

Chapter IV

Graphical User Interfaces Design (Guidelines for designing)



Outline

- I. Introduction
- II. Windows
- III. GUI Organisation
- IV. Texts and Characters
- V. Colors
- VI. Icones
- VII. Menus
- VIII. Pointers
- IX. Conclusion

I. Introduction

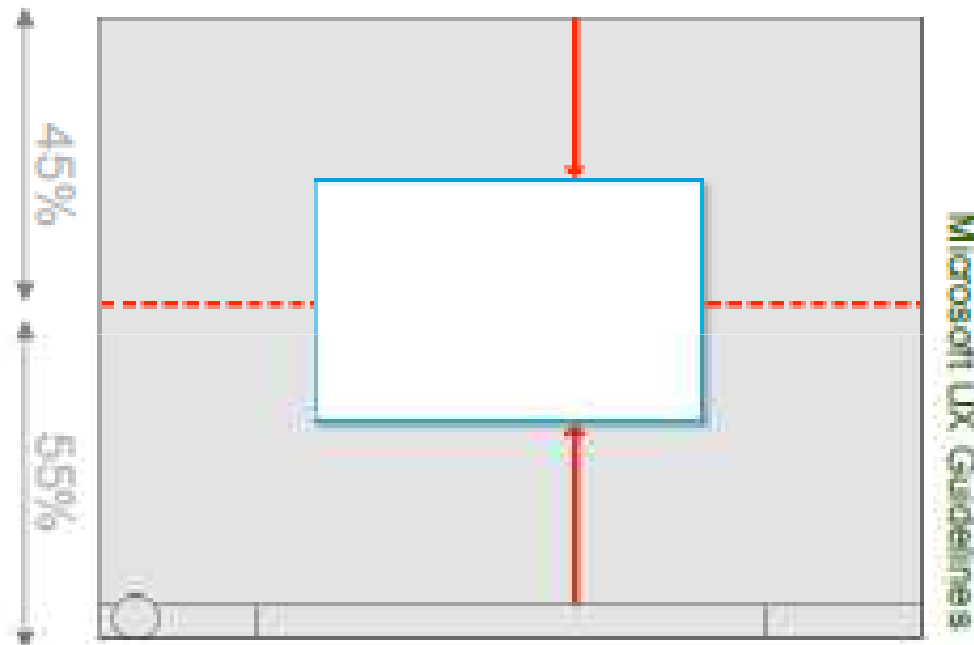
Designing and organizing a GUI is a complex issue involving multiple elements: buttons and menu placement, text layout, font selection, use of colors and icons, message writing, data density management, etc.

The objective of this chapter is to present conventions and recommendations for better designing your GUI.

II. Windows

1. Opening an application window

❖ **New window** : in the center... or almost



Biais du regard vers le haut.

