



User Interface, User Interaction and Product Design

Prof. Giuseppe Riccardi

Dipartimento di Ingegneria e Scienza dell'Informazione

University of Trento

giuseppe.riccardi@unitn.it



UI guidelines in Android

Android Design

GET STARTED ^

- Creative Vision
- Design Principles
- UI Overview

STYLE v

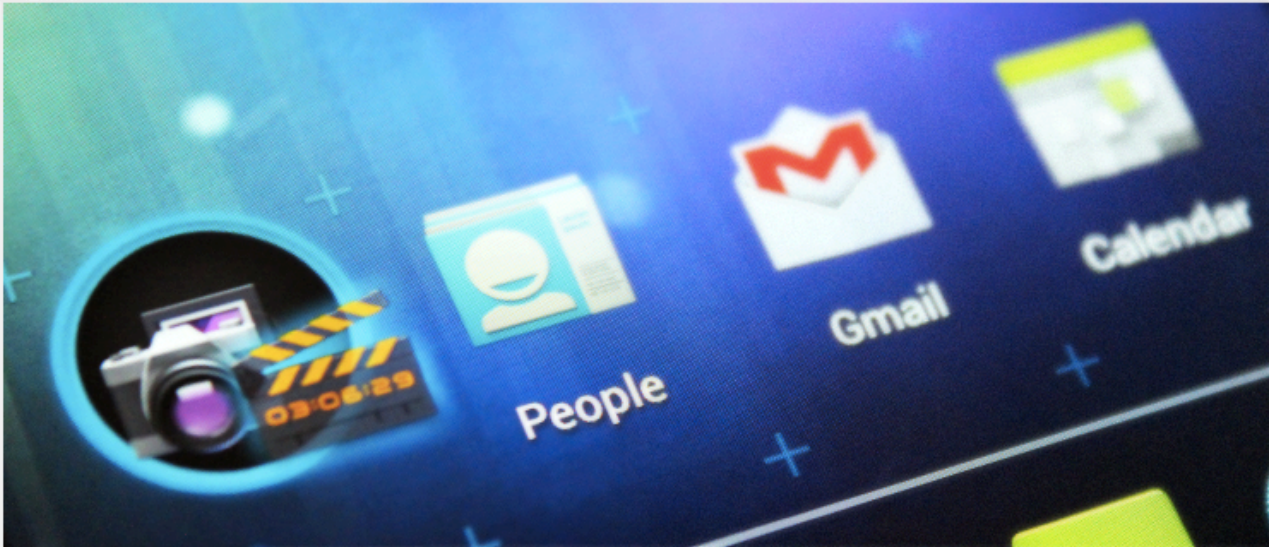
PATTERNS v

BUILDING BLOCKS v

DOWNLOADS

DEVELOPERS

Creative Vision < PREVIOUS NEXT >



Ice Cream Sandwich (Android 4.0) marks a major milestone for Android design. We touched nearly every pixel of the system as we expanded the new design approaches introduced in Honeycomb tablets to all types of mobile devices. Starting with the most basic elements, we introduced a new font, Roboto, designed for high-resolution displays. Other big changes include framework-level action bars on phones and support for new phones without physical buttons.

We focused the design work with three overarching goals for our core apps and the system at large. As you design apps to work with Android, consider these goals:

