IPM 15/16 – T2.1
Prototyping

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Summary

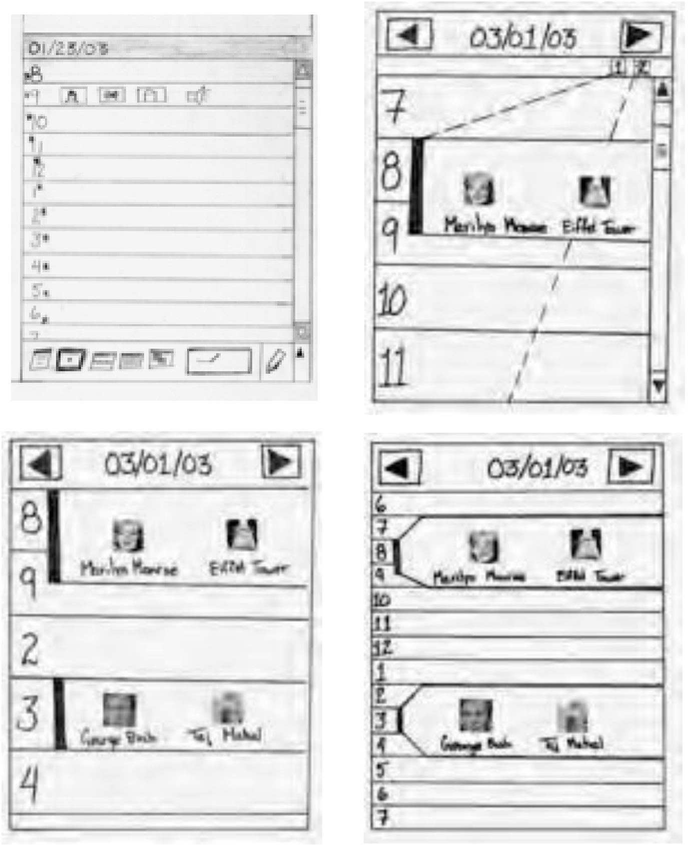
- What is a prototype?
- When, what and how to prototype
- Types of prototypes

What is a prototype?

And what is it for?

What is a prototype?

- Can take many forms:
  - cardboard, foam, software, video,
  - clay, paper, hidden people, website,
  - sketches, scripts, index cards etc.
- The point: make ideas real:
  - Limited representation of design for users (and designers, and other stakeholders) to interact with



4 designs: image-enhanced planner

Why prototype?

- **Communication**: discuss ideas with stakeholders
  - “Where’s the ON button?”
- Develop **requirements** and/or specifications
  - “Uh-oh, here’s something we forgot.”
- **Learning** and problem solving
  - “Hey, that will work!”
- **Evaluate** interface effectiveness
  - “Whoops, users didn’t understand that.”
- Develop **conceptual and physical design**
  - “That’s way too heavy”
- **Save time and money**
  - Don’t waste time coding/building the wrong thing

Goal is to understand the interaction design

When to prototype?

To get out of a rut, focus discussion, reach agreement

- When you have questions and you can’t proceed:
  - Functionality:
    - Structure, sequencing, flow
    - Clarity & completeness of information
  - Appearance
    - Branding, clarity, aesthetics, color, shape, etc.
  - Specifications
    - “design by prototyping” (evolutionary approach)
- When you need to communicate ideas
  - Design team, managers, users etc.

Questions that *might* need prototyping to answer

- For example (these are *detailed*):
  - – Screen too crowded? actions clear when actually laid out?
  - – Knob versus slider for controlling volume

    much more for involved for innovative physical interface … imagine the prototyping for the iPod !
- Navigation: e.g.
  - – Transparent menu versus solid menu
  - – How many files to show in file selection box

The purpose of a prototype is to **answer a question**

and it is usually thrown-away…

“Design by prototyping”

- *Evolutionary* approach to system development
- Uses the **prototype itself as the specification**.

