



University of M'sila
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Department of Computer Science

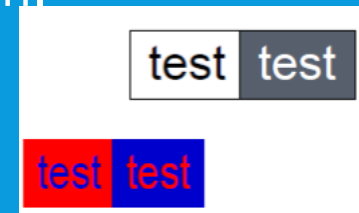
ERGONOMIC RULES PART 2: STYLE GUIDE

Academic Year 2024-2025

Prepared and presented by SAOUDI Lalia

1/BASIC PRINCIPALES

- **1.2. Readability of Colors:**
 - **Organisation of the retina: Two types of photoreceptor cells**
 - Rods in the periphery: shape perception and night vision
 - Cones (6 million) at the centre (fovea): primary colors (red, green, blue)
 - These receptors convert light into nerve impulses and transmit them along the cerebral cortex via the optic nerve
 - Blue: less than 4% of cones: limited acuity, reserved for peripheral vision, This means we see blue less sharply than red or green.



- **perceptual recommendations**
 - High contrast between characters/background
 - Dark characters on a light background
 - Limit the number of colors to enhance their discrimination: 4 at most in a display and 7 ± 2 across the entire interface.

1/BASIC PRINCIPALES

Strategic Uses of Blue in HCI & Design

1. Primary Actions & Navigation

Why it works: Blue is universally associated with links. It signifies clickability, trust, and reliability.

Best Practice: Use a bold, saturated blue for primary buttons and hyperlinks.

2 Backgrounds & Large Areas

Why it works: Blue is perceived as calm, stable, and non-intrusive. Dark blues are excellent for reducing eye strain in low-light environments.

Best Practice: Use dark blue (e.g., #0A2540) for dashboard backgrounds or admin panels. Use light, desaturated blues for large background areas to create a sense of space and calm.

1/BASIC PRINCIPALES

Strategic Uses of Blue in HCI & Design

3. Status & Information

Why it works: Blue is neutral and informative, not alarming. It's the opposite of "red" for danger.

Best Practice: Use blue to indicate:

Informational states (e.g.,  Info)

Active/Selected state (e.g., a selected tab or filter)

1/BASIC PRINCIPALES

Best Practices

Do

- Use for large buttons, links, and headers. Blue has lower visual acuity and appears blurry at small scales.
- Use dark blue on light grey/white (excellent contrast). Light blue fails contrast ratios for text.
- Use saturated, vibrant blues for key interactive elements. Saturation draws attention and improves visibility.
- Pair blue with **white**, light **gray**, or **orange** (a high-contrast complement). Low contrast or hue confusion makes interfaces hard to parse.
- Add an icon or label to a blue status indicator. Redundancy ensures accessibility for all users.

1/BASIC PRINCIPLES

▪ 1.3.Text Display A A

- Typography: well-composed font, avoiding:
 - sans serif fonts more readable on screen (Arial, Calibri, Helvetica, ..)
 - ans serif fonts more readable on screen (Arial, Calibri, Helvetica, ..)
 - Bold, italic, underlined slow down reading,
 - UPPER CASE less readable than lowercase.
 - Lowercase letters are more distinct from one another than uppercase letters.
 - Hello this is a reading test to assess the readability of the text in lowercase
 - HELLO THIS IS A READING TEST TO ASSESS THE READABILITY OF THE TEXT IN
UPPERCASE
- **ans serif fonts more readable on screen (Arial, Calibri, Helvetica, ..)**

1/BASIC PRINCIPLES

1.4. Two Second Principle:

- the system response must not take more than 2 seconds to arrive
- Risks
 - the user may restart the action
 - bugs or error messages
- Solutions
 - quick actions: indicator of action completed
 - long actions: dynamic indicator of action in progress

1/BASIC PRINCIPLES

- **1.5 Principle of 3 Clicks**
- Principle
 - the desired information must be accessible in 3 clicks (web)
 - Quickly
- Risks
 - the user may abandon the task/application
- Solutions
 - make important actions accessible directly or at least quickly
 - adapt to the situation

1/BASIC PRINCIPLES

- **1.6 Rearview Mirror Syndrome**

- Principle

- users tend to reject unfamiliar items
- “things were better before”

- Risks

- rejection of new applications/versions
- workarounds
- issue for innovations, software evolution

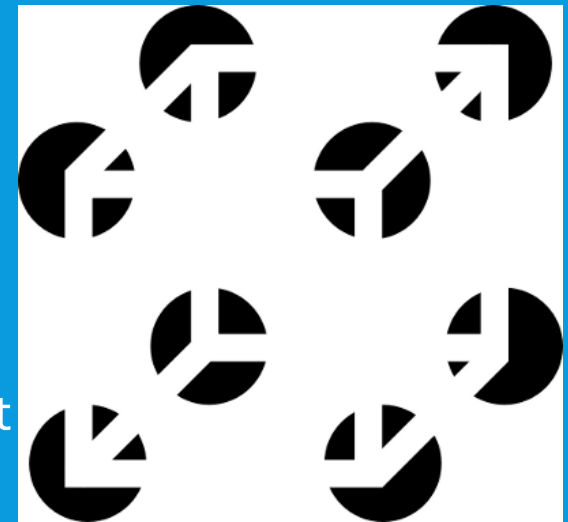
- Solutions

- evolution in consistency
- Accompanying change

1/BASIC PRINCIPLES

- **1.7 Gestalt Theory or Psychology of Form**

- the processes of perception and mental representation spontaneously handle phenomena
 - as structured sets (the forms)
 - and not as a mere addition or juxtaposition of elements
- completion
 - emergence of characteristics absent from individual forms
- laws of Gestalt theory
 - studied: proximity, similarity
 - others: figure-ground distinction, visual continuity, symmetry, focal point

