IPM 15/16 – T1.6
Design Concepts

Miguel Tavares Coimbra

U.PORTO FC

Summary

- Affordance
- Mapping
- Feedback
- Visibility
- Consistency
- Transfer effects

Design Concepts

design concepts are at a very high level and open to interpretation; they are a *starting point*

- Affordance
- Mapping
- Feedback
- Visibility
- Consistency
- Conceptual models

Other factors:

- Transfer effects
- Cultural associations
- Individual differences

"The design of everyday things", Don Norman, 1988

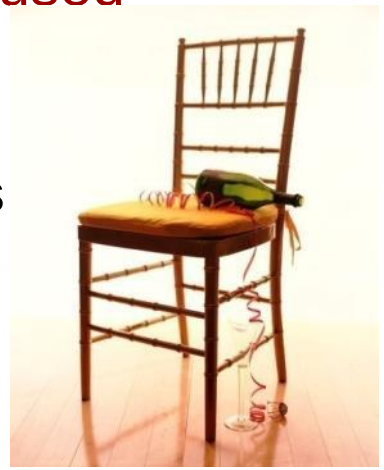
Affordance

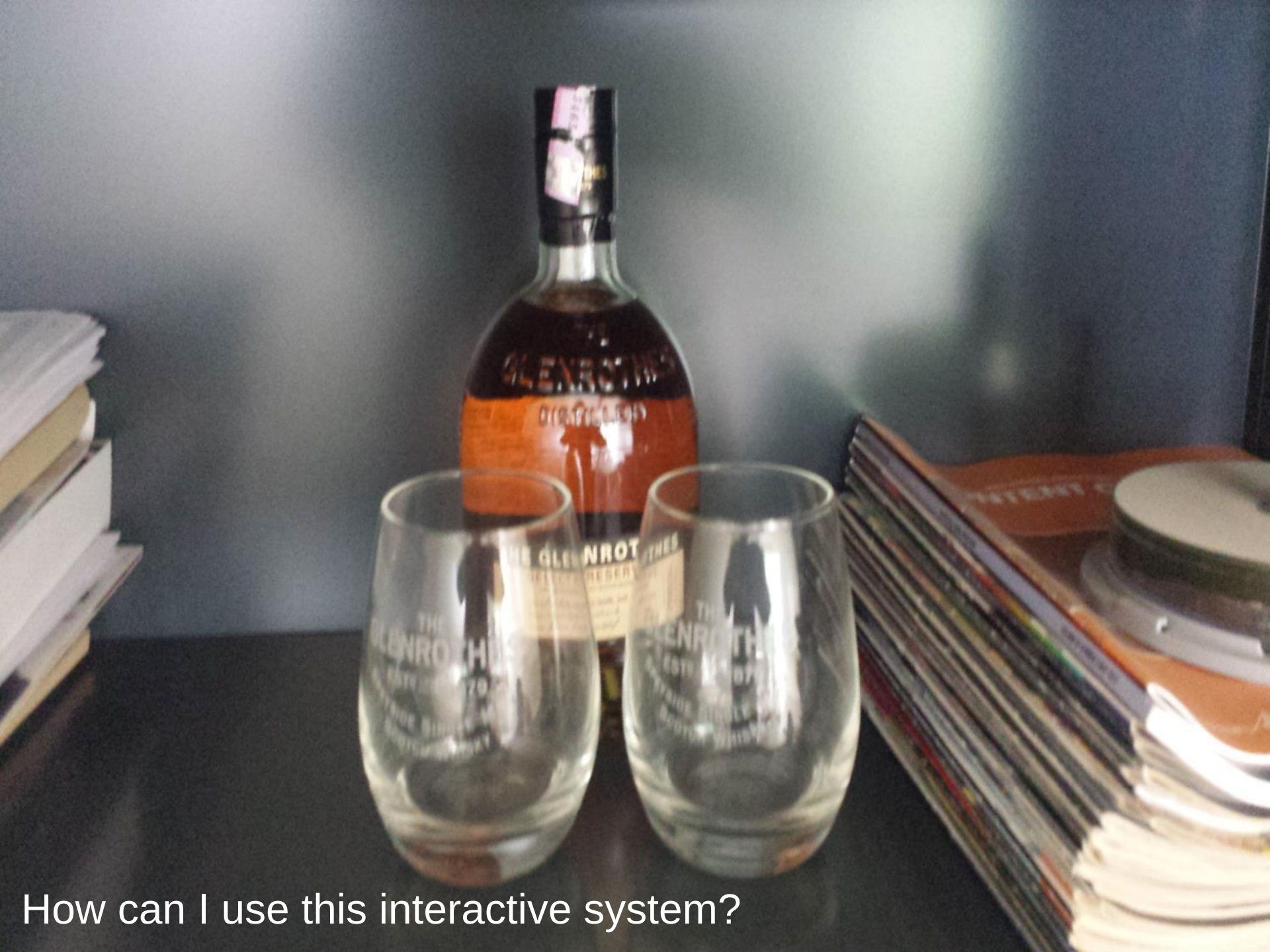
"the term affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used."

