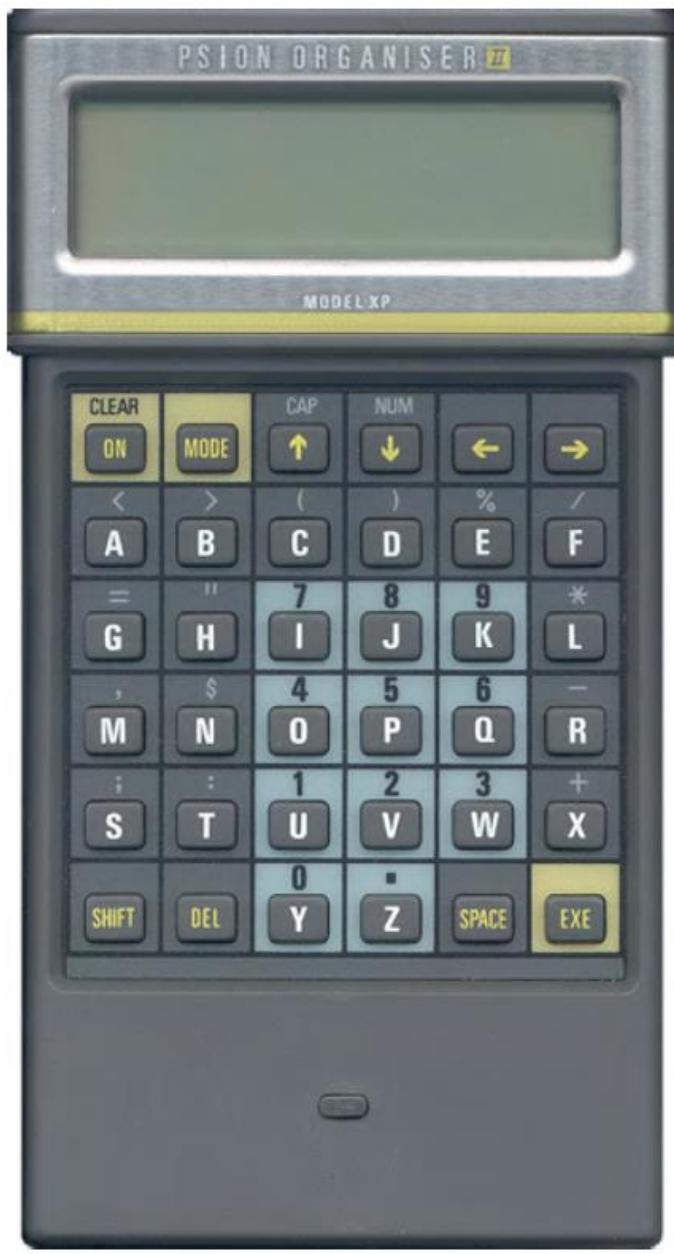


Compaq Portable (1983)

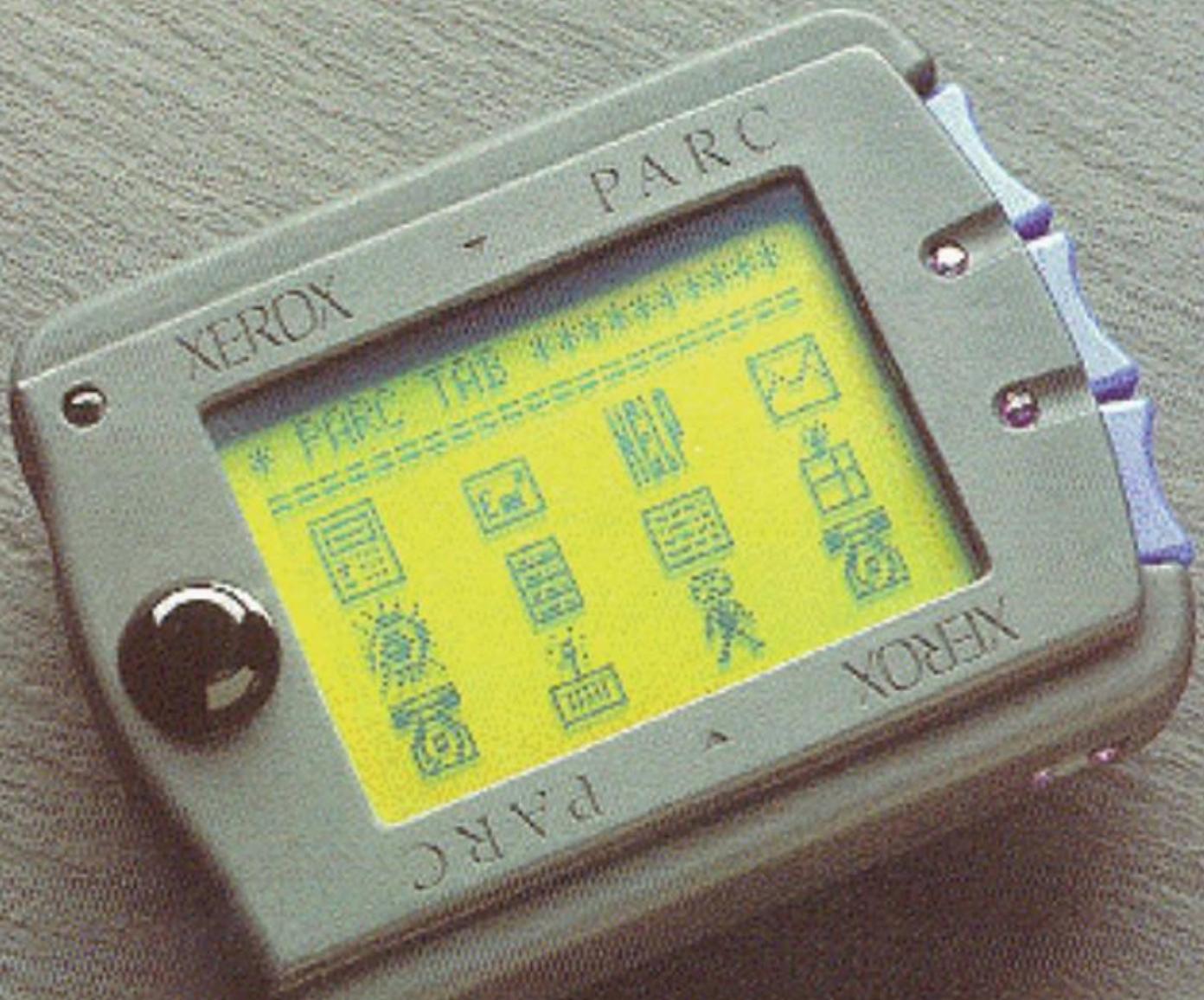




Grid Compass in Space (1985)



**Psion Organizer
1984/86**



Xerox PARC TAB (1992/93)

XEROX - PARC

* TAB LOCAL MENU *

Power down

ENTER mode

ESC EXIT

Memory check

HELP Applications

QUIT local mode

XEROX

XERCY PARC

Main:

