UTM

UNIVERSITI TEKNOLOGI MALAYSIA

INTRODUCTION TO HUMAN COMPUTER INTERACTION

Chapter 01 (Part 4)

Design principles

Design principles

- Generalizable abstractions for thinking about different aspects of design
- The **do's** and **don'ts** of interaction design
- **What to provide and what not to provide at the interface**
- Derived from a mix of theory-based knowledge, experience and common-sense

Design Principles

- Visibility
- Feedback
- Constraints
- Mapping
- Consistency
- Affordance

Design Principles

- Visibility
  - can I see it?
- Feedback
  - what is doing now?
- Constraints
  - Why can't do that?
- Mapping
  - Where am I and where can I go?
- Consistency
  - I think I have seen this before?
- Affordance
  - How do I use it?

Visibility

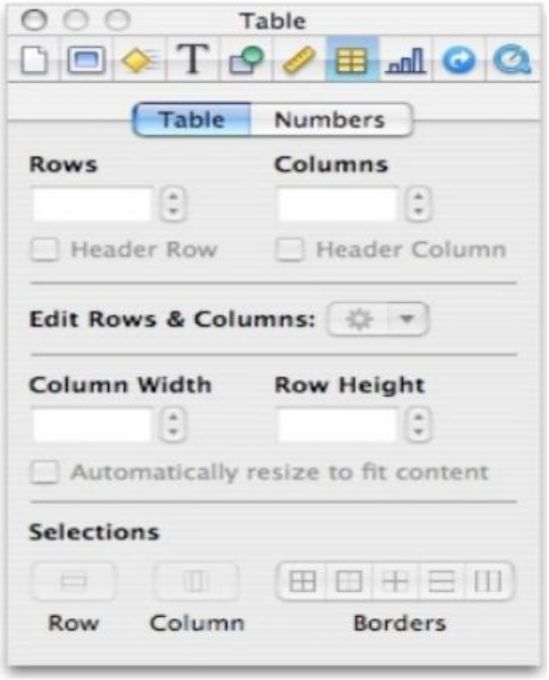
- Can see the state of a device and possible actions?
- Car controls are positioned in a way that they can be easily found and used.

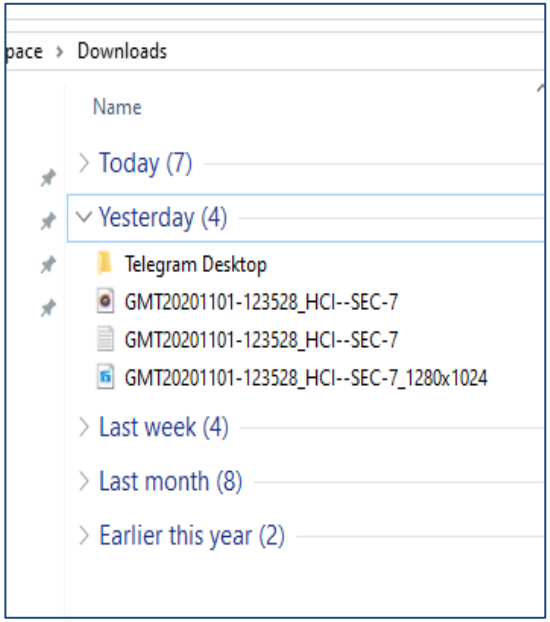
Visibility

- Problem arise when we cannot **“see”** how to do use a device.
- Sensor technology like auto faucets – **not sure how to use – guess where to put hands.**
- It is not visible as to what to do!
- **Visible** knobs, dials and buttons have been replaced by invisible and ambiguous **“active zones”**.

