

Mobile and Ubiquitous Computing

2022-2023

Mobile UI Design

CHALLENGES of MOBILE DESIGN

- Mobility and Form Factor are Key
 - One hand
 - Varying context:
 - Noise
 - Attention
 - Situation type: formal, informal, devices tolerated... or not
 - But mostly: brief interaction

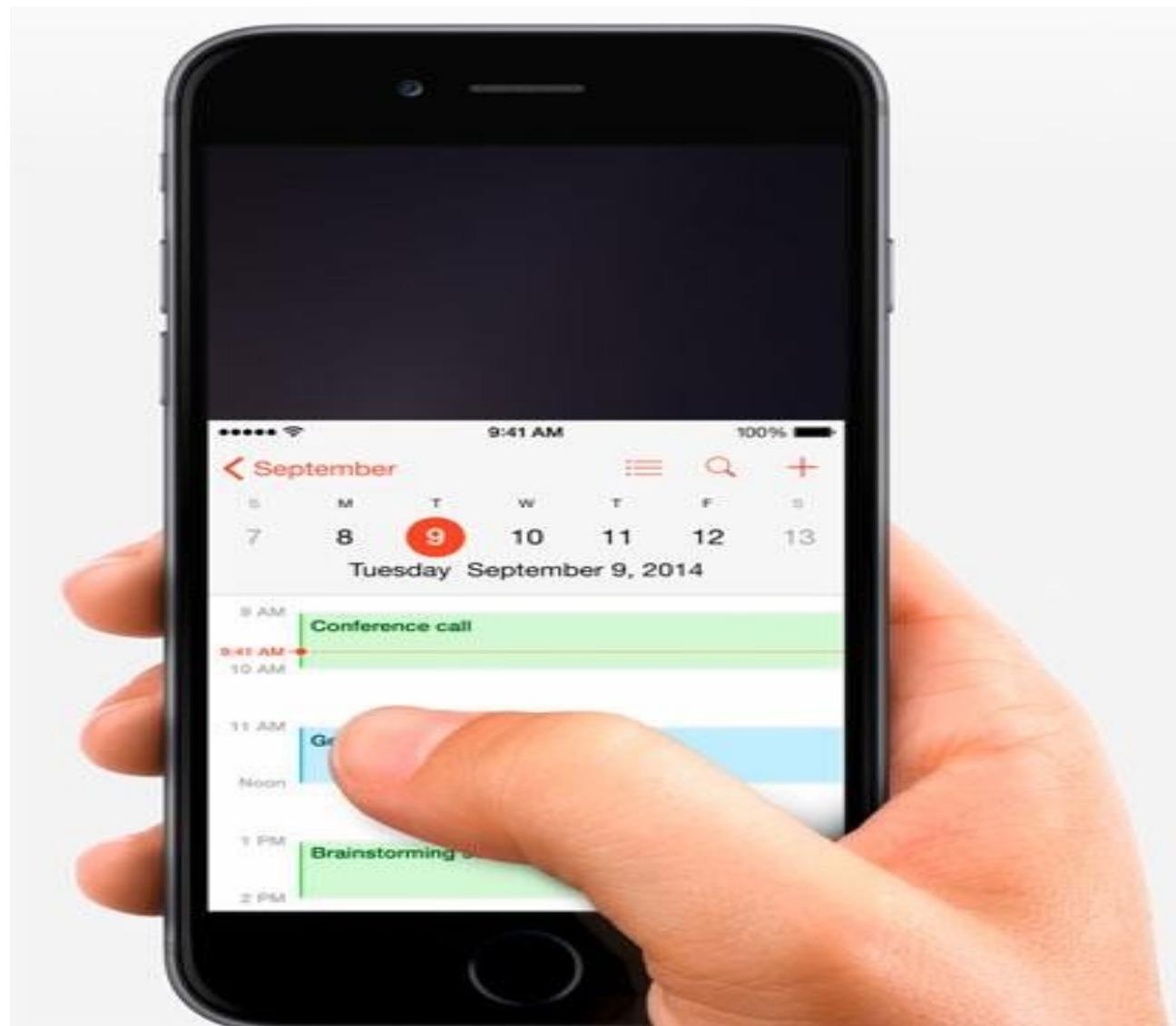
MOBILITY and FORM FACTOR are KEY!



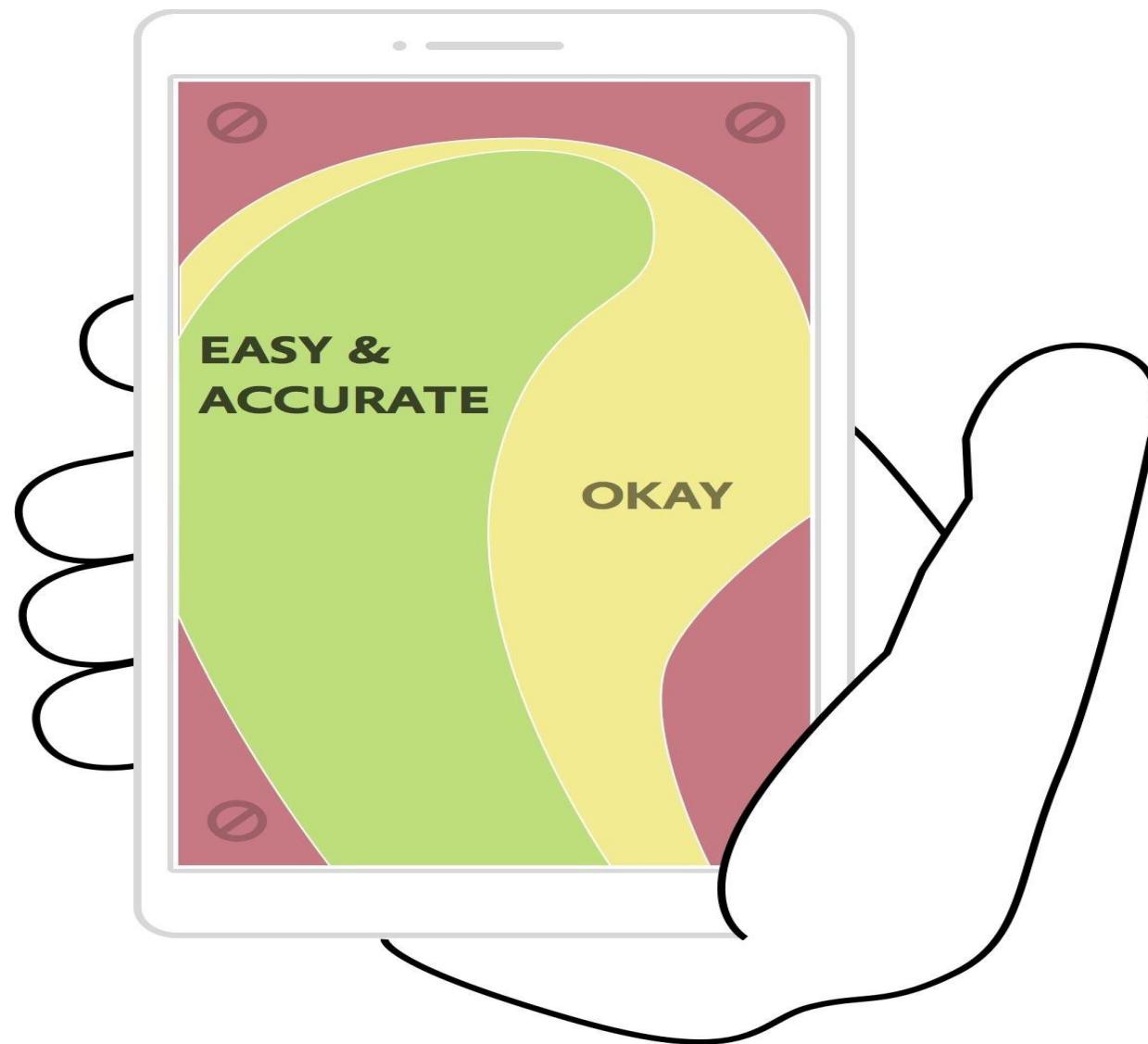
HAND-HELD USAGE



SINGLE-HAND (OFTEN!)



THUMB-INTERACTION



NEW INTERACTION MODALITIES

- Context constraints:

Attention

Noise

Time

Connectivity

Location based (absent or imprecise)

USAGE CONTEXT



SEVERAL PLACES



SPLIT ATTENTION



SPLIT ATTENTION



SOCIAL CONSTRAINTS...