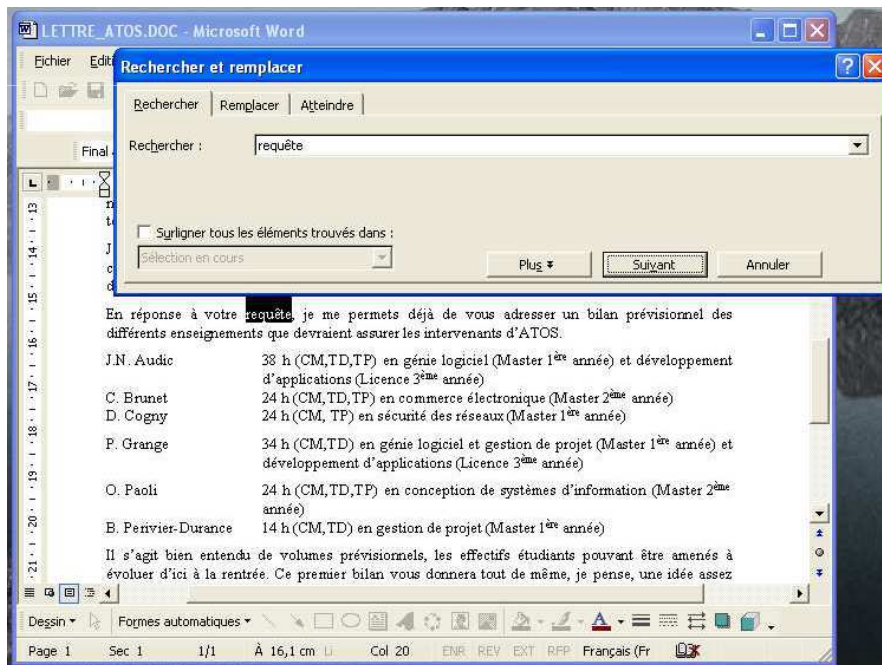
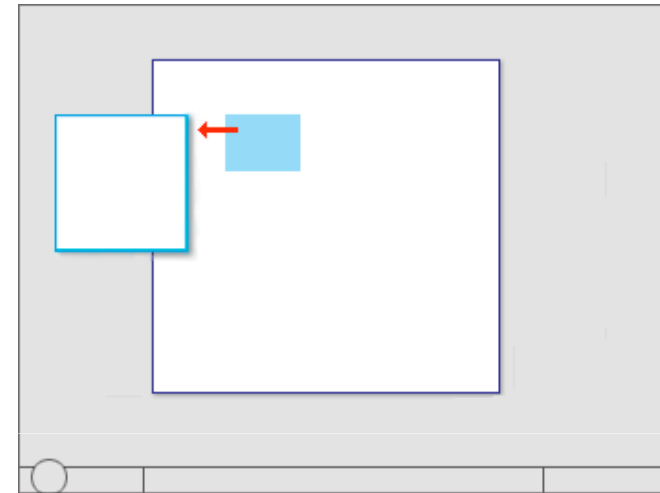
Alignement horizontal légèrement au-dessus du milieu

❖ **Reopen**: in the state (size, position, display) when closed.

II. Windows

2. Opening pop-ups (fenêtres contextuelles)

- ❖ Near the focus of attention,
- ❖ Focus always visible.

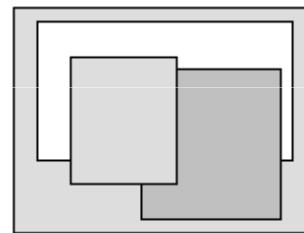
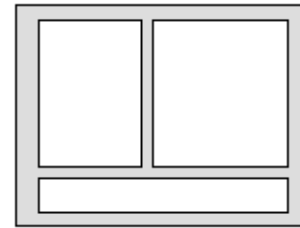


II. Windows

3. Display strategies

Multi-windowing (voir chap. II)