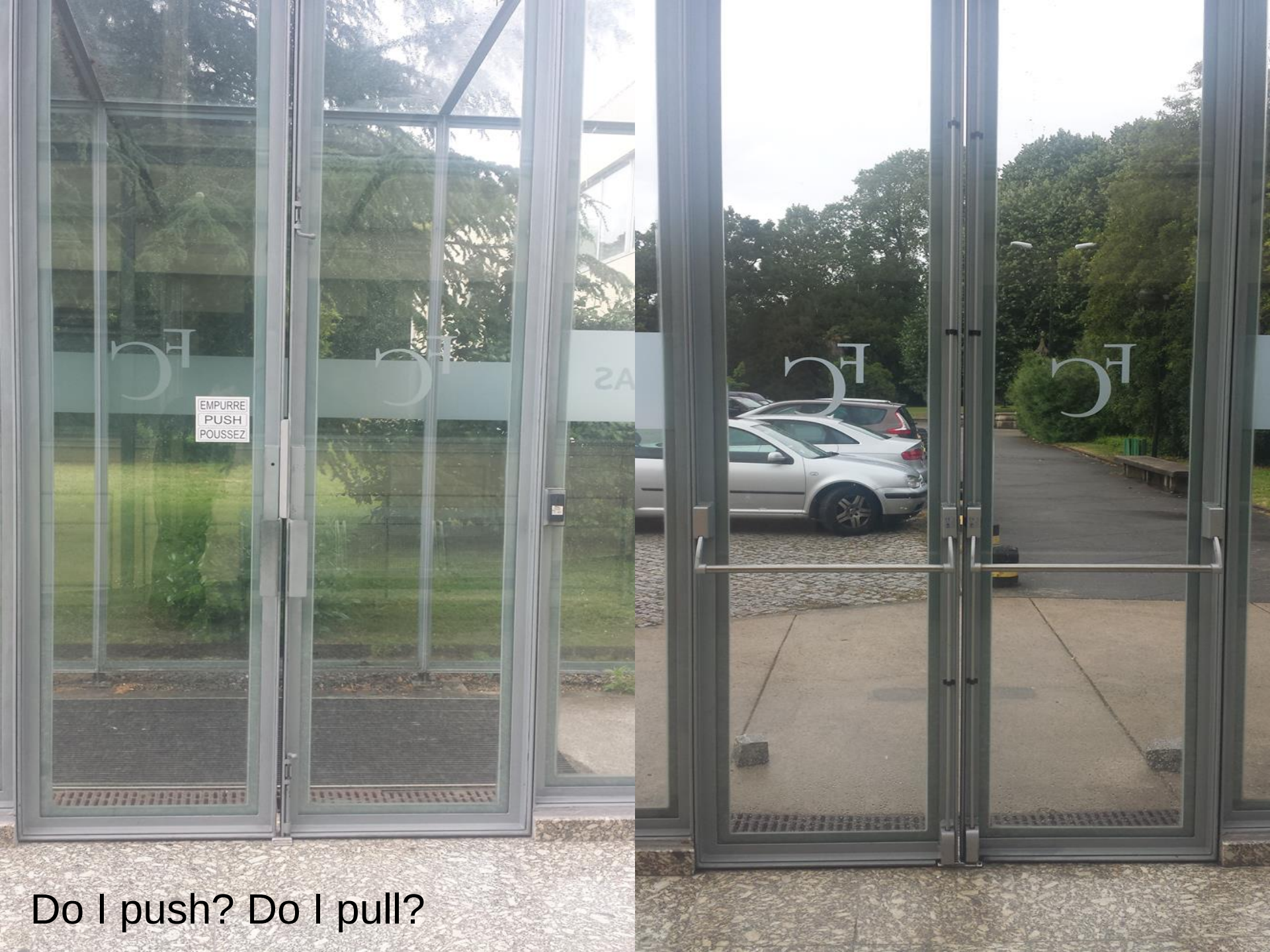
"A chair affords ("is for") support, and, therefore, affords sitting."

"The design of everyday things", Don Norman, 1988

- Visual structure indicates how the object should be used
- Complex things may need explaining
- Simple things should not
  - when simple things need pictures, labels, instructions
    -> Design has failed!

