

UI guidelines in Android

Android Design

GET STARTED ^

Creative Vision

Design Principles

UI Overview

STYLE

PATTERNS

BUILDING BLOCKS

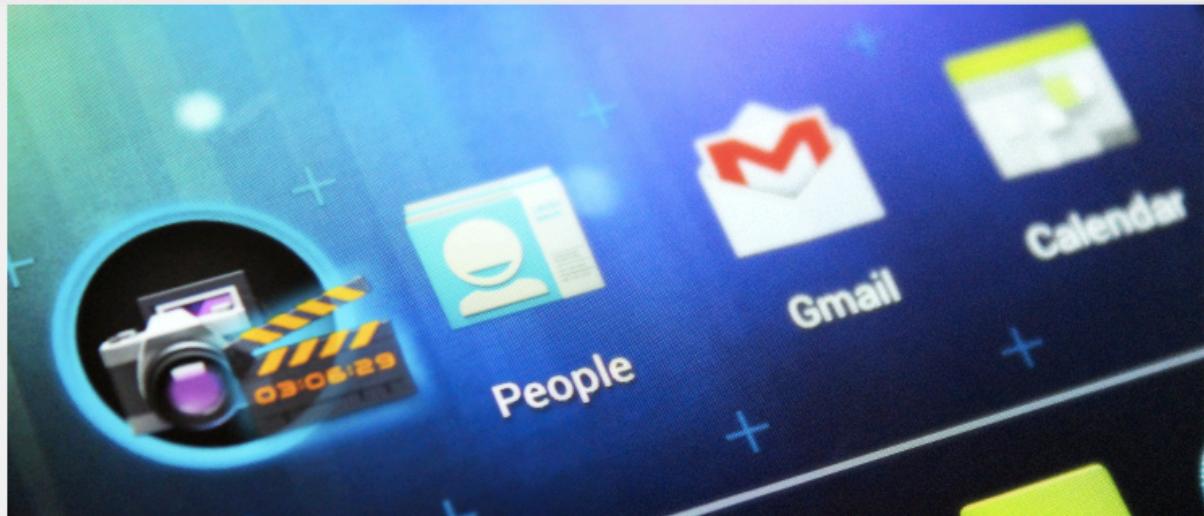
DOWNLOADS

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:



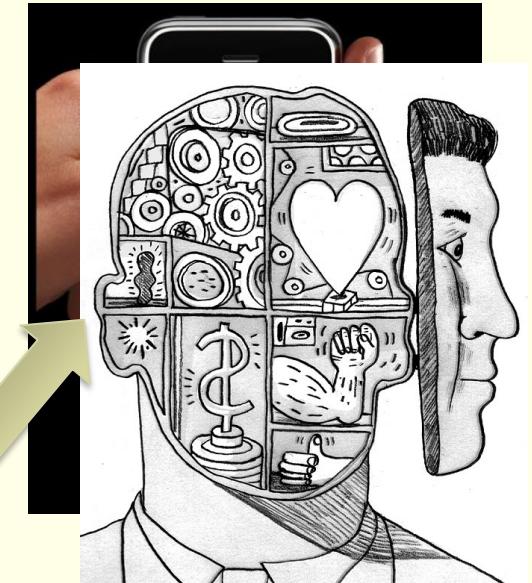
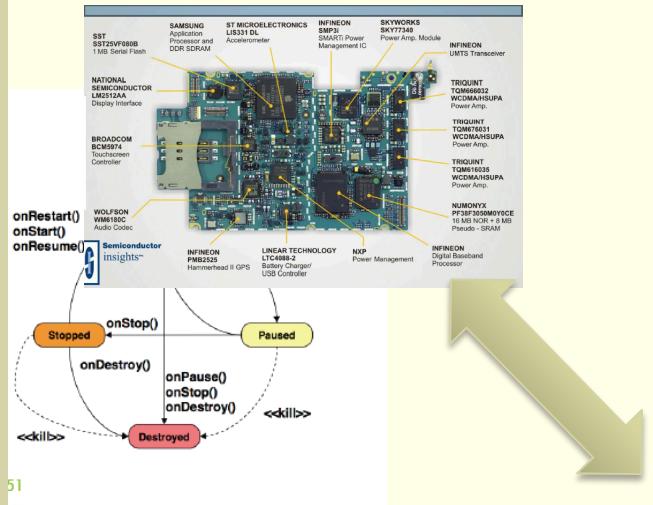
Why User Interface Design? What

Prof. Giuseppe Riccardi

Dipartimento di Ingegneria e Scienza dell'Informazione

University of Trento
riccardi@dit.unitn.it

User Interface





On Terminology

- UI design does not stop at displaying Information via a GUI, MUI or VUI
- That is where it starts!
- That is when the human-machine interaction can be grounded into actions as simple as:
 - Clicks, Taps, Swipes, Gestures, Typing
 - In order to accomplish a task ("Compose an email")
- It applies to designing human-machine interactive systems and NOT only

Why

- 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 any Human-Machine Interface System)
- Psychological and Cognitive Motivations