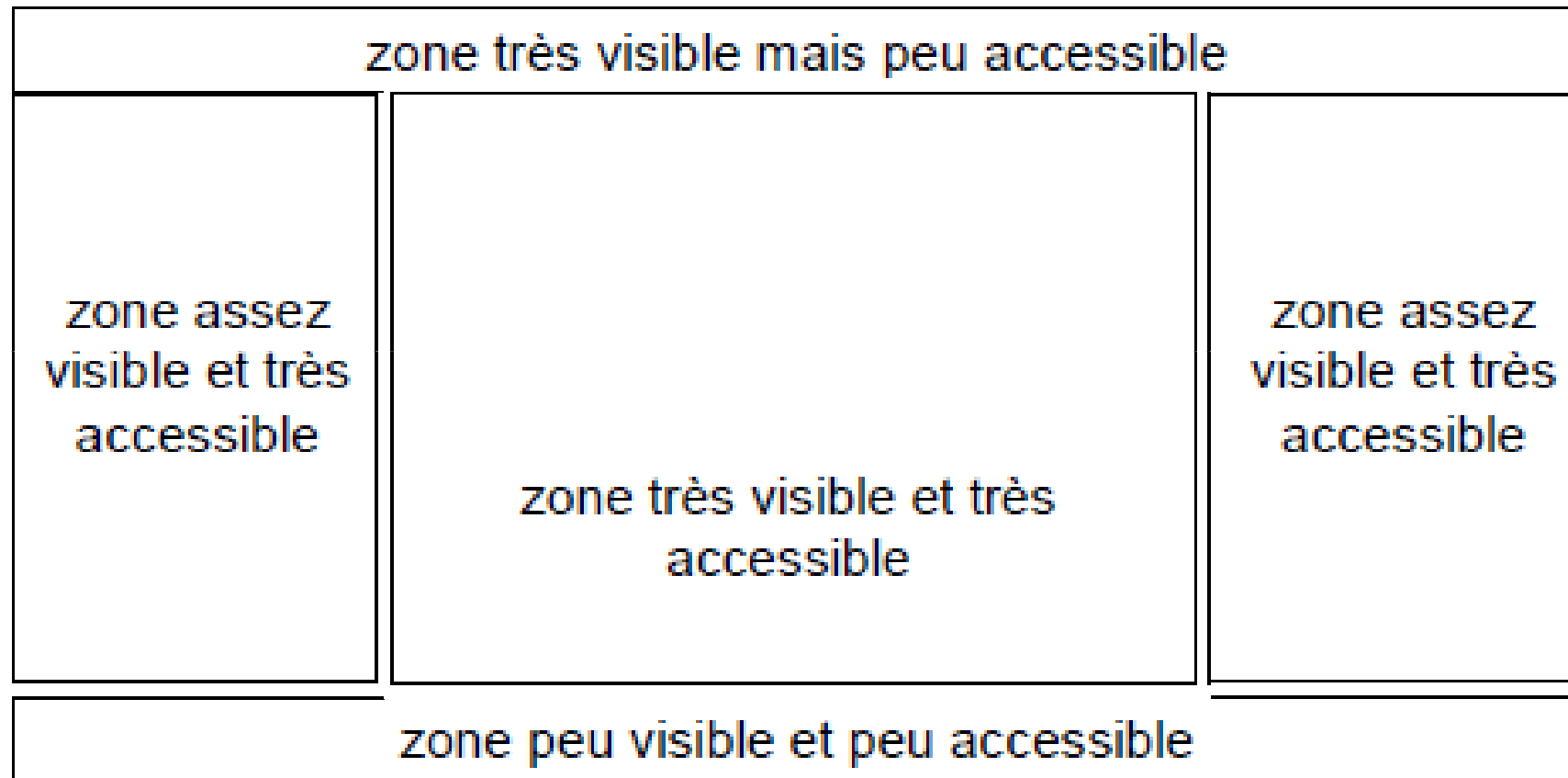
- ❖ side-by-side window
(sans superposition)
- ❖ Overlapping window
(avec superposition)



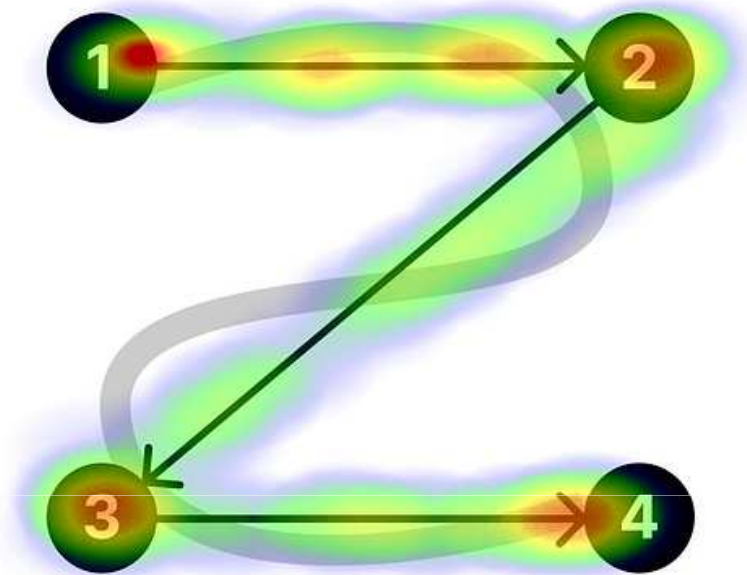
Recommendations

- ❑ Allow window coverings for users with minimal experience;
- ❑ Use side-by-side for novice users and for information that needs to be always visible.