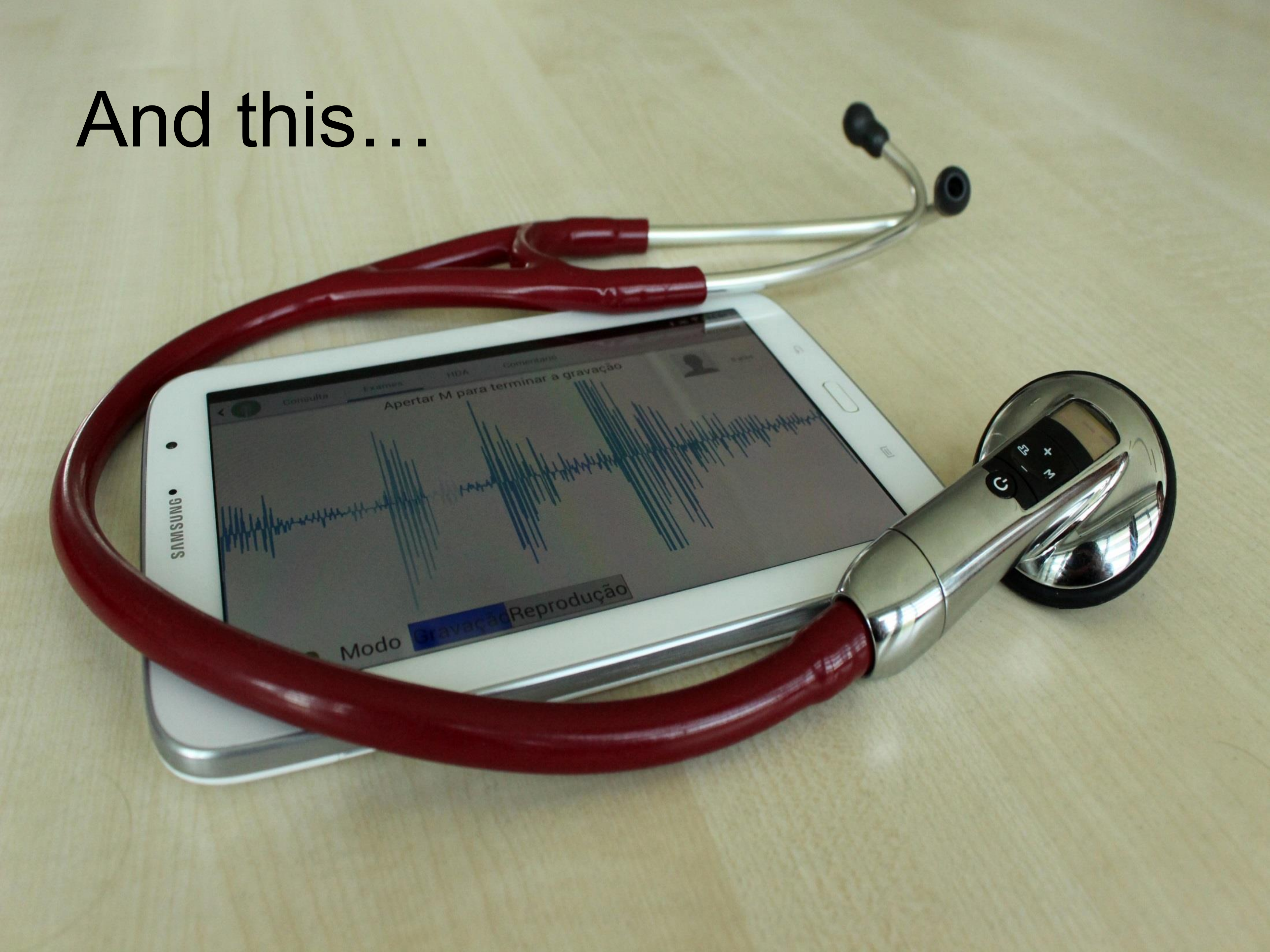
pros: complete model at end, fast to market.

cons: haphazard, feature crammed application, no overall performance strategy, may have to start again.

We thought this was awesome…

Then evolved into this…

And this…


Consulta
Exames
HDA
Comentarios
Apertar M para terminar a gravação
Modo
Gravação
Reprodução
SAMSUNG
M

Was this really the best way to design?