Drivice

Road

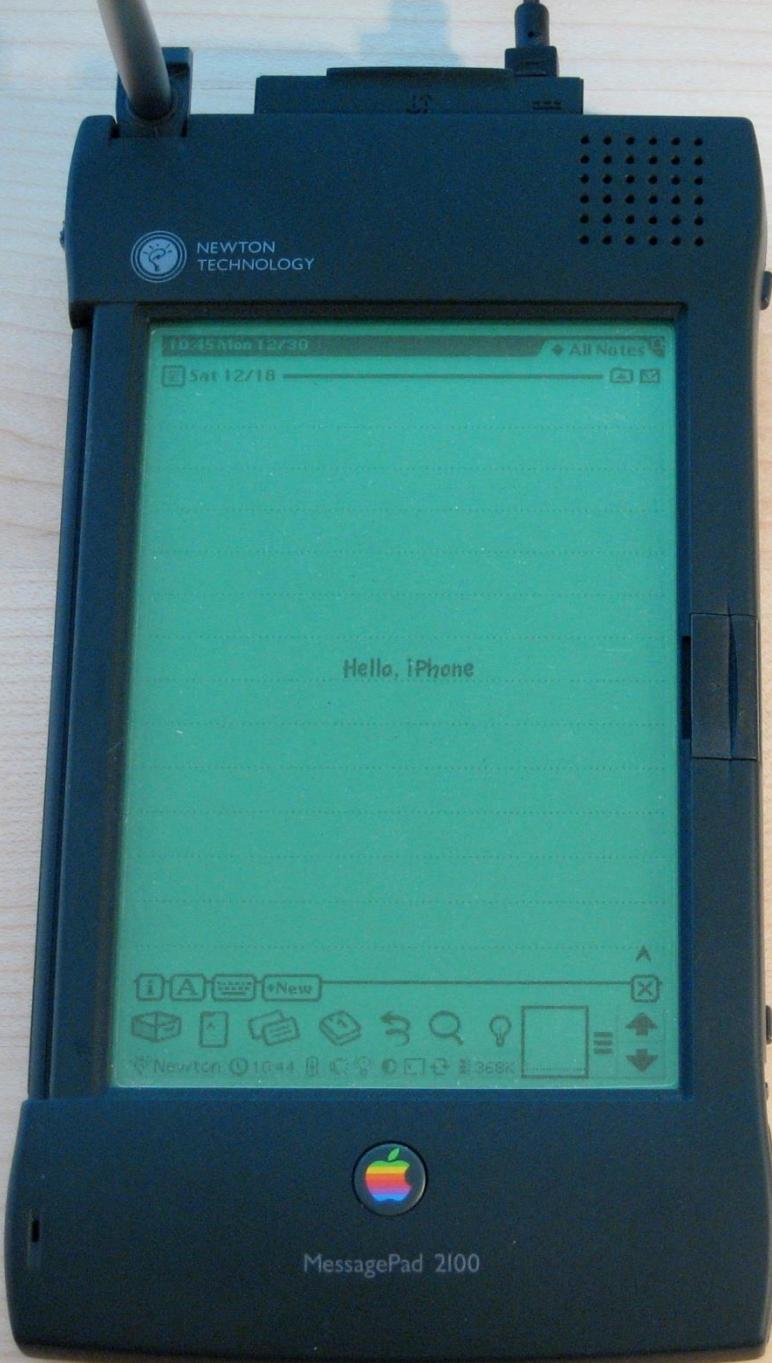


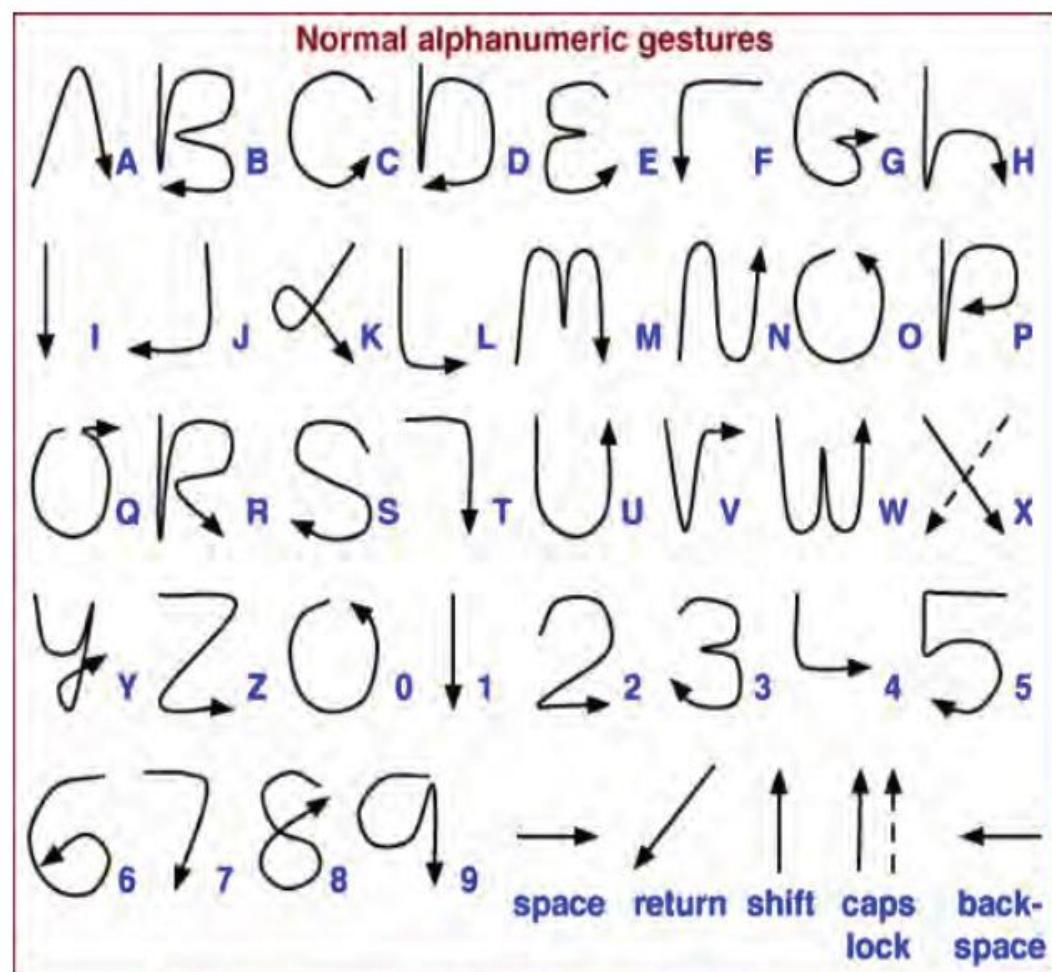
lamming



flynn

C A R X E R C Y



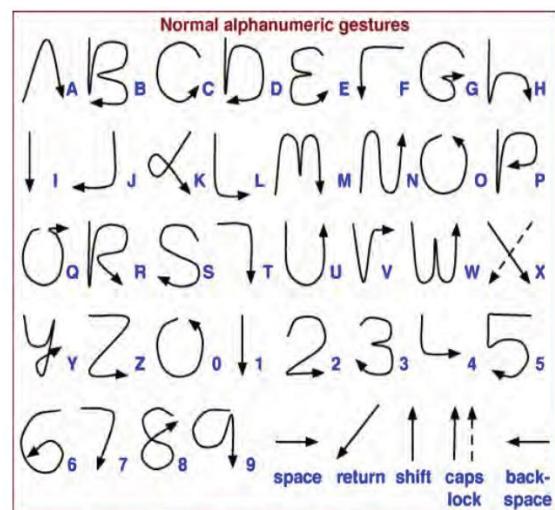
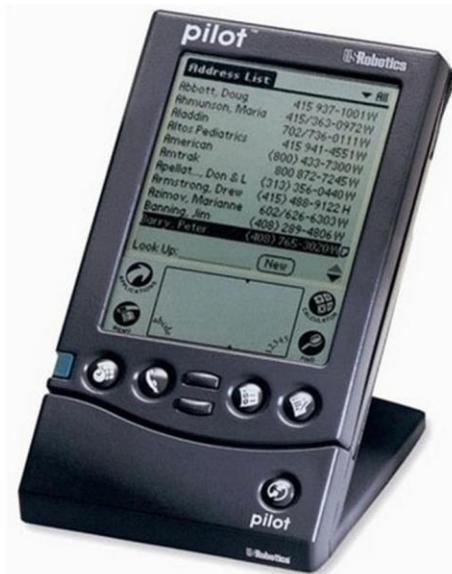
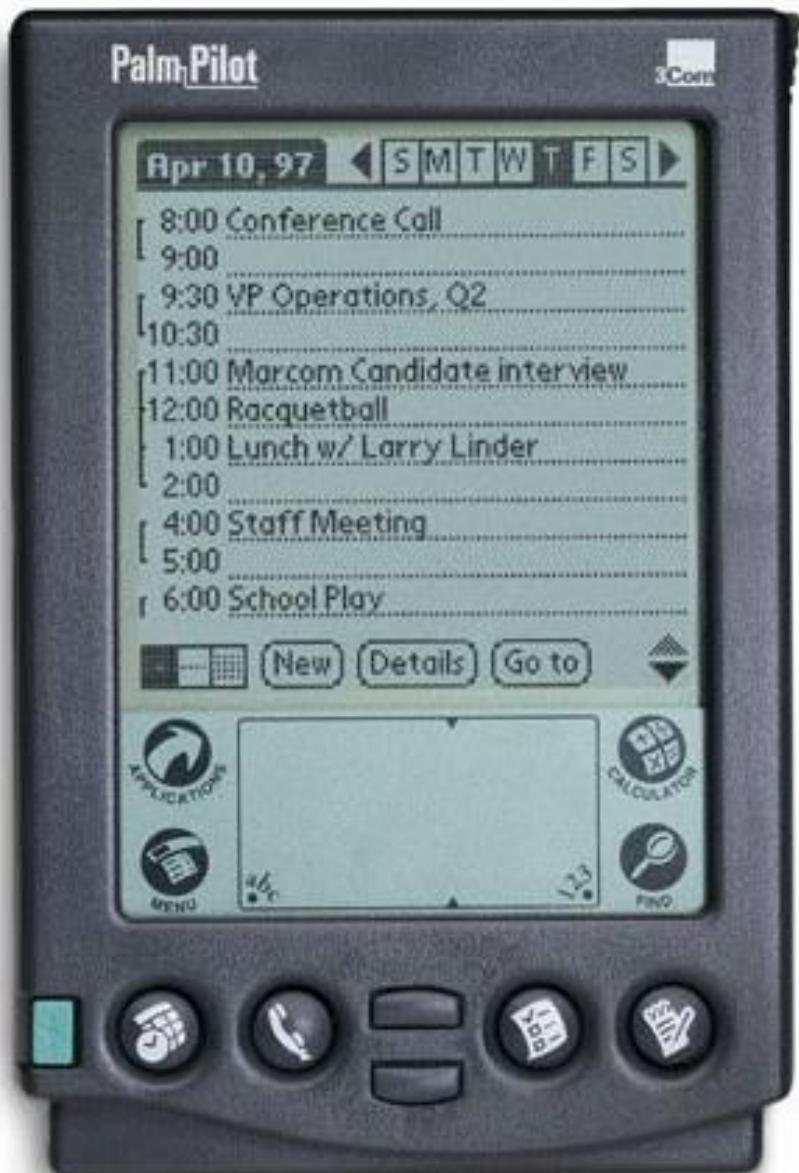