Visibility

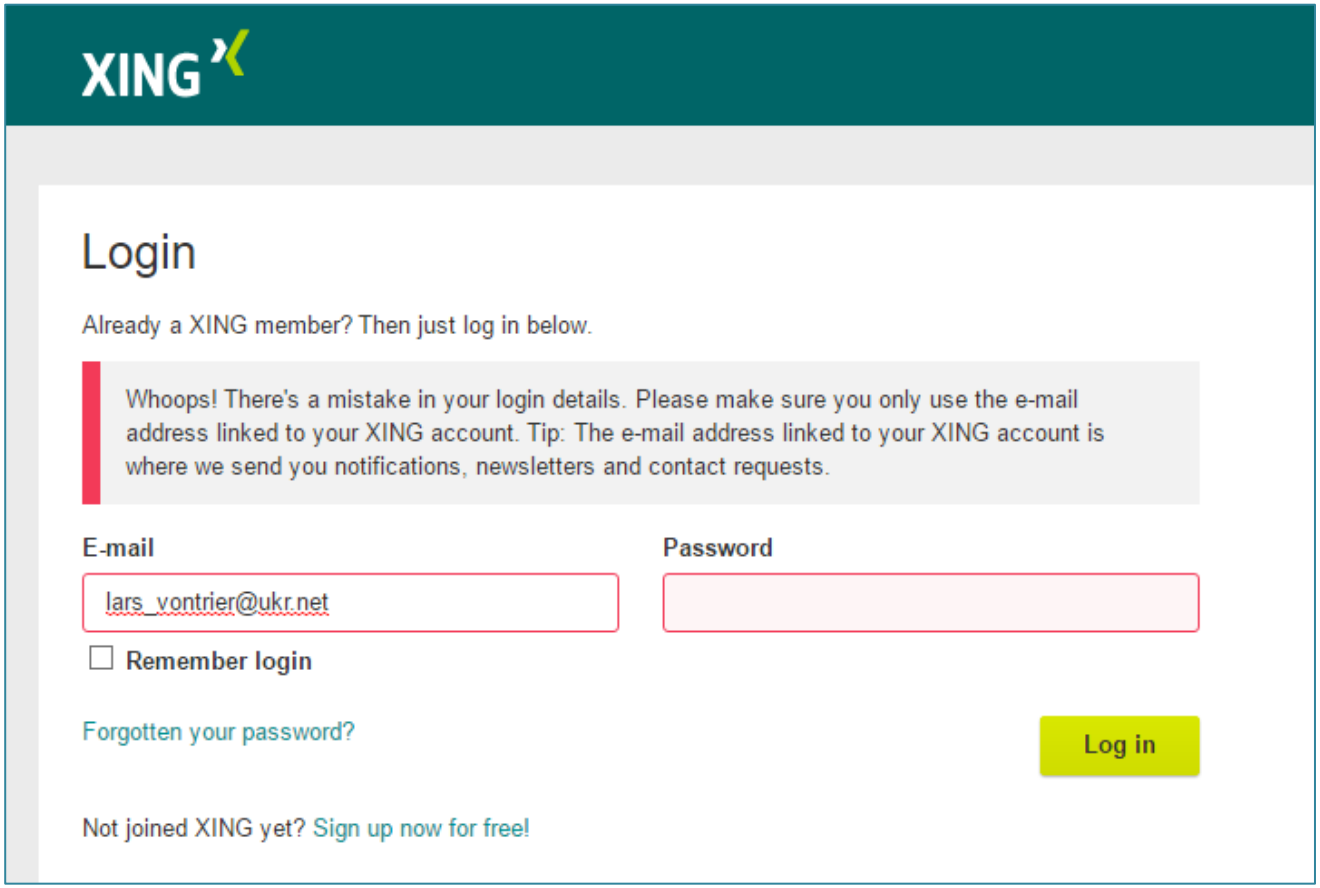
- **Hiding** certain functions can be advantageous in interface design.
- Certain functions are kept **invisible until needed**, also contained within a group of similar types.
- Google search makes it **clear** where to enter text.