III. GUI Organisation



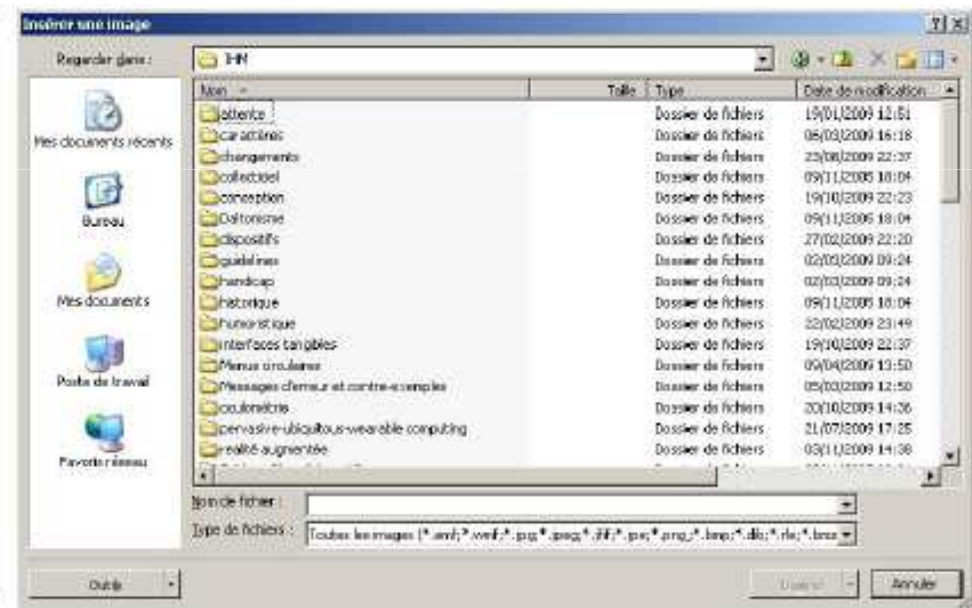
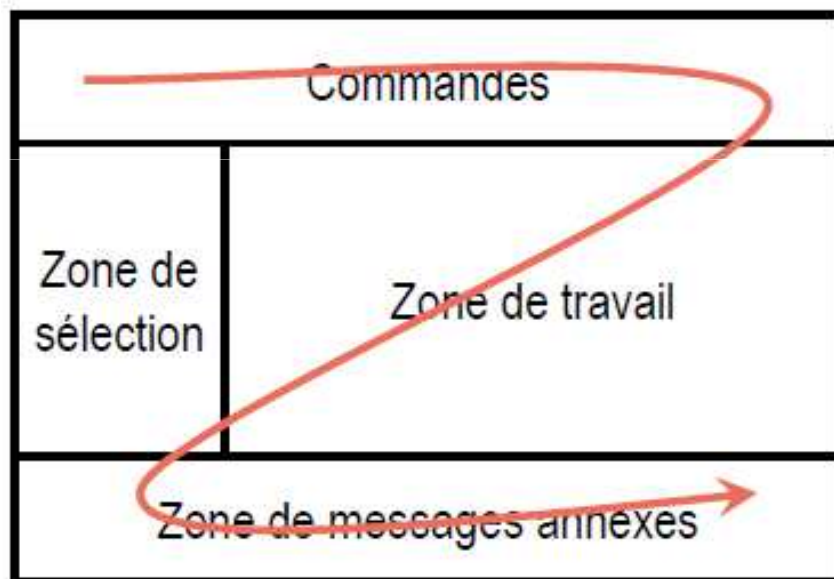
Z-shaped path