... AMONG OTHER



SHORT INTERACTIONS



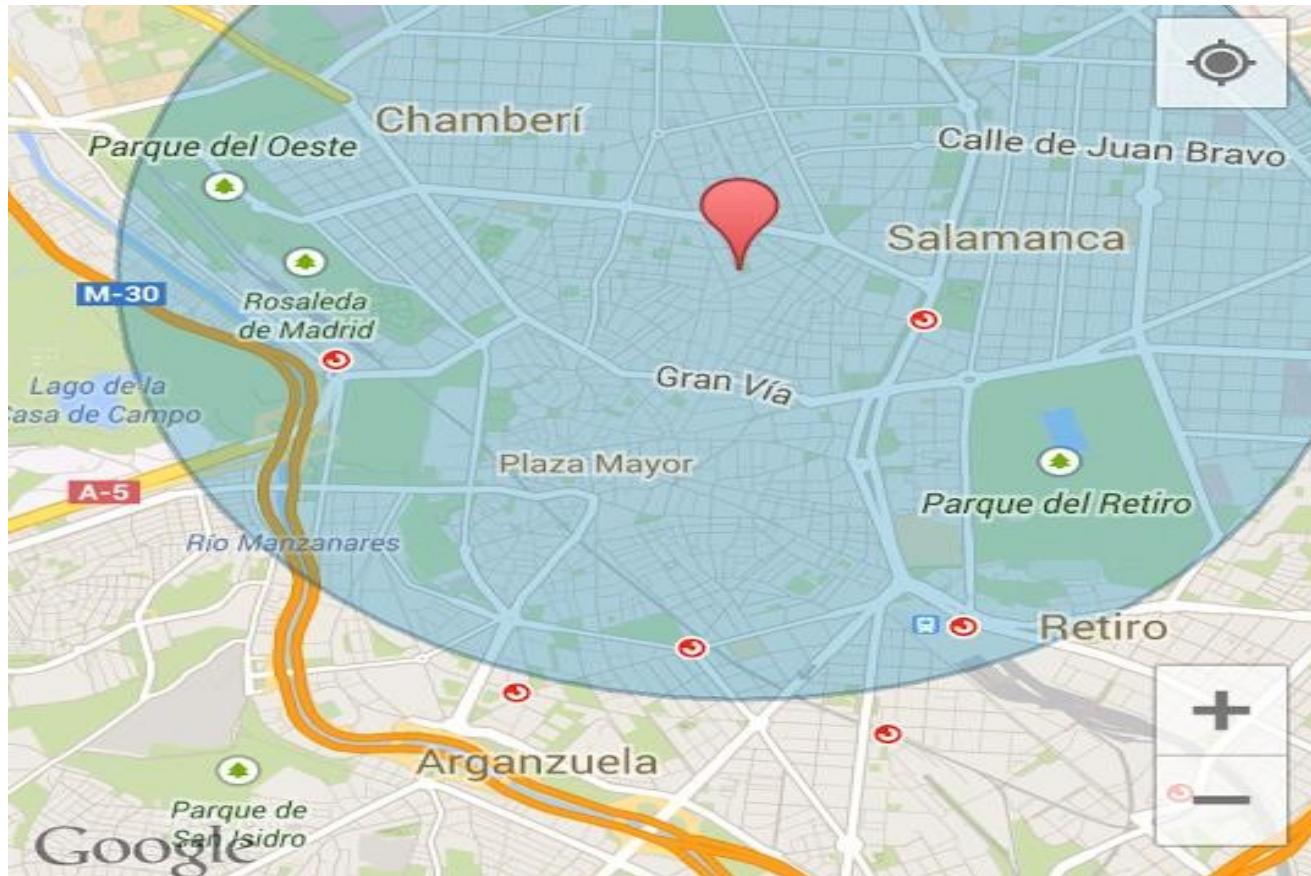
CONNECTIVITY



LOCATION-BASED INTERFACES



LACK OF PRECISION



MOBILE FORM FACTORS / INTERACTION

- The Touchscreen, the standard UI:

No Cursor

No Hover

Fat Finger

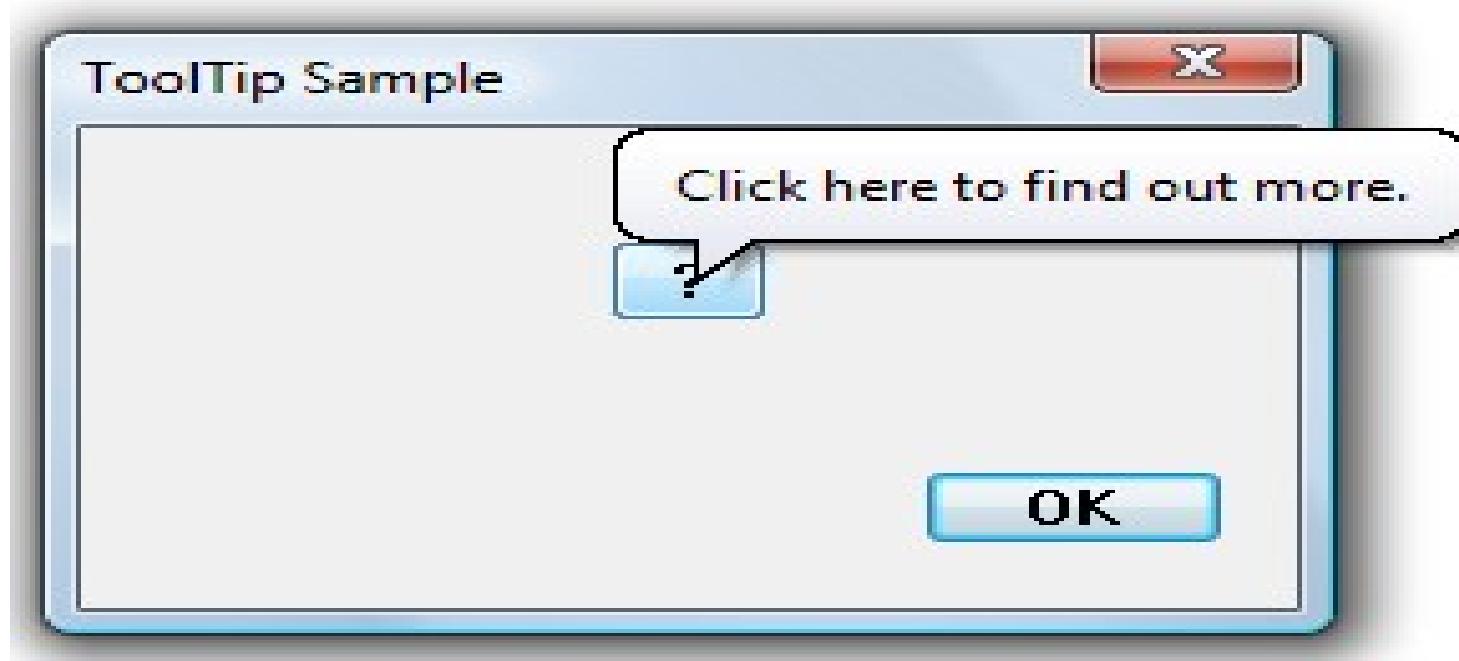
Spacing

No Haptic Feedback

NO CURSOR!



No HOVER!