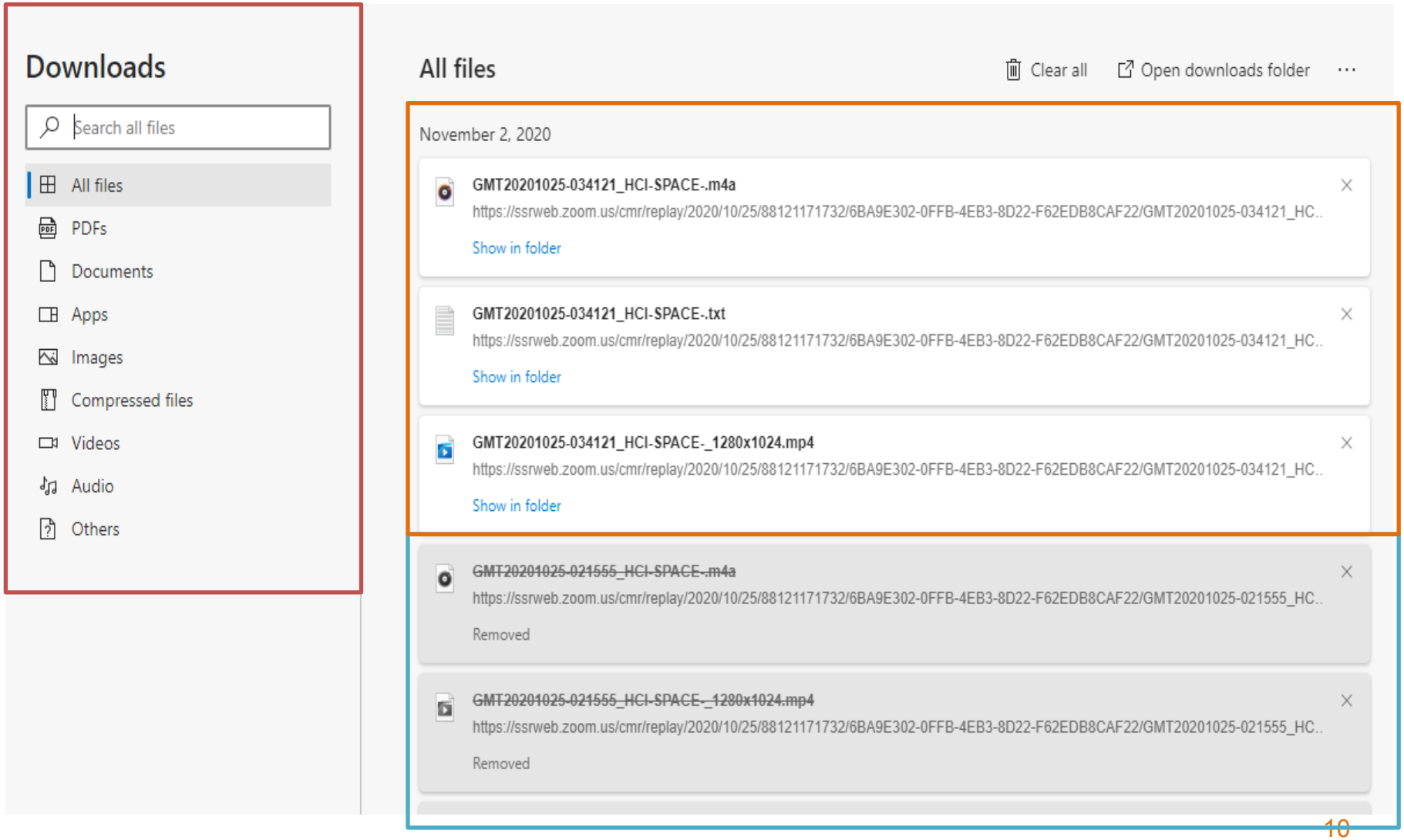


Visibility

- **Red color** is for identification of critical problems.



Visibility


Downloads
Search all files
All files
PDFs
Documents
Apps
Images
Compressed files
Videos
Audio
Others
All files
Clear all
Open downloads folder
November 2, 2020
GMT20201025-034121_HCI-SPACE-.m4a
https://ssrweb.zoom.us/cmr/replay/2020/10/25/88121171732/6BA9E302-0FFB-4EB3-8D22-F62EDB8CAF22/GMT20201025-034121_HC..
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GMT20201025-021555_HCI-SPACE-_1280x1024.mp4
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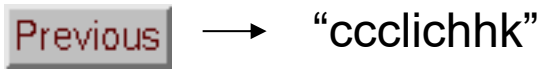
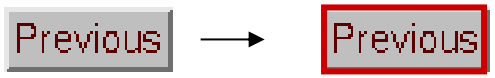
Removed

Feedback

- Sending information **back** to the user about
  - what has been done?
  - what is it doing now?
  - What action has been performed?
- Includes **sound, highlighting, animation** and combinations of these
  - e.g. when screen button clicked on provides sound or red highlight feedback.
- Needs to be **immediate** and **synchronized** with user action.