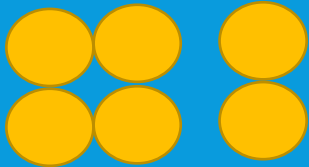


1/BASIC PRINCIPLES

- **Gestalt Theory – Law of Proximity**

- Law of Proximity

- the brain tends to associate things that are physically close

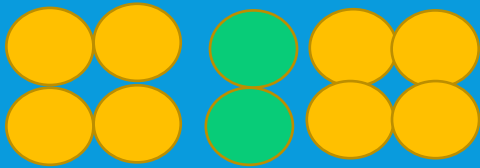


- **Solutions**

- bring similar elements together / separate different elements

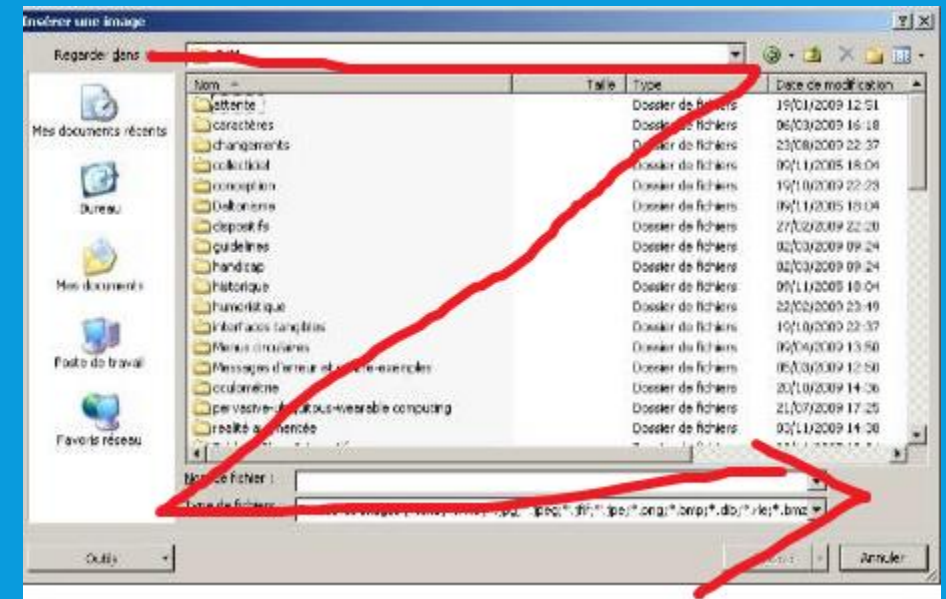
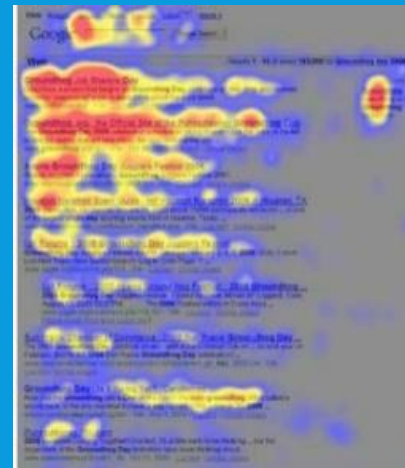
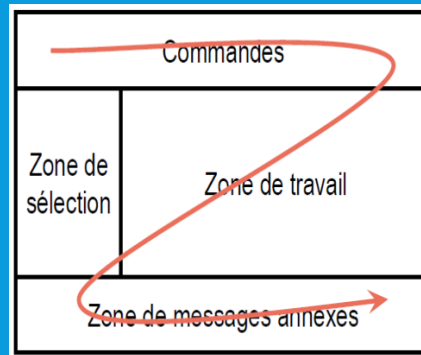
1/BASIC PRINCIPLES

- Law of Similarity
- the brain tends to associate things that are alike (according to shape, colour, size, behaviour...)