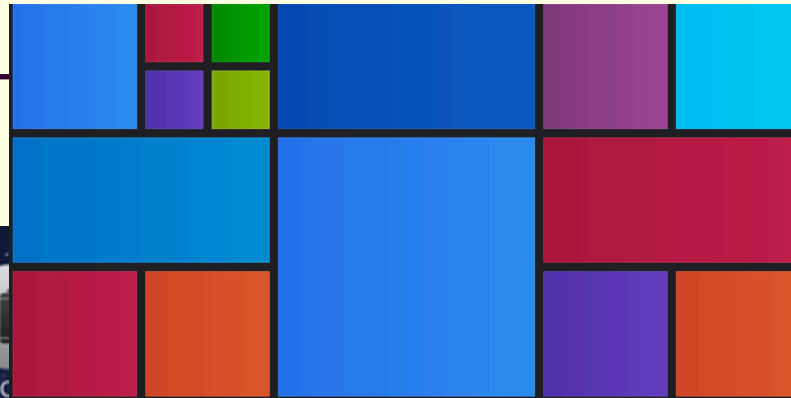


UI Design

Flat Design- Material Design

Windows 8

iOS7

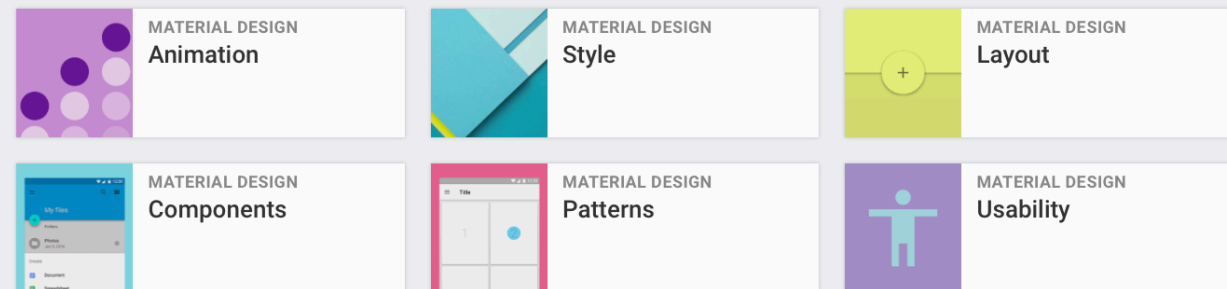


Android



Android uses a new design metaphor inspired by paper and ink that provides a reassuring sense of tactility. Visit the [material design](#) site for more resources.

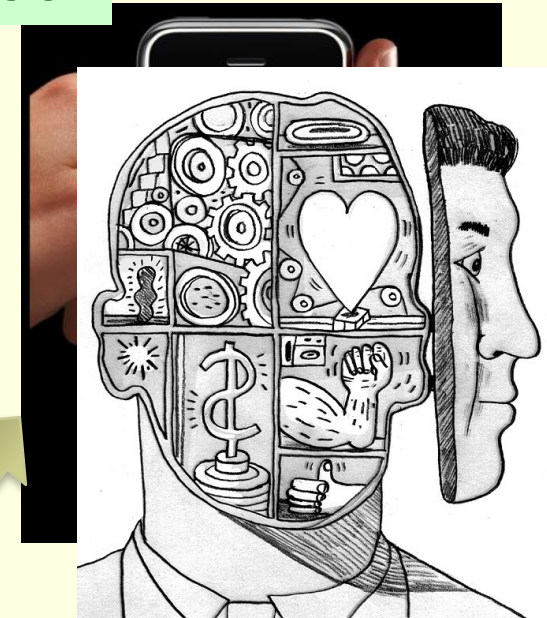
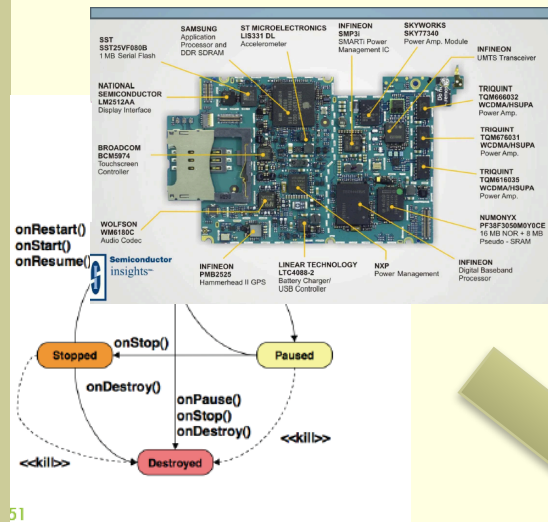
- > Introducing material design
- > Downloads for designers
- > Articles



Product Design

Design and Development

User



Product





On Terminology

- UI may be implemented via a **GraphicalUI**, **MultimodalUI** or **VoiceUI**
- That is where it starts!
- That is when the human-machine **interaction** and **experience** can be grounded into actions as simple as:
 - Clicks, Swipes, Gestures, Typing, Spoken Words
 - In order to **accomplish** or **support** a user task ("Compose an email")
- It applies to designing dyadic interaction as well as more complex n-ary systems.



Why User Interface/Interaction Design

- In a typical mid-large SW project the UI designer function should be present
- In small project teams (people < 2-3) might not be available.
- He/She a minority whereas the team is mostly made of programmers/managers
- It is important that programmers know what UI design is about.
 - Better Communicate SW system development team.
- Programmers might turn into UI designers!