Feedback

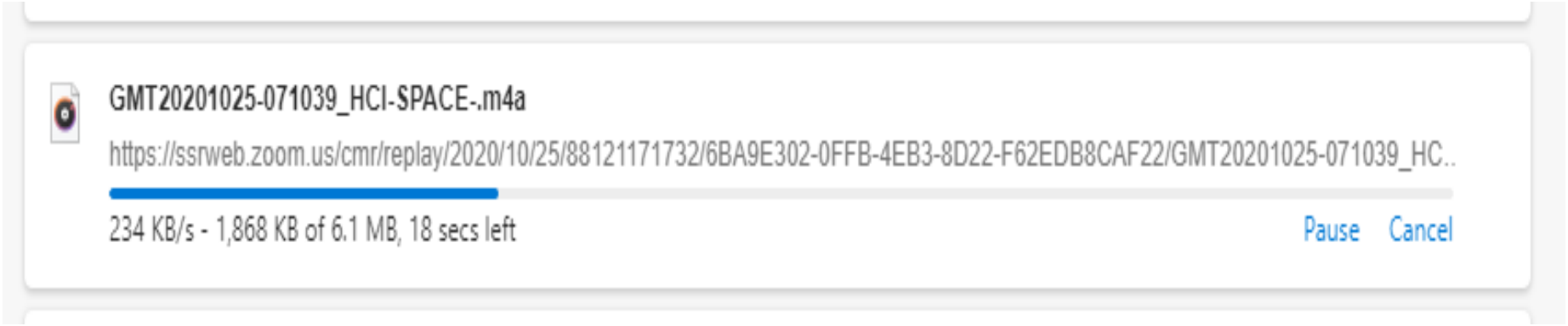
- The ‘Learning’ folder becomes **highlighted** as the user **clicks on a folder** on a Mac desktop.

Feedback

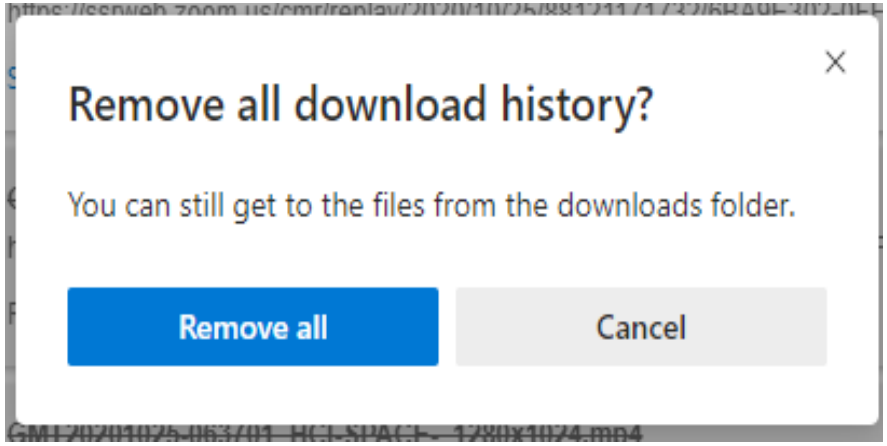
How iPhone app **remaining power battery** to the user?