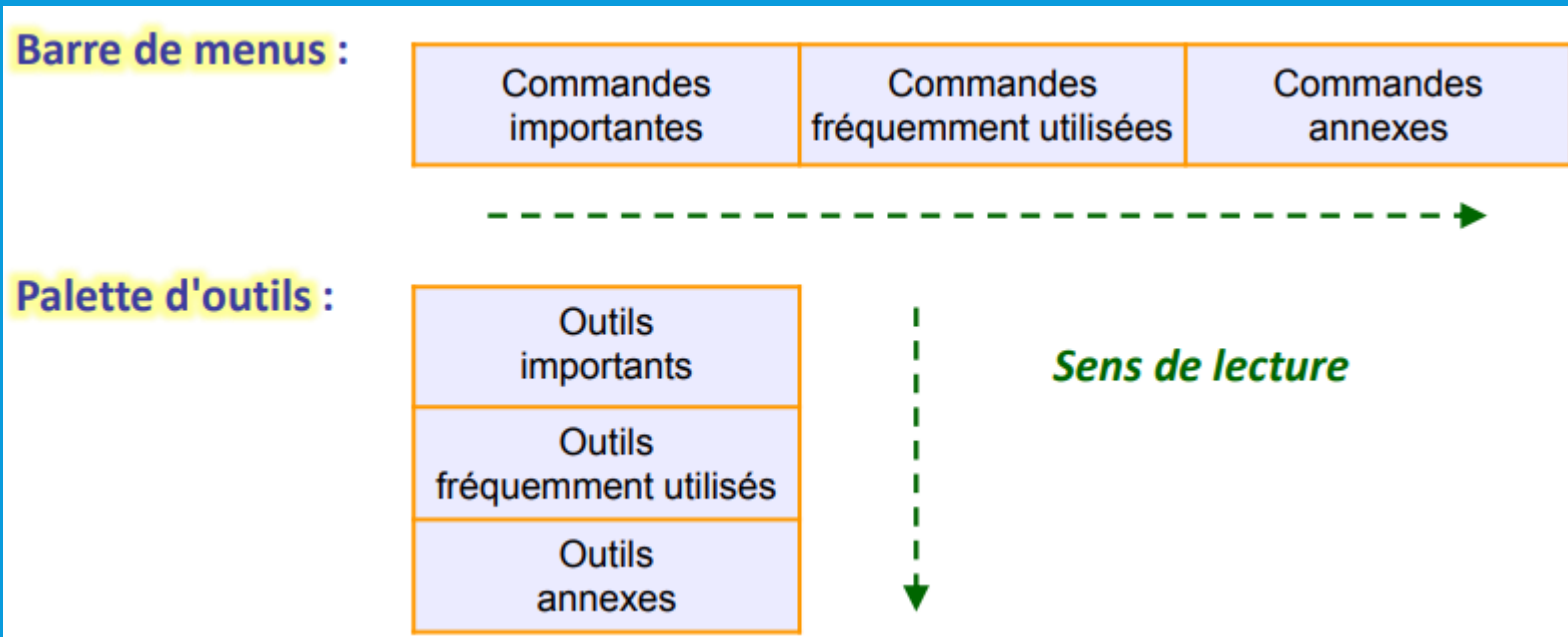
2. MANIPULATION ZONES

- **On-screen reading: pathways**
- Traditional reading direction
 - from left to right
 - from the past to the future
- Screen Pathway
 - 1st visualisation of the screen
 - Z-pattern
 - then
 - selective pathway
 - search engine
 - in F / comb

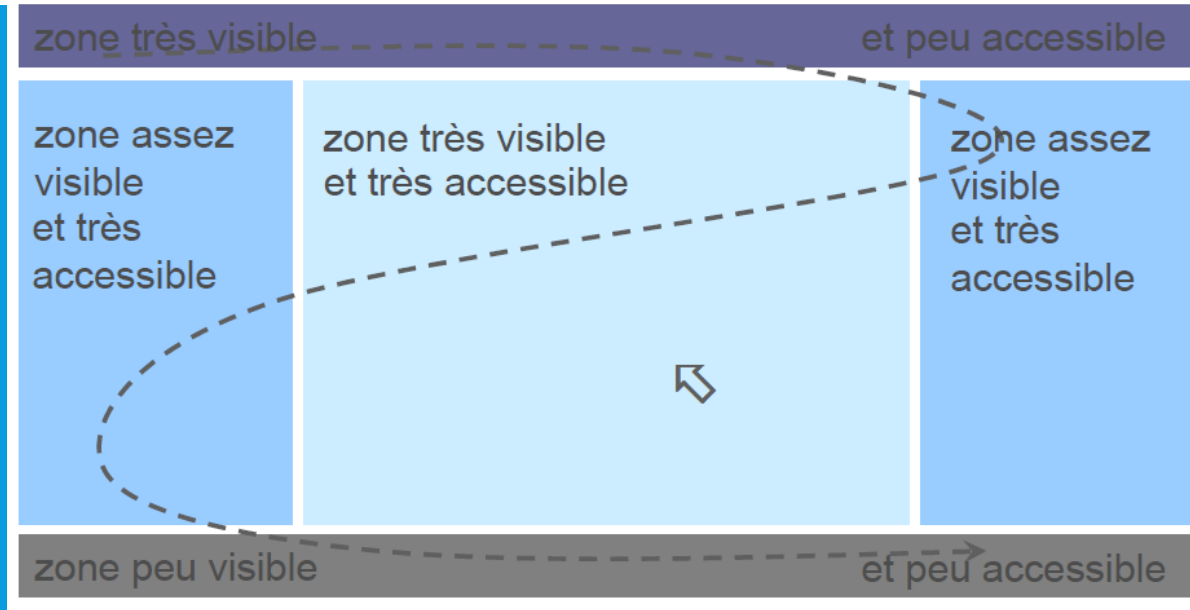


2. MANIPULATION ZONES

- In the manipulation areas of interfaces, it is advised to arrange, in the reading direction:
 - Important elements first
 - Frequently used controls next
 - Other elements at the end