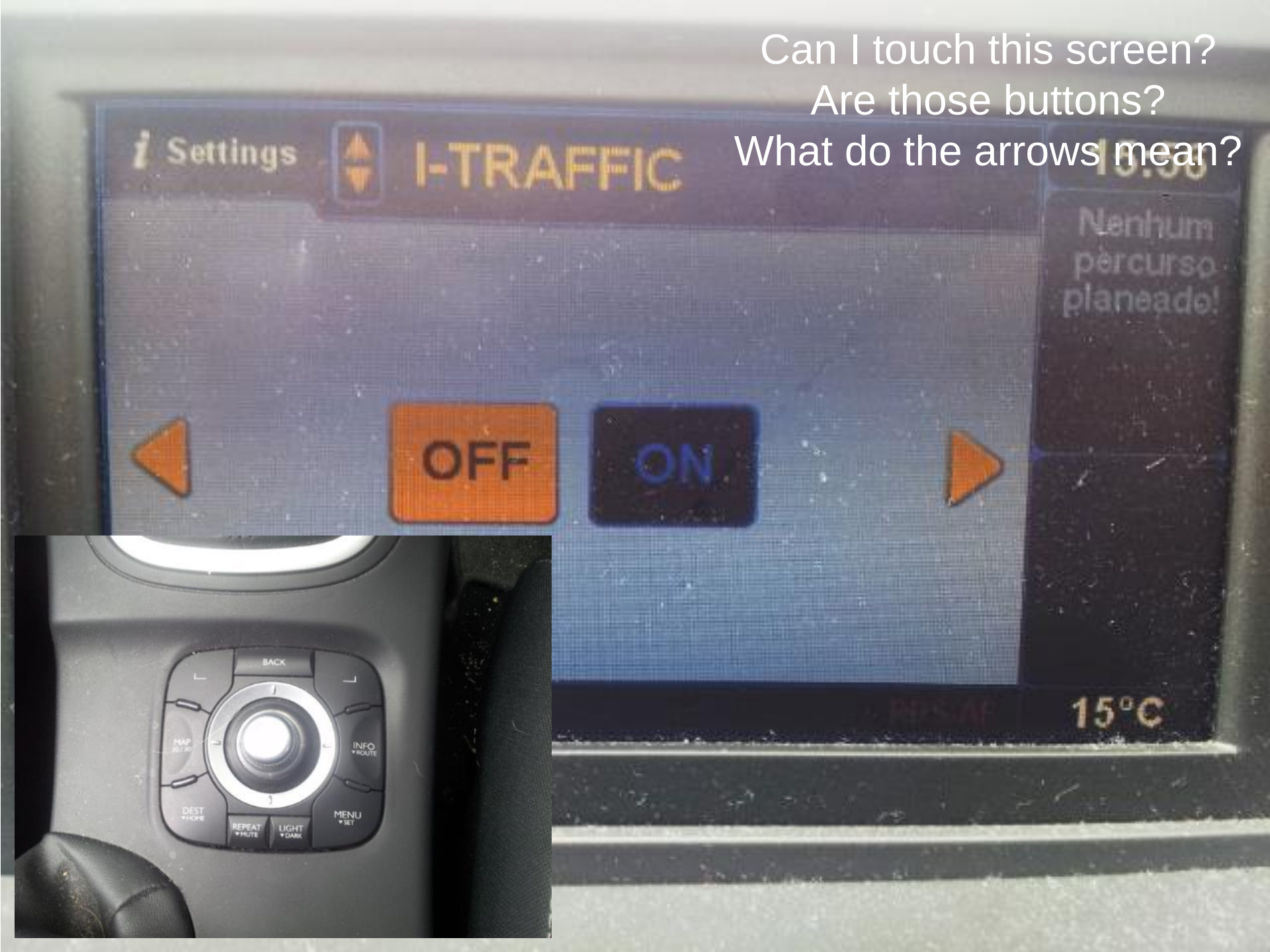



How can I use this interactive system?