(clue: we were a bit smarter with our next technology…)

Types of prototypes

Types of prototypes

think of prototyping techniques as
tools in your bag of tricks

- Have lots so that you have appropriate one
- Should be fast, effective and targeted to the issues
  - **Don’t waste time** implementing something that won’t teach you anything

Fidelity ranges from low to high

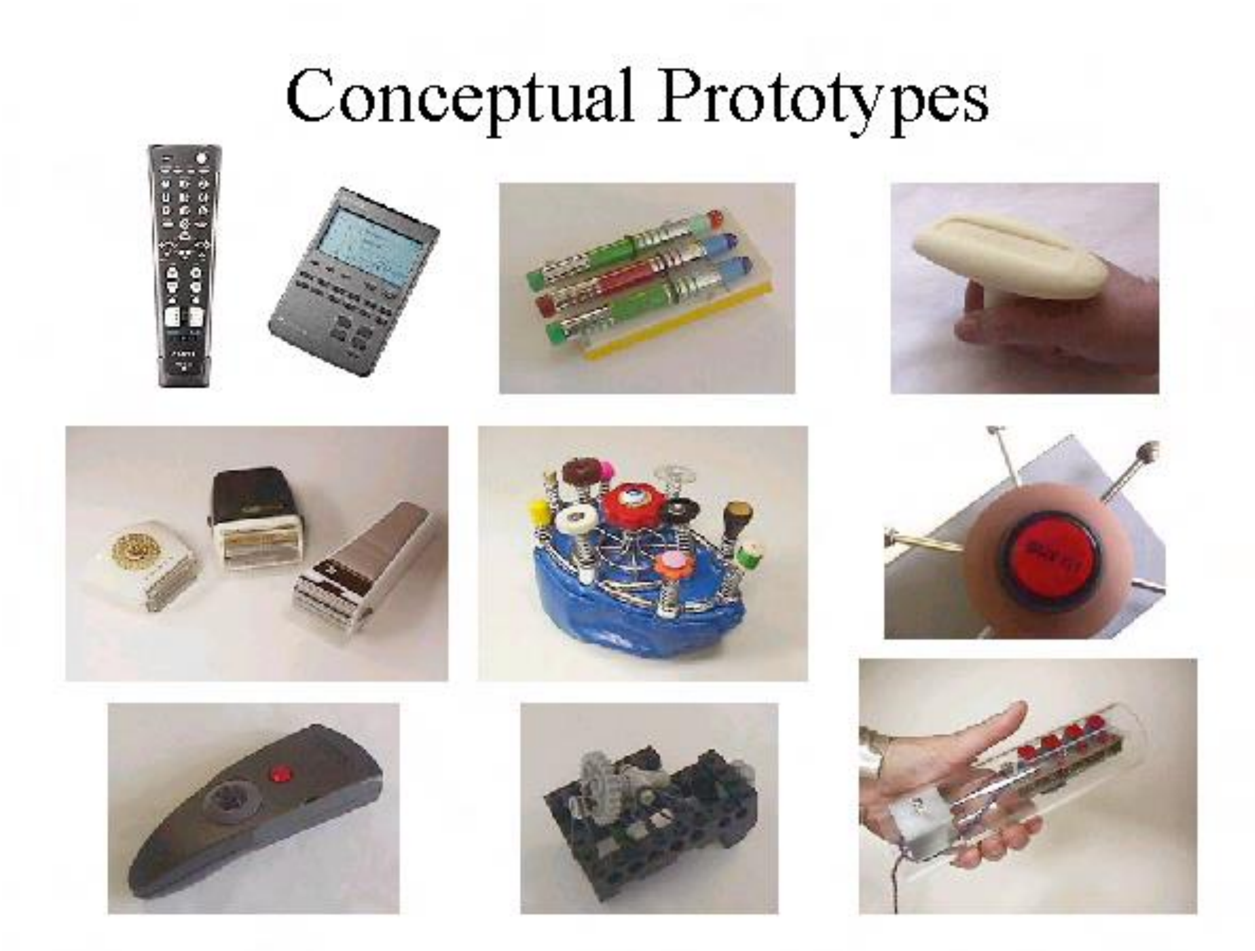
When to use different types of prototypes?

early design

Choose a representation	**Low fidelity paper prototypes**
Rough out interface style	
Task walkthrough & redesign	
Fine tune interface, screen design	**Medium fidelity prototypes**
Heuristic evaluation and redesign	
Usability testing and redesign	**High fidelity prototypes / restricted systems**
Limited field testing	
Alpha/Beta tests	**Working systems**

late design

Handheld “universal remote control”