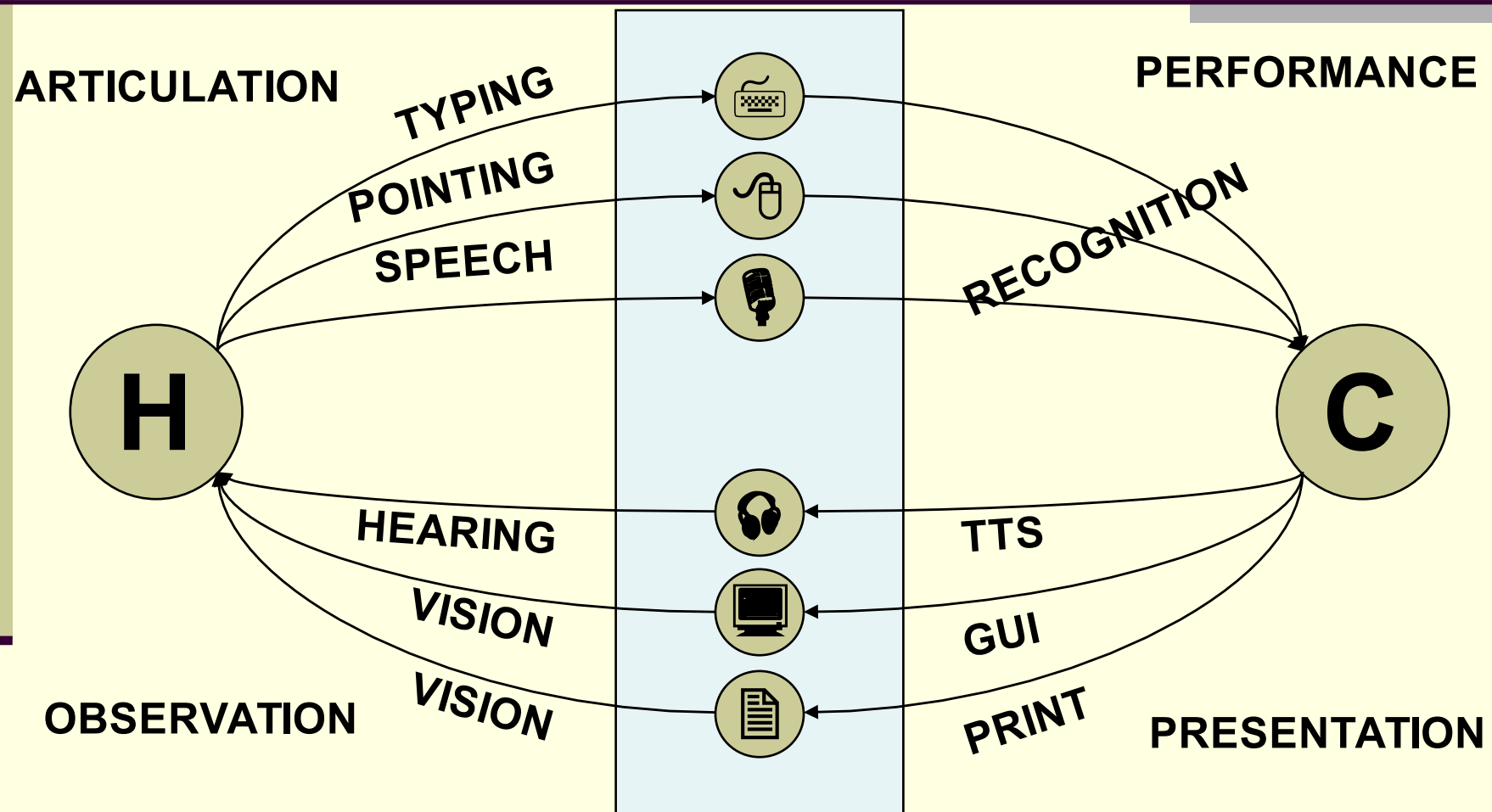
Lecture Plan

- 1st Part
 - User Interface Design
 - Principles (applicable to Human-Machine Interaction Systems)
 - Psychological and Cognitive Motivations

- 2° Part (March 9)
 - User Interaction guidelines
 - App Design Process
 - Examples