FINGER-BASED INTERACTION



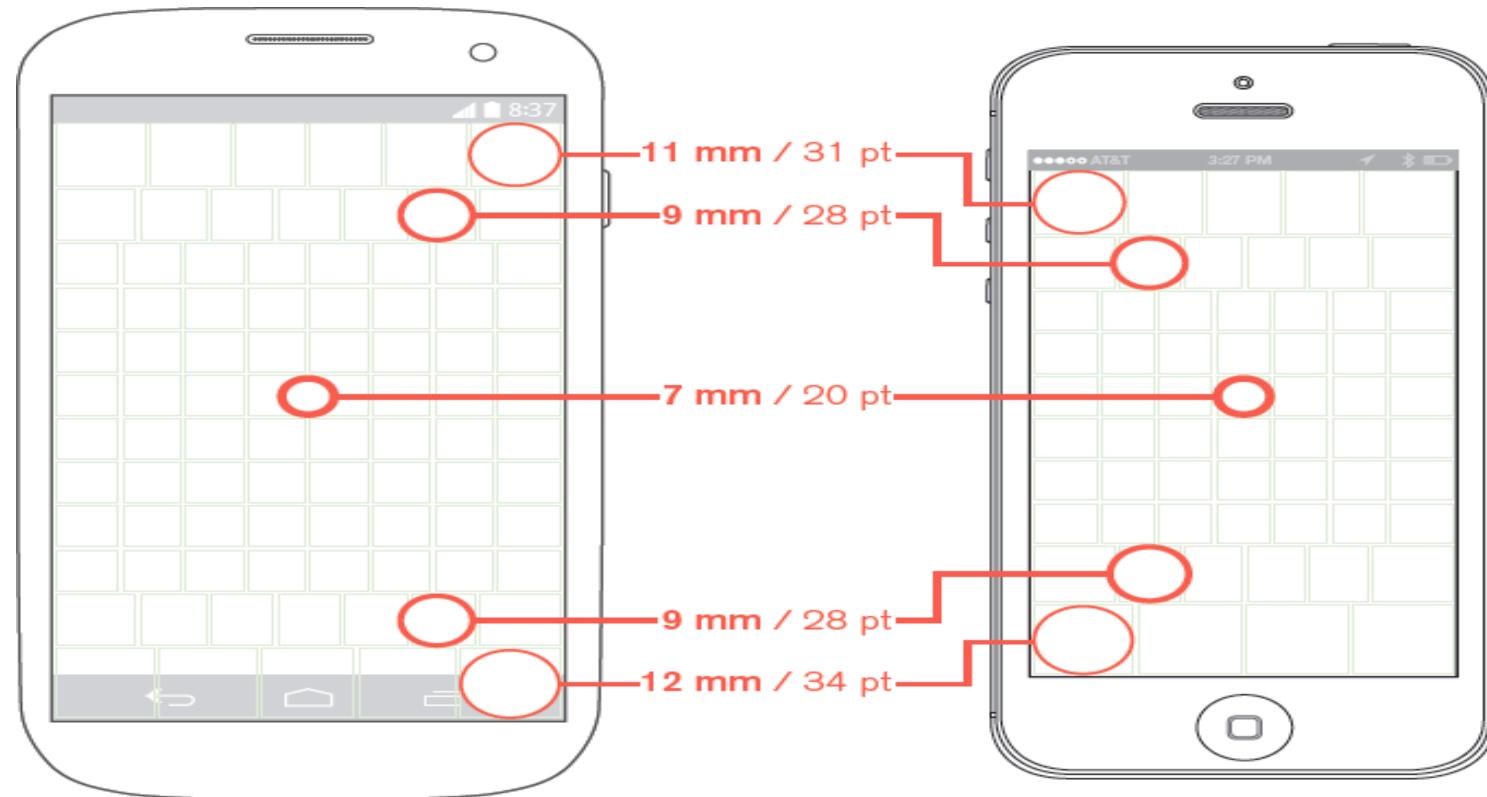
FAT FINGER PROBLEM



THE SMALLER THE WORSE



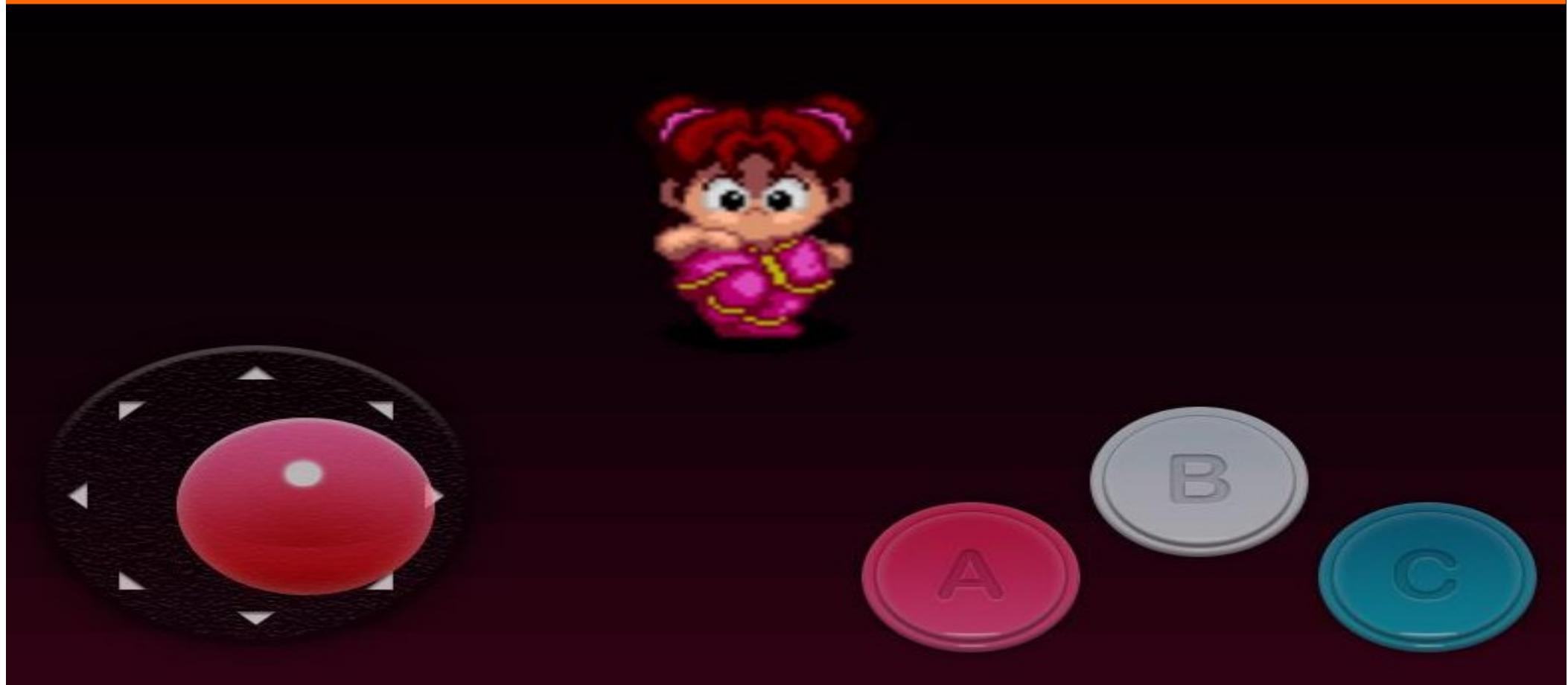
SIZES, SPACINGS



LACK OF HAPTIC FEEDBACK



TRANSLATE THE PHYSICAL TO THE VIRTUAL...



NEW INTERACTION MODALITIES

- Alternative surfaces (arm?, table?, window?)
- Gestures as a way to expand interaction possibilities:
Gestures are hard to learn, memorize and associate.