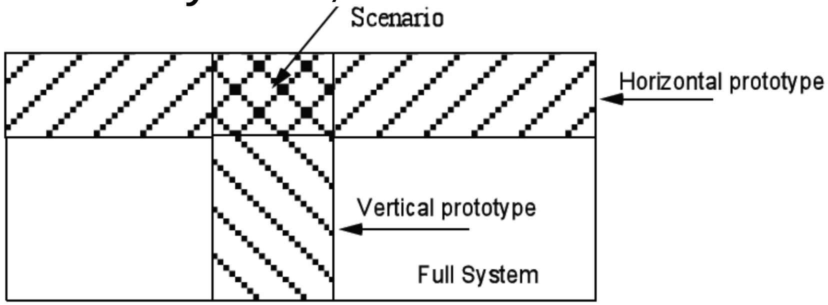


Low fidelity prototypes

- Prototyping with a computer
  - Simulate or animate critical features of the intended system
    - Engaging for end users
- Purpose
  - Provides a sophisticated but limited scenario to the user to try
  - Provides a development path: crude screens -> functional system
  - Can test subtle design issues
- Danger
  - User's reactions are usually "in the small"
    - Blinds people to major conceptual flaws
  - Users reluctant to challenge / change the design itself
    - Designs are too "pretty", egos…
  - Viewers (including management!) may think its real!

Approaches to ‘scoping’ prototype functionality

- **Vertical** prototype
  - Includes **in-depth functionality** for only a **few selected features**
  - Key design ideas can be tested in depth
- **Horizontal** prototype
  - Surface layers only: includes the entire user interface with no underlying functionality
  - A simulation; no real work can be performed
- **Prototype scenario**
  - **Scripts** of particular fixed uses of the system; no deviation supported
  - *See* whole thing (fake)
  - *Use* implemented corner of it.



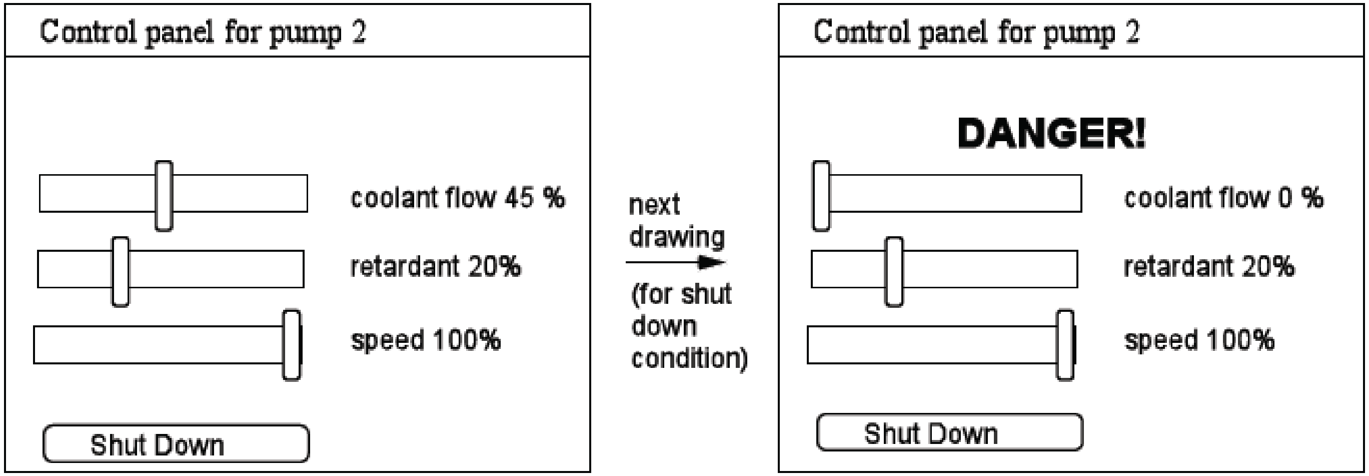
Approaches to prototype/product integration

- Throw-away
  - Prototype only serves to elicit user reaction
  - Creating prototype must be rapid, otherwise too expensive
- Incremental
  - Product built as separate components (modules)
  - Each component prototyped and tested, then added to the final system
- Evolutionary
  - Prototype altered to incorporate design changes
  - Eventually becomes the final product