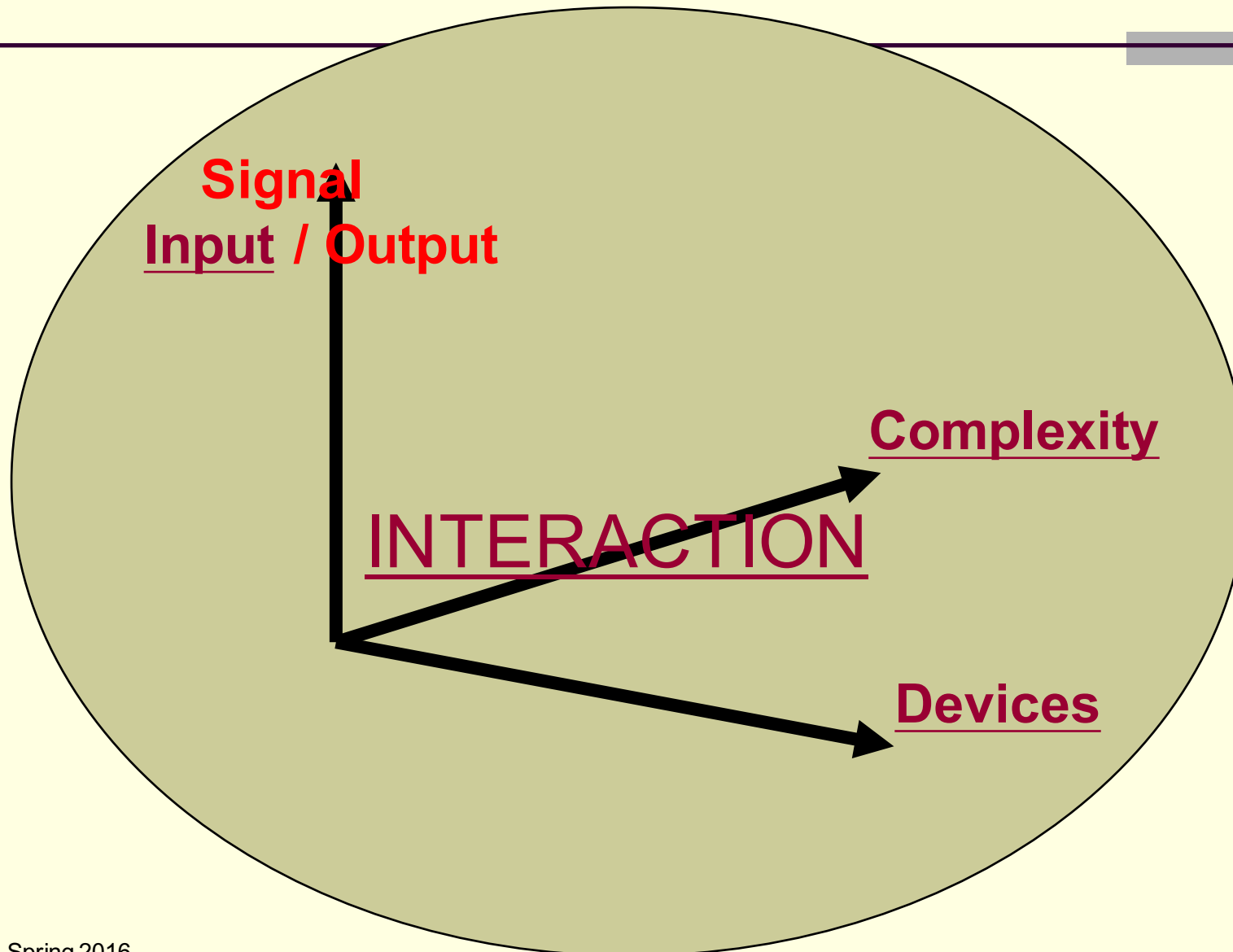


Human - Computer Interaction





De-Constructing Communication





Human Computer Interaction

- Device
 - Input Device: Mouse, Keyboard, Joystick, Audio, ..
 - Output: Speakers, Screen (Virtual Reality Goggles)
- Interface
 - WIMP (Windows, Icons, Menus & Pointers) [Xerox '70s]
- Human-Machine Interaction
 - Multimodal (Speech, Text, Gestures, Haptics, Sensors)

HCI Goals

- U³: Useful & Usable & Used
- Fun
- Esthetics



Demo

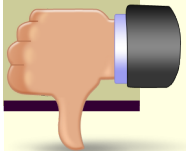
Mobile Phone 1990



Useful



Usable



Used

Repubblica
RadioTV



User Interface Design

- **Educated ART**

- Human Interaction Understanding

- Creativity and Expression (*Skeumorphisms vs Flat design*)

- Based on

- Science (Cognitive, Psychology)

- Engineering

- Goal of Designing interactive systems based on requirements

- SW, HW

- Interaction System (User, Machine)



Bridge Design and Engineering (0)

- Many solutions to the problem of

" Design and Build a bridge from point A to B, that can carry car/truck traffic, pedestrians, be stable in super-windy conditions, earthquakes etc.."



Bridge Design and Engineering (1)





Bridge Design and Engineering (2)