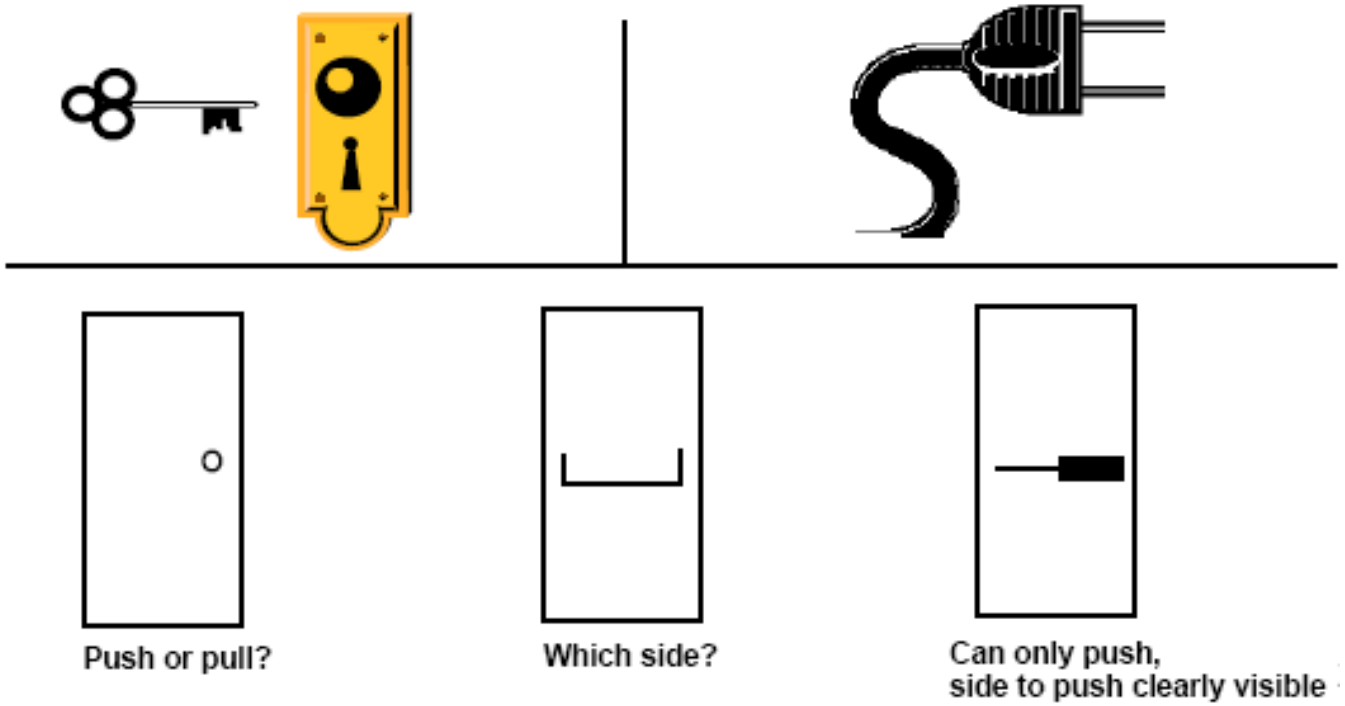
Do I push? Do I pull?

Can I touch this screen?
Are those buttons?
What do the arrows mean?