NEW INTERACTION



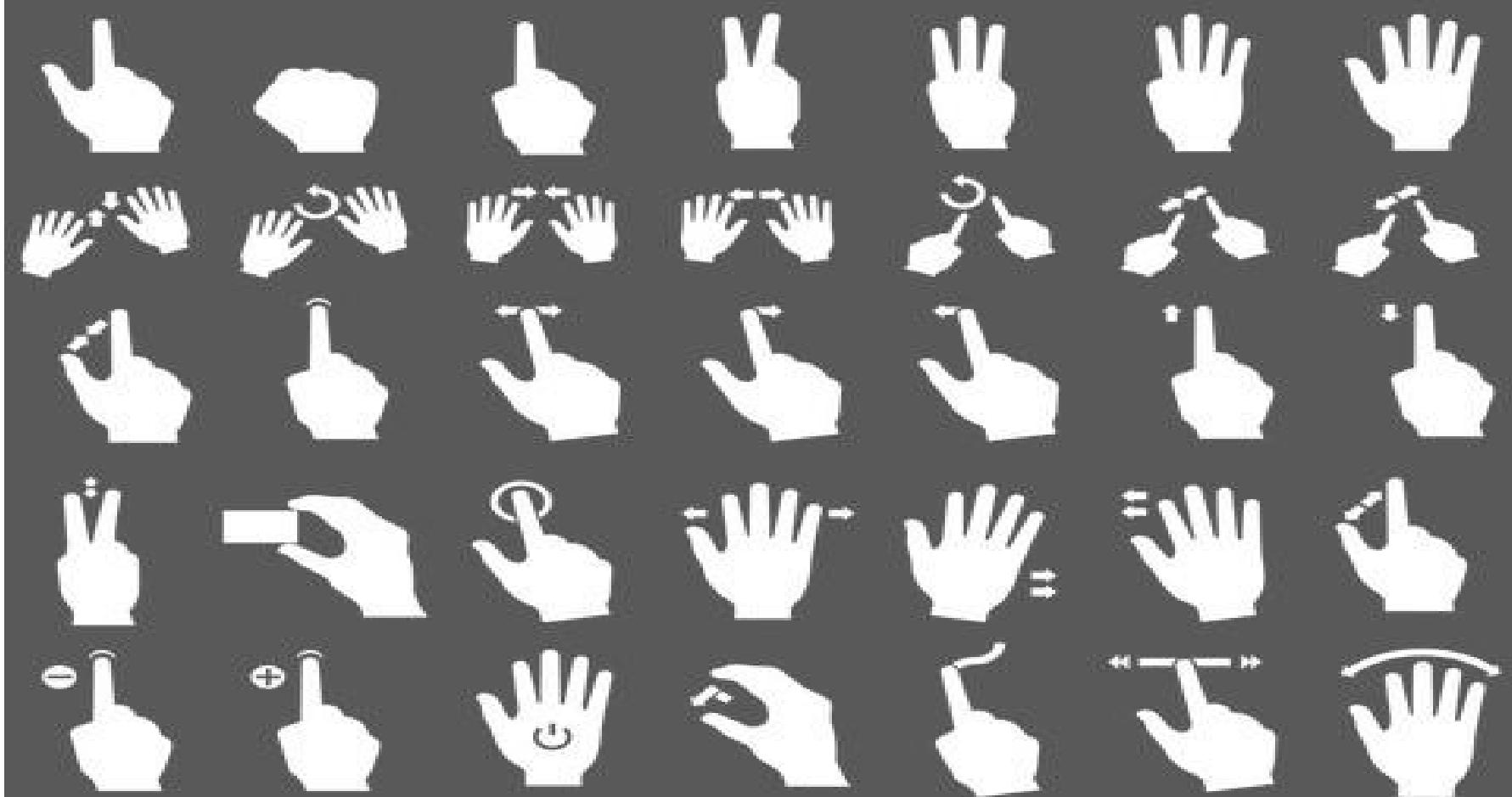
GESTURE-BASED INTERFACES



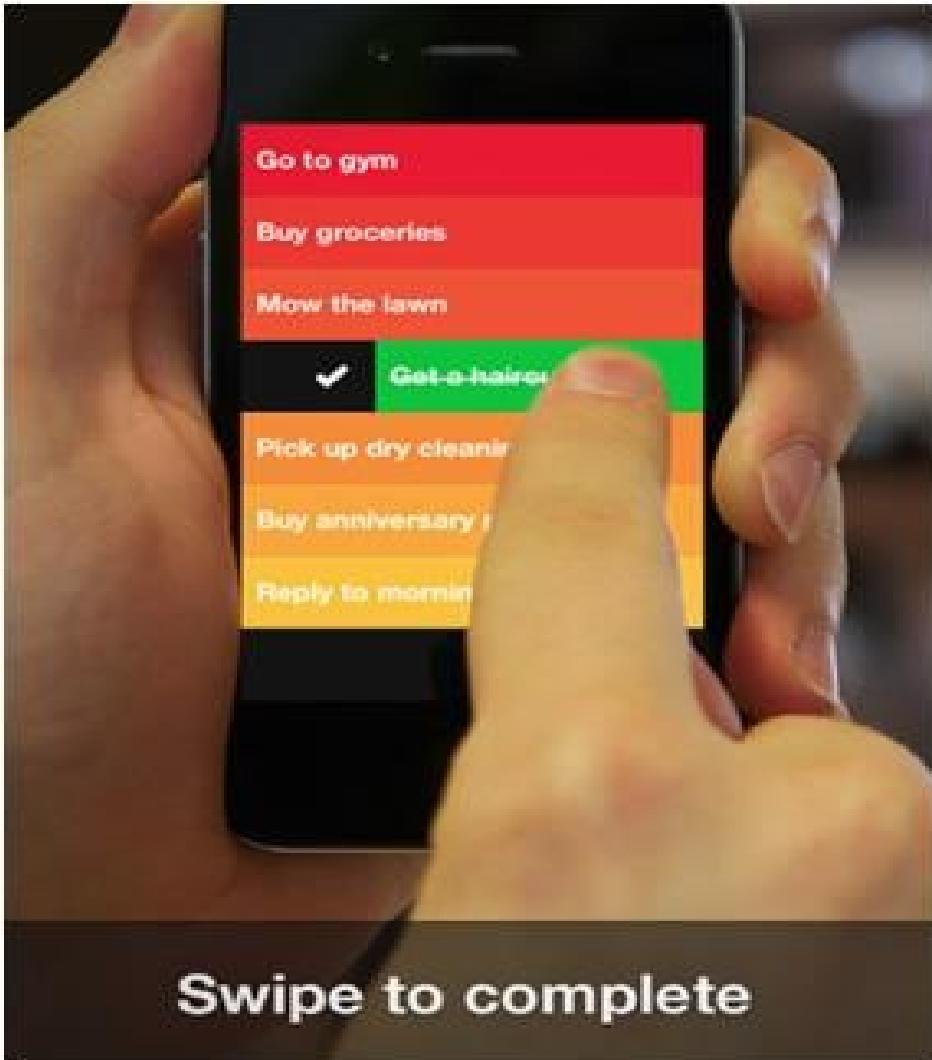
GESTURE-BASED INTERFACES



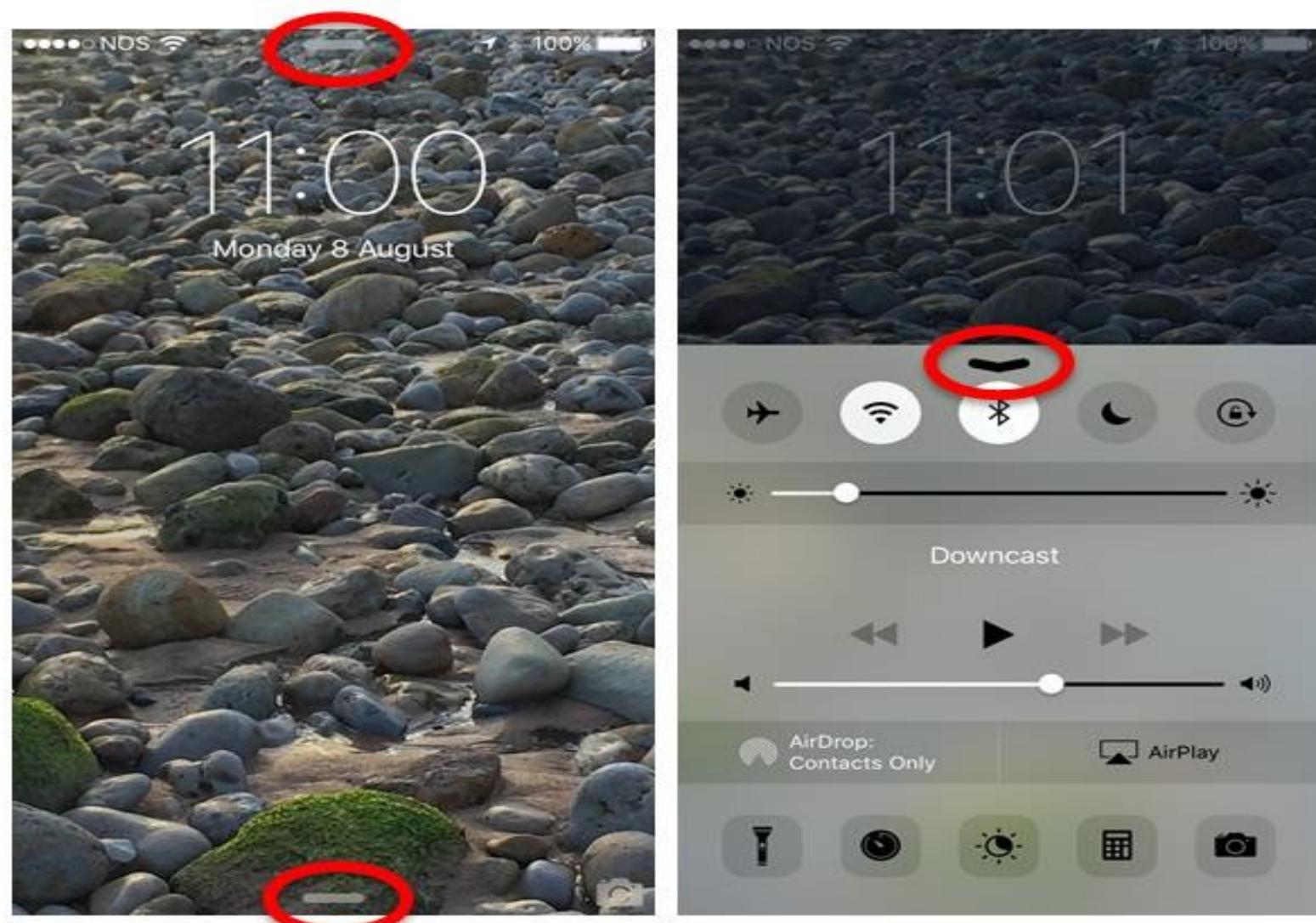
GESTURE-BASED INTERFACES



GESTURES – HOW TO GUESS THEM?



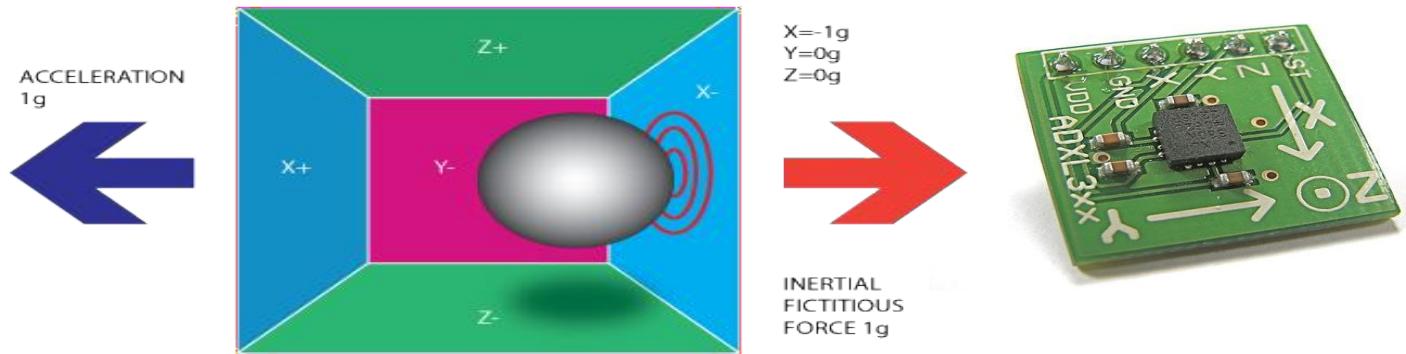
GESTURES – VISUAL CUES



NEW INTERACTION MODALITIES

- Use the whole device...

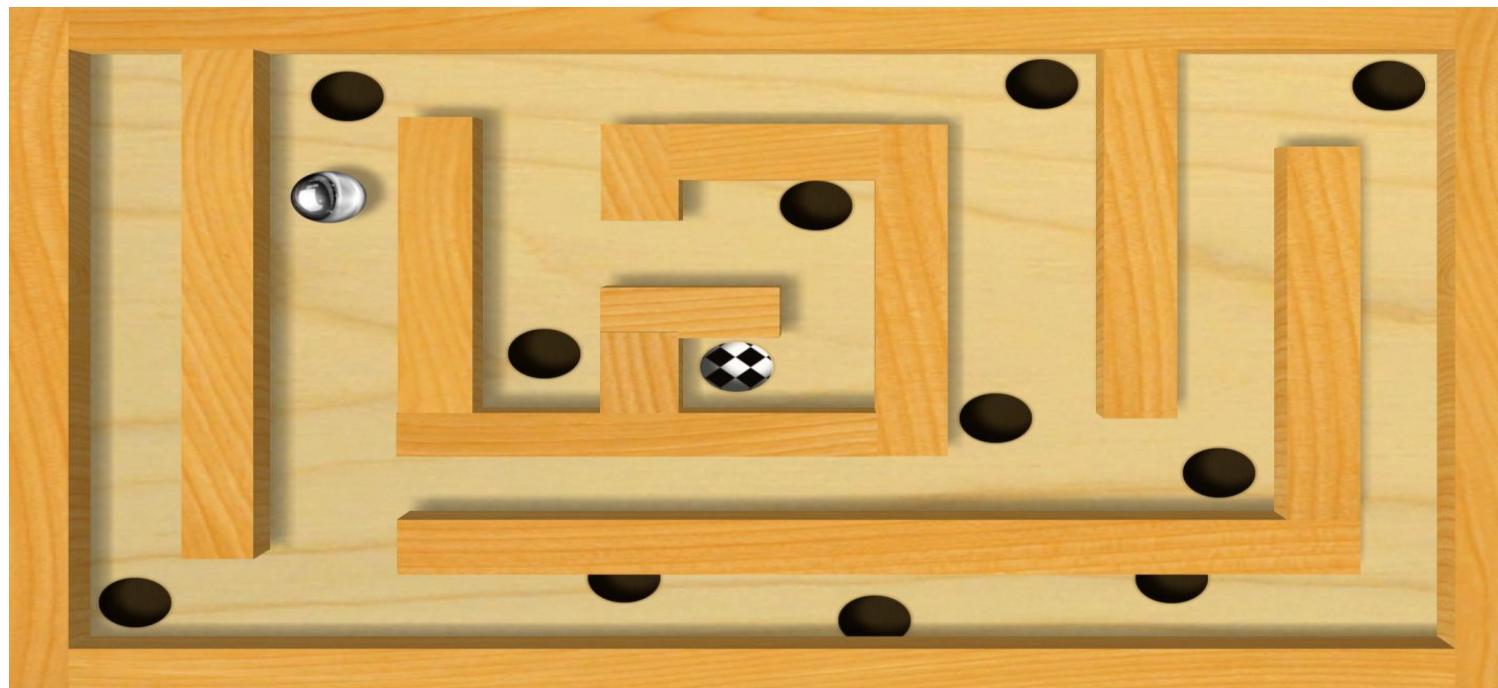
ACCELEROMETERS AND GYROSCOPES



ORIENTATION, ROTATION



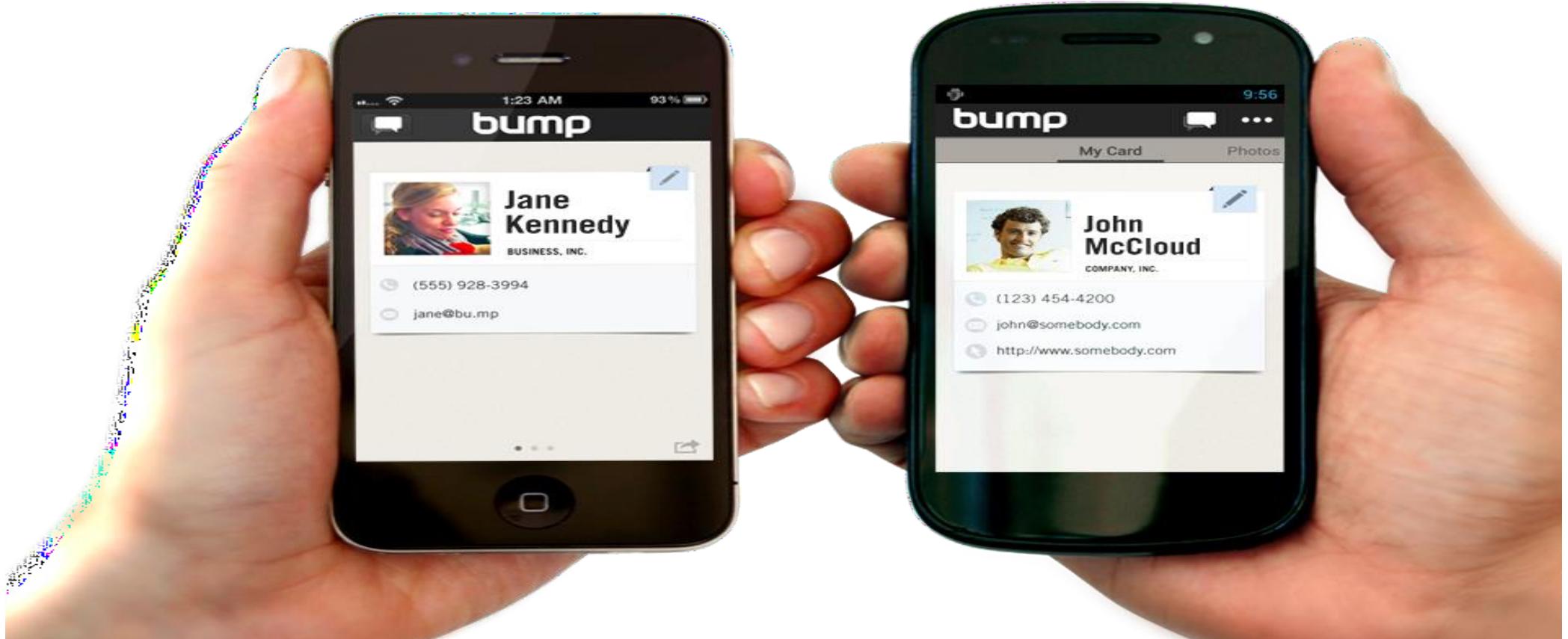
USE THE WHOLE DEVICE TO INTERACT



Example: SHAKE TO UNDO



Example: BUMP TO TRANSFER



CAMERA



CAMERA



NEW INTERACTION MODALITIES

- What about voice?