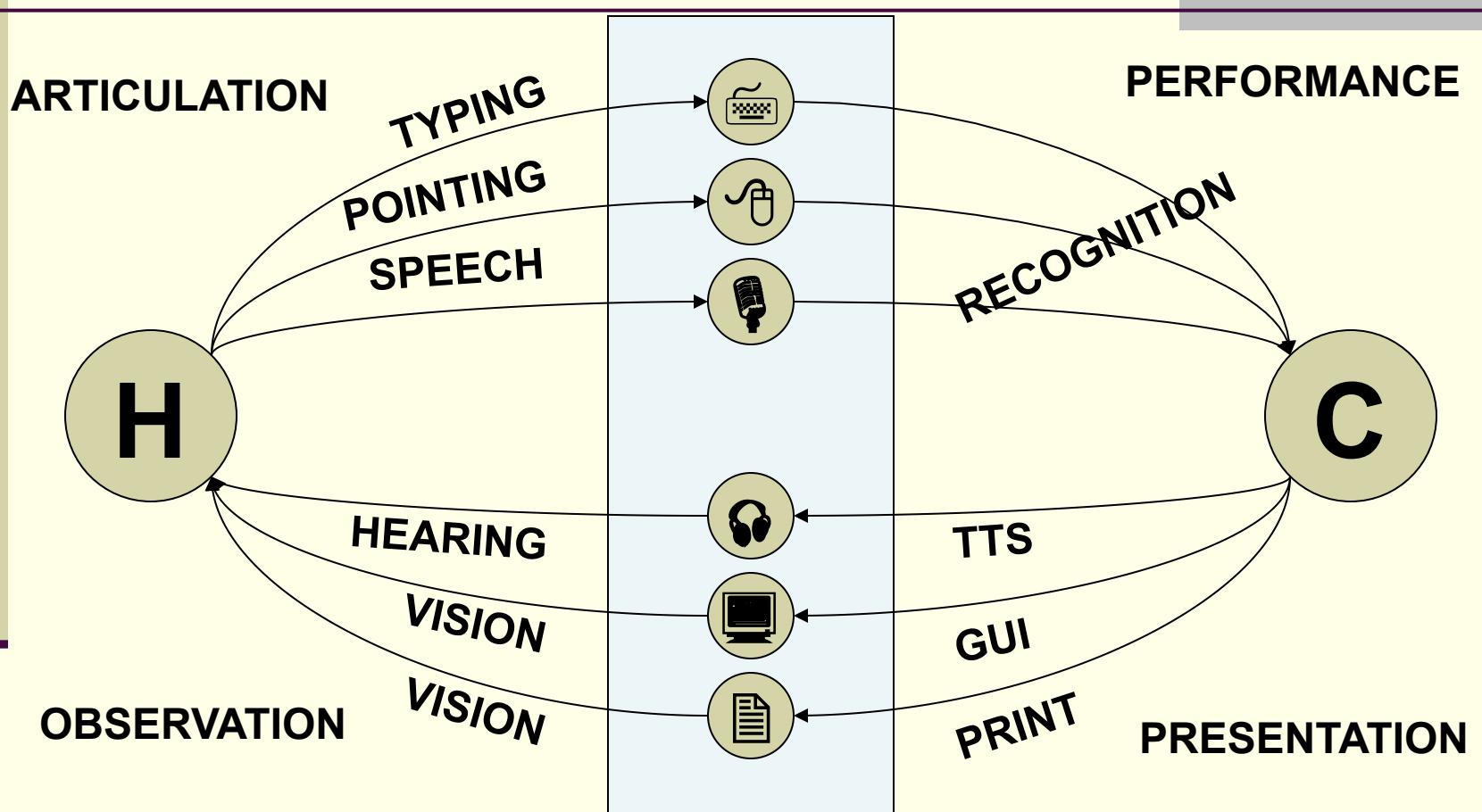
■ 2° Part

■ Mobile UI guidelines

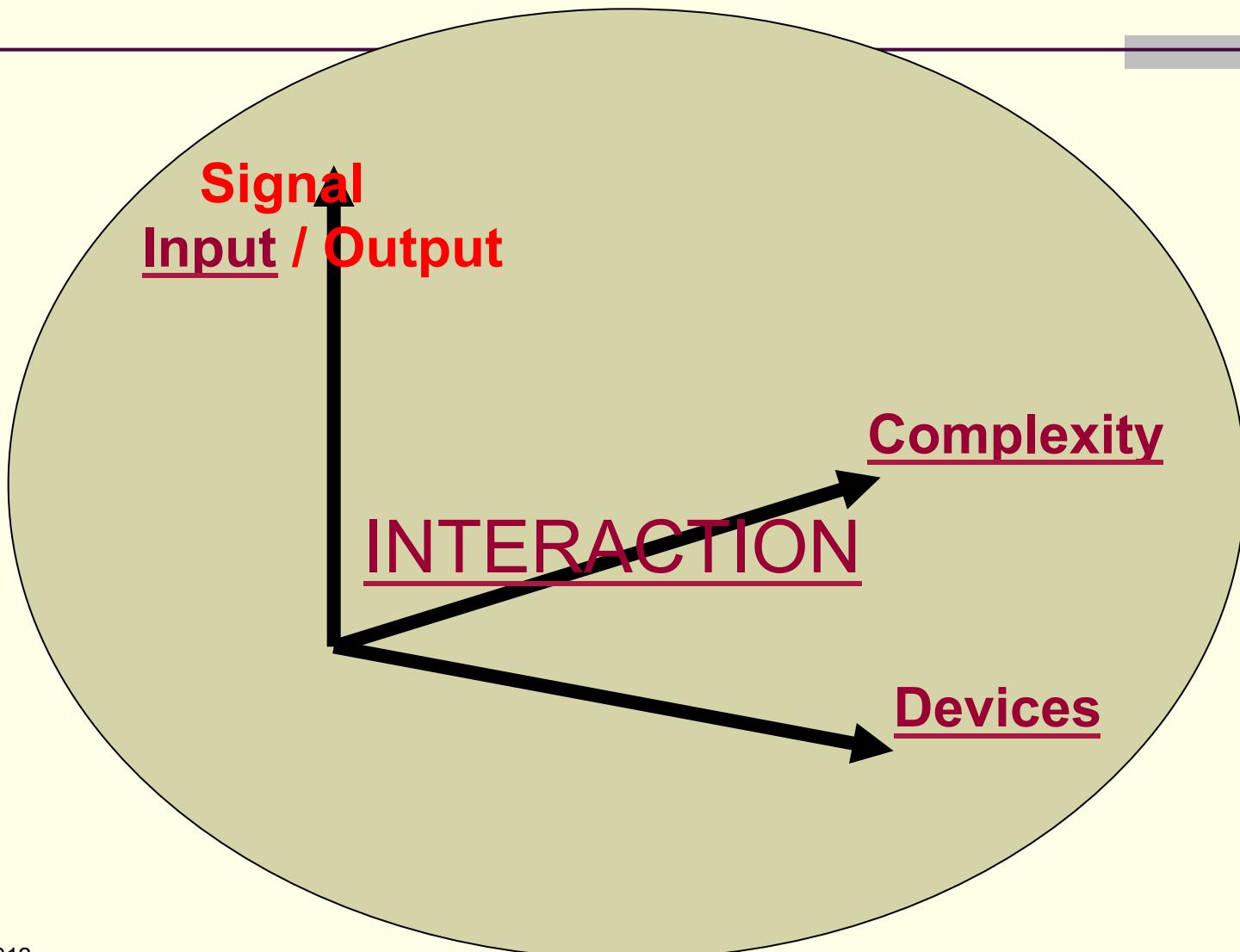
■ Prototyping: WireFraming

■ Examples

Human - Computer Interaction



De-Constructing Communication



Human Computer Interaction

The Interface

■ Device

- Input Device: Mouse, Keyboard, Joystick, Audio, ..
- Output: Screen, Speakers, Virtual Reality goggles

■ Interface

- GUI
- WIMP (Windows, Icons, Menus & Pointers) [Xerox '70s]

■ Human-Machine Interaction

- Multimodal (Speech, Text, Gestures)

■ HCI principles

- U³: Useful & Usable & Used

Demo

Mobile Phone 1990



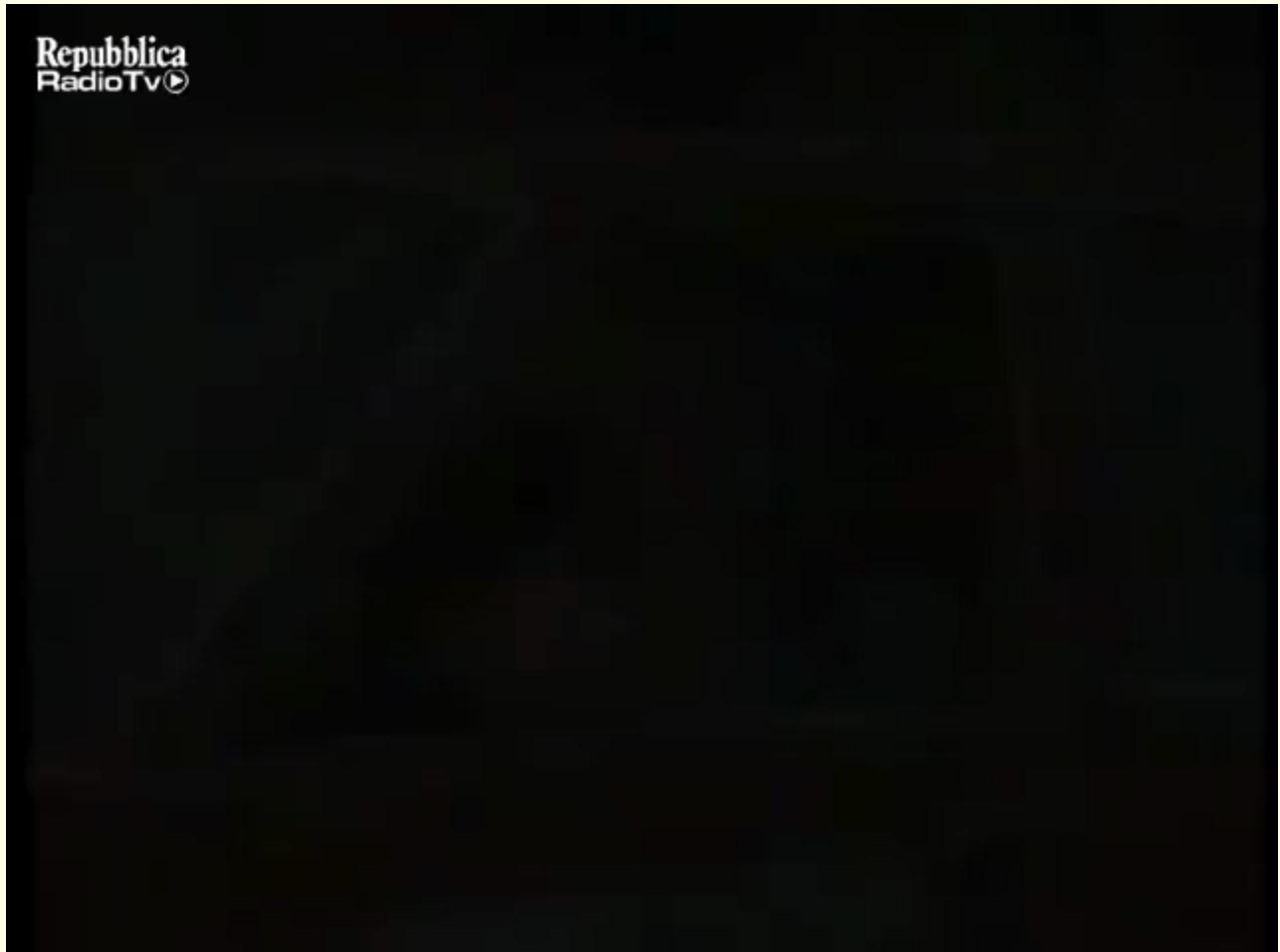
Useful



Usable



Used





Outline

- Intro
- Principles (Design Rules)
- Foundations
 - Perception
 - Vision
 - Attention
 - Memory
 - Task Execution

Reference for the lectures : “**Designing with the mind in mind**”, Jeff Johnson



User Interface Design

- Educated ART
 - Creativity
 - Human Interaction Understanding
- 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)



House design

- Given a set of requirements
 - Location
 - Real estate space
 - Energy saving materials
 - Project costs
- There are many solutions
 - Different Aesthetic appeal
 - Space layouts
 - Expected people behavior

House design: Project 1



House design: Project 2



Artifact requires

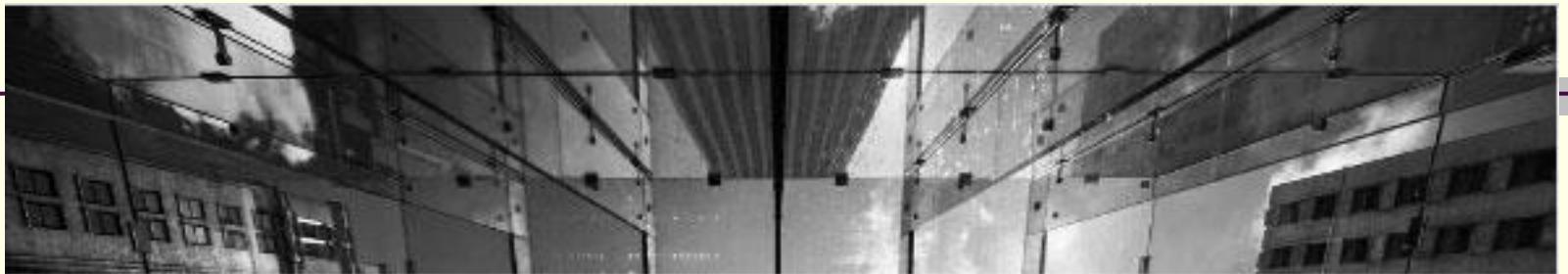
- Science (Cognitive, Psychology..)
- Engineering (Technology & Systems)
- User/Social acceptance
 - Reward ("it takes from A to B, it saves time, it is safe, it is fun! It is beautiful! ")
 - Aesthetics (sensorial information) universals
- Architecture, Industrial, User design
 - Require all of the above to reach a point equilibrium == solution
 - Not unique!



Towards a Science of HCI Systems

- 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 Tasks 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



What they do come from?

- They are inspired from human psychology processes
- Science on how people
 - Perceive
 - Remember
 - Learn
 - Reason
 - Ground Intentions into Actions



Perception

- Perception is the process of interpreting signals being collected by our sense organs into our nervous system.

Hearing , Sight, Smell, Taste, Touch





“Vision”, W. H. Freeman, New York, NY



ATM Transaction

Select Amount

.....

No

Yes



ATM Transaction

Please Confirm Amount

200 \$?

NO

YES



ATM Transaction

Do you want a printed receipt ?