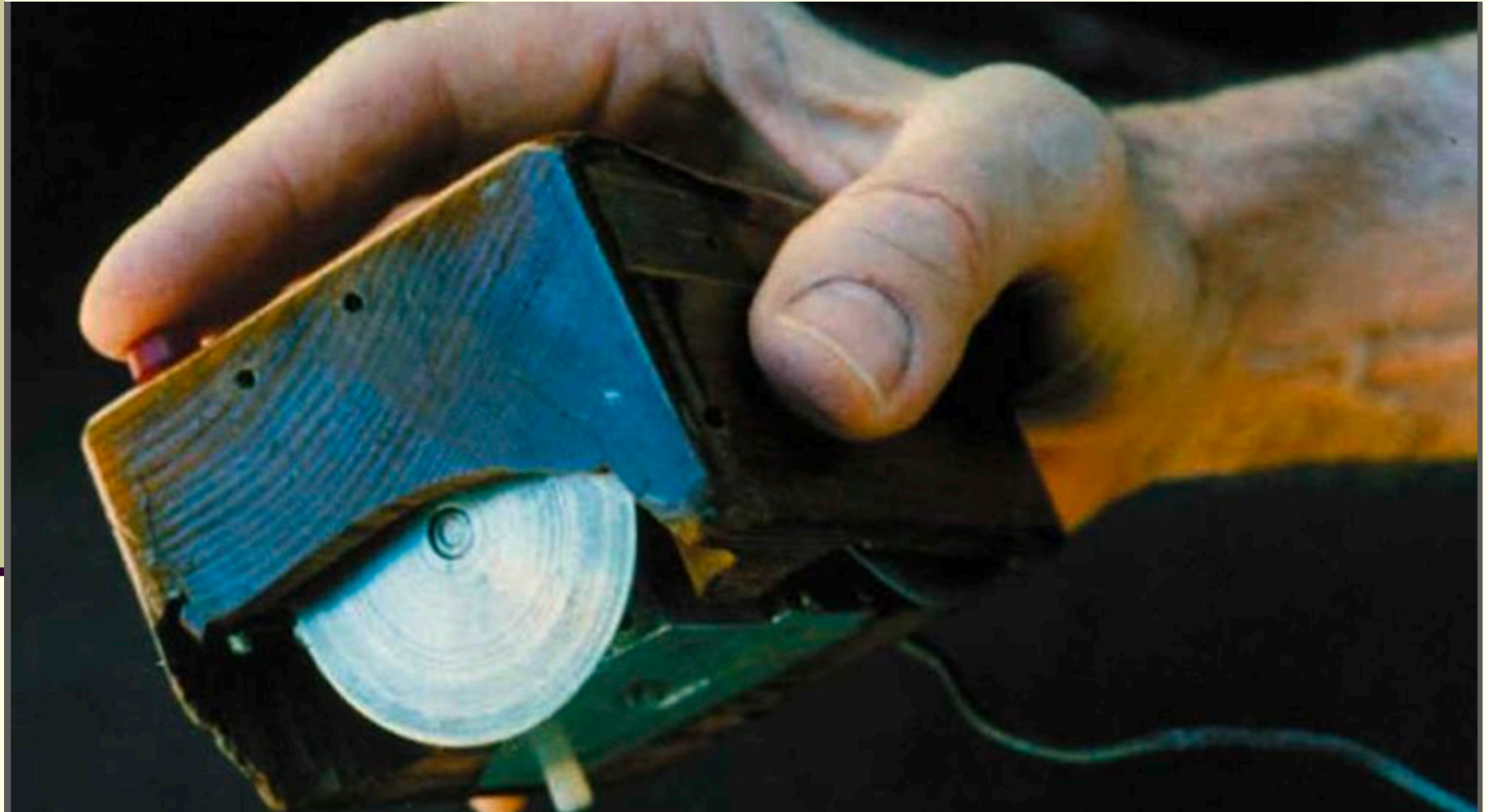
Artifact may require

- Engineering (Technology & Systems)
- Science (Cognitive, Psychology..)
- Aesthetics universals
- User/Social acceptance
- The end-product will be a mix of all of the above to reach a point equilibrium == solution
- **Not unique!**