2. VISIBILITY AND ACCESSIBILITY ZONES



- **Recommendations (Western culture)**
 - Titles in the top left
 - Working area in the middle of the screen/window

3. POSITIONING AND ALIGNMENT OF LABELS

Right-Justified Horizontal Labels

Label

Longer Label

Select Value

Even Longer Label

One More Label

☒ Value 1
☐ Value 2

Primary Action

Vertical Labels

Label

Longer Label

Select Value

Even Longer Label

One More Label

☒ Value 1
☐ Value 2

Primary Action

Left-Justified Horizontal Labels

Label:

Longer Label:

Select Value

Even Longer Label:

One More Label:

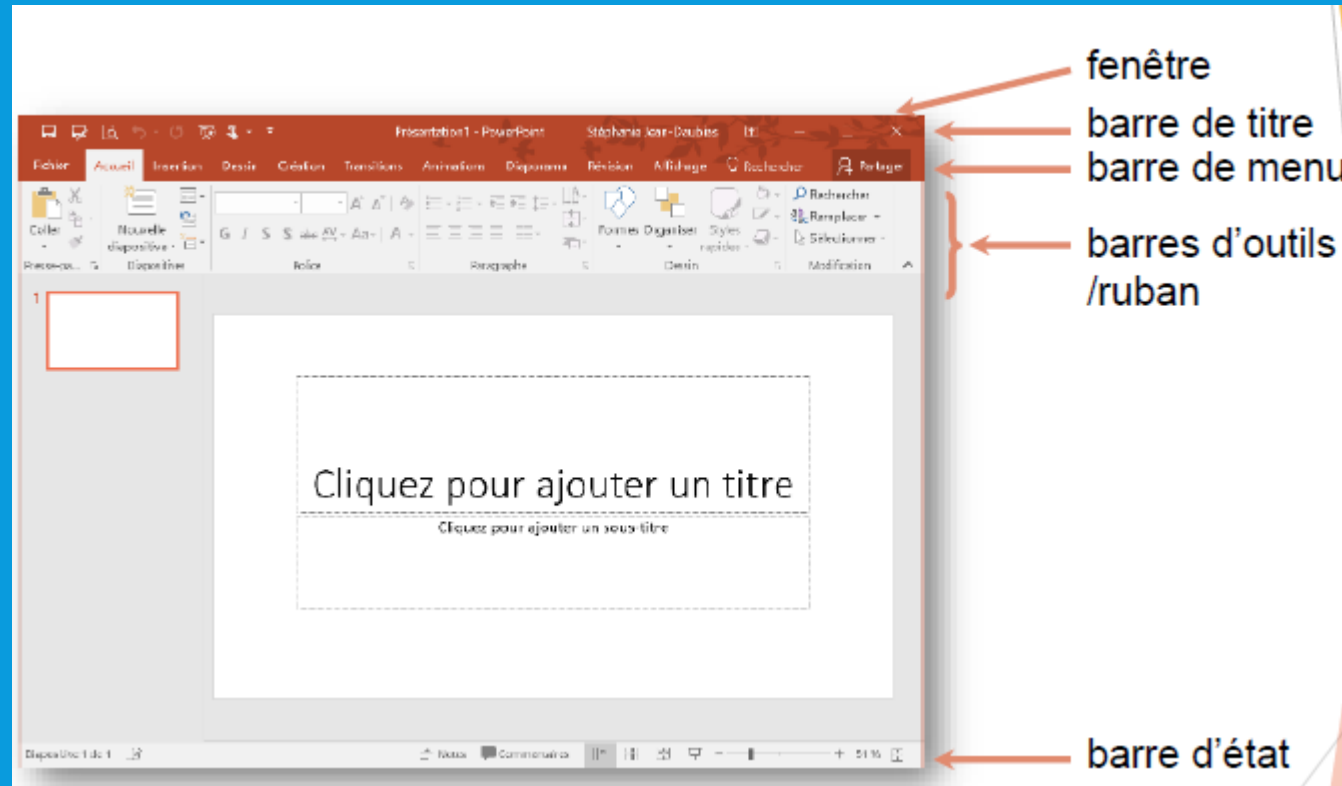
☒ Value 1
☐ Value 2

Primary Action

3. POSITIONING AND ALIGNMENT OF LABELS

- Experimental evaluation on a reading task, with eye tracking
- **Recommendation:**
 - Labels should be as close as possible to the input fields.
 - When the
 - labels are of very different sizes they should be right-aligned.
 - Otherwise, if they are of similar size, they may be left-aligned.
 - Prefer vertical labels close to the input if space is available