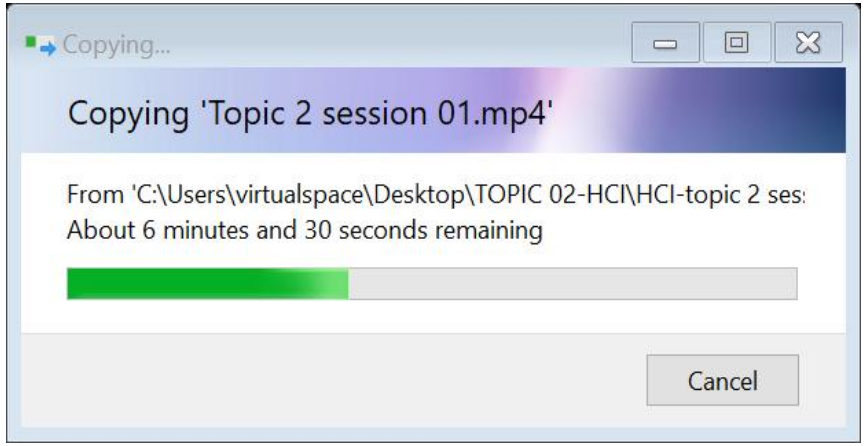
Feedback

Show the current status



Asking user before performed remove file





Constraints

- **Restricting** the possible **actions** that can be performed
- Helps **prevent user** from selecting **incorrect** options
  - Reduce the chance of error
- Physical objects can be designed to constrain things
  - e.g. only one way you can insert a key into a lock

Logical or Ambiguous design?

www.baddesigns.com

- Where do you plug the mouse?
- Where do you plug the keyboard?
- top or bottom connector?
- Do the colour coded icons help?

Physical Constraints

[www.baddesigns.com]

- Refer to the way physical objects restrict the movement of things
- Example:
  - Design only **one way** to insert a **mouse connection**; and only one way to insert a **keyboard connection**, and **make them different.**

Logical Constraints

(How to design them more logically)

(i) A provides direct adjacent **mapping** between **icon and connector**

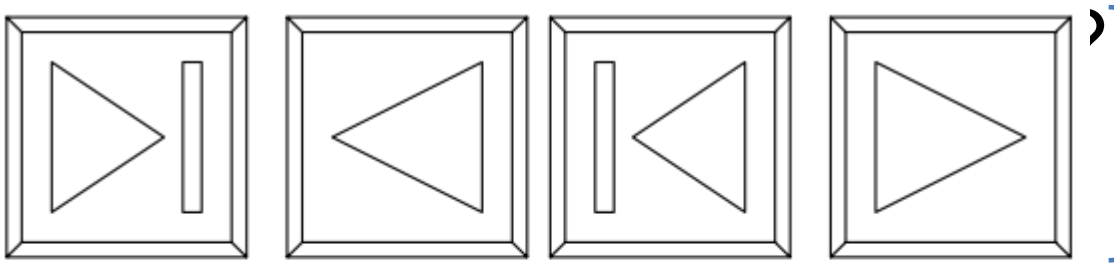
(ii) B provides **color coding** to associate the connectors with the labels

www.baddesigns.com

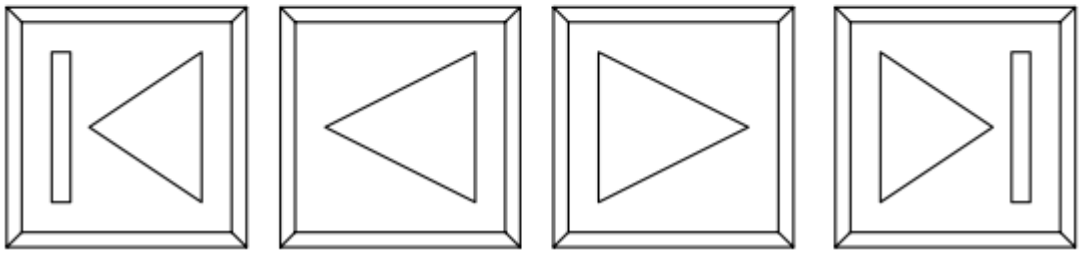
Exploit people's reasoning about relationships between objects in the world

Mapping

- Relationship between to **controls** and their movements and the effect in the world
-