Palm Pilot (1996)

http://en.wikipedia.org/wiki/File:Palmpilot5000_eu.png



**Nokia Communicator
1996**



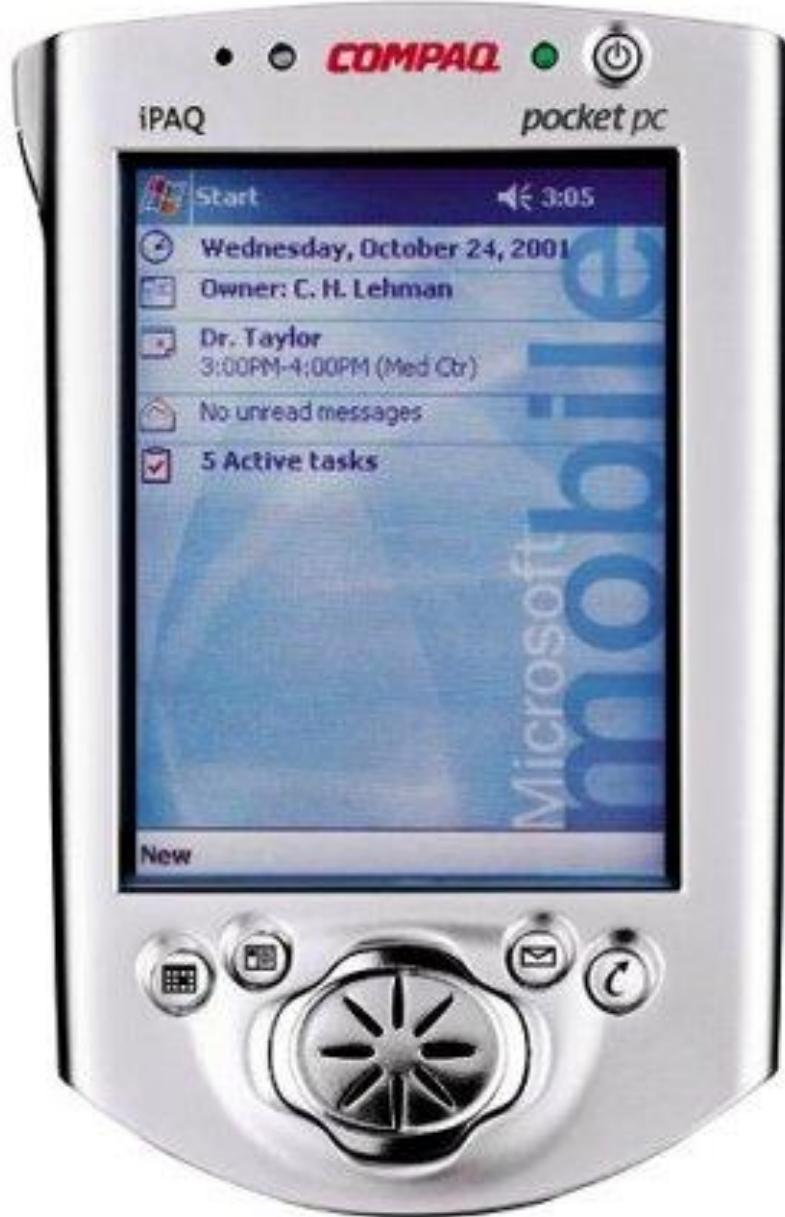
Palm Pilot 1000, 1996



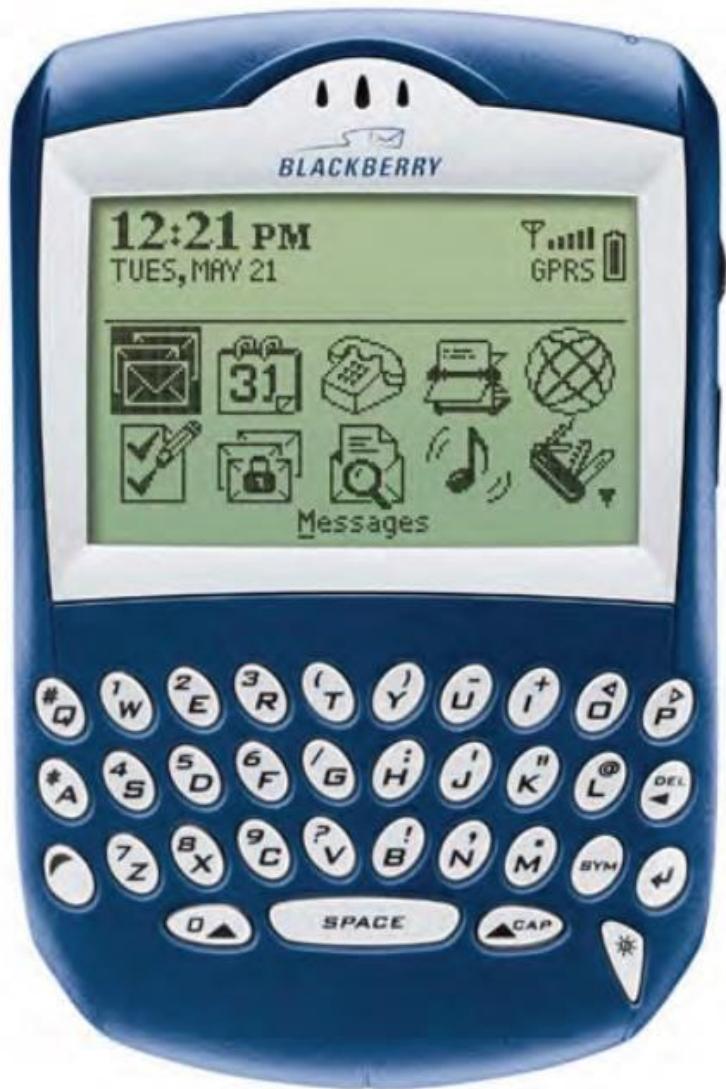
BlackBerry RIM 950 1998



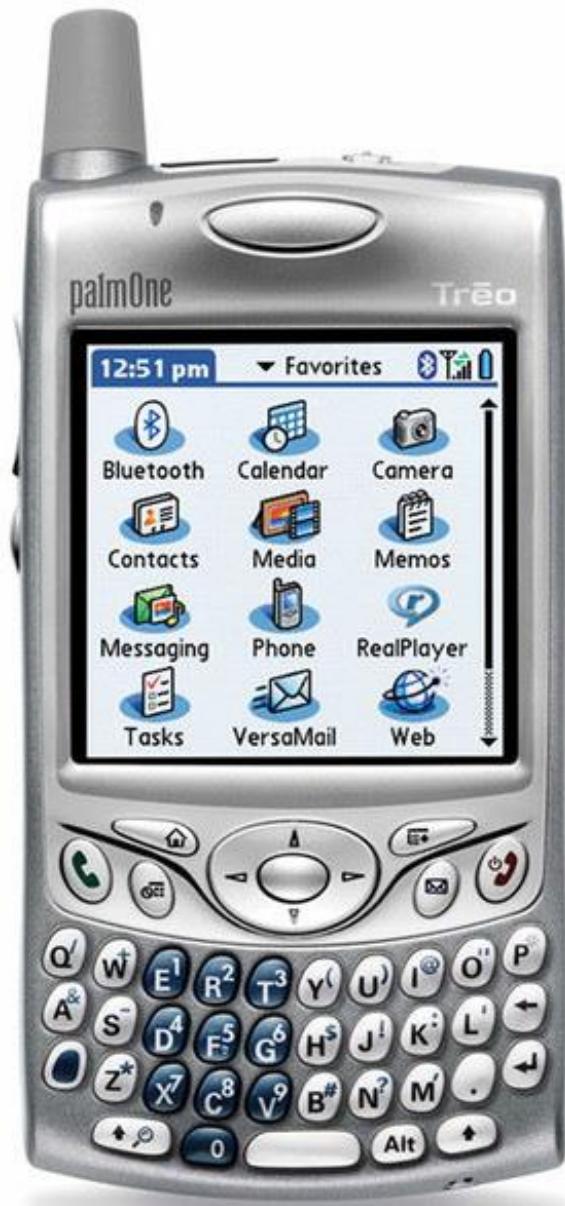
HP Jornada 430 in 1999



Compaq iPaq H3630 in 2000



Blackberry “Quark” Series 2002



Palm Treo 600 in 2003



i-Mate (HTC) PDA2k in 2004

Everything Changed in 2007



Apple iPhone in 2007

iPhone 1st Generation



The Evolution of iPhone from 2007 to 2014

The Story of Android



DANGER



T-Mobile Sidekick 2002

Andy Rubin

DANGER



Founded in 2000

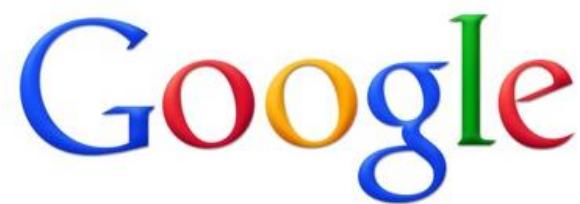
Acquired by Microsoft in 2008



Release MS Kin in 2010



Founded in 2003



Acquired by Google in 2005



Android 1.0 in 2008



androidcentral



BlackBerry Curve in 2006

Android 0.5 (Prototype) in 2007



"Holy crap. I guess we're not going to ship that phone [HTC G1]."