4. INTERACTION STYLES: WIMP INTERFACE **WINDOWS**, ICONS, MENUS, POINTERS : VOCABULARY

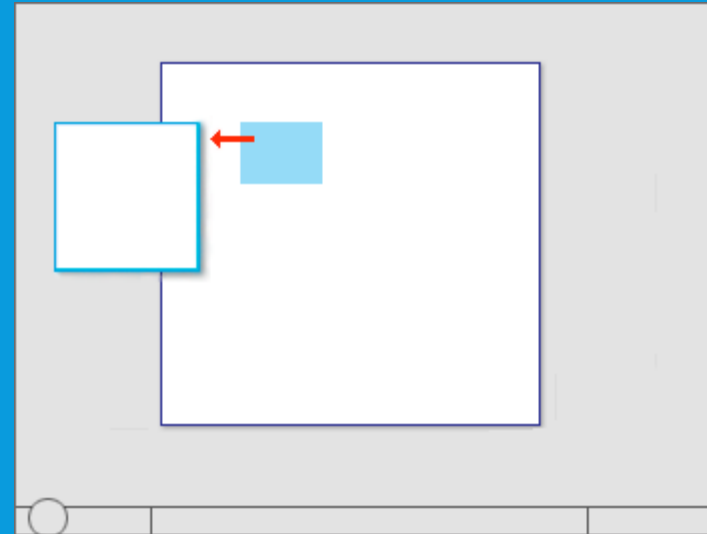


WIMP: OPENING A WINDOW

- **Opening a window: depends on:**
 - Where?
 - What size?
 - What content to display?
- Type of window (application, contextual, dialog, alert, information)
- New window or reopening

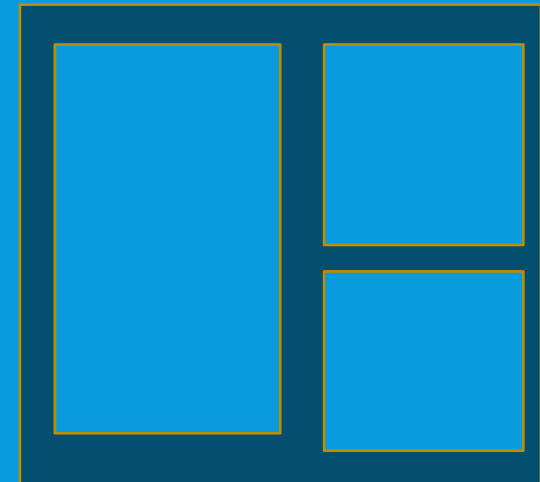
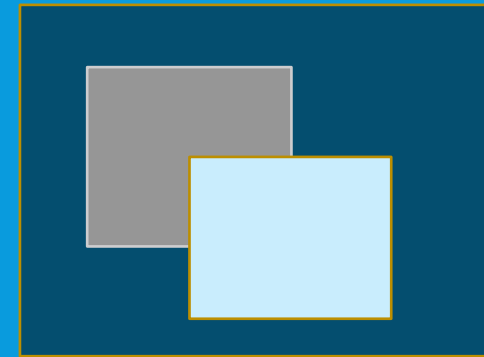
WIMP: OPENING A WINDOW

- **Opening: popup window**
 - Near the focus of attention
 - Focus always visible



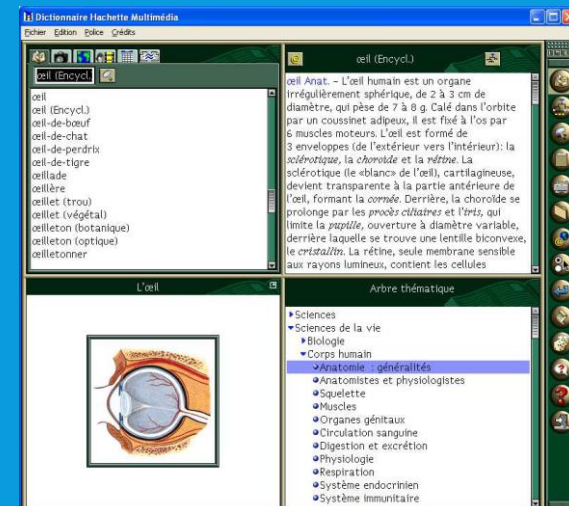
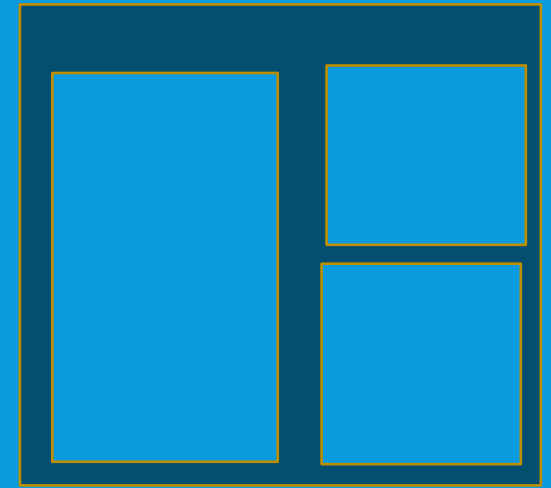
WIMP: MULTIPLE WINDOWS

- **Interest: multitasking environment**
- **Main issue: masking information**
 - Loss of context
 - Access time to the hidden window
- **Different strategies for managing multiple windows**
 - Window mosaics (tiling)
 - Overlapping windows
 - Zoomable windows