YES

NO



Perception is biased by

-
- Past : Experience or prior information

Language is Ambiguous

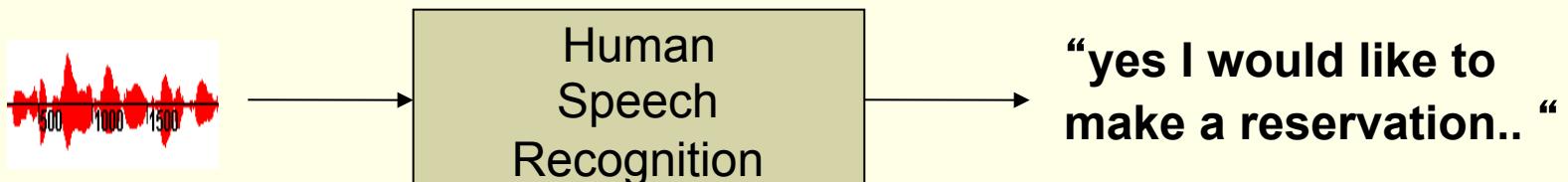
- Giorgio e Luca erano compagni di **banco**
 - Senso → **Mobile**
- Il direttore del **banco** di Napoli
 - Senso → **Istituzione di credito**
- Il nuovo test sara' il **banco** di prova
 - Senso → **Test**
- **Banco ottico**
-



Perception is biased by

- Past : Experience or prior information
- Present : Current Context
 - Also from concurrent signals from different sensorial information (sight & hearing)
 - Influence/Reinforce each other (e.g. lip reading)

“Cocktail Party Problem”



- Human Perception Experiment
- Multiple audio sources
- Humans can “adaptively” **separate** a specific sound source
- Cocktail Party Problem
 - Audio sample 1 source
 - Audio sample 2 source
 - Audio sample 3 source





Perception is biased by

- Past : Experience or prior information
- Present : Current Context
- Future : Our Goals
 - Our goals may filter our perception
 - Example of goal oriented information over web
 - Ignoring information ≠ Do not notice information



Take Away Guidelines

Perception

- **Avoid Ambiguity**
 - Requires effort
- **Be Consistent**
 - Exploit users past experience
- **Understand users' goals**
 - Either be explicit
 - Or Implicitly track them



The Gestalt Theory

Visual Perception

- Psychologists proposed in 20th century to explain how visual perception works
- Supported now by neurophysiological experiments
- Descriptive framework
- Support for graphic and user interface design



The Gestalt Theory

Visual Perception

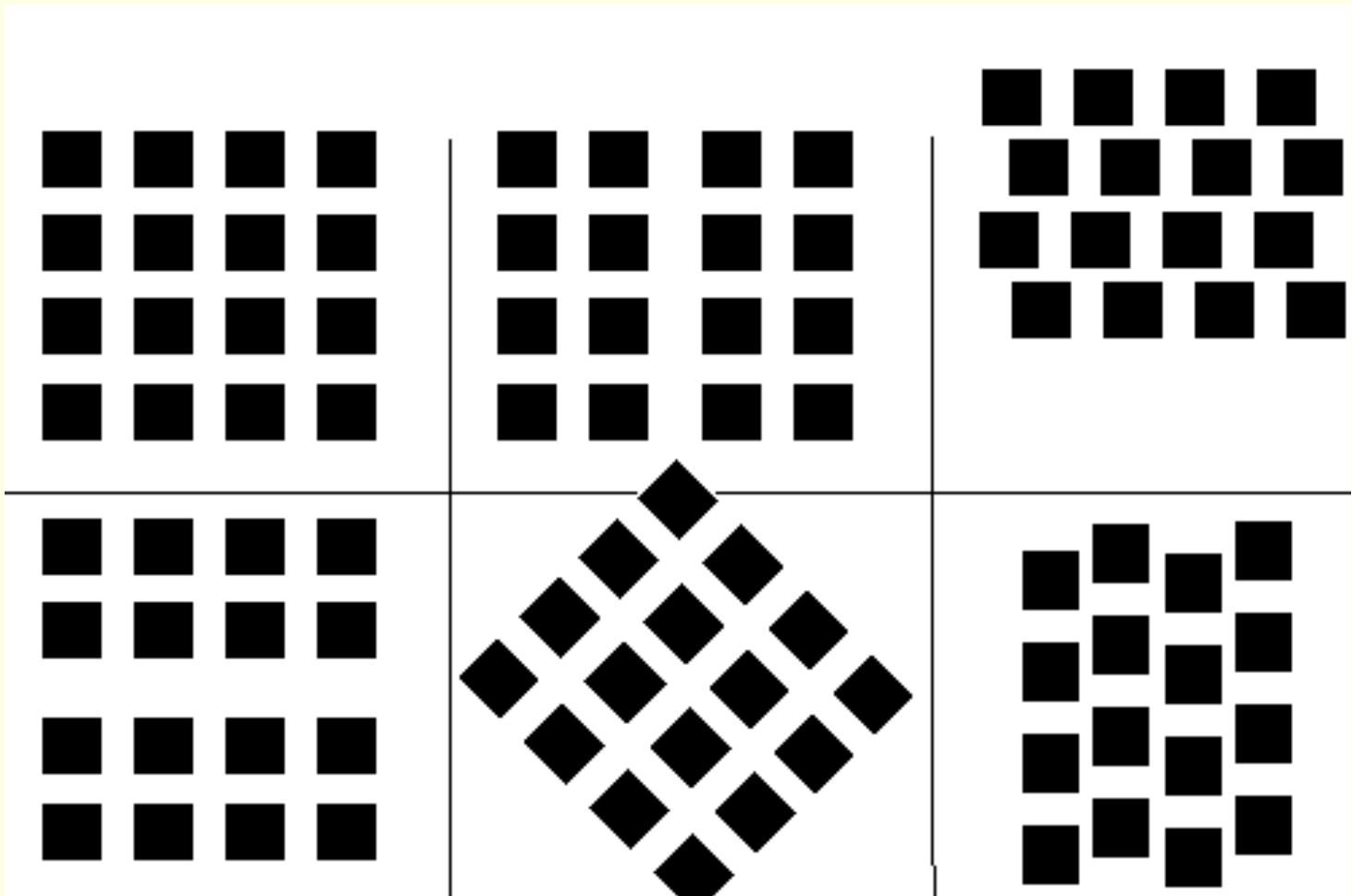
It identifies rules/principles
human visual perception
groups tokens together



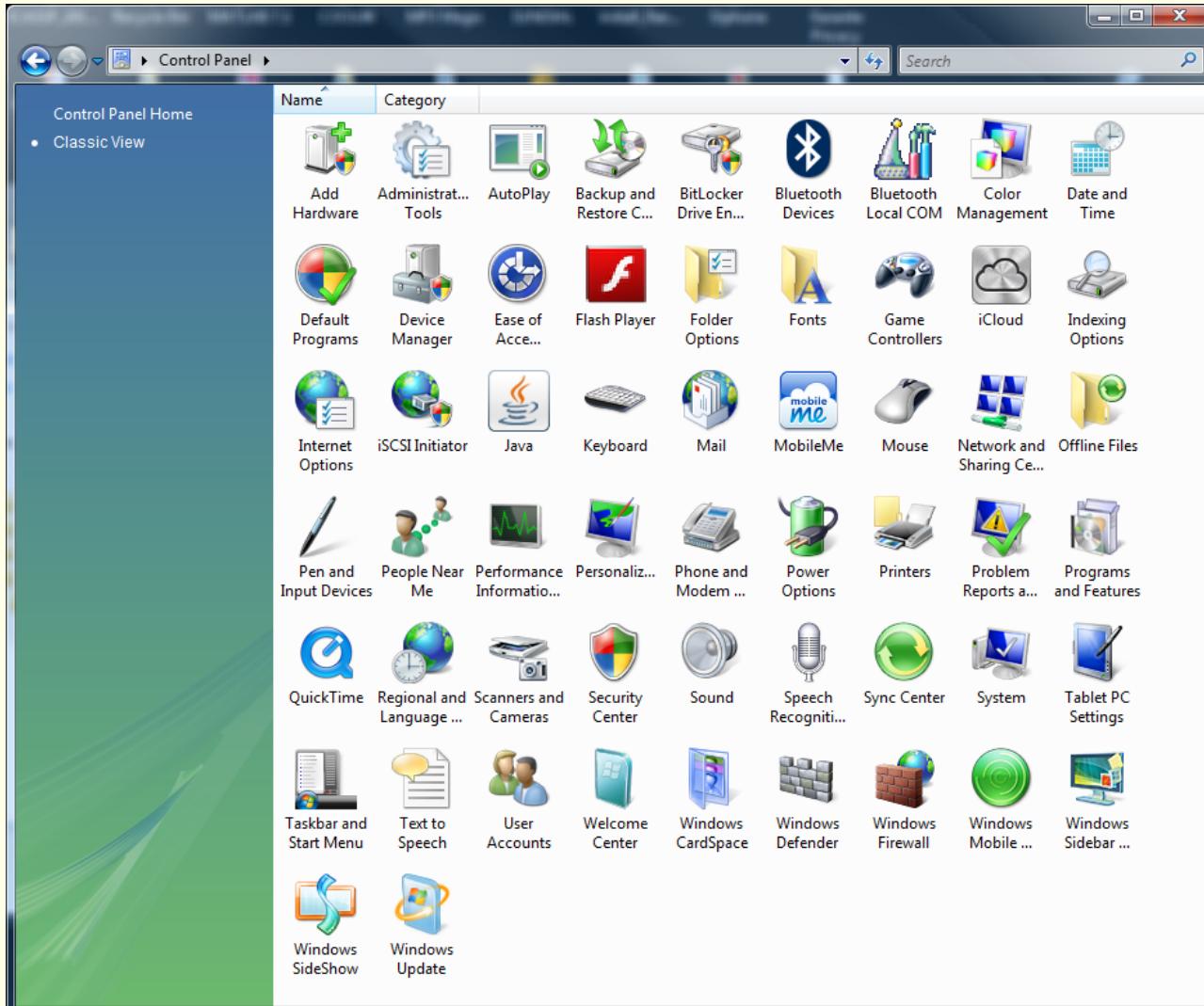
Rules

- Proximity
- Similarity
- Continuity
- Closure
- Symmetry
- Figure/Ground

Proximity (1)



Proximity (2)



Proximity (3)



System Preferences

Show All

Personal

Appearance Desktop & Screen Saver Dock Exposé & Spaces Language & Text Security Spotlight

Hardware

CDs & DVDs Displays Energy Saver Keyboard Mouse Trackpad Print & Fax Sound

Internet & Wireless

MobileMe Network Bluetooth Sharing

System

Accounts Date & Time Parental Controls Software Update Speech Startup Disk Time Machine Universal Access

Other

DivX Flip4Mac WMV Growl TeX Distribution



Proximity (4)