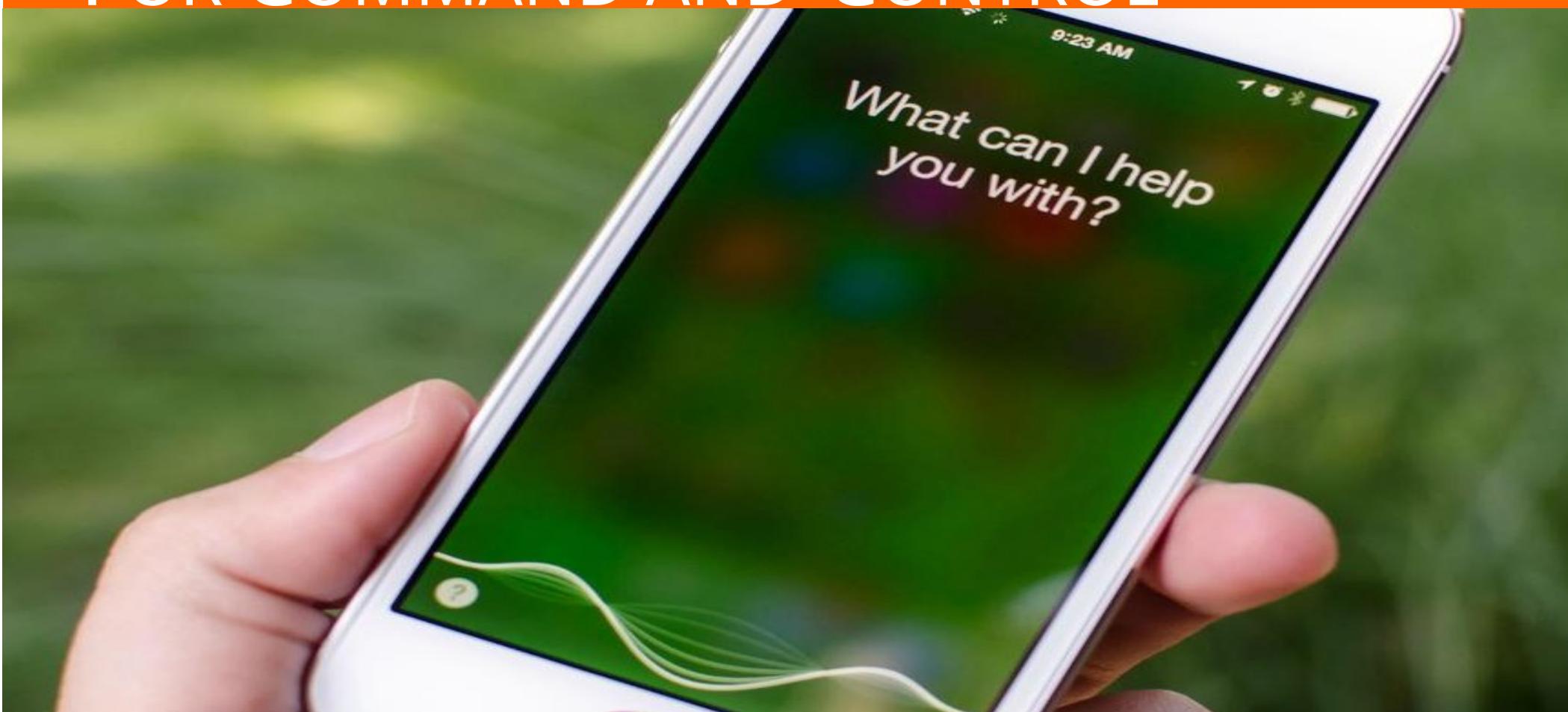
VOICE



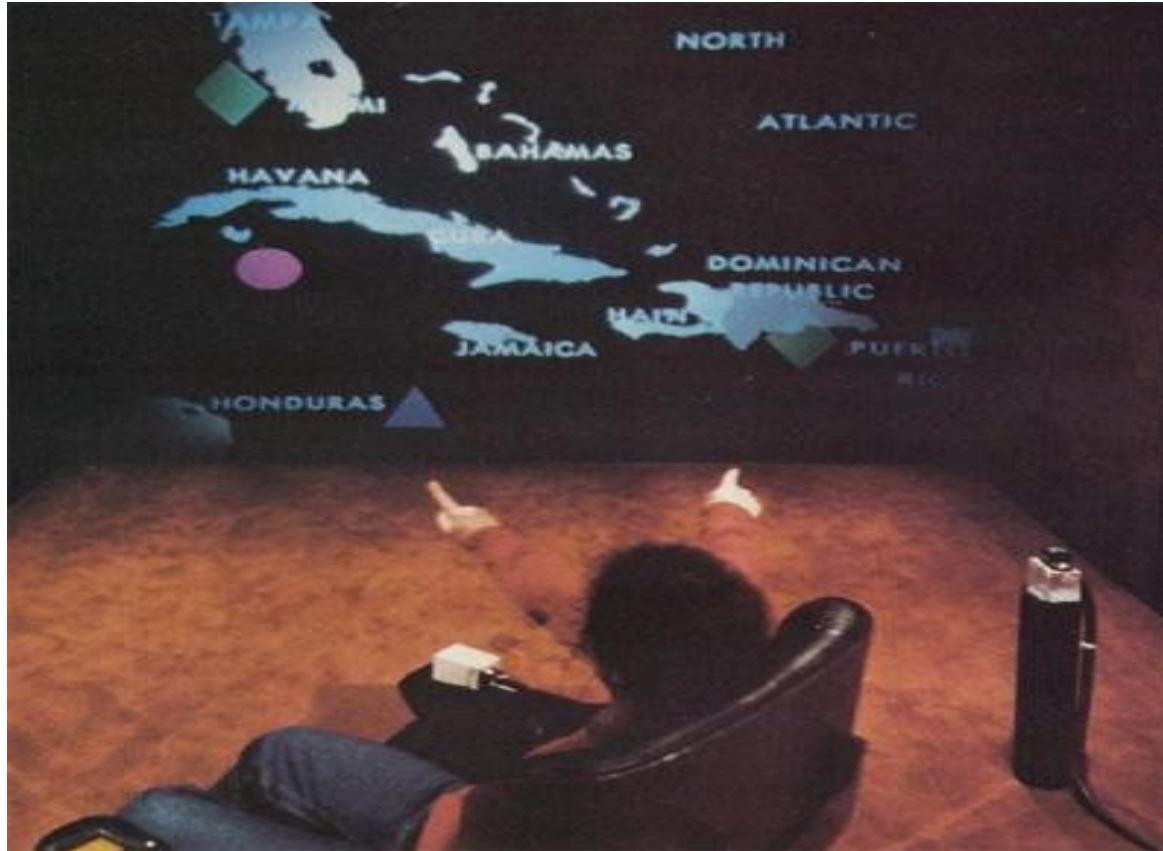
*What can I help
you with?*

?

FOR COMMAND AND CONTROL



COMPLEMENT OTHER MODALITIES



SOLE SOLUTION IN SOME CONTEXTS?



SOLE SOLUTION IN SOME CONTEXTS?



UNDESIRED IN OTHERS...



PRIVACY



PHYSICAL BUTTONS



SIMPLICITY!