-Andy Rubin

"As a consumer I was blown away. I wanted one immediately. But as a Google engineer, I thought 'We're going to have to start over,' "

"What we had suddenly looked just so ... '90s [...] It's just one of those things that are obvious when you see it."

-Chris DeSalvo

Android Team Members' responses to iPhone in 2007



Android 1.0 (HTC G1) in 2008

API Level 1



HTC Magic
Android 1.5 (Cupcake)
April 2009



API Level 3



HTC Magic
Android 1.6 (Donut)
September 2009



API Level 4



Motorola Droid
Android 2.0 (Eclair)
October 2009



API Level 5

Android 1.5, 1.6 & 2.0 in 2009



Google/HTC Nexus One
Android 2.1 (Eclair)
January 2010



API Level 7



Motorola Droid 2
Android 2.2 (Froyo)
May 2010



API Level 8



Google/Samsung Nexus S
Android 2.3 (Gingerbread)
December 2010



API Level 9 & 10

Android 2.1, 2.2 & 2.3 in 2010



Motorola Xoom

Android 3.0 (Honeycomb)

February 2011



API Level 11



Google/Samsung Galaxy Nexus Android 4.0 (Icecream Sandwich) October 2011



API Level 14

Android 3.x, & 4.0 in 2011



Google/Asus Nexus 7
Android 4.1 (Jelly Bean)
July 2012



API Level 16

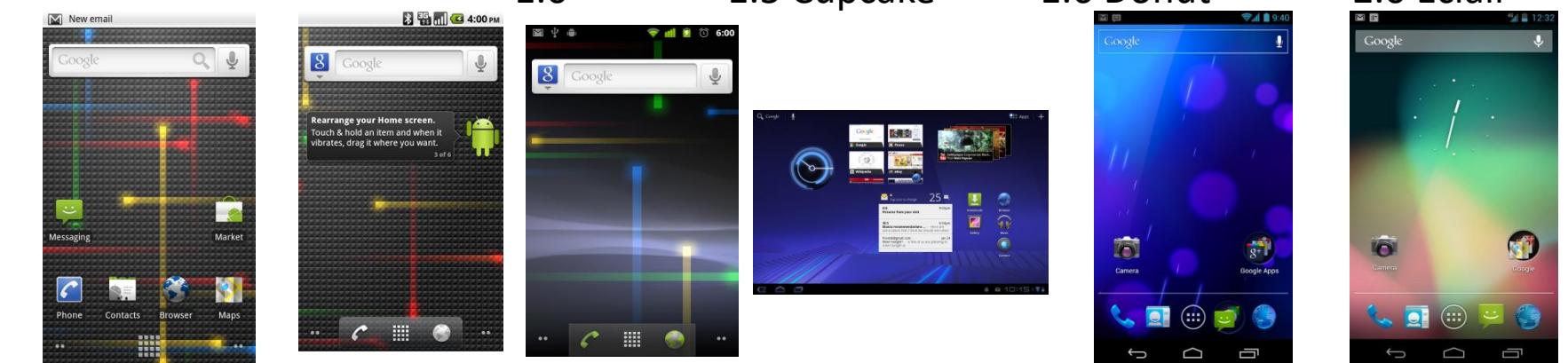


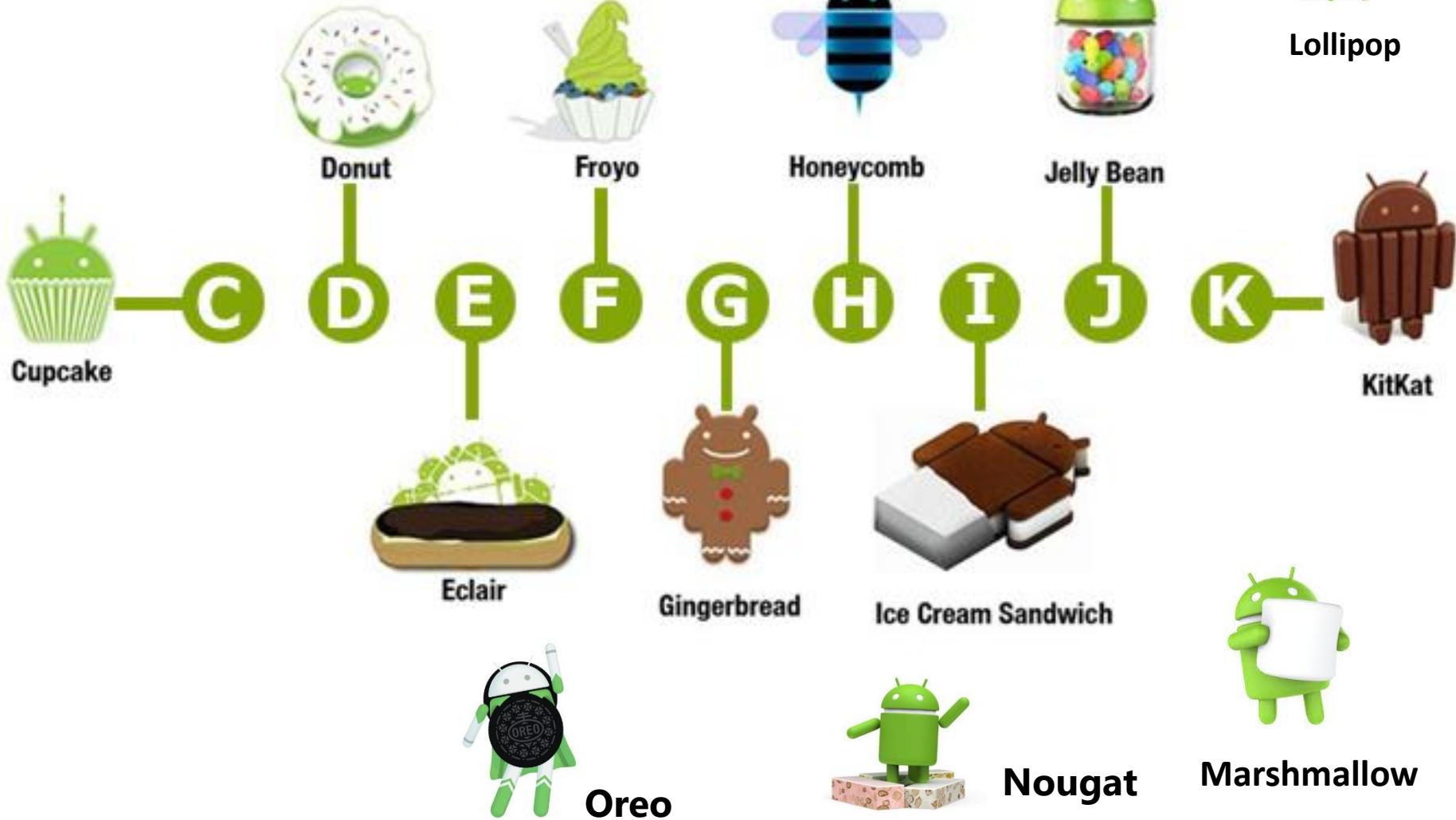
Google/LG Nexus 4
Android 4.2 (Jelly Bean)
October 2011