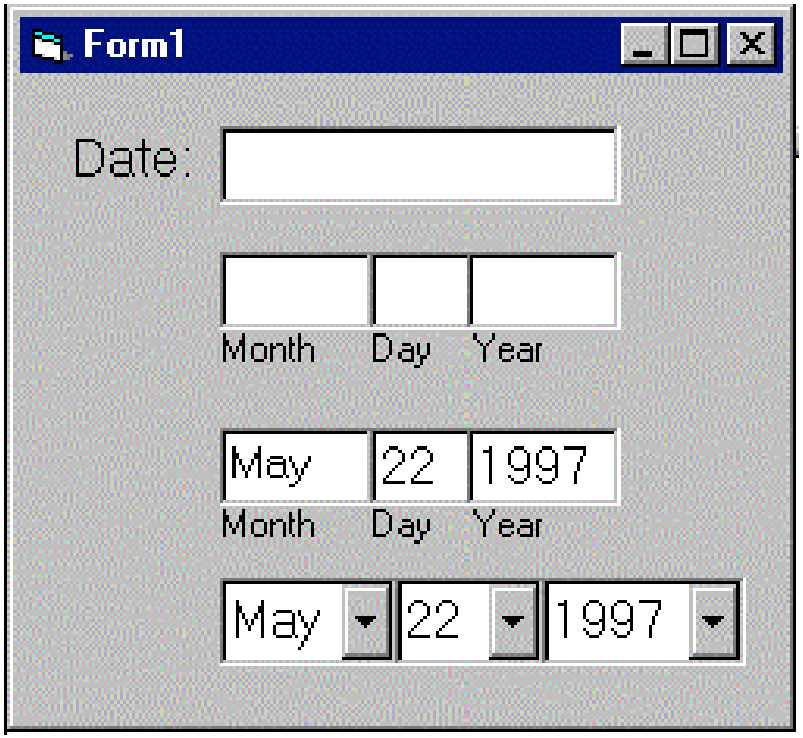


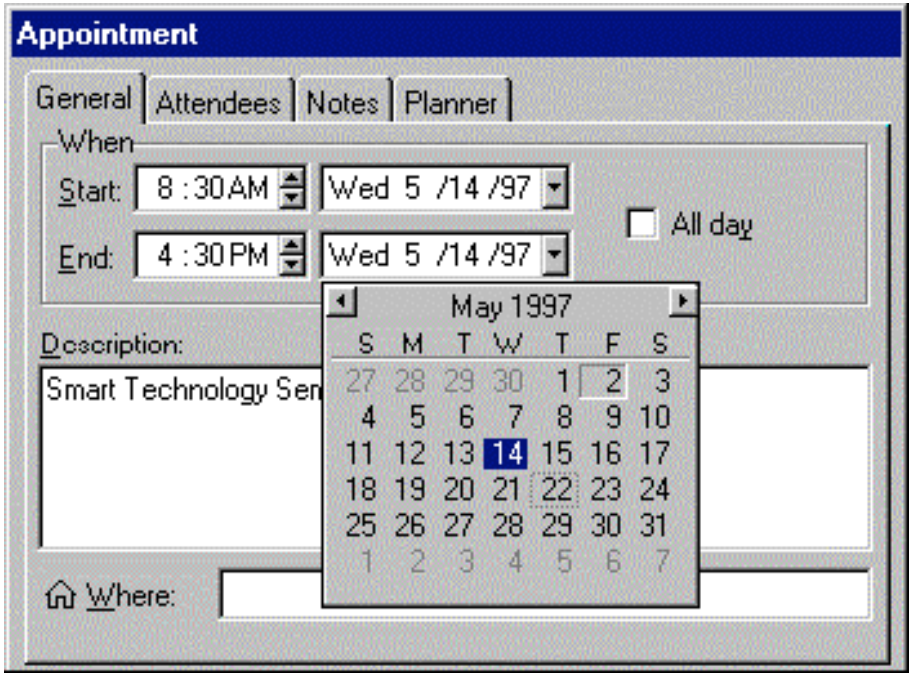
Visible constraints

Object's appearance indicates *limitations of* possible actions



A progression of visible constraints to enter a date





To answer a call, I have to turn the wheel?

Mapping

the link between what you want to do and what is perceived possible. It is the relationship between moving a control, and the results in the real world

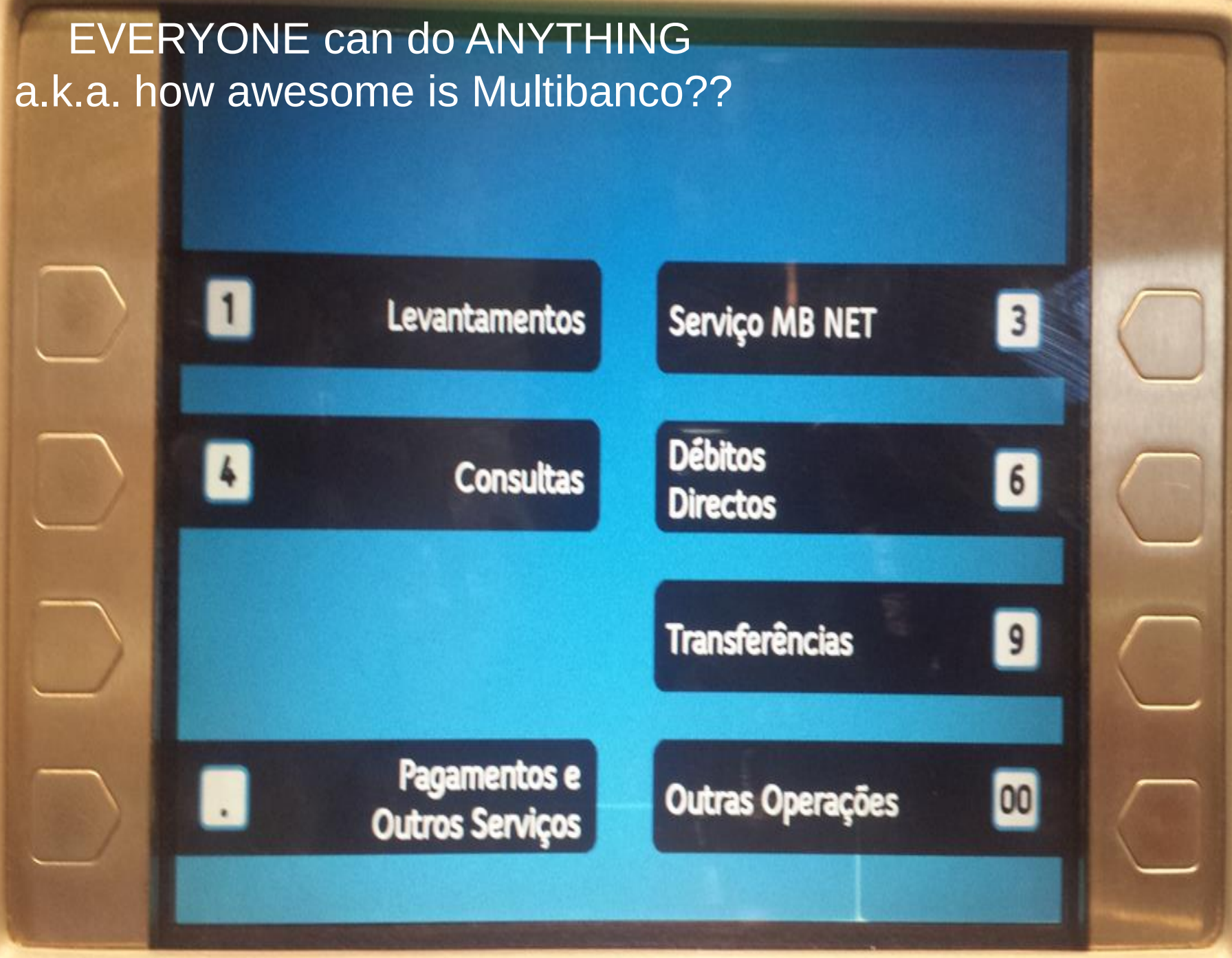
- Can I do this?
- How can I do this?
- What is the sequence of actions that enables me to accomplish my objectives?