amazon dash
BUTTON

SOLVE FAT FINGER PROBLEM



USE WITHOUT SEEING



MANY VARIANTS



SHORT INTERACTIONS



NO LOADING



CONTINUE WHERE YOU LEFT OFF



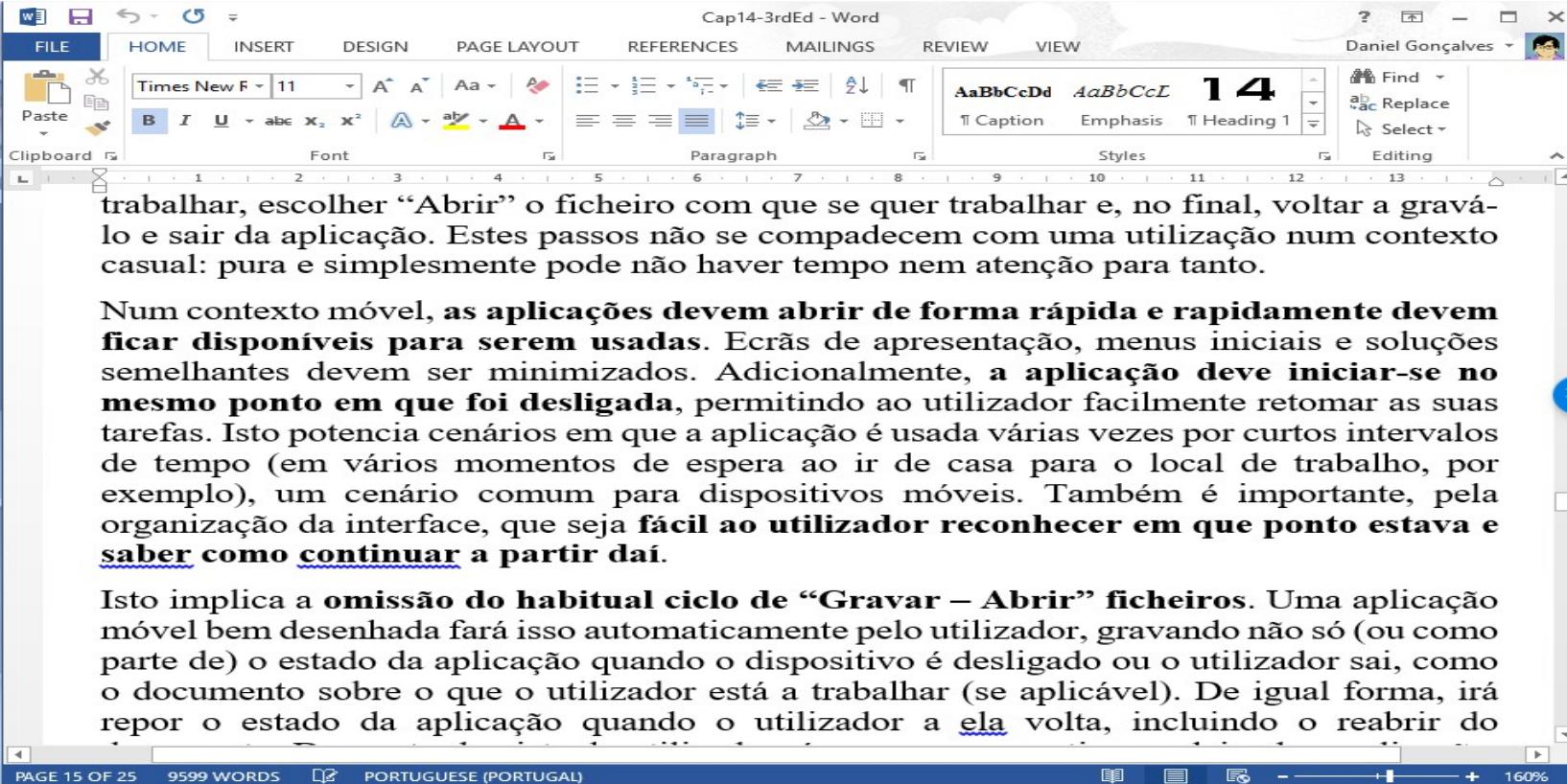
CONTINUE WHERE YOU LEFT OFF



CONTINUE WHERE YOU LEFT OFF



So, NOT LIKE THIS...



The screenshot shows a Microsoft Word window titled "Cap14-3rdEd - Word". The ribbon at the top has tabs for FILE, HOME, INSERT, DESIGN, PAGE LAYOUT, REFERENCES, MAILINGS, REVIEW, and VIEW. The HOME tab is selected. The ribbon also includes a user profile for Daniel Gonçalves. Below the ribbon is the standard Windows-style toolbar with icons for file operations like Paste, Cut, Copy, and Paste Special. The main area contains a block of text:

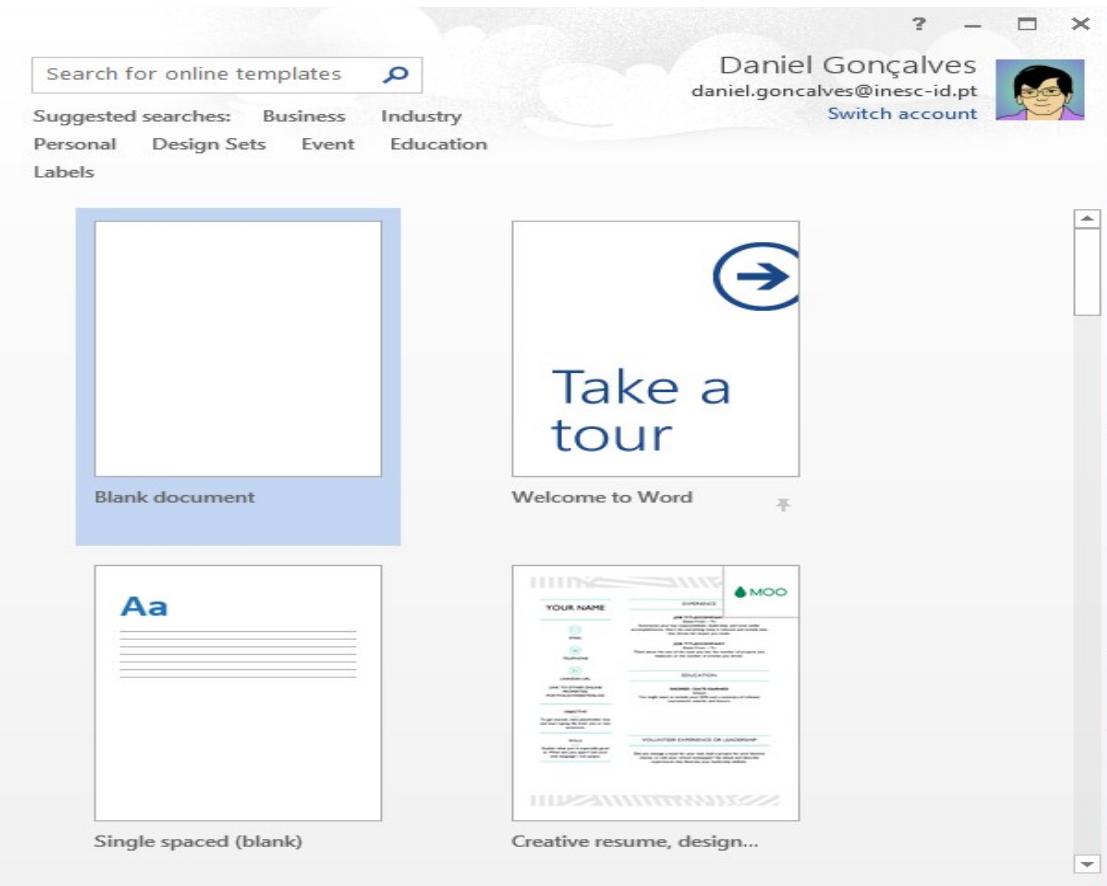
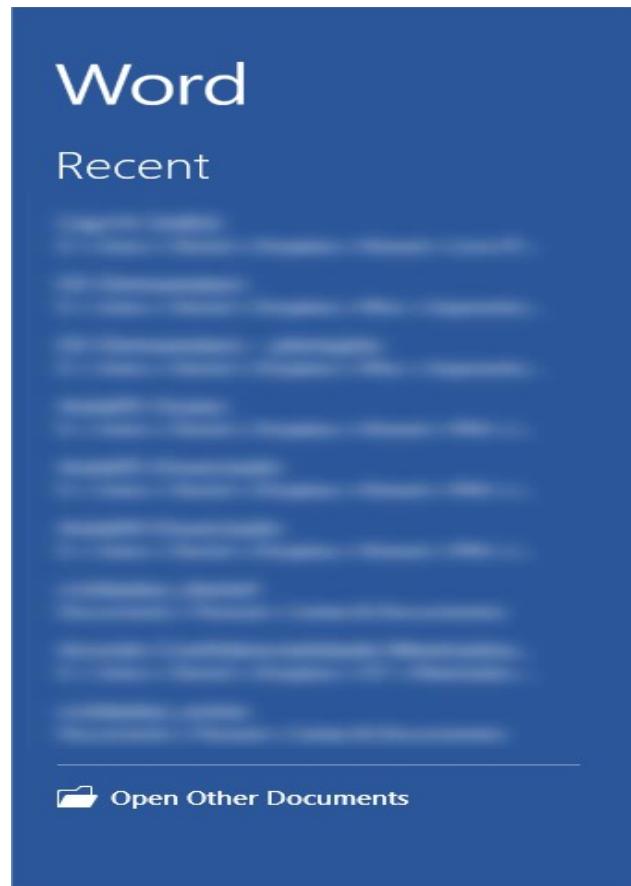
trabalhar, escolher “Abrir” o ficheiro com que se quer trabalhar e, no final, voltar a gravá-lo e sair da aplicação. Estes passos não se compadecem com uma utilização num contexto casual: pura e simplesmente pode não haver tempo nem atenção para tanto.

Num contexto móvel, **as aplicações devem abrir de forma rápida e rapidamente devem ficar disponíveis para serem usadas**. Ecrãs de apresentação, menus iniciais e soluções semelhantes devem ser minimizados. Adicionalmente, **a aplicação deve iniciar-se no mesmo ponto em que foi desligada**, permitindo ao utilizador facilmente retomar as suas tarefas. Isto potencia cenários em que a aplicação é usada várias vezes por curtos intervalos de tempo (em vários momentos de espera ao ir de casa para o local de trabalho, por exemplo), um cenário comum para dispositivos móveis. Também é importante, pela organização da interface, que seja **fácil ao utilizador reconhecer em que ponto estava e saber como continuar a partir daí**.

Isto implica a **omissão do habitual ciclo de “Gravar – Abrir” ficheiros**. Uma aplicação móvel bem desenhada fará isso automaticamente pelo utilizador, gravando não só (ou como parte de) o estado da aplicação quando o dispositivo é desligado ou o utilizador sai, como o documento sobre o que o utilizador está a trabalhar (se aplicável). De igual forma, irá repor o estado da aplicação quando o utilizador a ela volta, incluindo o reabrir do

PAGE 15 OF 25 9599 WORDS PORTUGUESE (PORTUGAL)

So, NOT LIKE THIS...