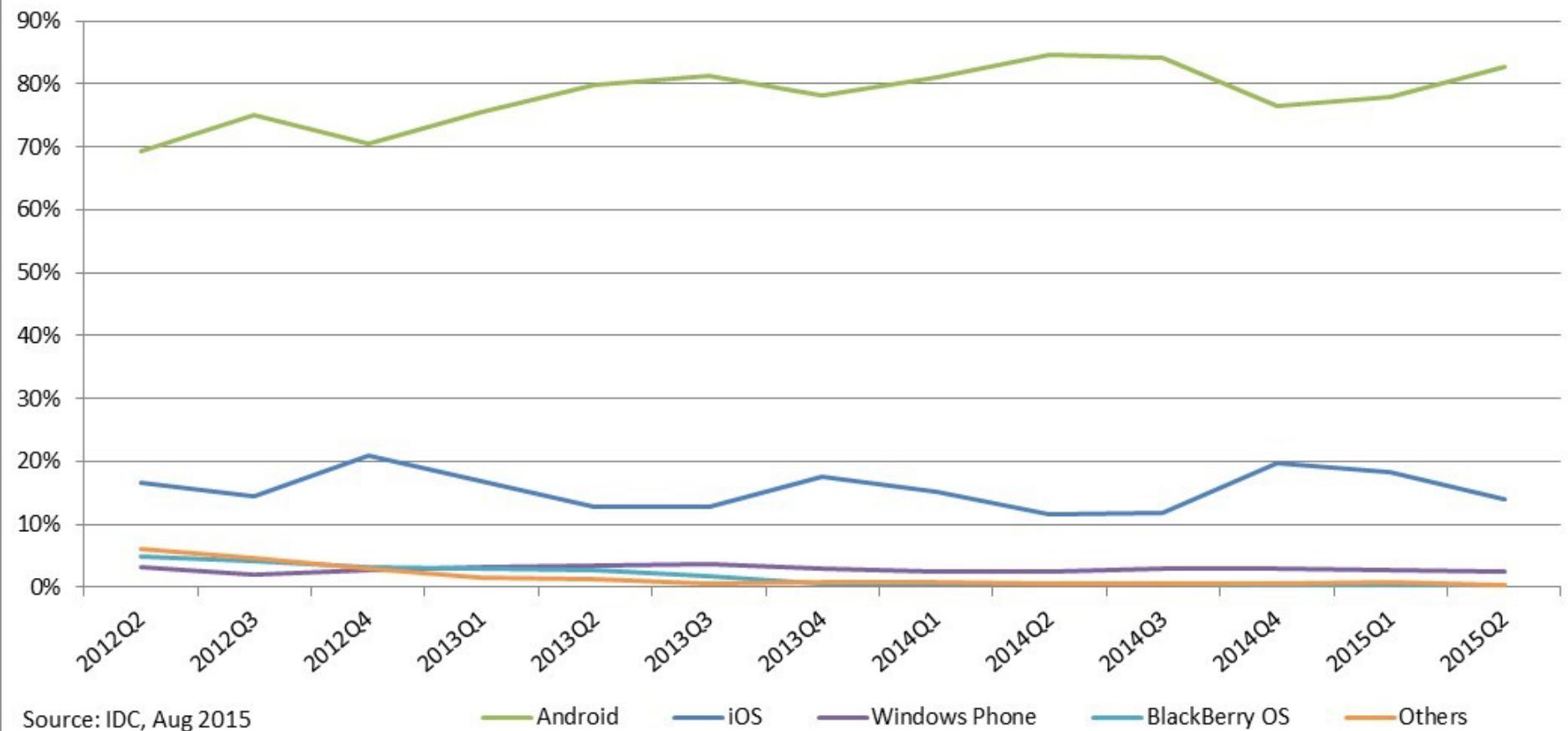
API Level 17

Android 4.1, & 4.2 in 2012





Worldwide Smartphone OS Market Share (Share in Unit Shipments)



Source: IDC, Aug 2015

— Android — iOS — Windows Phone — BlackBerry OS — Others

The mobile telephone has been ...

“... a way of rebuilding economies in eastern Europe, an instrument of unification in western Europe, a fashion statement in Finland or Japan, a mundane means of communication in the USA... an agent of political change in the Philippines”

J Agar, “Constant Touch: A Global History of the Mobile Phone”

Research Directions

Input

Input Paradigms

Keypad



Stylus



Direct Touch



Main Concerns

For all input styles:

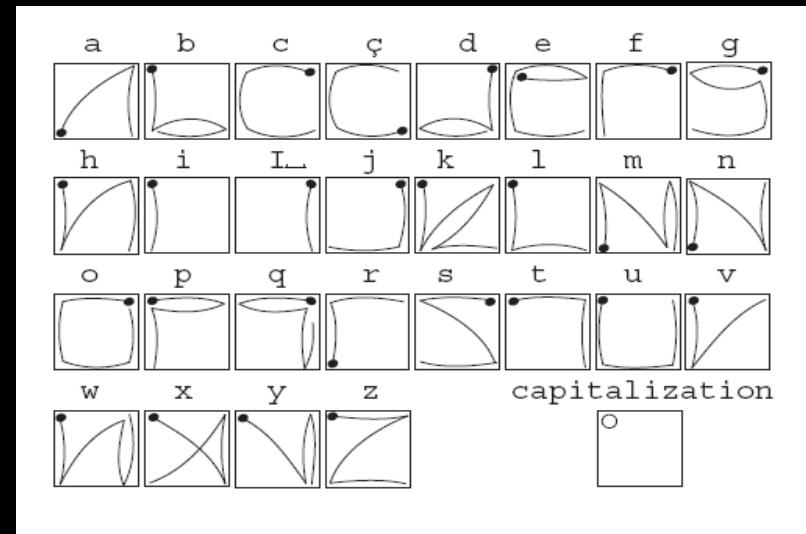
Text Entry Performance: Slow, error-prone

For touch devices:

“Fat Finger”: Occlusion, imprecision

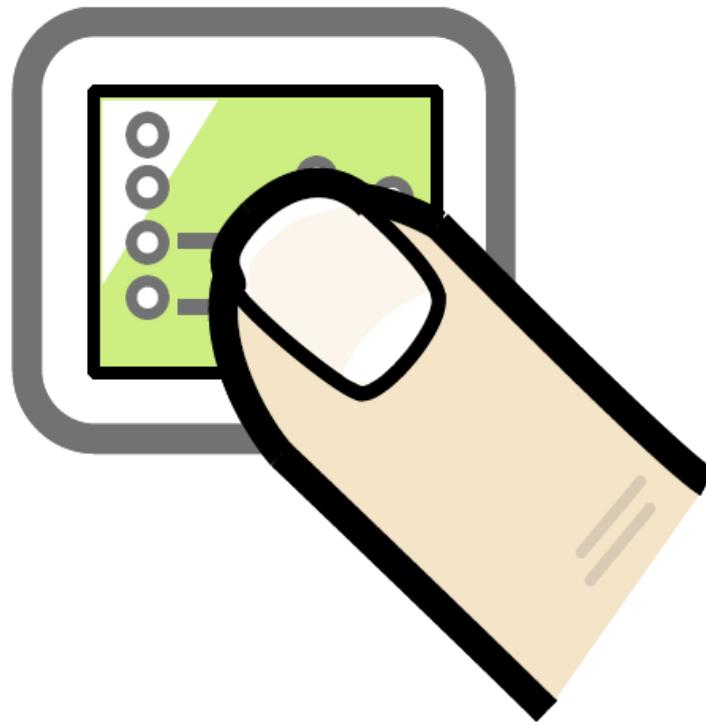
Text Entry Approaches

- Prediction & pattern matching on keyboards, strokes:
 - T9, ShapeWriter, Swype...
- Adding other sensor data
 - Vision TiltText, SHRIMP, ...
- Constraining gesture input for accessibility
 - EdgeWrite