Terminal — bash — 80x24

```
Giuseppe-Riccardis-MacBook-Air:~ beppe$ ls
Applications           Library          Public
Desktop                Movies           Send Registration
Documents              Music            Sites
Downloads              NetBeansProjects sharing_vista
Dropbox                Pictures

Giuseppe-Riccardis-MacBook-Air:~ beppe$ ls -la
total 64
drwxr-xr-x+ 31 beppe  staff   1054 Mar  26 11:31 .
drwxr-xr-x   5 root   admin    170 Mar   2  2011 ..
-rw-----  1 beppe  staff     3 Mar   2  2011 .CFUserTextEncoding
-rw-r--r--@ 1 beppe  staff  15364 Apr  18 14:34 .DS_Store
drwx----- 2 beppe  staff    68 Apr  22 16:36 .Trash
drwxr-xr-x  5 beppe  staff   170 Oct   6  2011 .android
-rw-----  1 beppe  staff  4552 Apr   6 15:16 .bash_history
drwx----- 3 beppe  staff   102 Mar   5  2011 .cups
drwx----- 14 beppe  staff   476 Apr  22 16:40 .dropbox
drwxr-xr-x  5 beppe  staff   170 Jun  23  2011 .editix
drwxr-xr-x  3 beppe  staff   102 Feb   9 16:40 .m2
drwxr-xr-x  4 beppe  staff   136 Sep  12  2011 .netbeans
drwxr-xr-x  2 beppe  staff    68 Apr   1  2011 .spss
drwx-----  3 beppe  staff   102 Apr   1  2011 .ssh
drwxr-xr-x  4 beppe  staff   136 May  30  2011 .sysdb20
Spring -rw-----  1 beppe  staff   912 Feb   9 16:00 .viminfo
```



Similarity

Page Setup

Size

Slides sized for: On-screen Show (4:3)

Width: 25.4 cm

Height: 19.05 cm

Orientation

Slides:

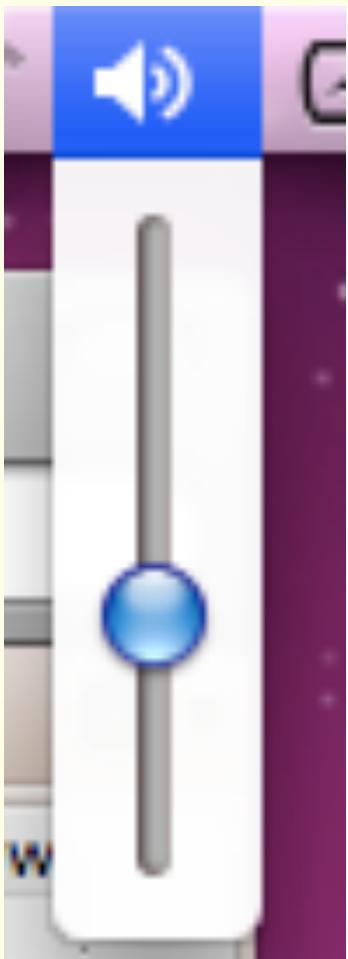
Notes, handouts & outlines:

Header/Footer... Options... Cancel OK

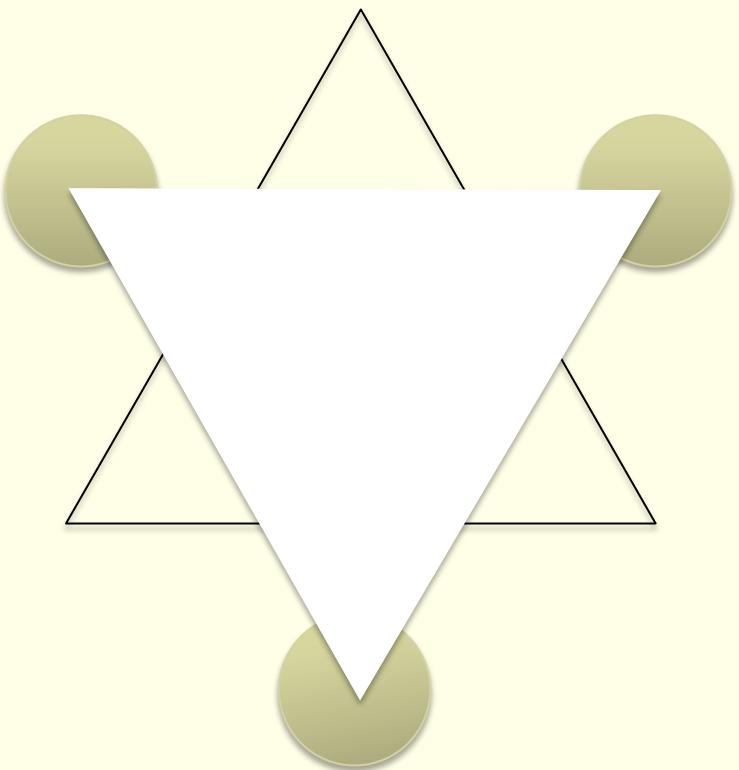
Continuity (1)



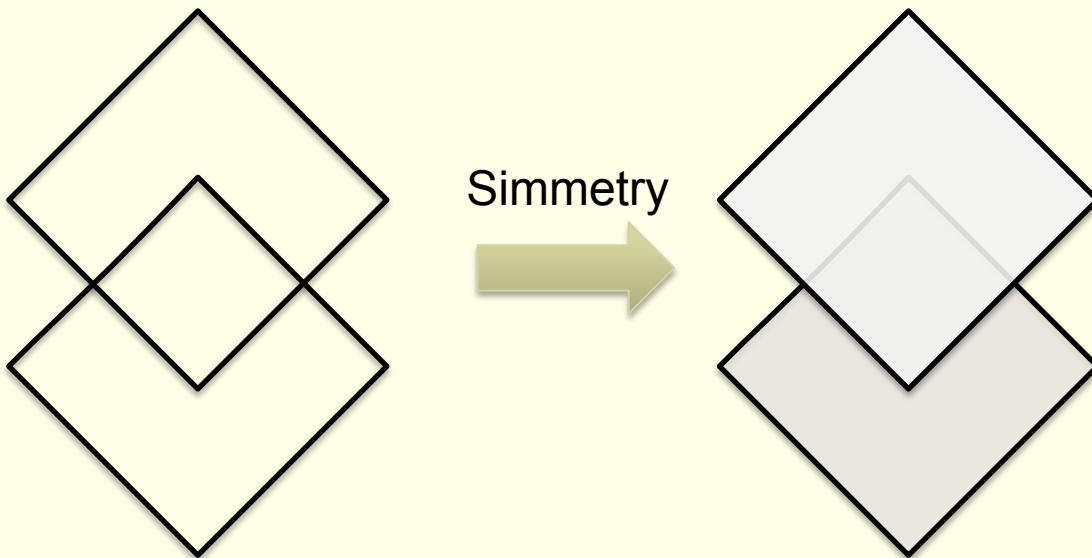
Continuity (2)



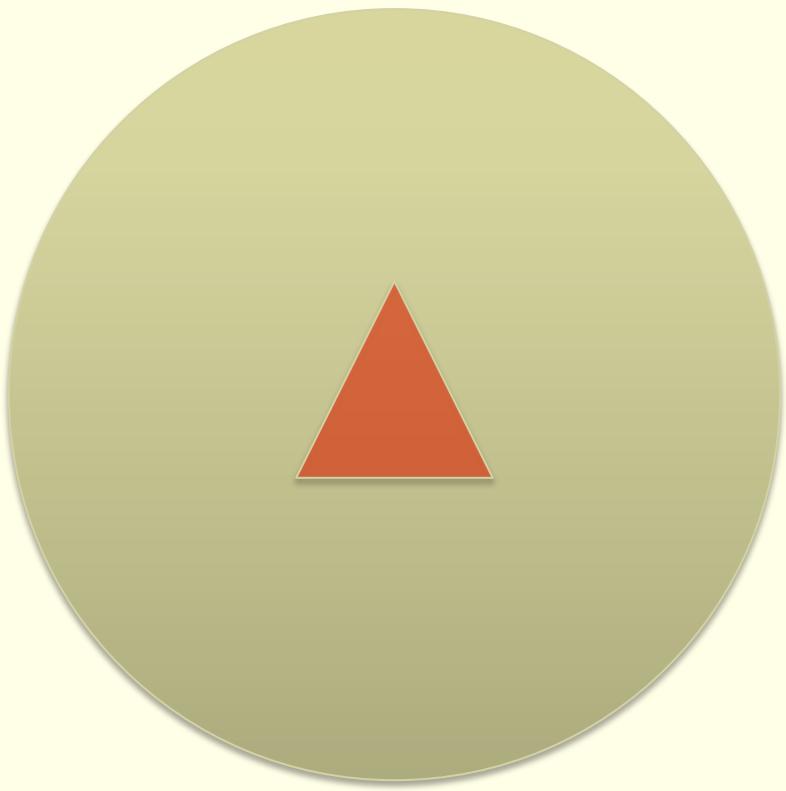
Closure (1)



Simmetry



Figure/Ground (1)

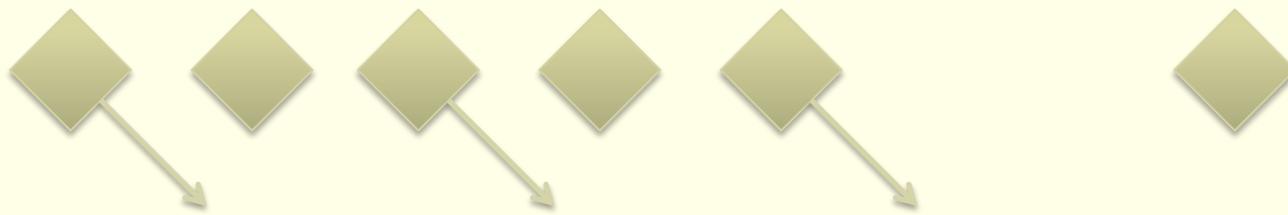


Figure/Ground (2)



Common Fate

Moving Objects





Closure-Symmetry-Continuity





Signals & Interactive Systems



Homework

- Select **three** smartphone (Android/Iphone) apps that you evaluate being for a given task and motivate it. What it does, Why you like, etc..