Technique: Software Mock-ups

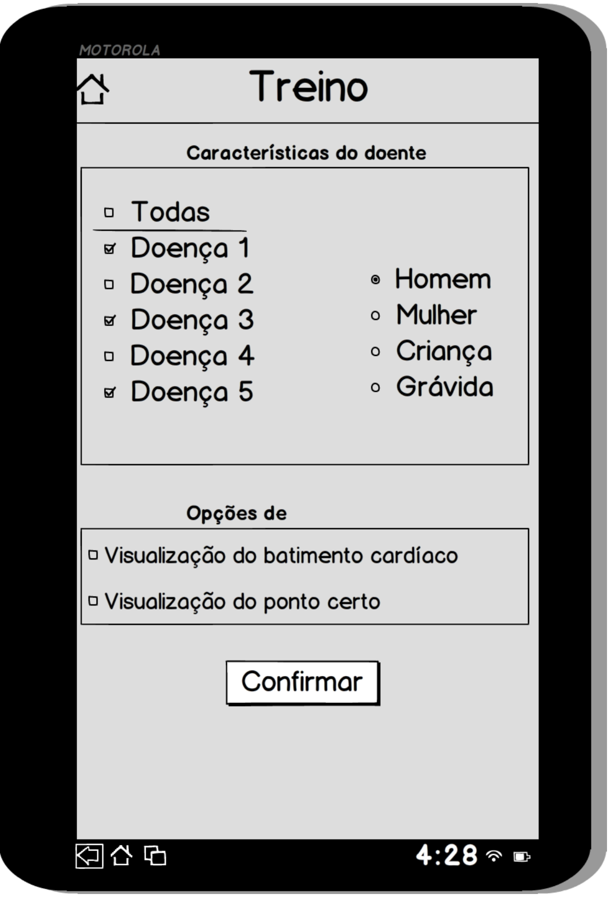
- Draw each storyboard scene on computer
  - Neater/easier (???) to change on fly than paper
- A very thin horizontal prototype!
- Does not capture the interaction “feel”

elements aren’t active: like paper prototype, but on screen



Example: Can I ‘auscultate’ a tablet in order to learn auscultation?