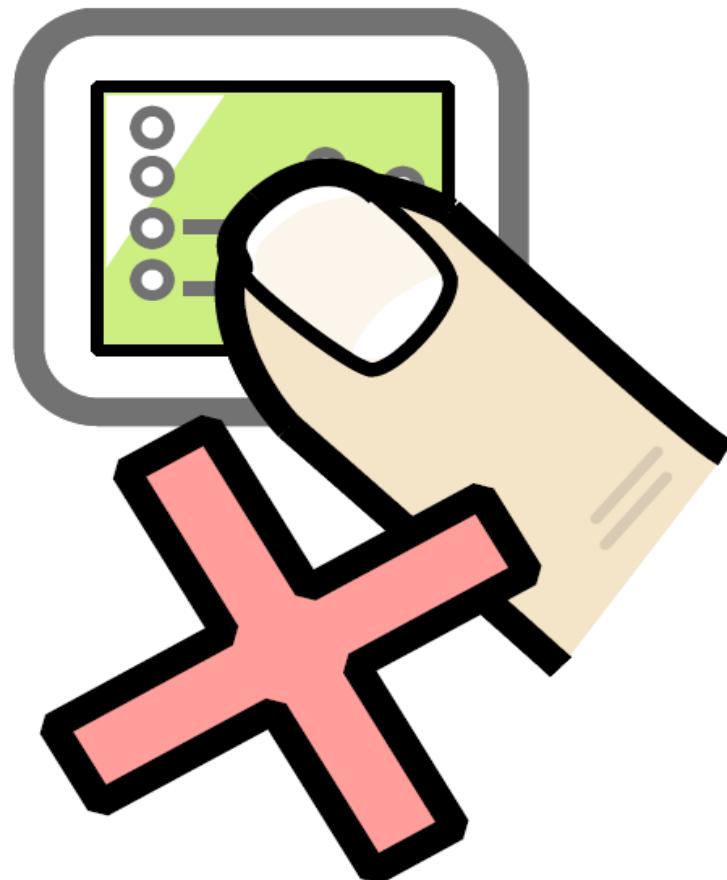
EdgeWrite : Wobbrock et al

The “Fat Finger” Problem



Graphics: Patrick Baudisch, nanoTouch

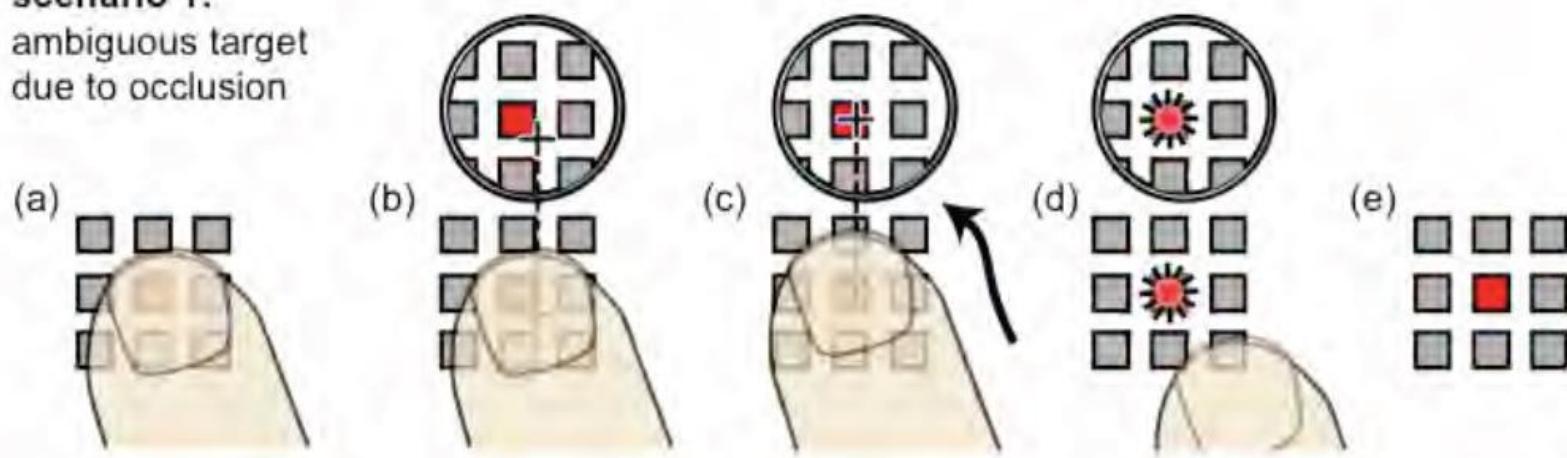
The “Fat Finger” Problem



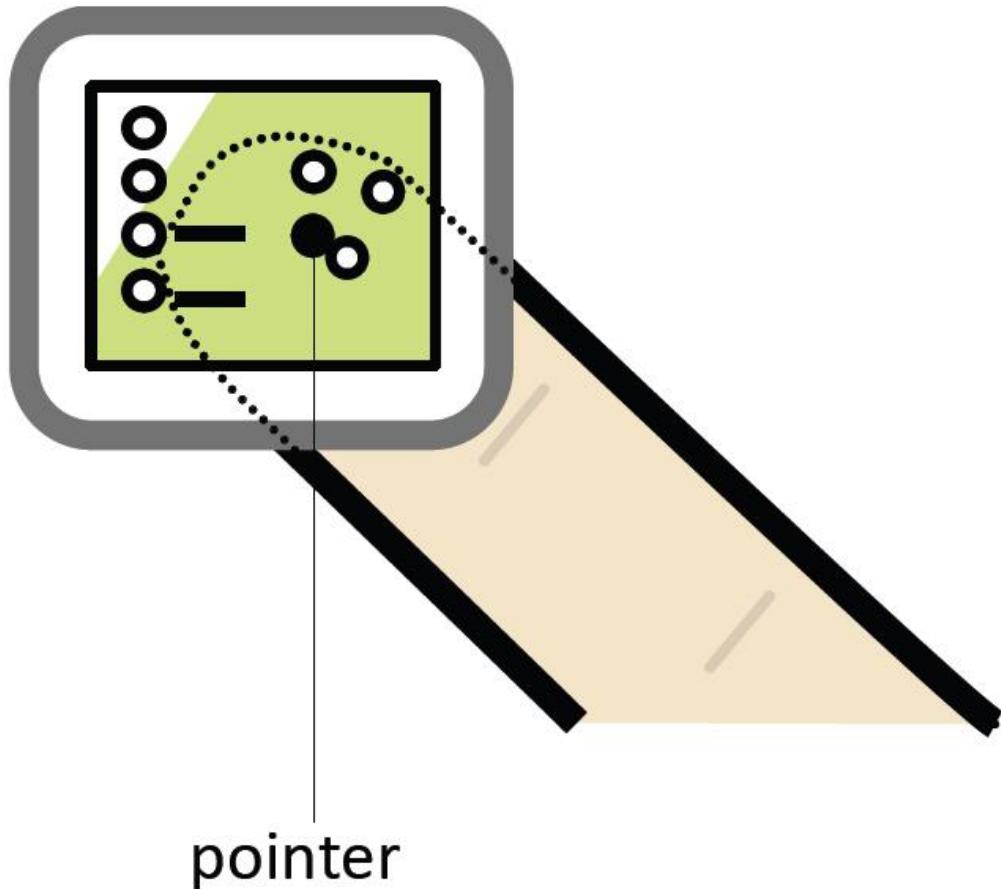
Graphics: Patrick Baudisch, nanoTouch

A Software Solution

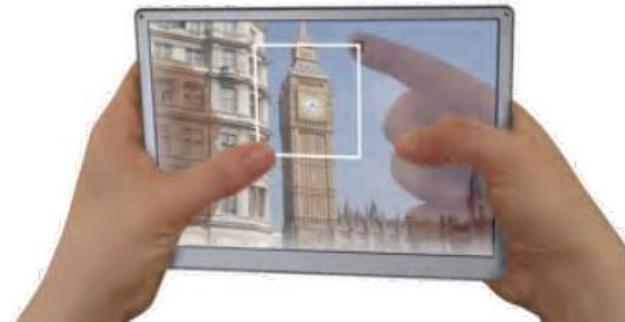
scenario 1:
ambiguous target
due to occlusion