UI guidelines to build Your App

Android Design

GET STARTED ^

Creative Vision

Design Principles

UI Overview

STYLE

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BUILDING BLOCKS ▾

DOWNLOADS

DEVELOPERS

< PREVIOUS

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The screenshot shows the 'Creative Vision' section of the Android Design website. The page has a light gray header with the title 'Creative Vision' in blue. Below the header is a navigation bar with links: 'GET STARTED' (with a dropdown arrow), 'Creative Vision' (which is the active page), 'Design Principles', 'UI Overview', 'STYLE', 'PATTERNS', 'BUILDING BLOCKS' (with a dropdown arrow), 'DOWNLOADS', and 'DEVELOPERS'. To the right of the navigation bar are 'PREVIOUS' and 'NEXT' buttons. The main content area features a large image of an Android smartphone home screen with various app icons like 'People', 'Gmail', and 'Calendar'. The text 'Ice Cream Sandwich (Android 4.0) marks a major milestone for Android design.' is displayed below the image.

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:



App Structure

Apps come in many varieties that address very different needs. For example:

- Apps such as Calculator or Camera that are built around a single focused activity handled from a single screen
- Apps such as Phone whose main purpose is to switch between different activities without deeper navigation
- Apps such as Gmail or the Play Store that combine a broad set of data views with deep navigation

Checklist

- Find ways to display useful content on your start screen.
- Use action bars to provide consistent navigation.
- Keep your hierarchies shallow by using horizontal navigation and shortcuts.
- Use multi-select to allow the user to act on collections of data.
- Allow for quick navigation between detail items with swipe views.



UI guideline docs in iOS

iOS Developer Library

iOS Human Interface Guidelines

Table of Contents

Introduction

Platform Characteristics

Human Interface Principles

App Design Strategies

Case Studies: Transitioning to iOS

User Experience Guidelines

iOS Technology Usage Guidelines

iOS UI Element Usage Guidelines

Custom Icon and Image Creation Guidelines

Revision History

Next

PDF



App Design strategies

- Create an Application Definition
- List All the Features You Think Users Might Like
- Determine Who Your Users Are
- Filter the Feature List Through the Audience Definition
- Review
- Prototype and Iterate

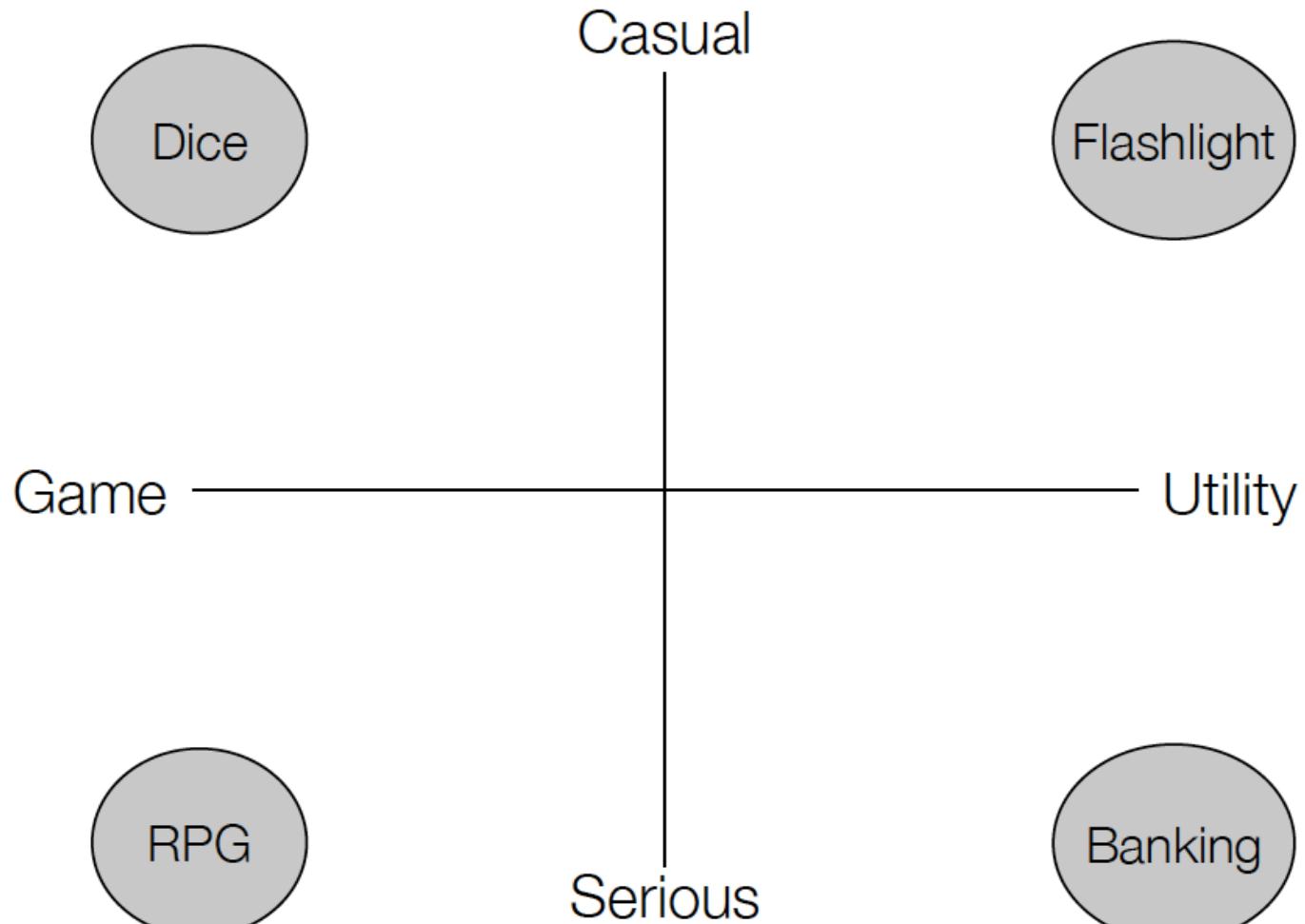


Extreme Use Cases

- 60 SECONDS use case
 - Soccer match scores, weather, stock quotes..

- 60 MINUTES use case
 - Video watching, Reading (emails) , Writing (blogs) , making dinner plans..

Extreme Use Cases





12 Myths of Mobile User-Interface Design

Over the years (2005 A. Marcus and adapted)

- Users want power and aesthetics.
Features are everything
- What we really need is a Swiss army knife
- 3G ~~is~~ e!
- Focus groups and other traditional market analysis tools are the best way to determine user needs
- If it works in New York, it will work anywhere
- The killer app will be games, --er, no, I mean, nightlife, or gps.... uh...



- Mobile devices will essentially be phones, organizers, or combinations, with maybe music/video added on
- The industry is converging on a UI standard
- Highly usable systems are just around the corner
- One existing operating system will dominate
- Mobile devices will be free-or nearly free
- Advanced data-oriented services are just around the corner





APP concept: create a story

I want to easily create a shopping list easily, quickly and share it with my family.

I want to check how much exercise while I go to work, do sports and share it with my doctor

I want to know where is the cheapest gas station wherever I am considering the mileage to reach it.

I want to tell my camera when is the best timing/lighting for me to shoot a picture

I want to plan my next summer vacation in the countryside and select from friends' advices and social websites

I want to monitor my and improve my mnemonic skills



The Story; Where and When

- At the office during a meeting
 - At home, with my kids
 - On Vacation with my friends
 - 24/7
 - A teacher with 1-10 grades students in class
 - Recruiter on face-to-face interviews
-



UI prototyping: **Wireframing**

UI schema of application

- Visual layout and its elements (e.g. action bars)
- Functions of the elements (e.g. input text box)
- Navigation flow and rules
- Effect of interaction context on the visual state

DOES NOT focus on graphics **RATHER** on app user
action dynamics and behavior in context
HOW: pencil, drawings, board and tools



Wireframing tools



Sketching and Prototyping with Firefox
PENCIL PROJECT

Works both as a Firefox plugin and standalone installation on windows, mac, and Linux

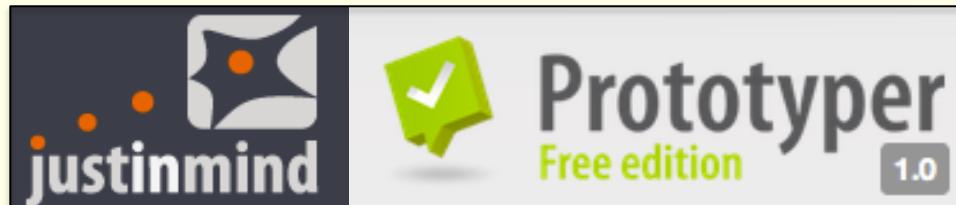
<http://pencil.evolus.vn/en-US/Downloads/Application.aspx>



WireframeSketcher

Works both as an Eclipse plugin and Standalone installation on windows, mac and Linux

<http://wireframesketcher.com/download.html>



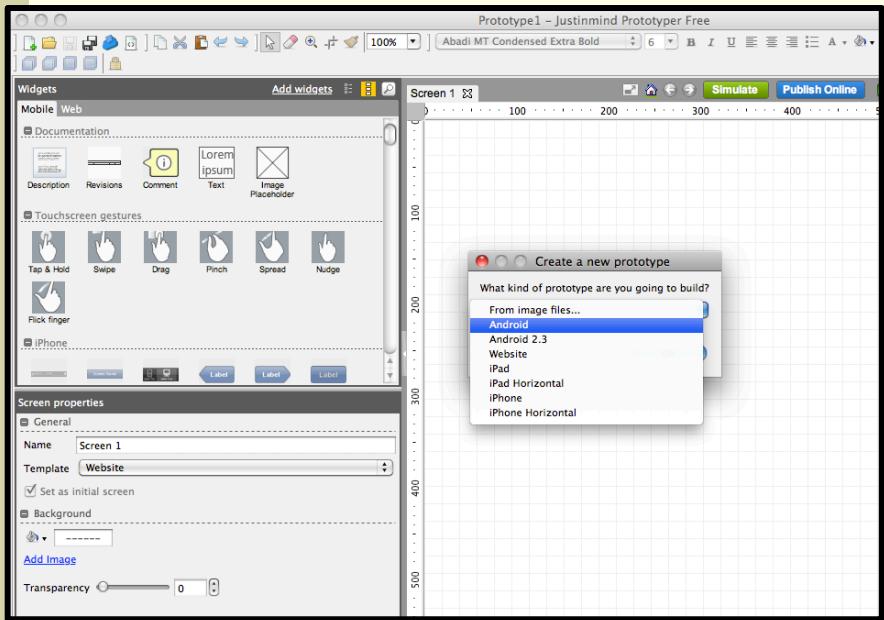
Standalone installation on windows, and mac