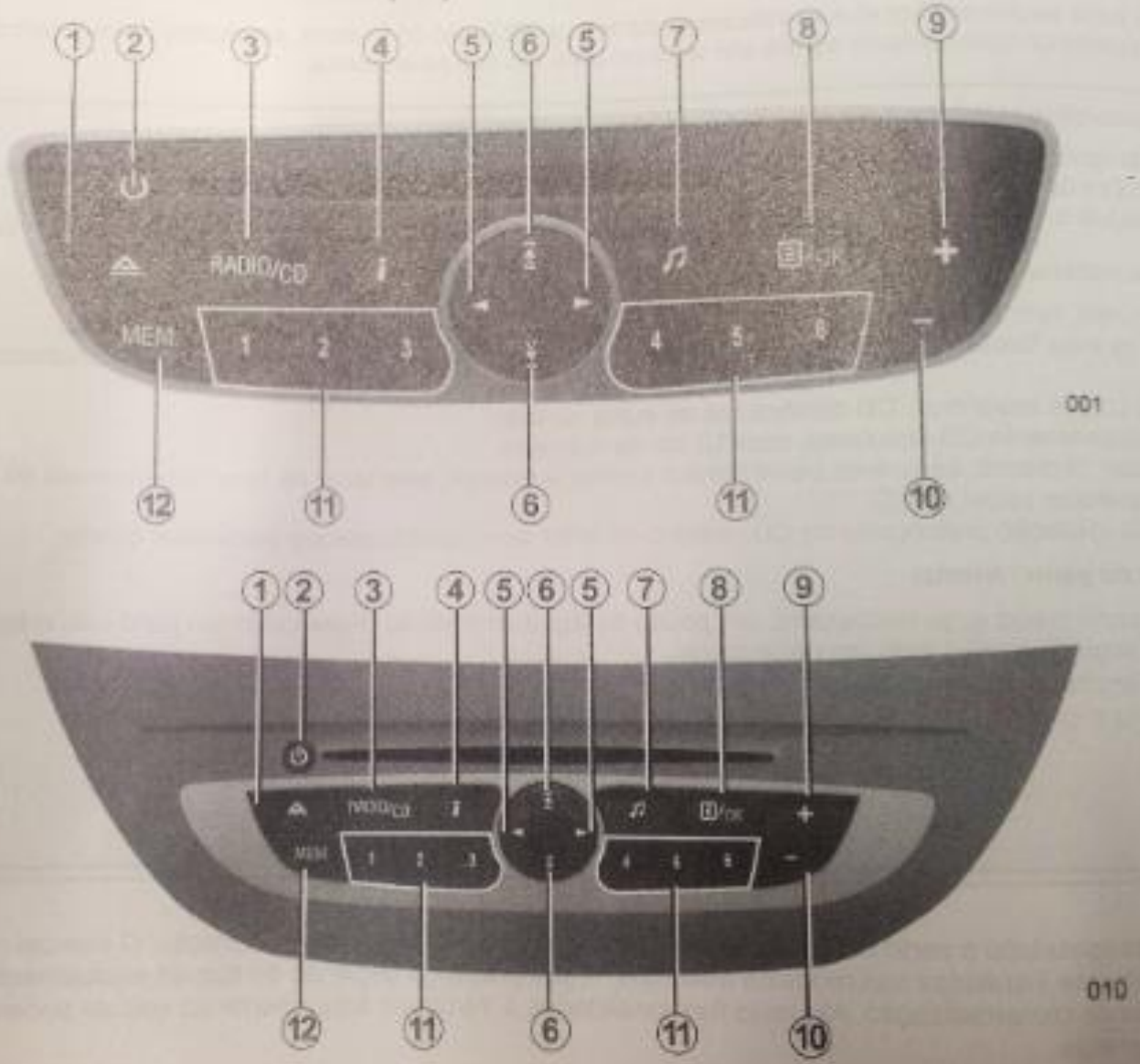
Which knob controls which hot plate?