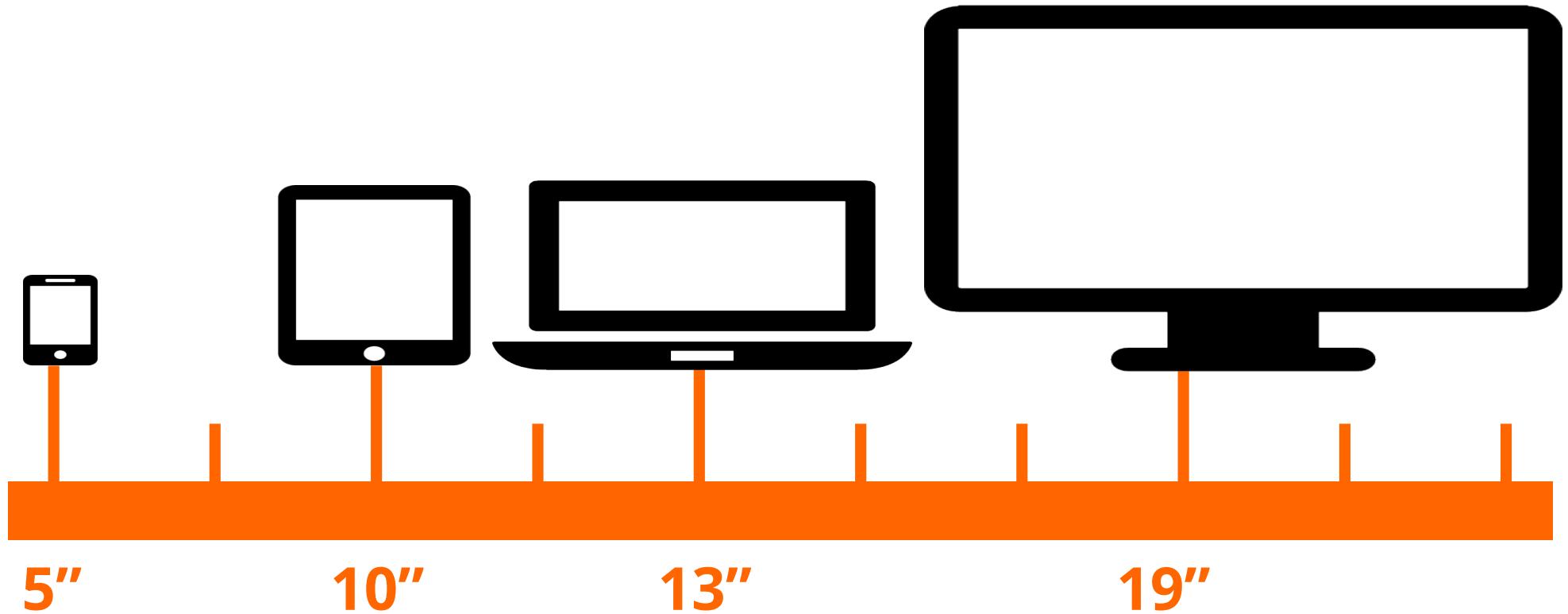
THIS IS NO LONGER A THING



03

SCREEN DESIGN

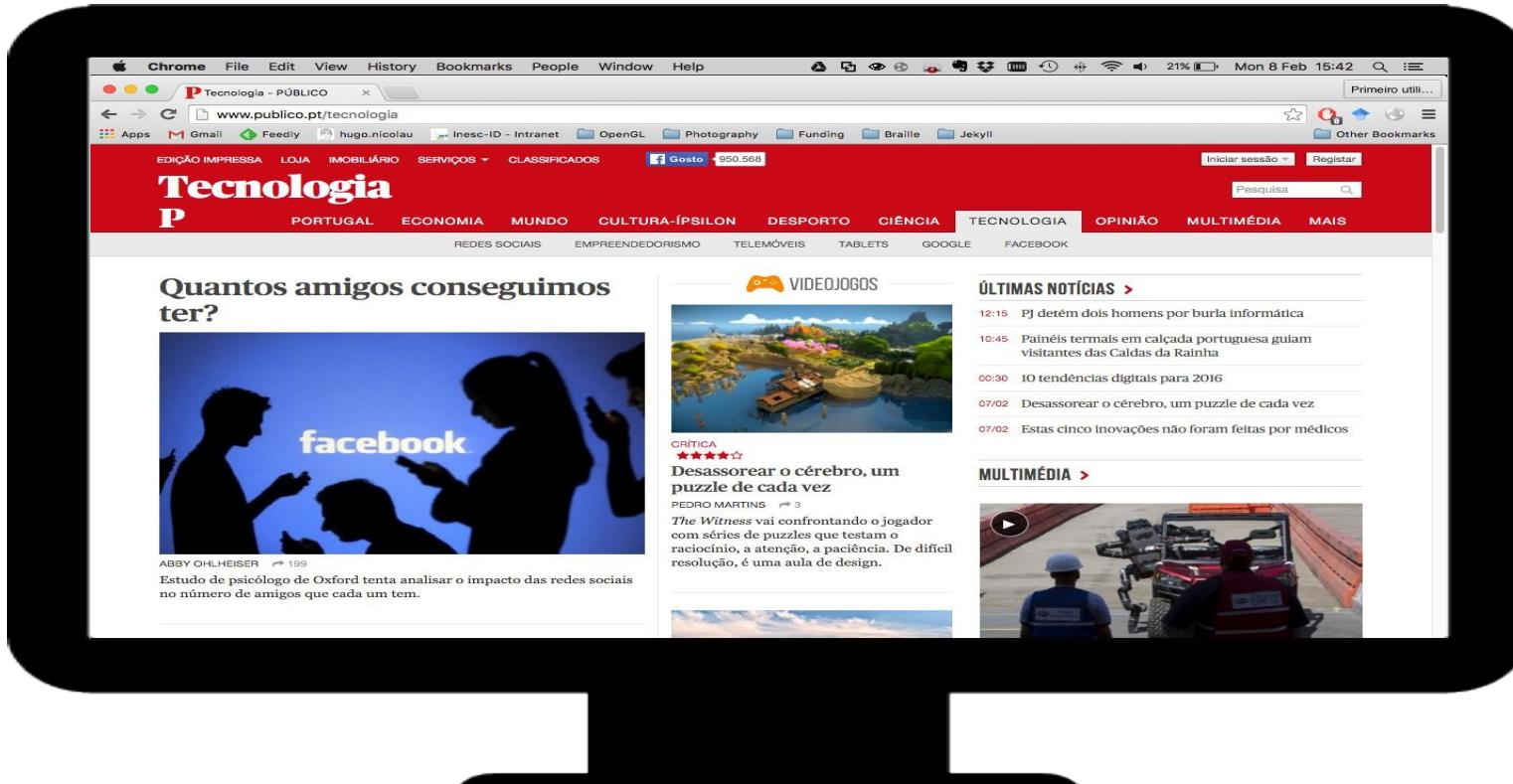
SMALL SCREENS



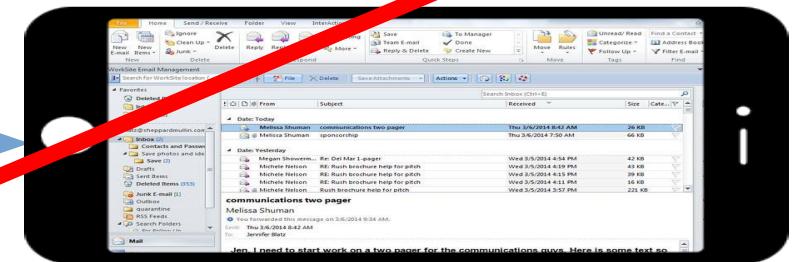
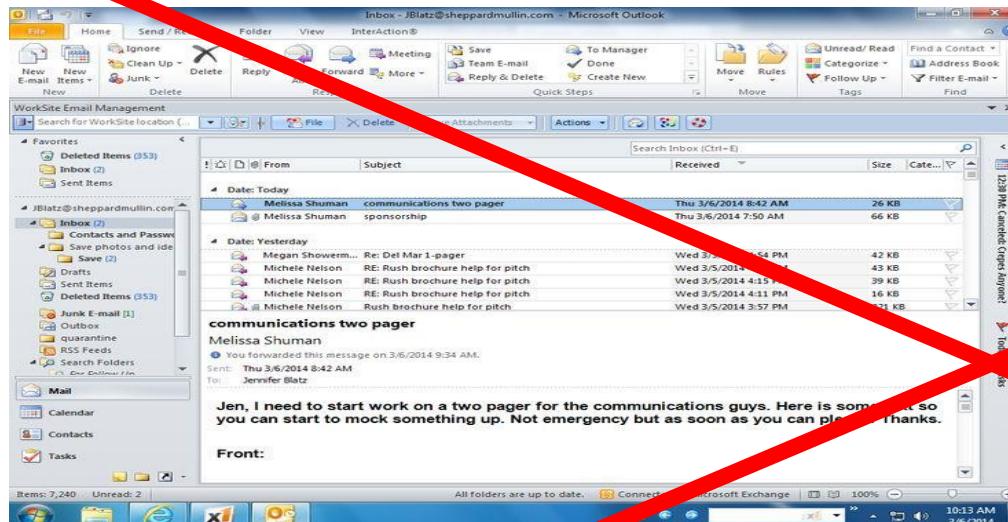
SMALL SCREENS

“ **But I have lots to
put on the screen!** ”

MINIATURIZATION - NOT!



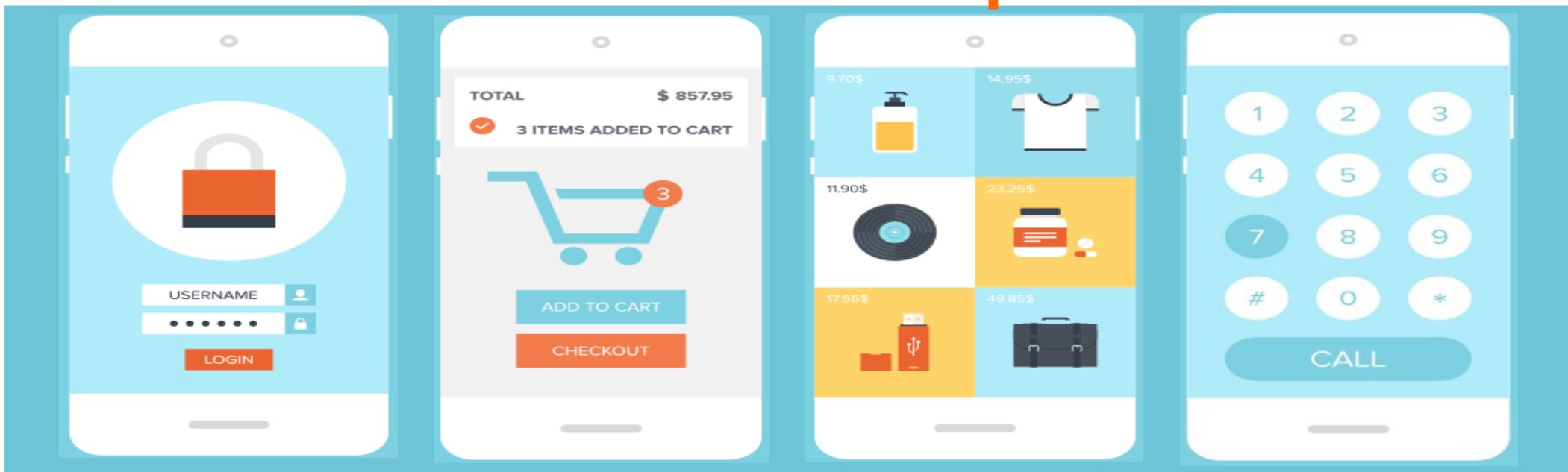
MINIATURIZATION - NOT!



SIMPLIFICATION THROUGH PRIORITIZATION

Mobile forces simplification

Decide which actions are important



DESIGN FOR SEVERAL SIZES

iPhone 5s	iPhone 5c	HTC One	Moto X	Galaxy S4	Nexus 5	Galaxy Note 3	LG G2	Lumia 1020
								
4"	4"	4.7"	4.7"	5"	4.95"	5.7"	5.2"	4.5"
× 1136 640	× 1136 640	× 1920 1080	× 1280 720	× 1920 1080	× 1920 1080	× 1920 1080	× 1920 1080	× 1280 768
326 ppi	326 ppi	468 ppi	313 ppi	441 ppi	445 ppi	388 ppi	423 ppi	332 ppi

FULLSCREEN LAYOUT!