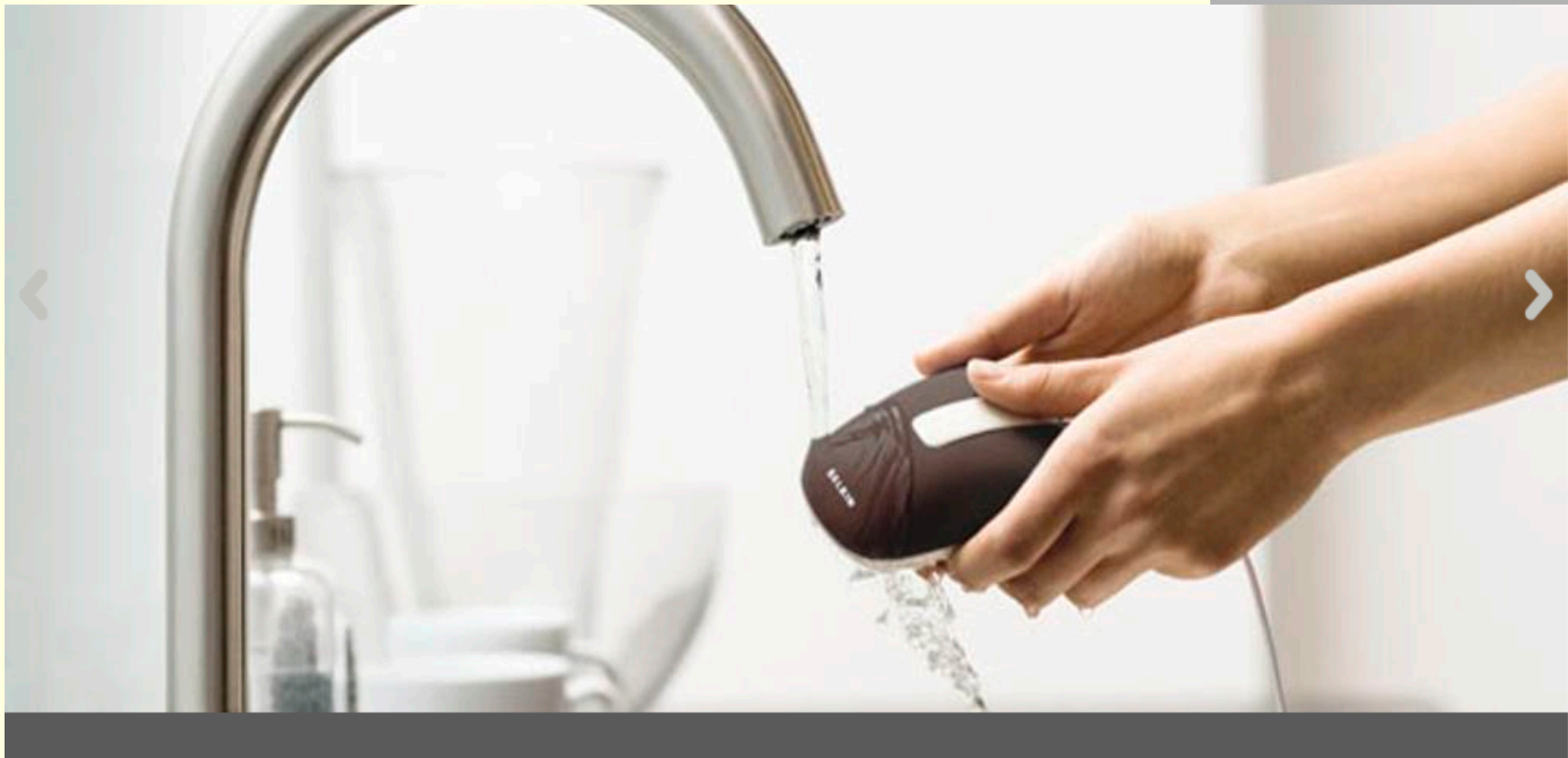


The Evolution of the Mouse

1967-2015







20 / 52

Slide Show



Ormai fuori produzione, il Washable mouse di Belkin poteva essere lavato con acqua senza temere per i circuiti elettronici