Could you guess
the ‘hidden’ mode?

Position ‘up’ means light on?
Light off? Does it matter?

EVERYONE can do ANYTHING
a.k.a. how awesome is Multibanco??





Mapping explained
(a.k.a. how you failed as a designer…)

Feedback

- Sending information back to the user about what action has actually been done and what result was accomplished
  - What is the system's state?
  - Did *this* cause *that* effect?
  - Was my action successful?

All commands have feedback except the on/off one
Why is one light yellow, the other green?

AC is on and going up. Wait. The light is red. Is AC off?

Feedback and causality

Causality: *A caused B to happen*

True causality != perceived causality

- We usually assume that the thing that happens right after an action was caused by that action

False causality

- Incorrect effect:
  - Starting up an unfamiliar application just as computer crashes causes “superstitious” behaviors
- Invisible effect:
  - Command with no apparent result often re-entered repeatedly
  - e.g., hitting esc, or alt-ctrl-del, on unresponsive system

Visibility

- “The more visible functions are, the more likely users will be able to know what to do next. In contrast, when functions are "out of sight," it makes them more difficult to find and know how to use.”

Preece, J., Rogers, Y., Sharp, H. (2002), Interaction Design: Beyond Human-Computer Interaction, New York: Wiley,

  - Directly linked with our *working memory.* We can process only 7 pieces of information at one time!
  - *Change blindness* phenomena


AT&T
replaytv
SONIC blue
DVD
Pioneer
SONY
TV
Pioneer
Panasonic
LIGHT TOWER
www.useit.org

Sauber F1 Team

Buttons, switches, levers, LEDs and display on a Formula One™ steering wheel.

Any comment I can write here is irrelevant.
By the way. Did you read this at all?

Special setup LED 1

KERS boost LED (boost active)

Speed or remaining KERS (%)

Gear

FIA flag LEDs (marshalling lights)

Lap/split times

DRS (activated)

Special setup LED 2

Neutral gear

FIA flag LEDs (marshalling lights)

Shift lights / pit limiter and other warning lights

Pit lane limiter On/off switch

Confirm in this lap

Radio button On/off switch, speak to race engineer

Special buttons (customisable, LED shows activation)

Special buttons (customisable, LED shows activation)

KERS boost

Downshift (gear -1)

Upshift (gear +1)

Differential: corner entry setting

-10/+1: select MFRS setting (then: press „Ack“)

Acknowledge (...new setting after change)

Engine: select pedal map

Clutch lever

Yes to answer questions in case of radio problems

Problem sets a marker in the telemetry data, **No** to answer questions in case of radio problems

KERS: select recovery map

Engine: fuel/ oxygen mix

Differential: preload (basic diff setting)

Release oil from extra tank

Start bite point finder procedure

Confirm tyre and operate rain light

Engine: RPM limiter

KERS: select release map

DRS: operates the rear wing flap

Clutch lever

Multi-Functional Rotary Switch (MFRS): select function, change setting using -10/+1 buttons, press „Ack“ to acknowledge new setting.

Diagnostics switch sensors on/off

Clutch offset bite point

Differential corner exit setting

Dash display options

Shift selects shift type

Cruise control (testing only)

Split time control

Front wing adjust wish for next pit stop (in addition to team radio)

Tyre wish for next pit stop (in addition to team radio)

Why is there no reverse gear button?

F1 cars must be equipped with a reverse gear. If needed, the driver presses „N“ to change to neutral and then pulls and holds the downshift lever for more than half a second.