Balsamiq mock-ups



MOTOROLA

Treino

Características do doente

- □ Todas
- ☑ Doença 1
- □ Doença 2
- ☑ Doença 3
- □ Doença 4
- ☑ Doença 5

- ● Homem
- ○ Mulher
- ○ Criança
- ○ Grávida

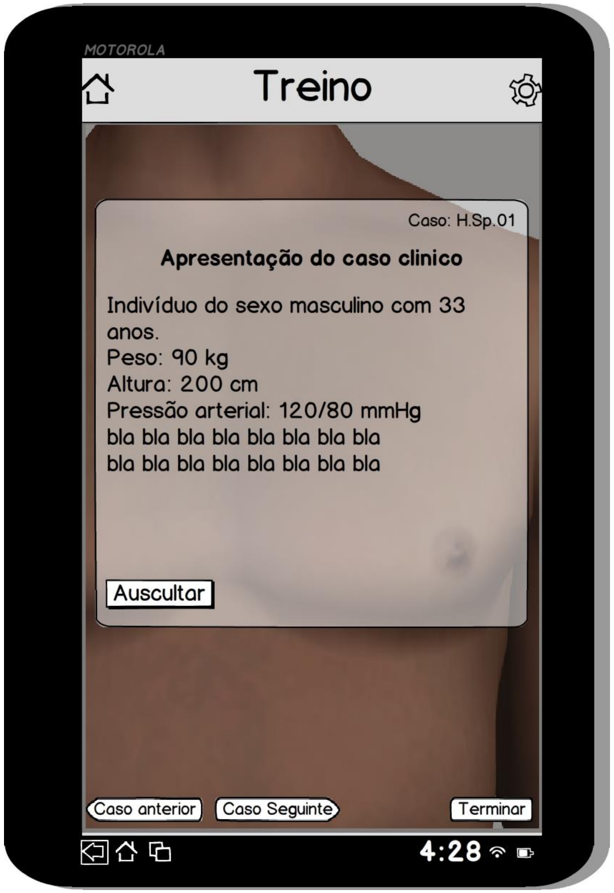
Opções de

- □ Visualização do batimento cardíaco
- □ Visualização do ponto certo

Confirmar

4:28

Opções



MOTOROLA

Treino

Caso: H.Sp.01

Apresentação do caso clinico

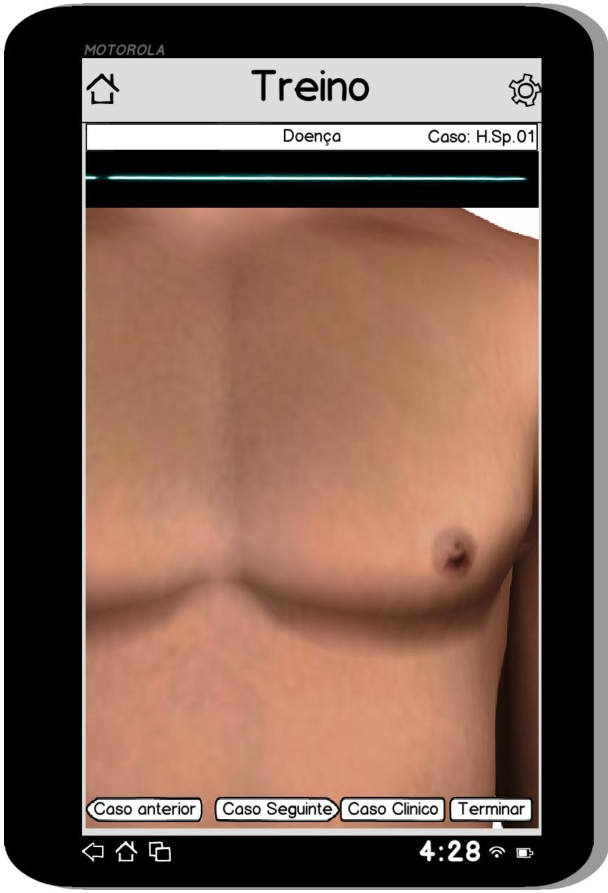
Indivíduo do sexo masculino com 33 anos.
Peso: 90 kg
Altura: 200 cm
Pressão arterial: 120/80 mmHg
bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla

Auscultar

Caso anterior | Caso Seguinte | Terminar

4:28

Caso



MOTOROLA

Treino

Doença | Caso: H.Sp.01

Caso anterior | Caso Seguinte | Caso Clinico | Terminar

4:28

Área de auscultação
e palpação

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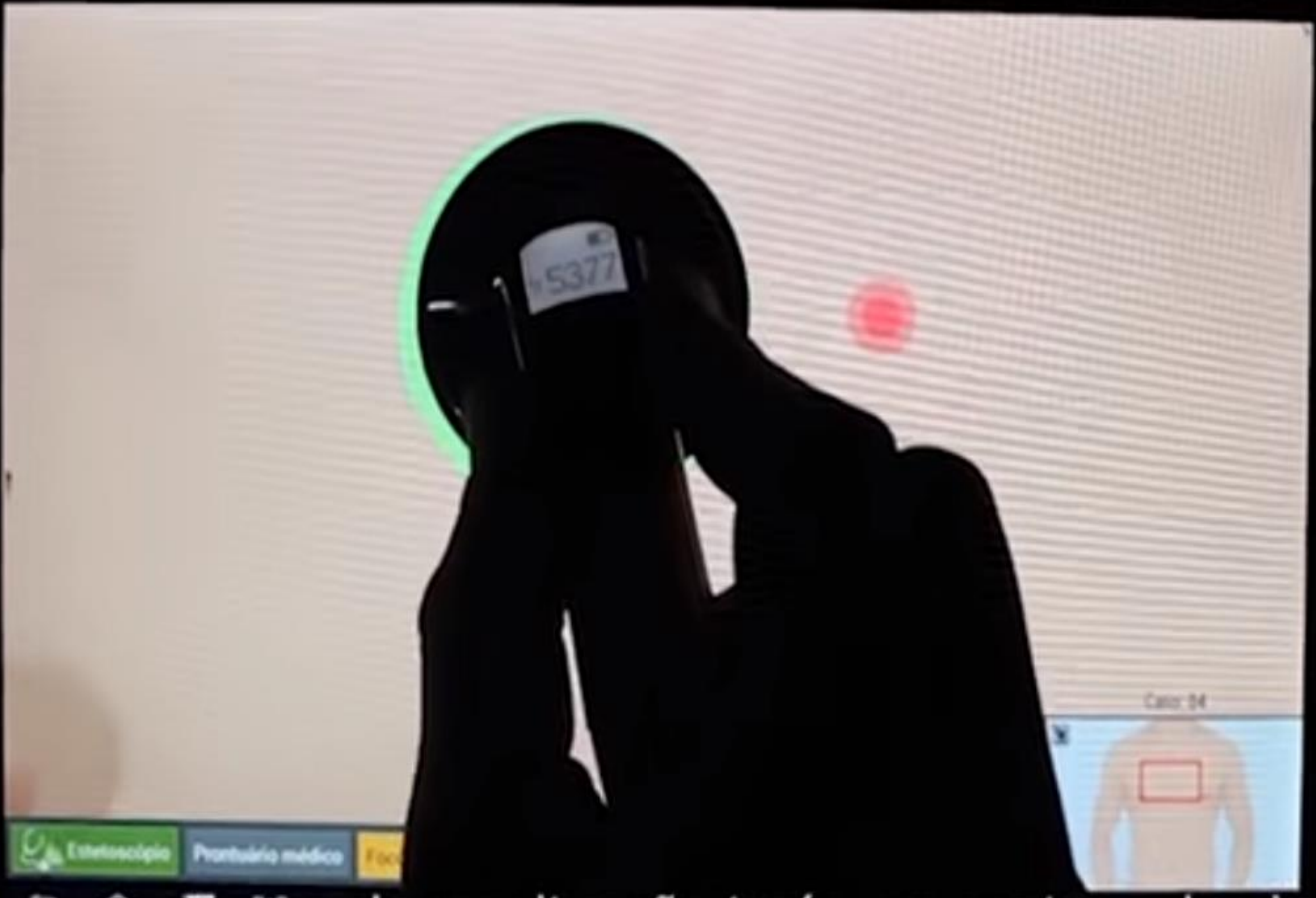
Great! But I can’t really test if the user scrolls around the torso ‘canvas’ without getting lost