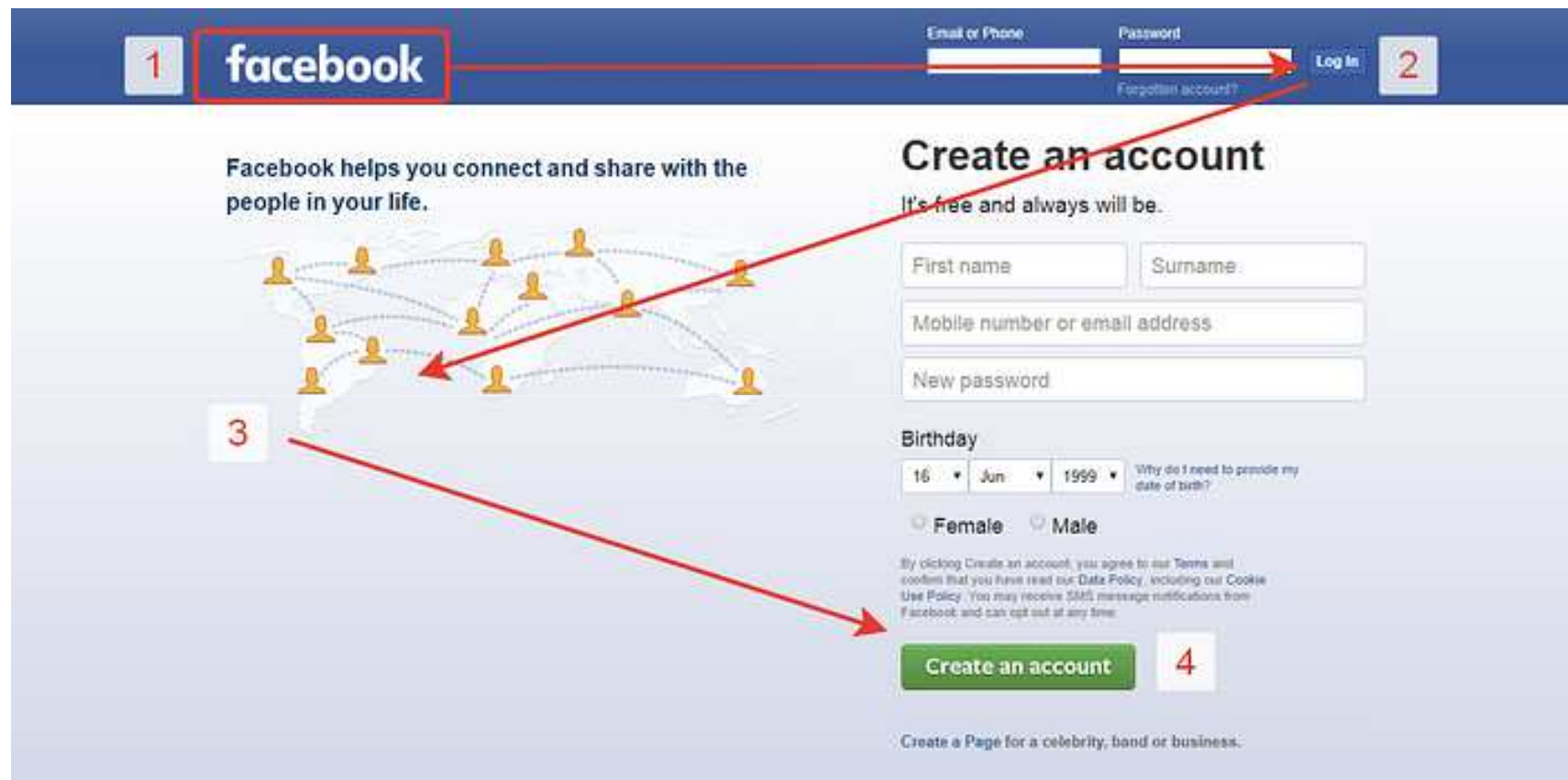
A **Z-shaped path** refers to how a **user's eye** naturally **scans** interface:

1. Start in the top-left,
2. Scan horizontally to the top-right,
3. Scan diagonally to the bottom-left,
4. Scan horizontally to the bottom-right

- ✓ **Z-shaped path** can be used by designers to strategically place important information in the **most visible areas**, ensuring an **intuitive** and **effective** user experience.