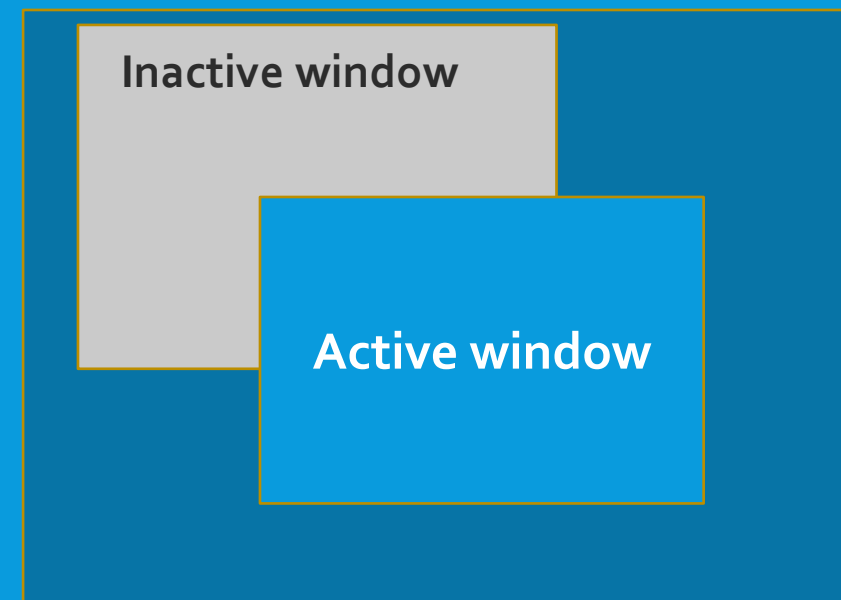
WIMP: MULTIPLE WINDOWS

- Window mosaic (tiling)
- Advantage: Observability
 - No masking of windows
- Disadvantage: Window management
 - undesired edge effects



WIMP: MULTIPLE WINDOWS

- Multitasking with overlapping (stacked) windows
- **Advantage: User controlled**
 - Flexible organisation by the user
- disadvantages
 - masked information
 - access time to hidden windows
 - via the taskbar



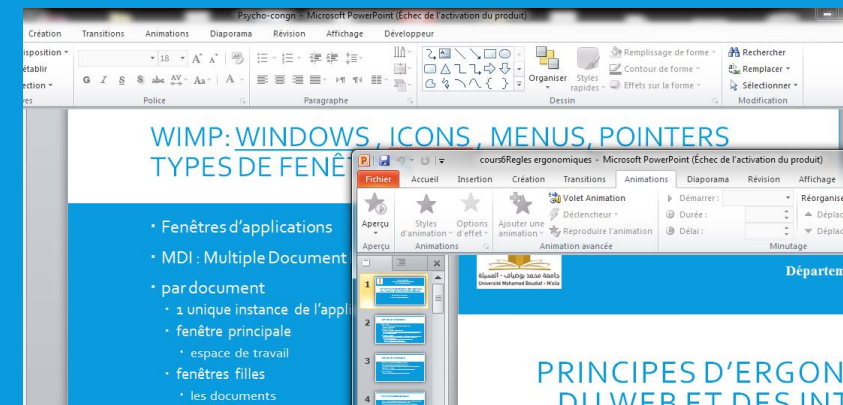
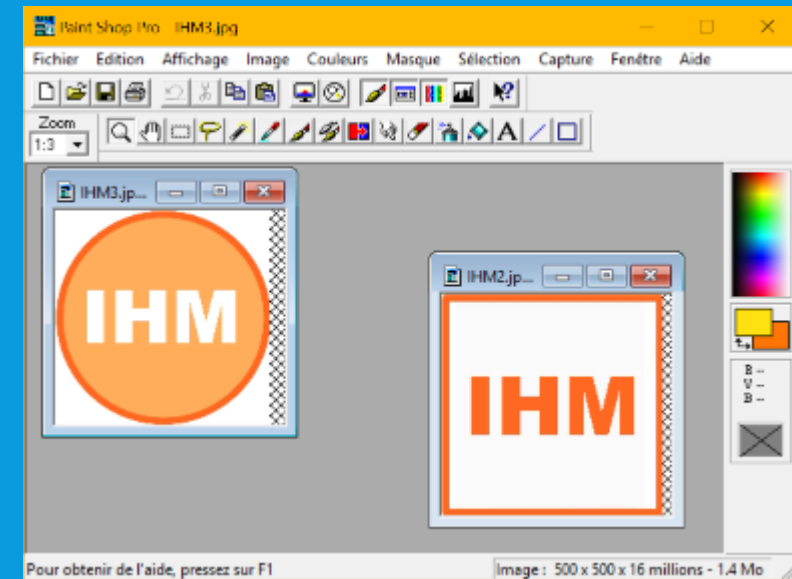
WIMP: MULTIPLE WINDOWS

- **Modal windows**
 - the window must be closed to return to the main window
 - required when the ongoing command cannot be suspended
 - movable to allow the user to see the upstream task
- **Non-modal windows**
 - One can switch from the dialog window to the main window
 - The user can temporarily abandon the current task