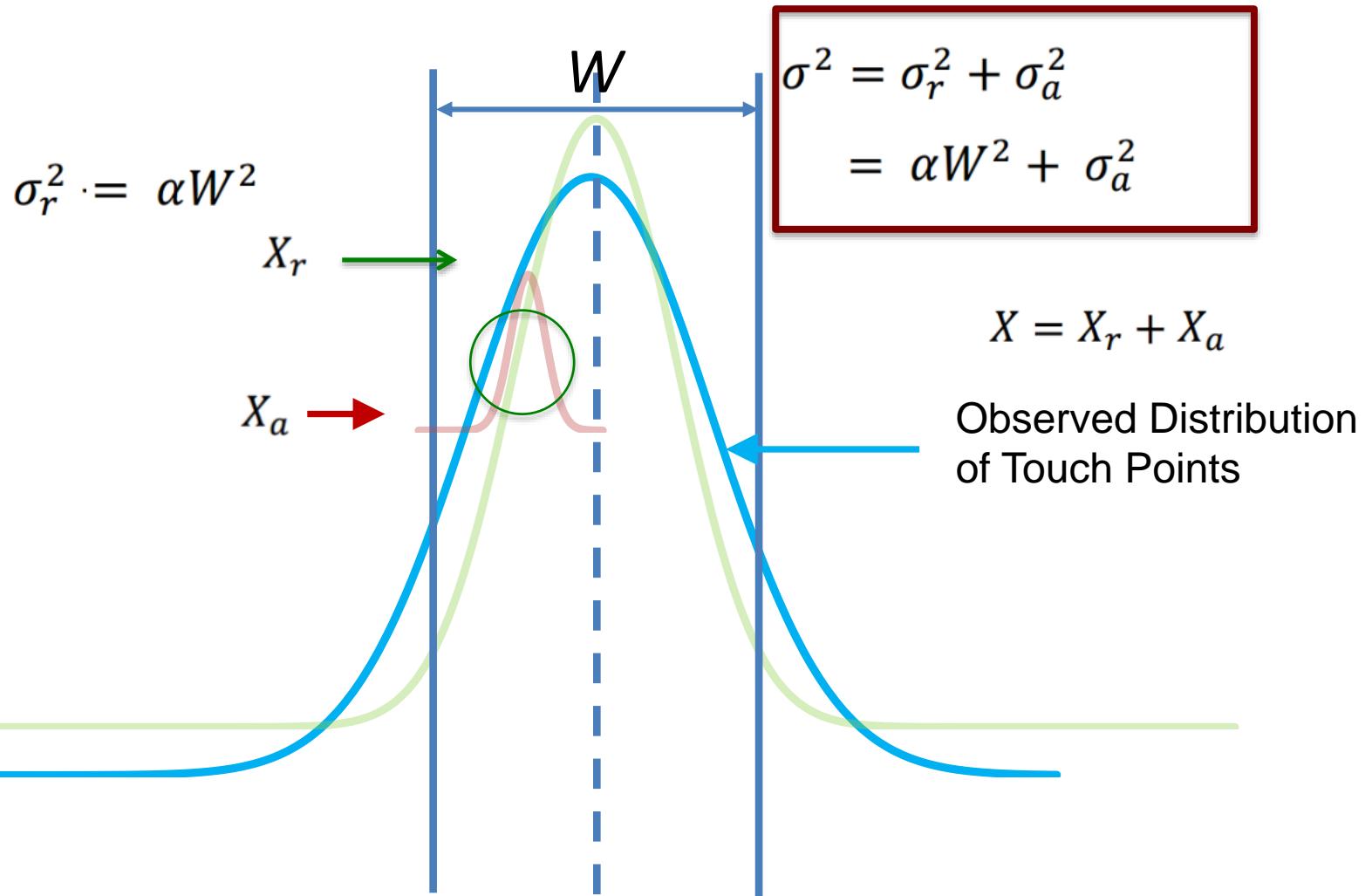
A Hardware Solution: Use the Backside



Graphics: Patrick Baudisch, nanoTouch



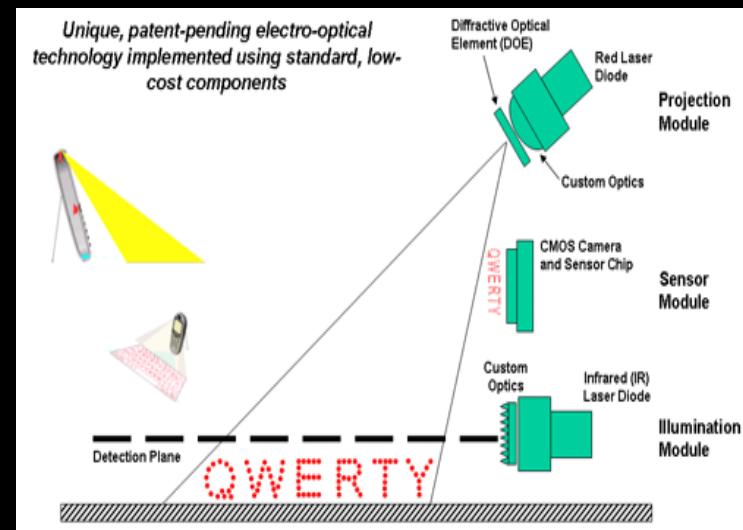
Dual Gaussian Distribution Model



[Bi, Li, Zhai. *FFitts Law: Modeling Finger Touch with Fitts' Law*. CHI2013]

[Bi, Zhai. *Bayesian Touch*. UIST2013]

Another Hardware Solution



Displays

The image displays four separate screens from a mobile application, arranged in a 2x2 grid. Each screen shows a list of items with a blue selection bar at the bottom.

- Top Left Screen:** Titled "Templates" (2). It lists "Login", "CreditCard" (selected), and "Appointment". Buttons at the bottom: "Options" and "Back".
- Top Right Screen:** Titled "Edit Template". It shows a "Fields:" section with radio buttons for "Name", "PIN", "Number", and "Expires" (selected). Buttons at the bottom: "Options" and "Cancel".
- Bottom Left Screen:** Titled "Logins" (2). It lists "E-Bay" and "Amazon" (selected). Buttons at the bottom: "Options" and "Back".
- Bottom Right Screen:** Titled "Preferences" (3). It shows a list with checked checkboxes for "Password", "Security", "Appearance" (selected), and "Language". Buttons at the bottom: "Select" and "Back".

#pixels(mobile) << #pixels(desktop)

#pixels(mobile) << #pixels(desktop)

#pixels(mobile) << #pixels(desktop)

display real estate(mobile) << display real estate(desktop)

- Content / UI have to be tailored for mobile consumption.
- Approach 1:
 - Create a separate mobile web.
 - Not compelling in 2000. Today?
- Approach 2:
 - Take the normal web / normal apps but automatically retarget them for mobile display.
- Approach 3:
 - Stick with the normal web / normal apps and add some meta-interaction techniques for zooming/panning

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Blog

[Spring 2010 jQuery Talks](#)

I gave a number of talks this spring on jQuery and especially on some of the recent additions made in jQuery 1.4. Below are all the slides and demos that I've given.

The conferences / meetups that I spoke at (or will speak at, in the case of MIX), and the talks that I gave, are [...]

24 Comments · Posted: March 4th, 2010 · Tags: jquery, speaking, talks, writing

[.closest\(Array\) in jQuery 1.4](#)

A new method signature is added for jQuery 1.4: `.closest(Array)`. It builds upon the previous `.closest()` method and hyper-optimizes the logic needed for handling event delegation (and live events).

`.closest()` (and by extension, `is()`) has become a critical function in jQuery. With more people using live events reducing any overhead has become of the utmost importance. [...]

50 Comments · Posted: December 18th, 2009 · Tags: closest, live, jquery

[.nodeName Case Sensitivity](#)

When working with the DOM `.nodeName` property there are two hard-and-fast rules that most people abide by:

The node names of HTML elements are always uppercase, even if they're explicitly created using lowercase characters. `<html>` will result in a `.nodeName === "HTML"` (see the HTML 5 draft).
The node names of XML elements are always in the [...]

21 Comments · Posted: November 24th, 2009 · Tags: dom, javascript, browser

[» Previous entries](#)

 **John Resig**
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JavaScript Books

-  **JavaScript Secrets**
Secret techniques of top JavaScript programmers.
-  **Pro JavaScript**
The best techniques for professional JavaScript. Published by Apress.

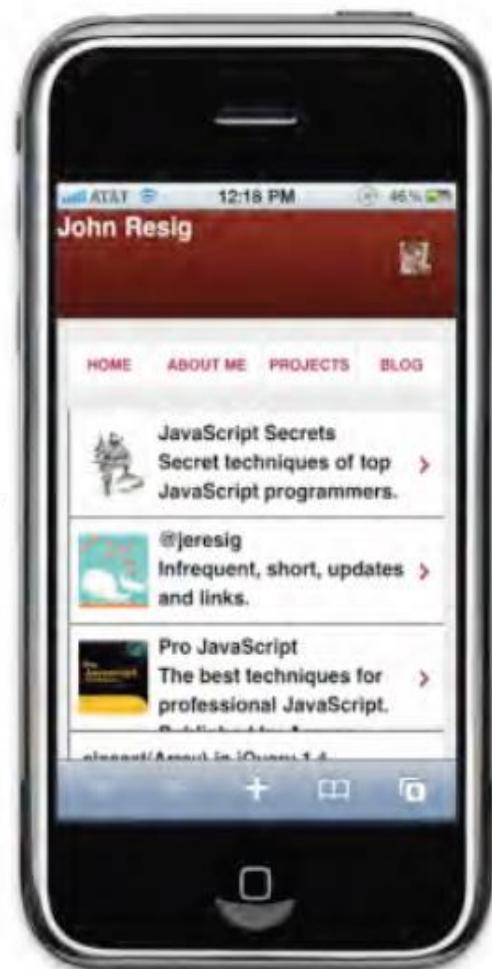
Micro Updates

-  **@jeresig**
Infrequent, short, updates and links.