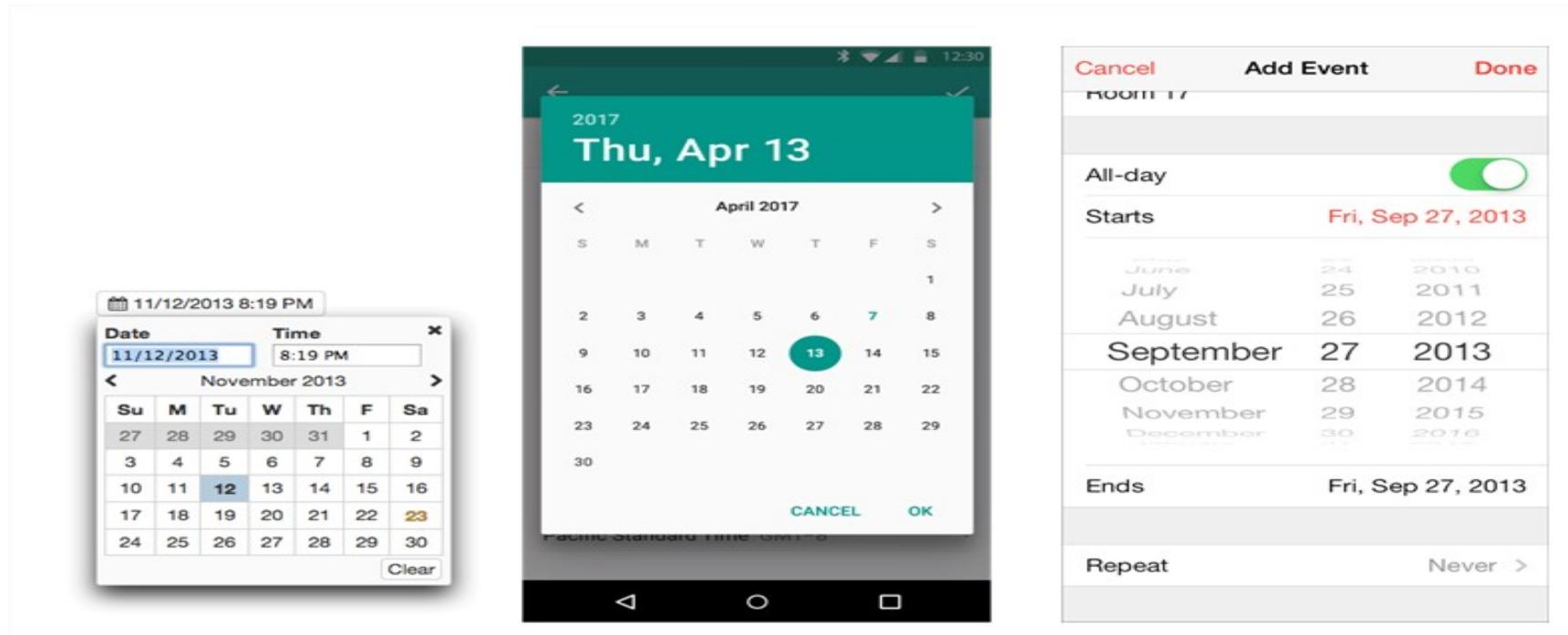
DIVIDE TASK INTO SCREENS



MAINTAIN VISUAL COHERENCE



SIZE: Miniaturization alters function



04

INTERACTION DESIGN PRINCIPLES

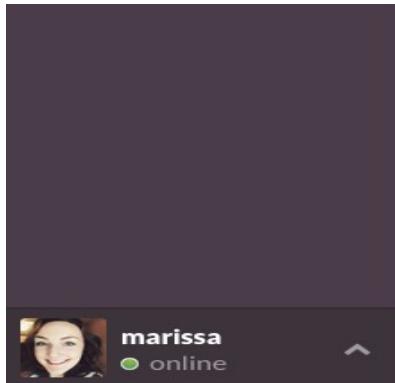
INTERACTION DESIGN PRINCIPLES

- 1. Learnability**
- 2. Visibility**
- 3. Memorability**
- 4. Efficiency**
- 5. Mapping**
- 6. Control**
- 7. Consistency**
- 8. Simplicity**
- 9. Error Prevention and Recovery**
- 10. Satisfaction**

LEARNABILITY

Easy “boarding” experience

Functionality limited to what is needed to achieve goal



Today

VISIBILITY

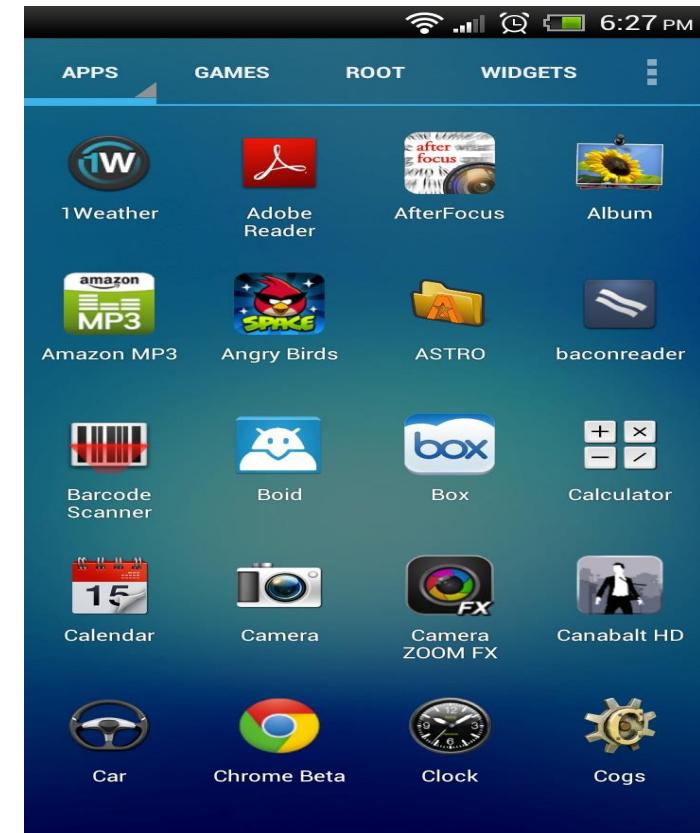
Important information should be the most visible

Appropriate and real-time feedback



MEMORABILITY

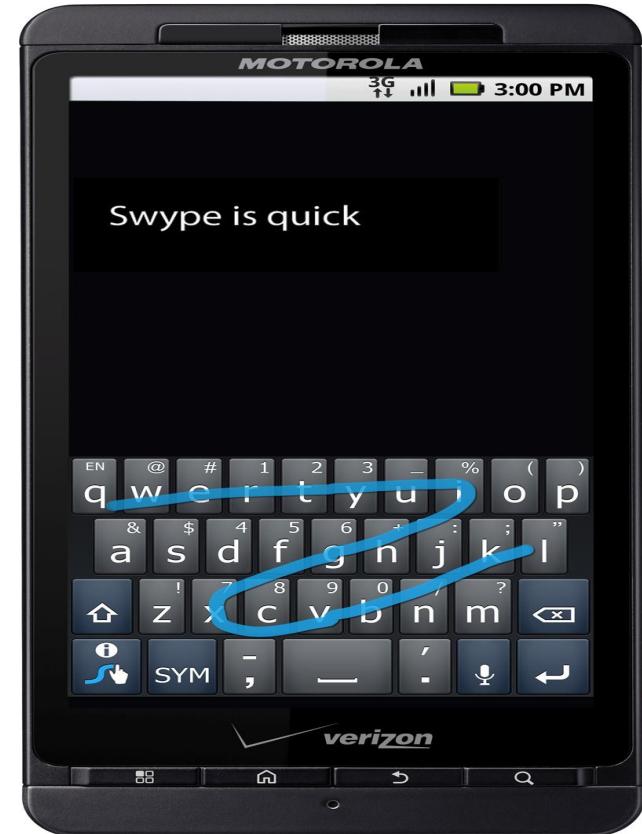
Easy to use each time user interacts with it



EFFICIENCY

Metrics:

- Number of steps to complete a task
- Time taken to perform a task



MAPPING

Real-world conventions

Result of an action is expected



USER CONTROL

User always in the control and not the other way around



CONSISTENCY

Similar items, look
and act alike

UI standards



SIMPLICITY

Avoid unnecessary functionality

Usual tasks should be easy

Less common tasks should be possible



ERROR PREVENTION AND RECOVERY

Aim to prevent errors

Be explicit

Use plain language

Indicate problem

Suggest a solution

 Log in

@ random@gmail.com

Incorrect email

! ...

LOG IN

Don't have an account yet? [Sign up](#)

or

 SIGN IN WITH INSTAGRAM

SATISFACTION



How much the user enjoys or dislikes software

05

PROTOTYPING TOOLS

PROTOTYPING MATTERS

Think before you act!



PROTOTYPING MATTERS

Define problem and solution: Ideation



SHARE AND ITERATE

Communication and collaboration tool

Review, review, review



LESS IS MORE



WIREFRAMES - UI FLOWS

Define key screens

How do they work together?



WIREFRAMES – UI FLOWS

Forces you to think about:

1. Goals
2. Concepts
3. Screens
4. UI Elements
5. Navigation

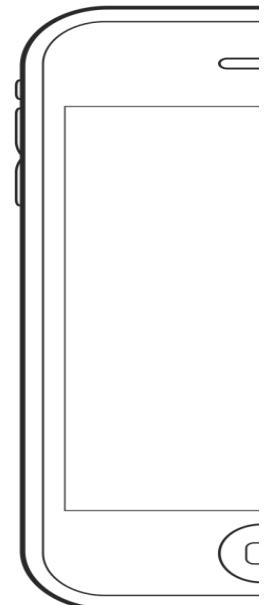


RESOURCES

Sketching templates:

[http://erikloehfelm.com/iphone_sketches/
iphone_sketchboard.pdf](http://erikloehfelm.com/iphone_sketches/iphone_sketchboard.pdf)

<https://www.smashingmagazine.com/2010/03/free-printable-sketching-wireframing-and-note-taking-pdf-templates/>



RESOURCES

Prototyping Tools: JustInMind, Balsamiq, NinjaMockup, ...