<http://www.justinmind.com/prototyper/download>

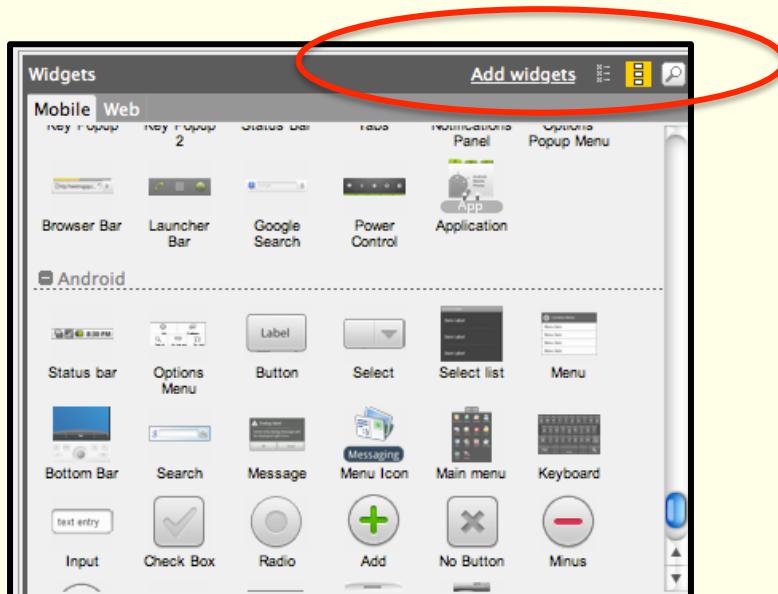


Justinmind Prototyper free

Download and Install the Justinmind Prototype



Install the Android widget
<http://www.justinmind.com/prototyper/widgets-mobile>

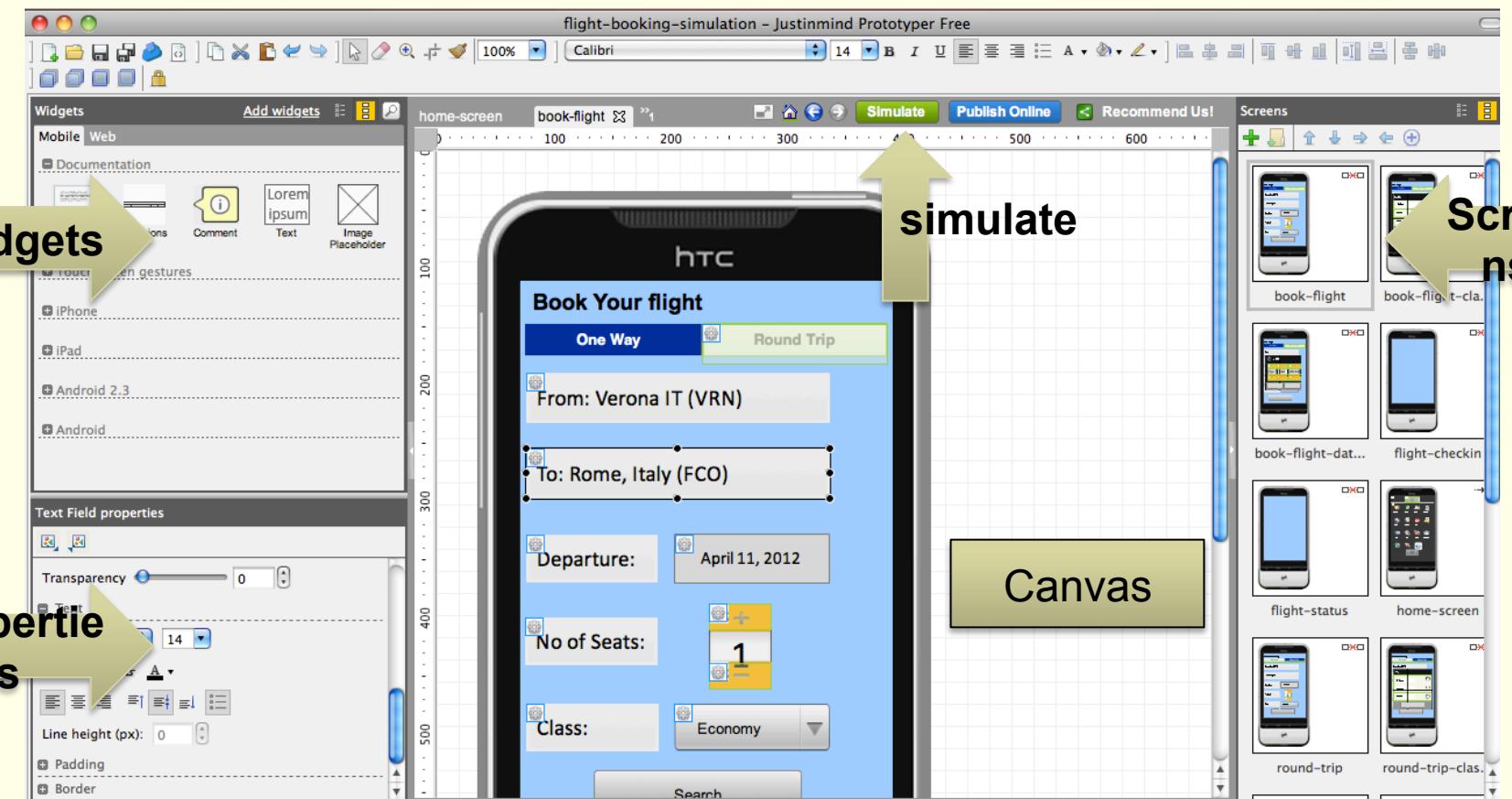




Features

- **No programming required.** Justinmind Prototyper is an intuitive tool. Just drag the components or interactions that you need from the palettes to the work area.
- **Instant Simulations.** See your application's prototype in action by simply clicking the Simulate button. No waiting required.
- **Exportable to HTML.** Export to HTML effortlessly, so that your clients or users can see it work online and give you their opinion.

The Tool



Widgets

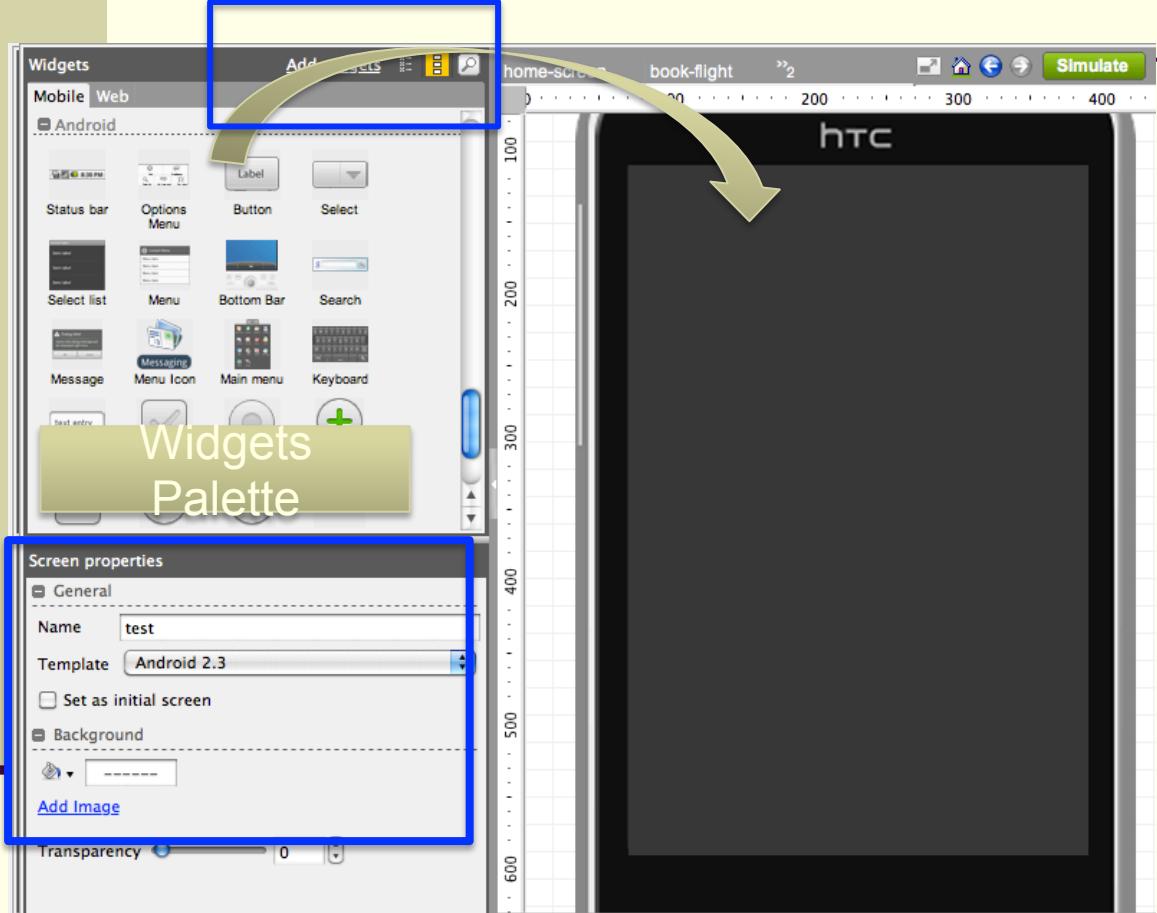
simulate

Screens

Canvas

Properties

Prototyping



- 1) The Widgets Palette contains the main widgets for mobile and web prototyping.
- 2) Once you add the Android Widgets from the website, you should get various Android Controls.
- 3) Drag and drop them to the Canvas.
- 4) Change the Properties to adjust the look and feel.