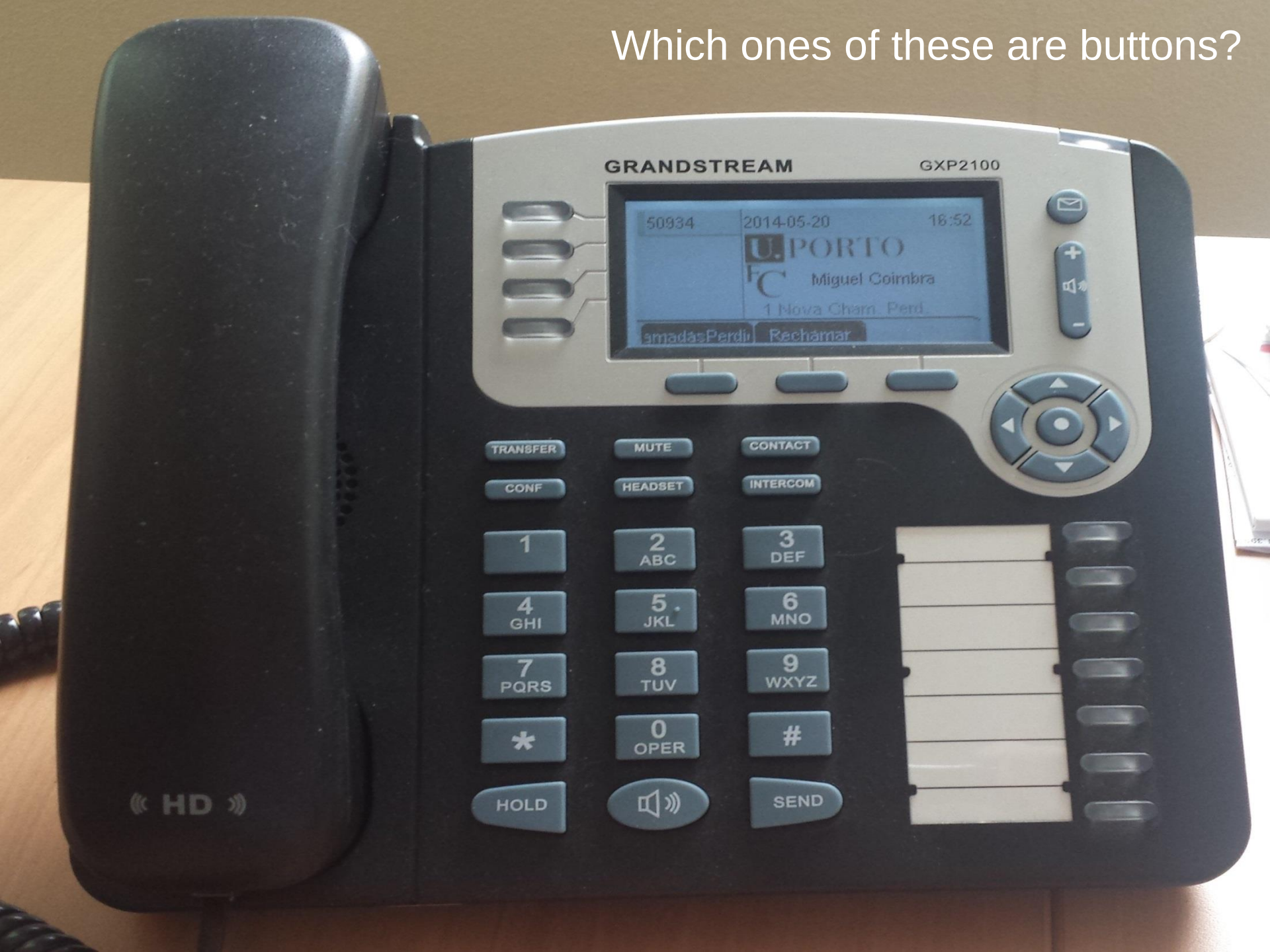
Consistency

- "Designing interfaces to have similar operations and use similar elements for achieving similar tasks"

Preece, J., Rogers, Y., Sharp, H. (2002), Interaction Design: Beyond Human-Computer Interaction, New York: Wiley,

  - Where have I seen this before?
  - Enables me to transfer knowledge to new contexts
  - Internal consistency – same elements inside a system
  - External consistency – coherence with external metaphors (transfer effects)

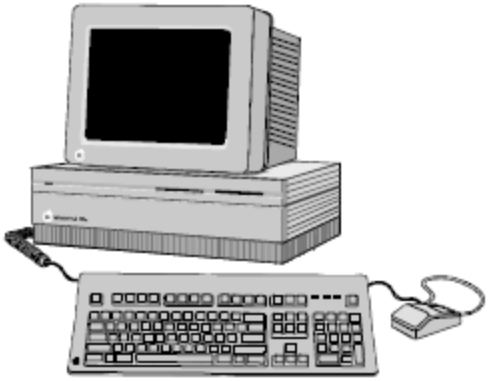
Which ones of these are buttons?



Different cars. Different radio controls

Transfer effects

- People transfer their learning/expectations of similar objects to the current objects
  - Positive transfer: previous learning applies to new situation
  - Negative transfer: previous learning conflicts with new situation



Summary

design concepts are at a very high level and open to interpretation; they are a *starting point*

- Affordance
- Mapping
- Feedback
- Visibility
- Consistency
- Transfer effects