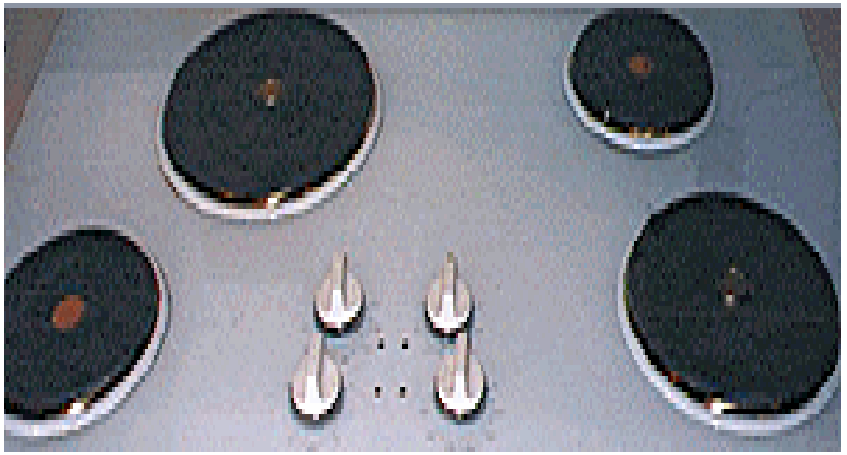
MAPPING 1



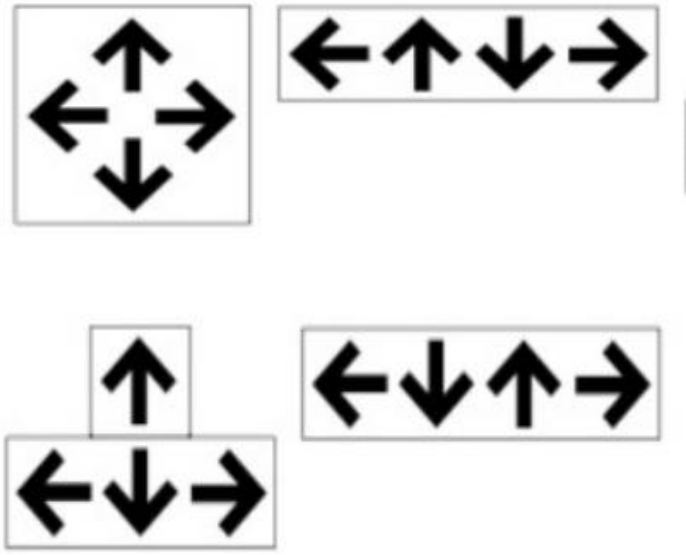
MAPPING 2

Mapping

- Which is the better mapping, and why?



Mapping



Good mapping arrangement.

Consistency

- Design interfaces to have **similar operations** and use **similar elements** for achieving **similar tasks**

- For example:
  - always use **ctrl key plus** first initial of the command for an operation – **ctrl+C, ctrl+S, ctrl+O**

- Main benefit is consistent interfaces are :
  - easier to learn and use when similar concepts are expresses in similar way.
  - User quickly transfer prior knowledge to new contexts and focus on relevant tasks.

When consistency breaks down

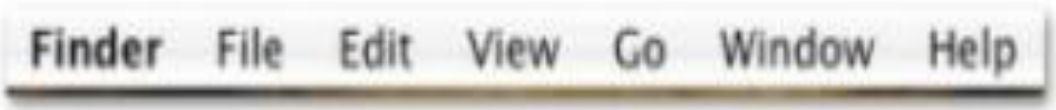
- What happens if there is **more than one command** starting with the **same** letter?
  - e.g. save, spelling, select, style
- Have to find other initials or combinations of keys, thereby **breaking the consistency rule**
  - e.g. ctrl+S, ctrl+Sp, ctrl+shift+L
- Increases learning burden on user, making them more prone to errors

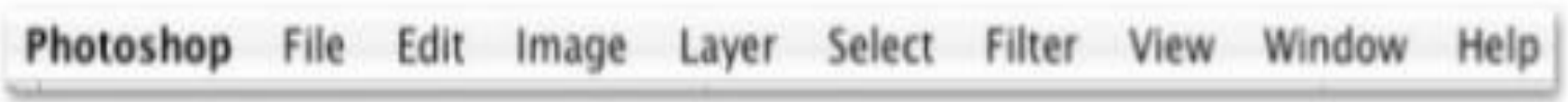
Internal and External consistency

- Internal consistency refers to designing operations to behave the same within an application
  - Difficult to achieve with complex interfaces
- External consistency refers to designing operations, interfaces, etc., to be the same across applications and devices
  - Very rarely the case, based on different designer's preference