JavaScript Jobs

- Ninja Jobs: JavaScript Jobs**
- Mozilla: Browser Jobs**

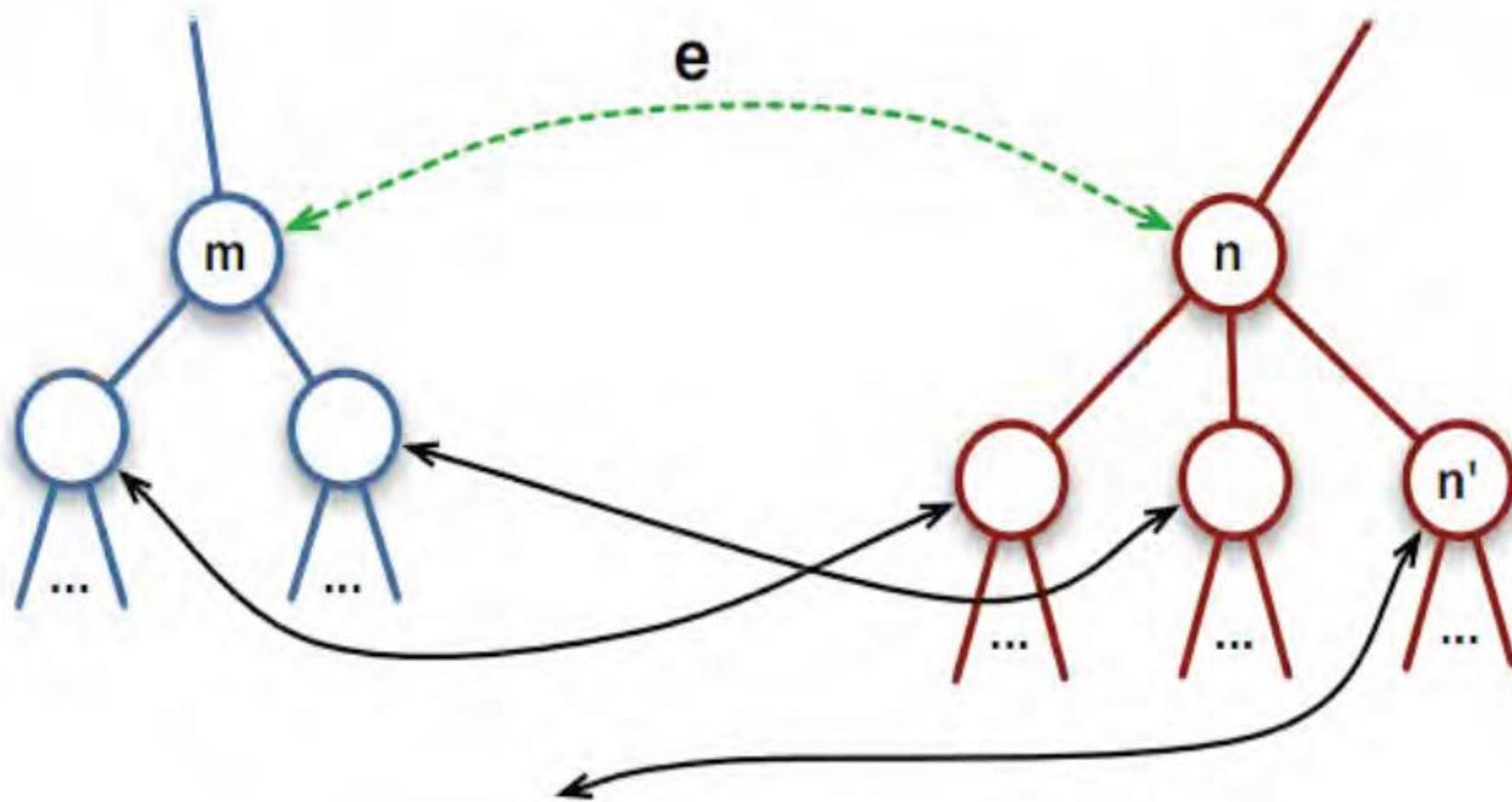
Hosting provided by [Engine Yard](#)



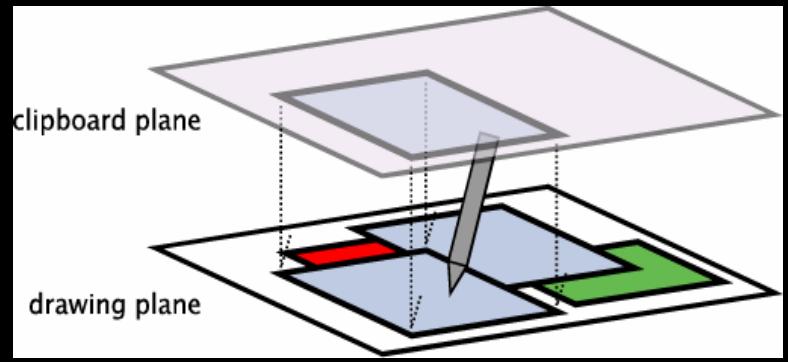
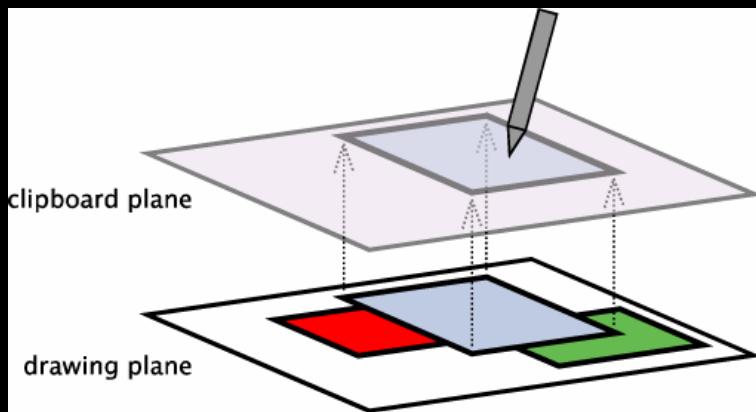
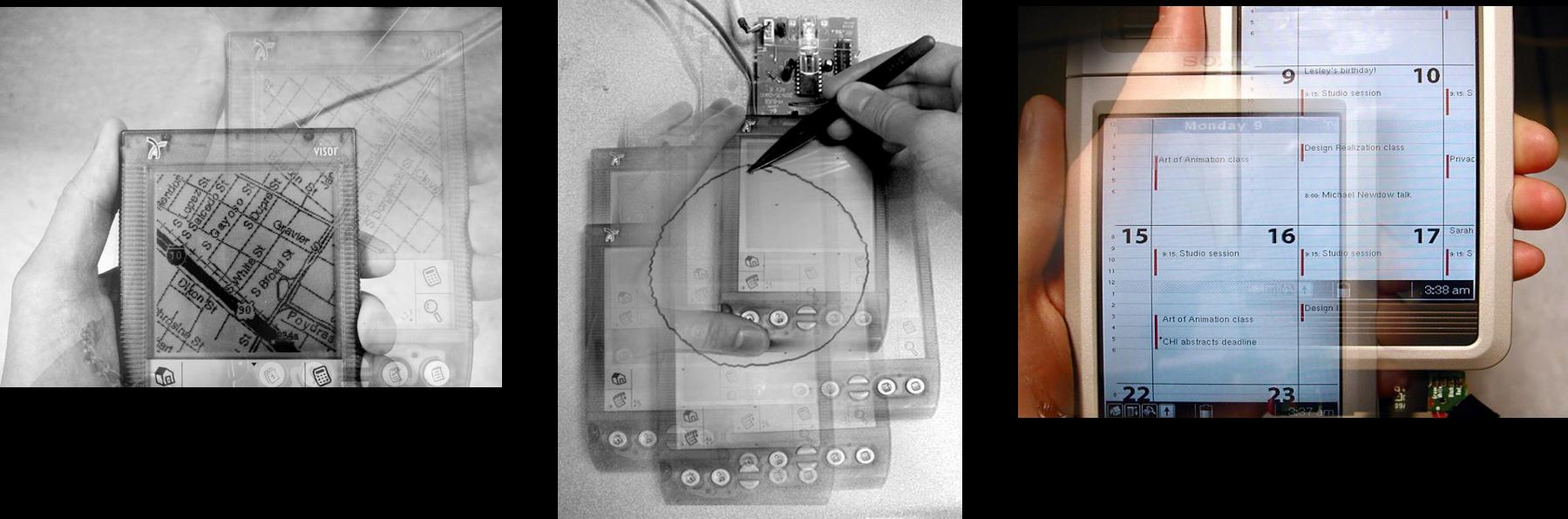
Bricolage (Kumar, 2010)

Regular site:
Content

Mobile site:
Formatting



Peephole Displays

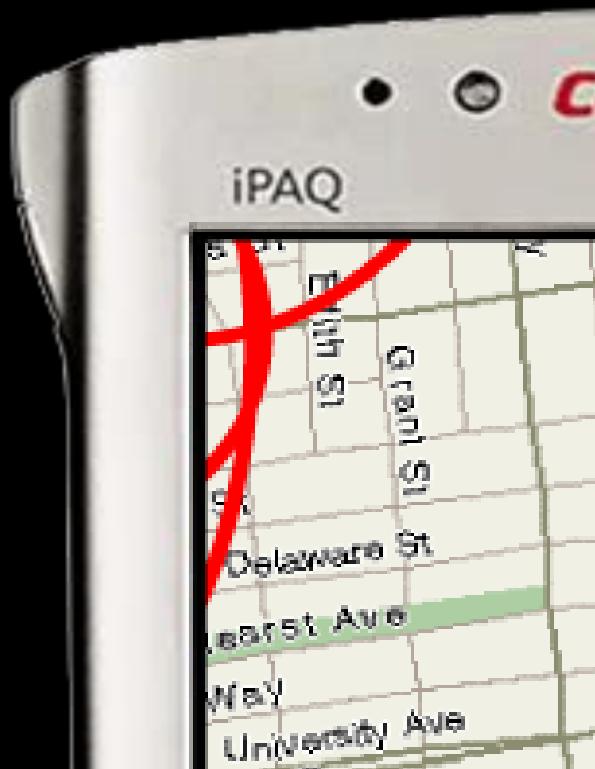


Halo - A Virtual Periphery for Mobile Devices

Providing Visual Cue for Objects Located Out of the Small Screen



Wedge: Clutter-Free Visualization of Off-Screen Locations



halo: clutter problem



wedge: avoids overlap