(amongst other questions that remain unanswered…)

High-Fidelity Prototypes

- Vertical prototypes
- “Full” prototypes – Alpha versions

- Costly to build (requires time and expertise)
- Enables usability and technology acceptance testing



Em qualquer situação terás um contorno luminoso
para guiar a tua auscultação.

What if my prototype is ‘impossible’ to create?

“Impossible is just a big word thrown around by small men who find it easier to live in the world they've been given than to explore the power they have to change it. Impossible is not a fact. It's an opinion. Impossible is not a declaration. It's a dare. Impossible is potential. Impossible is temporary. Impossible is nothing.”

Muhammad Ali

Get creative!

Wizard of Oz: test the future!

- A method of testing a system that does not exist
  - The voice editor, by IBM (1984)

Comp.
For
Speech

What the user sees

The Wizard

Wizard of Oz

- Human simulates system’s intelligence & interacts w/ user
- Uses real or mock interface
  - “Pay no attention to the man behind the curtain!”
- User uses computer as expected
- “wizard” (sometimes hidden):
  - Interprets subject’s input according to an algorithm
  - Has computer/screen behave in appropriate manner
- Good for:
  - Adding simulated and complex vertical functionality
  - Testing futuristic ideas
- Possible cons?

Wizard of Oz examples

- IBM: an imperfect listening typewriter using continuous speech recognition
  - Secretary (i.e., Wizard) trained to:
    - Understand key words as “commands”
    - Type responses on screen as the system would
    - Manipulate graphic images through gesture and speech
- Intelligent agents / programming by demonstration
  - Person trained to mimic “learning agent”
    - User provides examples of task they are trying to do
    - Computer learns from them
  - Shows how people specify their tasks

How could I test this?

Low fidelity vs. High fidelity

cheap
easy to build lots
facilitate communication
gross design (layout)
market requirements
proof-of-concept
limited error checking
hard to get to code
facilitator driven
limited functionality

complete functionality
interactive
user-driven
exploration and testing
look and feel of final product
provides specification
marketing and sales tool
expensive
time consuming
inefficient proof-of-concept
poor for requirements gathering
can be hard to throw away

Summary

- Prototyping
  - Speeds up design and lowers overall cost
  - Allows users to react to the design and suggest changes
  - Prototypes and scenarios are used throughout design
  - Low-fi best for brainstorming and choosing a conceptual model
  - Med/hi-fi prototypes best for fine-tuning and detailed design
- Low, medium-fi prototyping methods
  - Vertical, horizontal and scenario prototyping
  - Sketching
  - Storyboarding
  - Scripted simulations
  - Wizard of Oz

Resources

1. Kellogg S. Booth, Introduction to HCI Methods, University of British Columbia, Canada http://www.ugrad.cs.ubc.ca/~cs344/current-term/