26 / 52

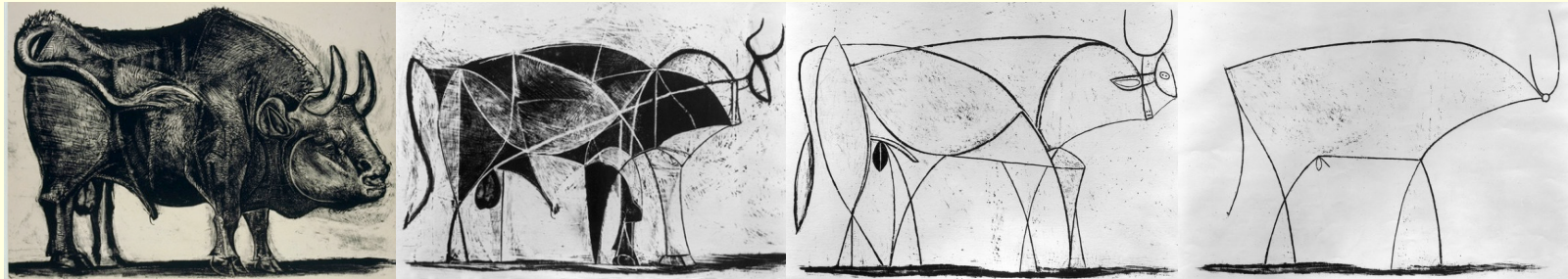
Slide Show





Function \leftrightarrow Aesthetics

Picasso Bull Images



Apple Mouse over time



1985

1992

2005

2009

The design of the TV remote



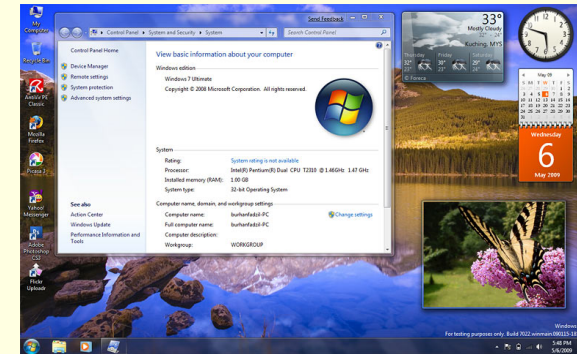


GUI design: Microsoft OS

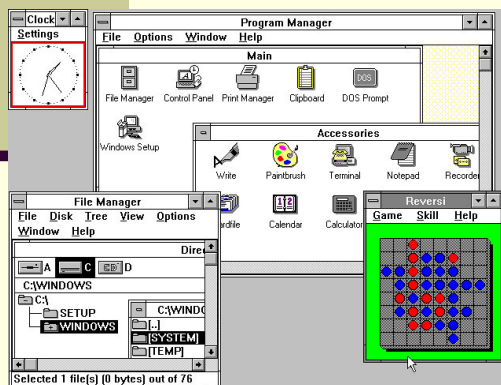
Windows 95



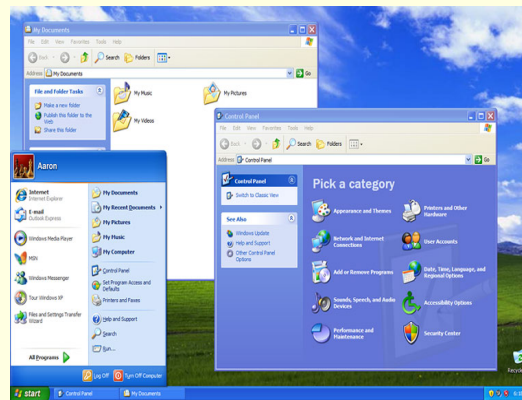
Windows 7



Windows 3.0



Windows XP



Windows 8



1990

1995

2001

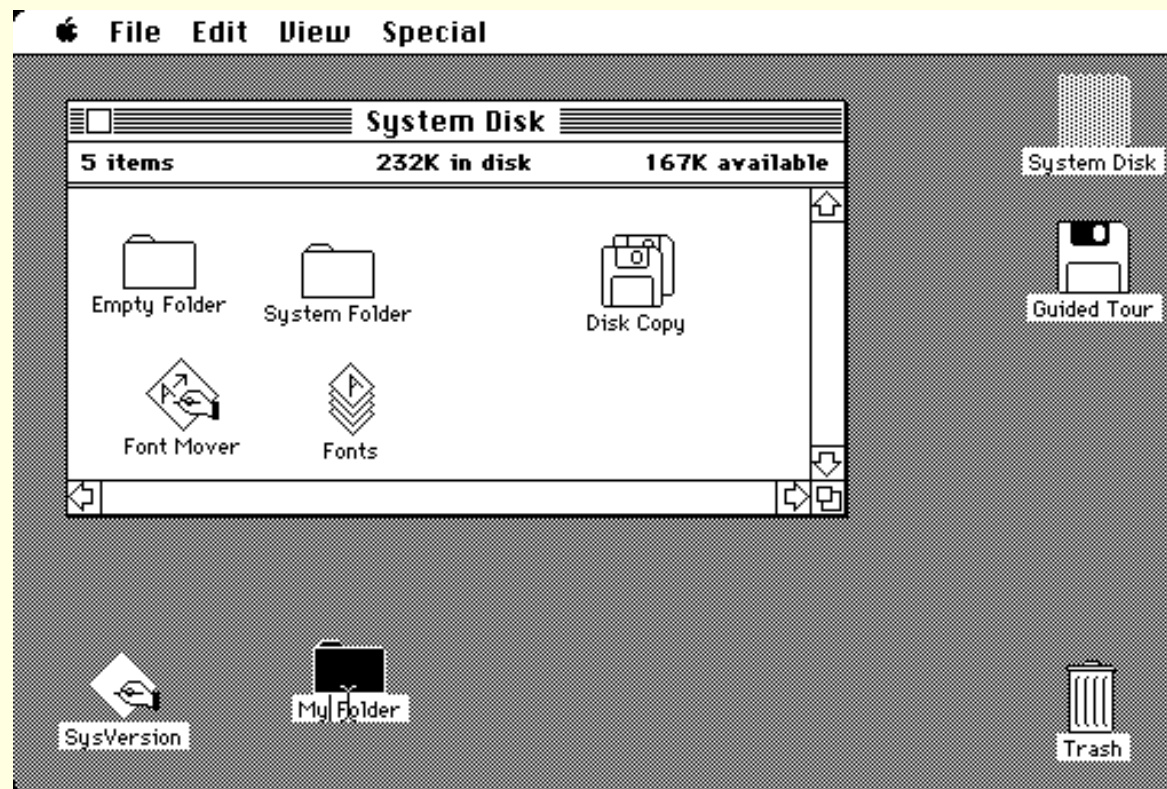
2009

2012



GUI design: Apple OS

1984 - 1.0



1984

1995

2001

2009

2012



GUI design: Apple OS

1997-8.0



1984

1995

2001

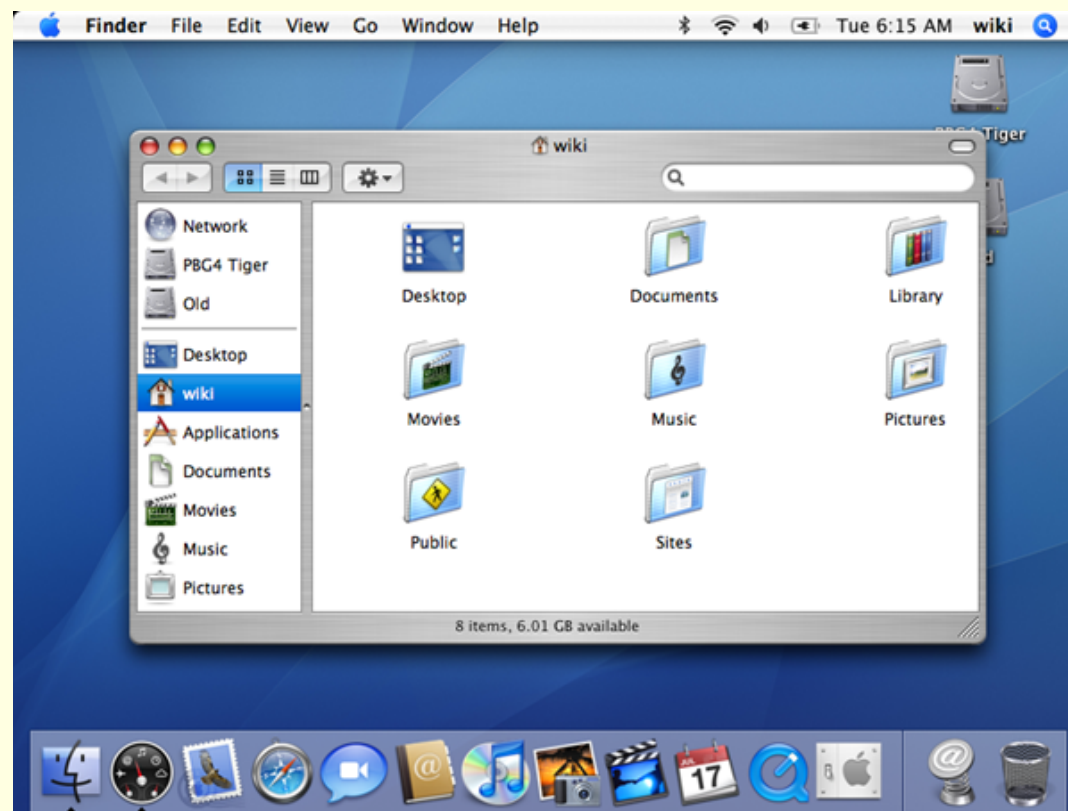
2009

2012



GUI design: Apple OS

2005-10.4



1984

1995

2001

2009

2012



GUI design: Apple OS

2013 - 10.9



1984

1995

2001

2009

2012

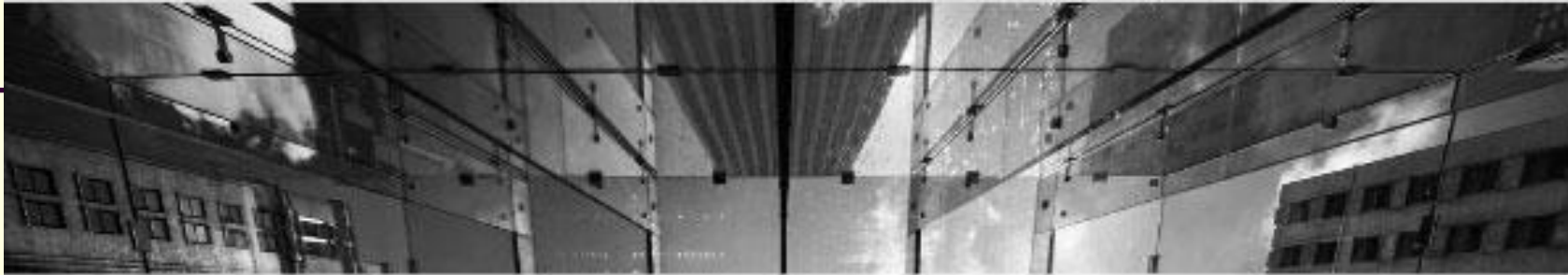


Putting the **USERS** in the Design of UI

- Engineering of Bridge Building
 - DOES not need people to evaluate the solution!
- In HCI systems, users are part of it.
 - They are needed to study and evaluate
- Usability Testing
 - Limited by the number of users and delay btw prototype and final engineered solution



A word of advice from S. Jobs:



“You can't just ask customers what they want and then try to give that to them. By the time you get it built, they'll want something new.”





UI Design Principles

- They guide towards optimal equilibrium of requirements
- Do not provide analytical solution
- Should allow to avoid errors in early phases
 - System, User Requirements, Prototyping
- And not to rediscover each time dos and donts
 - "color blindness"
- They may be **Ambiguous and Contradictory**
- Goal to **UNDERSTAND** the motivations of such principles so to **GUIDED** in executive decisions.



Guidelines - A

(Shneiderman 1987)

- **Strive for Consistency**
- Cater to Universal Usability
- **Offer Informative Feedback**
- Design Task Flows to yield closure
- Prevent Errors
- Permit Easy Reversal of Actions
- Make Users feel They are in Control
- **Minimize Short-Term Memory Load**



Guidelines - B

(Nielsen and Molich 1990)

- Consistency and Standards
- Visibility of System Status
- Match between System and Real World
- User Control and Freedom
- Error Prevention
- Flexibility and Efficiency of Use
- Aesthetics and Minimalist Design
- Help Users Recognize, Diagnose and Recover from Errors
- Provide Online Documentation and Help