Add Screens



Click on the **+** symbol under the Screens Palette to add a new screen



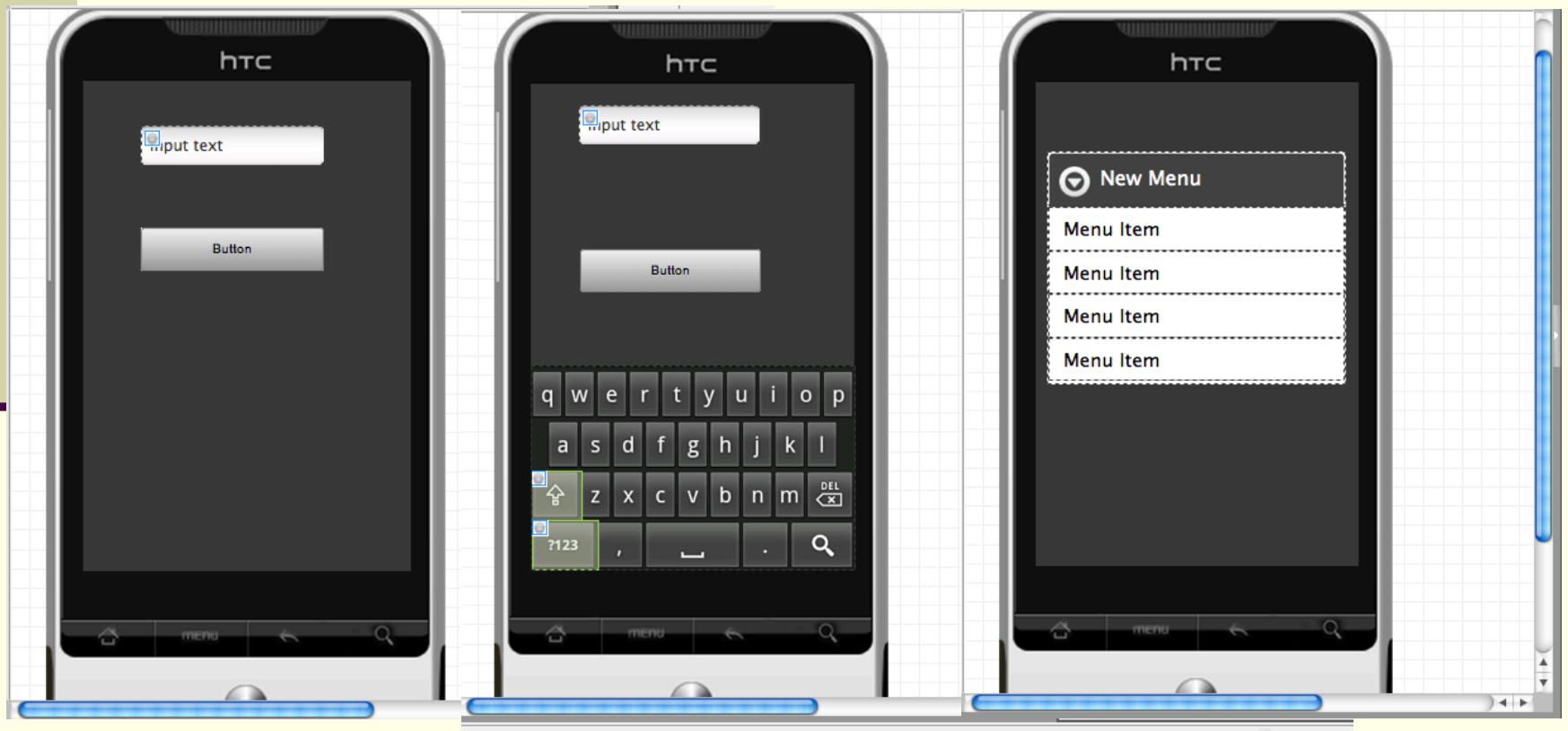
Enter the name of the new Screen

Add Controls to the new Screen

Add Transitions

Requirements:

- a) On Clicking on the input box you should pop up the keyboard
- b) On Clicking the button open a new page with a Menu



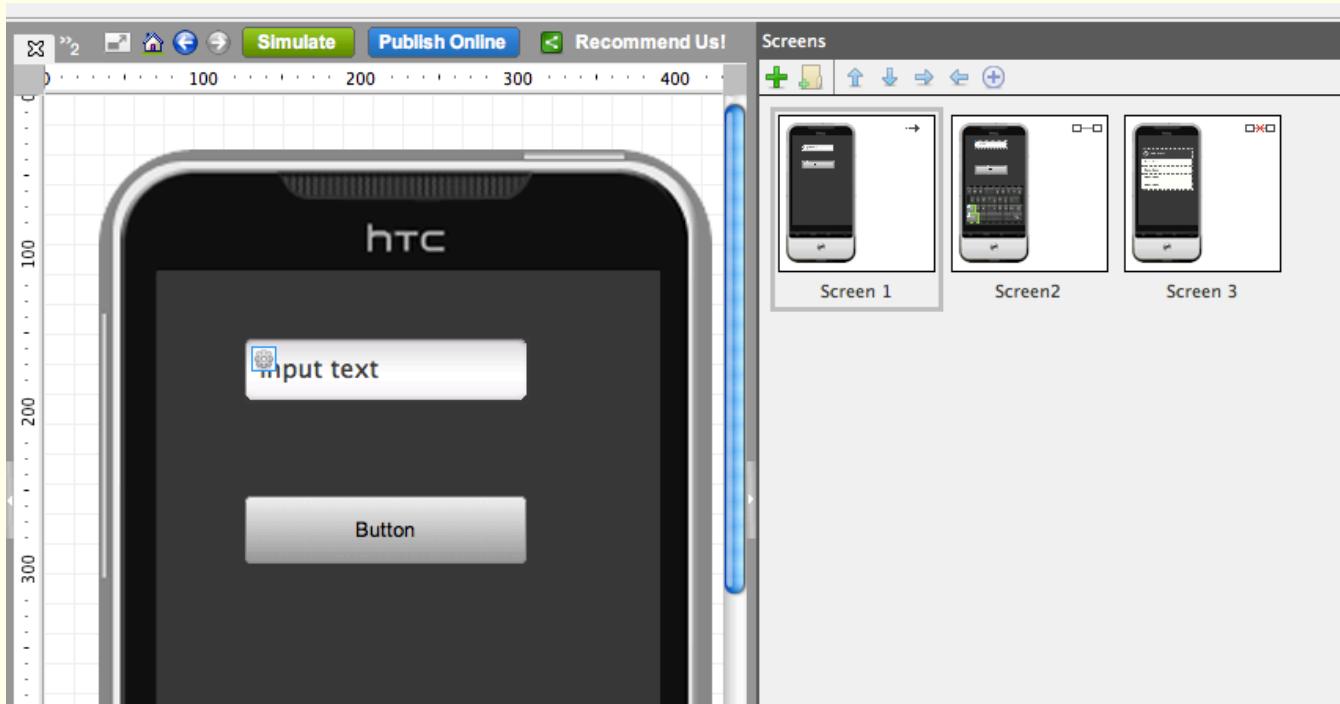
Create all three Screens

- Create the Screens Separately



Transition

Requirement 1: On Clicking on the input box you should pop up the keyboard

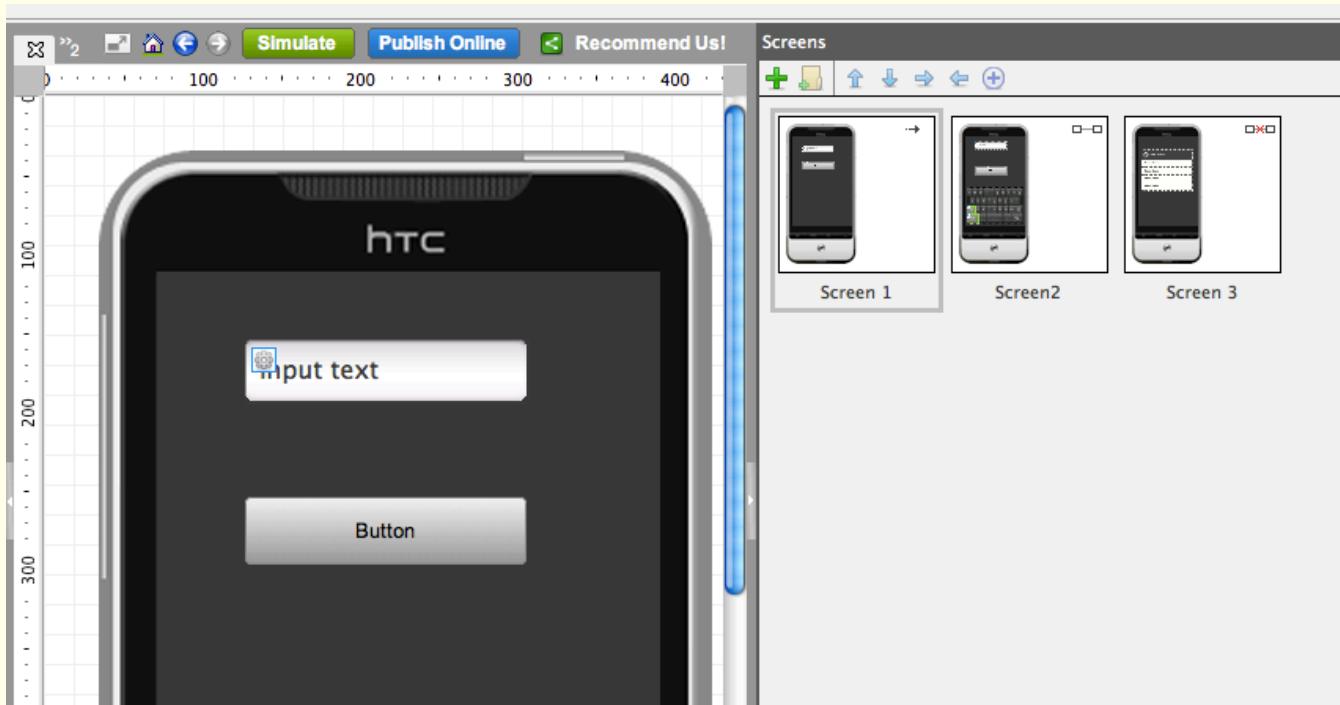


How to:

- Click on the Input box in Screen 1
- Drag and Drop it to the Screen 2 icon under Screens