Influence of the application context of Z-shaped path



Influence of the application context of Z-shaped path

Zone la
+ chère

Zone
gratuite

The image shows a Google search results page for the query "Parfum". A red Z-shaped line is drawn across the page, starting from the top right, moving down to the left, and then back up to the right. This path highlights several search results, including "Parfums YSL", "Parfums Lancôme", "Parfums 70% - L'aderParfums.com", "Parfums sur Nocibé.fr", "Sublime Noël chez Maud", "Parfums - 70% Pour Noël", "Parfums discount - 50%", "Parfums jusqu'à -80%", and "Parfums Moins Chers". The path starts at the top right, goes down to the left, and then back up to the right. The path is highlighted with a red line. The path starts at the top right, goes down to the left, and then back up to the right. The path is highlighted with a red line. The path starts at the top right, goes down to the left, and then back up to the right. The path is highlighted with a red line.

Google Parfum

Web Images Maps Shopping Actualités Plus Outils de recherche

Environ 32 300 000 résultats (0,25 secondes)

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zone payante moins chère

IV. Texts and Characters

Mayhew (1992), Götz (1998)

- ❖ sans-serif letters make it easier to read isolated text elements (menus): Arial, Helvetica, Verdana

AaBbCc

Police sans-serif (caractères à bâton) - ici Arial

- ❖ Serif letters, with serifs (Times New Roman), create a virtual horizontal line that makes long texts easier to read.

AaBbCc

Police serif (caractères avec empattements) - ici Times

IV. Texts and Characters

(suite)

- ❖ **Avoid italicized fonts**, except in special cases (to highlight an element).
- ❖ Avoid any slant greater than 45°.

Éviter à tout prix une inclinaison supérieure à 45°

- ❖ **Left-justify text** (Western culture). Right and left justification creates spaces of varying length that make it difficult to read.

- ❖ Limit **capital letters** to **single words** or **short titles**; capital letters are less legible than lowercase.

L'interface Homme-machine étudie la façon dont les humains interagissent avec les ordinateurs ou entre eux à l'aide d'ordinateurs, ainsi que la façon de concevoir des systèmes informatiques qui soient ergonomiques, c'est-à-dire efficaces, faciles à utiliser ou plus généralement adaptés à leur contexte d'utilisation.

L'INTERFACE HOMME-MACHINE ÉTUDIE LA FAÇON DONT LES HUMAINS INTERAGISSENT AVEC LES ORDINATEURS OU ENTRE EUX À L'AIDE D'ORDINATEURS, AINSI QUE LA FAÇON DE CONCEVOIR DES SYSTÈMES INFORMATIQUES QUI SOIENT ERGONOMIQUES, C'EST-À-DIRE EFFICACES, FACILES À UTILISER...

un texte écrit en minuscules se lit beaucoup plus vite qu'un texte en majuscules. La vitesse de lecture en majuscules a été estimée 13% plus lente qu'en minuscules, ceci provenant d'une différenciation plus forte des minuscules que des majuscules. Estimation faite par Tullis en 1988. De même, la lecture d'un texte est améliorée si la longueur d'une ligne est supérieure à 26 caractères (longueur conseillée 50 à 55 caractères ou doubles colonnes de 30 à 35 car)

→ Ne pas souligner de longs textes, ceci réduit la lisibilité

Font

- ❖ Choose the **font** based on **legibility** criteria (avoid italics).
- ❖ **Avoid** using **more than three** different fonts in a single window or across multiple windows displayed simultaneously.
- ❖ Give each **font** a specific **role** (title, paragraph, box, etc.)

Font size

- ❖ Minimum size: 8 points; smaller fonts are virtually illegible;
- ❖ Maximum size: 16 points; larger fonts impair legibility.