External consistency

more difficult to achieve because different systems rarely observe the same design standards

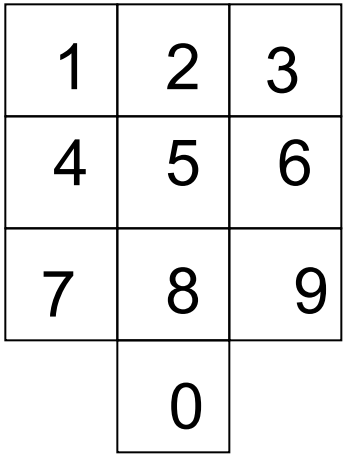




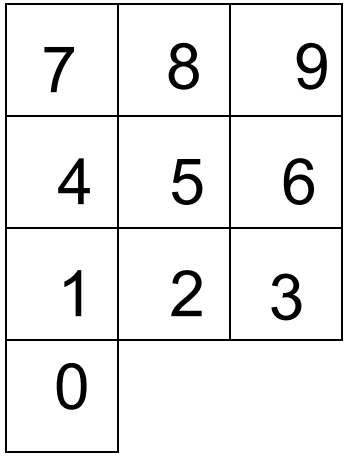
Keypad numbers layout

- A case of external inconsistency

(a) phones, remote controls



(b) calculators, computer keypads

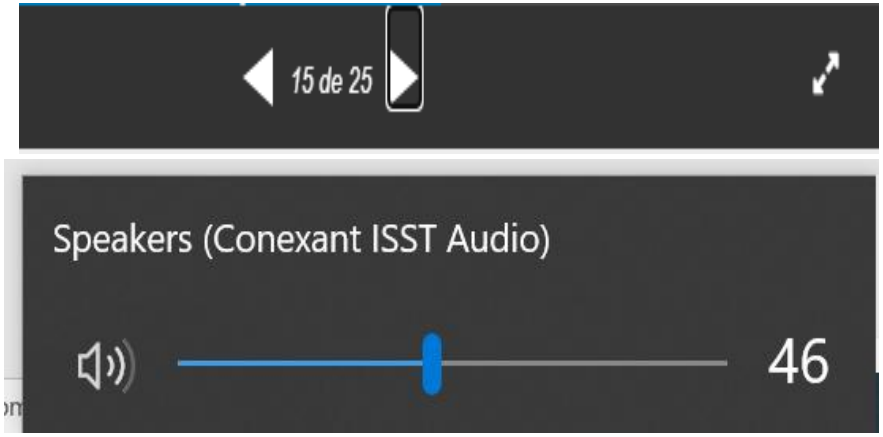


Affordances (to give a clue to its operation)

- Refers to an attribute/properties of an object that allows people to **know how to use it**
  - e.g. a mouse button invites pushing, a door handle affords pulling
- Norman (1988) used the term to discuss the design of everyday objects
- Since has been much popularised in interaction design to discuss how to design interface objects
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on

Activity

- **Virtual Affordances**
  - How do the following screen objects afford?
  - What if you were a novice user?
  - Would you know what to do with them?



Affordance

- **Physical affordances:**
  - How do the following physical objects afford?
  - Are they obvious?


PUSH
PUSH


KEEP IT OBVIOUS
Affordance
LEARN MORE ABOUT IT


O2-UK
10:43
Wednesday, 29 July
slide to unlock


Phone
Mail
Safari
Music

Affordance

- Car Handles

What does ‘affordance’ have to offer interaction design?

- Interfaces are virtual and do not have affordances like physical objects
- Norman argues it does not make sense to talk about interfaces in terms of ‘real’ affordances
- Instead interfaces are better conceptualized as ‘perceived’ affordances
  - Learned conventions of arbitrary mappings between action and effect at the interface
  - Some mappings are better than others

Key points

- Interaction design is concerned with designing interactive products to support the way people communicate and interact in their everyday and working lives
- It is concerned with how to create quality user experiences
- It requires taking into account a number of interdependent factors, including context of use, type of activities, cultural differences, and user groups
- It is multidisciplinary, involving many inputs from wide-reaching disciplines and fields


Any
Questions