Transitions

Requirement 2: On Clicking the button open a new page with a Menu

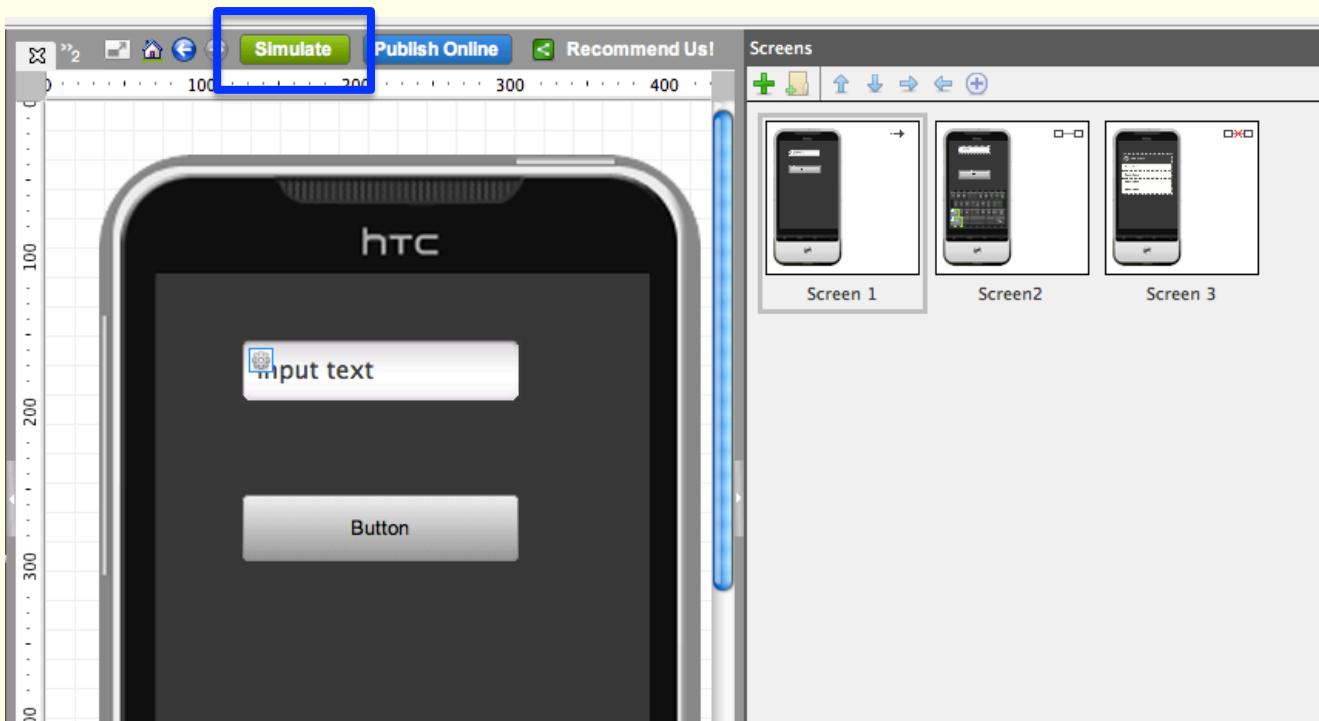


How to:

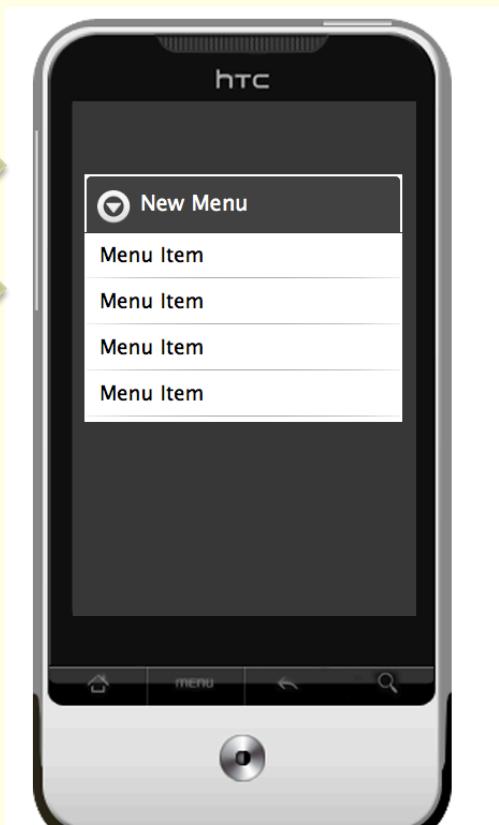
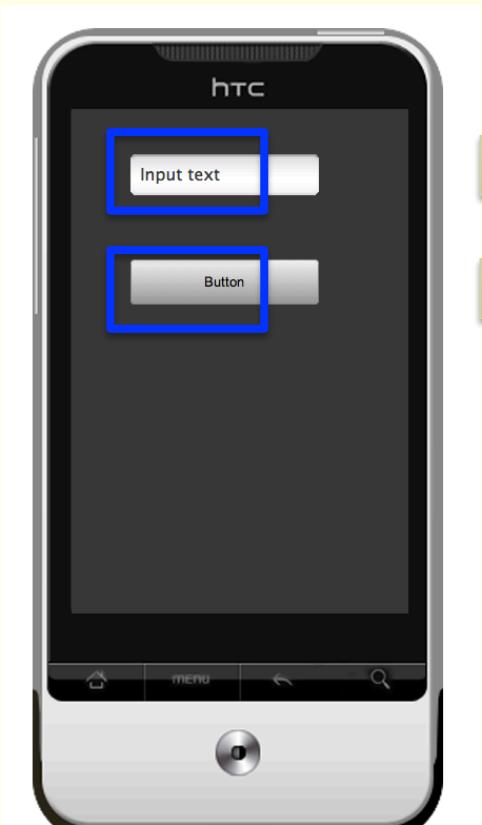
- Click on the Button Screen 1
- Drag and Drop it to the Screen 3 icon under Screens

Test

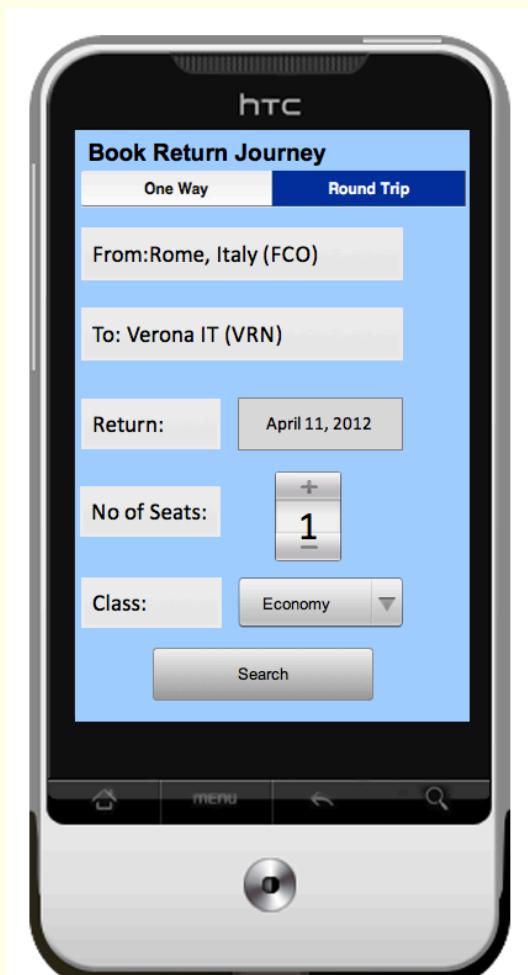
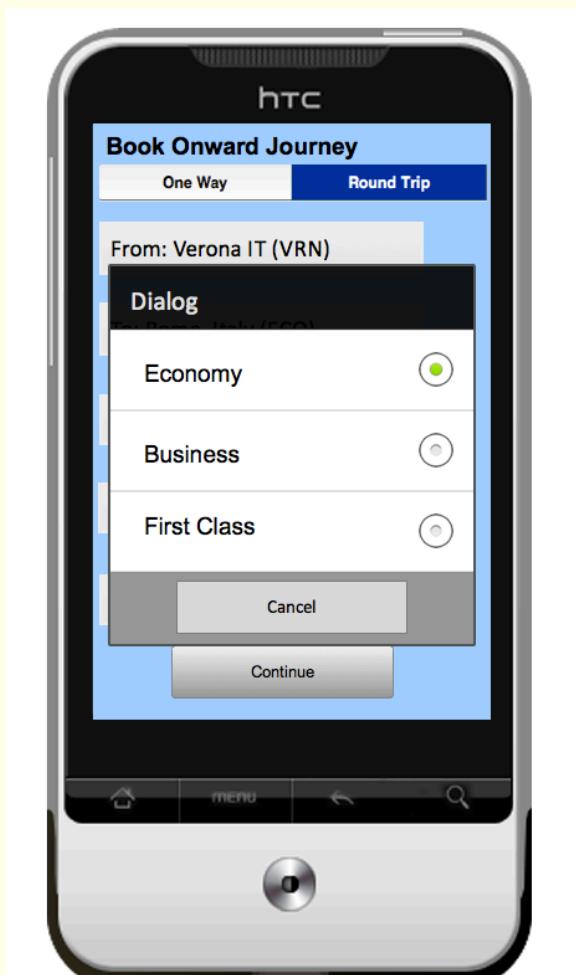
- Click on the simulate Button



Test



Screenshots





Course Material

Lecture Presentations

Text Books

1. Rabiner & Juang. *Fundamentals of Speech Recognition*. Prentice-Hall, 1993.
2. D. Jurafsky & J. Martin, *Speech and Language Processing*, Prentice Hall
3. Duda, Hart & Stork. *Pattern Classification*. Wiley & Sons, 2001.
4. Renato De Mori, *Spoken Dialogues with Computers*, Academic Press, Inc., Orlando, FL, 1997
5. David G. Stork, Elad Yom-Tov , *Computer Manual in MATLAB to Accompany Pattern Classification*, 2nd Edition, 2004.
6. Huang, Acero, Hon, *Spoken language processing*, Prentice Hall, 2001
7. S. Young et al., *The HTK Book*, Cambridge University Engineering Department, 2002