WIMP: WINDOWS, ICONS, MENUS, POINTERS

TYPES OF WINDOWS

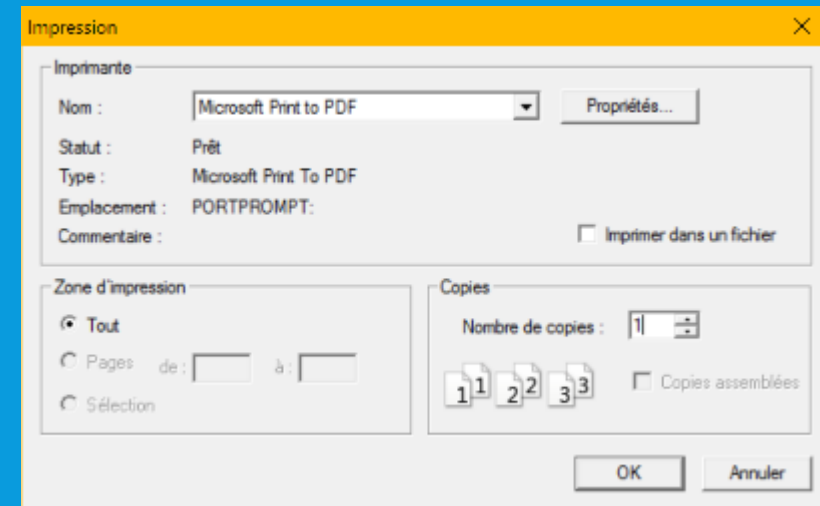
- Application windows
- MDI: Multiple Document Interface
 - Per document
 - A single instance of the application
 - Main window
 - Workspace
 - Child windows
 - The documents
- Document windows
- One instance of the application per document



WIMP: WINDOWS, ICONS, MENUS, POINTERS

TYPES OF WINDOWS

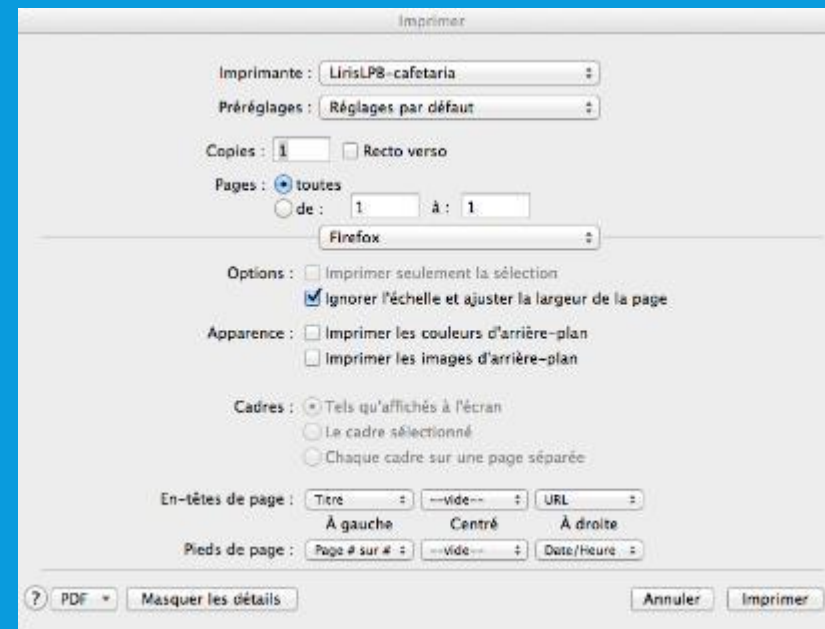
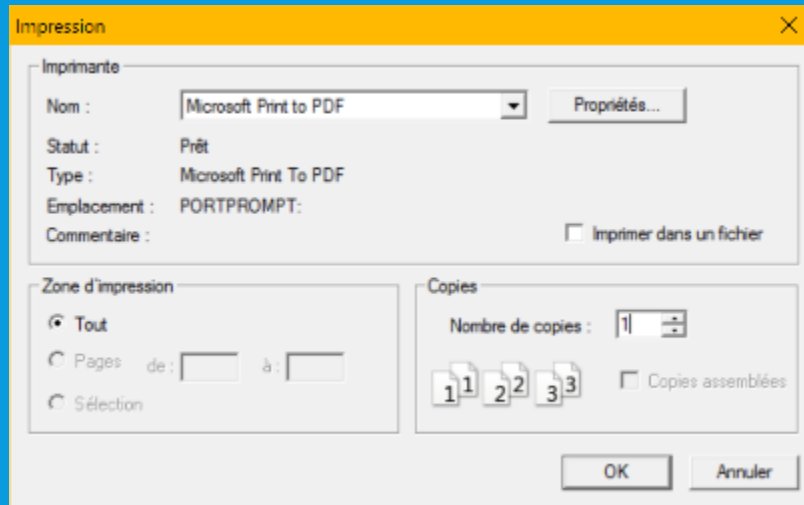
- Dialog/window (linked to a user action)
 - For interaction between the system and the user
 - Separation (time and place) between specification and execution of the command
 - Modal windows
 - Buttons
 - No more than 5
 - At least OK, Cancel (+ Help)
 - Cancel: no input made on the dialog should be considered



WIMP: WINDOWS, ICONS, MENUS, POINTERS

TYPES OF WINDOWS

- Dialog window: button order
 - Adherence to style guides
 - Windows: OK Cancel
 - Linux, MacOS, Android: Cancel OK



WIMP: **WINDOWS**, ICONS, MENUS, POINTERS

MULTI-WINDOWING: RECOMMENDATIONS

- **Organisational strategy:**

- Allow overlapping or switching of windows for users with minimal experience
- Use tiling for novice users as well as for information that needs to always be visible

- **Window partitioning strategies**

- Organise partitioning based on the task: coherent grouping of information
- Limit the amount of information to be remembered from one window to another
- Adapt the number of windows to the usage

WIMP: WINDOWS, **ICONS**, MENUS, POINTERS

- **Interest**
 - Quickly identifiable
 - Compact: little space in the interface
- **Problem: affordance**
 - The ability of symbols to represent the functions they denote
 - Icons: non-trivial affordance

WIMP: WINDOWS, ICONS, MENUS, POINTERS

- Icons: interactive graphic symbol

- 'Iconised' windows:



- Objects, sometimes associated with a state

- Recycle bin, disks



- Applications



- Documents, folders



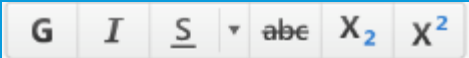
- Actions

- record, launch voice recognition



WIMP: WINDOWS, ICONS, MENUS, POINTERS

Graphical representation / meaning association

- Resemblance 
- Description 
- Example 
- Metaphor 
- analogy (cut = scissors) 
- Symbol 
- arbitrary

Difficulty of
interpretation

WIMP: WINDOWS, ICONS, MENUS, POINTERS

- Use of icons
 - for frequent commands
 - to free up space
 - associated with a label
 - integrated into a button, a menu
- Disadvantages
 - difficulty of understanding 
 - Longevity
- Solutions
 - test representations
 - tooltips, icons + text
 - evolve representations 

WIMP: WINDOWS, ICONS, MENUS, POINTERS: CONSTRUCTION

- **Methodology**
 - Identify all commands to iconify and create them at the same time
 - Limit icons to frequent commands
 - Always validate the design through experimentation
- **Guidance: promote the identification of icons**
 - Ensure icons are distinctly recognisable from one another
 - Group icons by family
 - Consistency of representations within a group
- **Cognitive load – limited number of icons (degradation from 12)**
- **Observability – Selected character clearly visible**
- **Prefer an icon / text association**



WIMP: WINDOWS, ICONS, MENUS, POINTERS

- **Interest**

- Structure system functionalities following a logical organisation
- coherent thus easily memorable: recognition rather than recall
- Importance of task analysis

- **Limitation**

- Lack of speed: useful mainly to novice and occasional users
- Provide shortcuts for experts

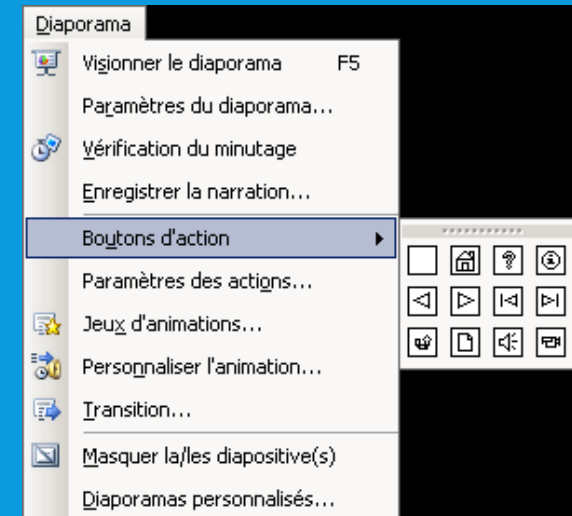
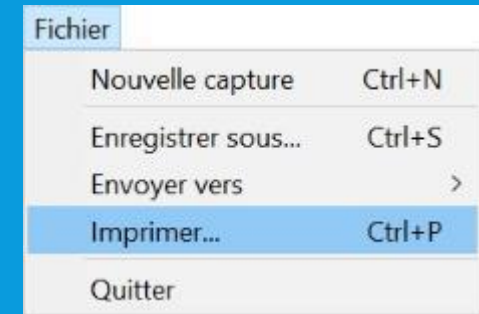
- **What is a menu**

- **General definition** – Area where choices are specified to guide interaction
- Different types not limited to traditional application menus

WIMP: WINDOWS, ICONS, MENUS, POINTERS

Menu:

- set of items
 - list of commands triggered by a click
 - highlighting of the chosen option
- Characteristics
 - hierarchical
 - indicated by 
 - to group sub-items
 - only 1 sub-level
- Tear-off
 - usually containing a palette that transforms into a utility window



WIMP: WINDOWS, ICONS, MENUS, POINTERS

- **Rules for menu bars**

- between 2 and 7 menus
- otherwise another component or different distribution
- label in a single word

- **Rules for menu items**

- at least 2 items per menu
- otherwise another component or different distribution
- label possible in multiple words (max 4)
- grouping: separators: grouped items separated by a horizontal line
- take into account thematic, frequency of use, order of use, (alphabetical order)

WIMP: WINDOWS, ICONS, MENUS, POINTERS

- Pointing devices (mouse, trackball, joysticks...)
 - Cursors
 - different cursor → different action
 - Positioning 
 - positioning in text
 - waiting 
 - hyperlink, clickable object 
 - Movement 
 - Resizing