Display formats

(Directives de Smith & Mosier)

- ☐ Left-justify alphabetical data lists
- ☐ Right-justify integers
- ☐ Align decimal values with the decimal point
- ☐ Avoid leading zeros (unless otherwise agreed)
- ☐ Break numbers into groups of 3 to 4 digits
- ☐ Avoid lines written in capital letters; they are less readable
- ☐ Avoid lines that are too short (ideally: 60 characters, 8-10 words)

V. Colors

The idea behind color coding is to associate **each color** in the interface with a **specific** and **uniform meaning** for the entire application.

Recommendations

- ☐ The user should be able to **name the colors used**
- ☐ Do not use color, design in **black/white** first.
- ☐ Avoid **brown and green backgrounds** (Mayhew 1992, Götz 1998).
- ☐ Use a neutral and light color for the background.
- ☐ Add color, only, when it serves a functional purpose or provides aesthetic benefits.

Recommendations (suite)

- ❑ Avoid saturated blue for critical displays or small text or objects. Use ,instead, blue for framing.
- ❑ Limit the number of colors to facilitate their discrimination: a maximum of 4 in a display and 7 ± 2 across the entire interface.
- ❑ Use the same color for the same type of information;
- ❑ Use contrasting colors to express difference;
- ❑ Choose low-contrast colors to express similarity;



Recommandations (suite)

- ❑ Avoid certain color combinations

Le blanc sur jaune est difficile à lire

Le blanc sur noir est facile à lire

Le rouge sur bleu est difficile à lire

Le bleu sur rouge est difficile à lire

Le vert sur rose est difficile à lire

Le rose sur vert est difficile à lire

Mais la saturation et la luminance jouent aussi

Mais la saturation et la luminance jouent aussi

Color code

(Guidelines de Brown)

- ❑ White/Black: Primary color
- ❑ Red: Alarms or errors; Stop
- ❑ Yellow: Warnings or data requiring attention
- ❑ Green: Normal/OK,
- ❑ Saturated Blue: Do not use for critical data,
- ❑ Pink (Magenta): Secondary alarm color, data differentiation
- ❑ ...

VI. Icônes

Metaphorical representations

1. of objects

➤ corbeille, disques



➤ programs



➤ files, folders



2. of actions

enregistrer



lancer la reconnaissance vocale



Advantages

- Quickly identifiable;
- Compact: limited space in the interface.

Icons Construction

1. Methodology

1. Identify all commands to be iconized and create them simultaneously;
2. Limit icons to frequently used commands;
3. The icons used must be representative of the action or concept you wish to represent;
4. When an icon is used to represent something, keep it for the entire application;
5. Limit their number (12 ideally, 20 maximum);
6. Favor icon/text pairing;
7. Group icons by category;
8. Always validate the design through testing.

2. Règles de construction

Ressemblance	 Clavier
Descriptif	  Ecrire
Exemple	 
Caricature	
Analogie	    Adresses 
Convention	
Arbitraire	  

Difficulté d'interprétation

Icones iPhone



1. Est-ce que vous pouvez identifier facilement et rapidement ces icones ? Justifier votre réponse.
2. Est-ce que ces icones sont représentatives des actions pour lesquelles sont destinées ? Justifier .

VI. Menus

Definition

- ❑ A zone where you specify your choices to guide the interaction.
- ❑ Various types, not limited to classic application menus.

Purpose

- ❑ To structure system functionalities according to a coherent, logical organization that is therefore easily memorable.

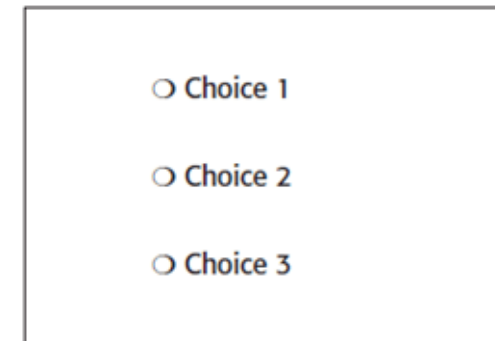
Limitation

- ❑ Lack of speed: mainly useful for novice and occasional users;
 - Provide shortcuts for experts.

Structures of Menus

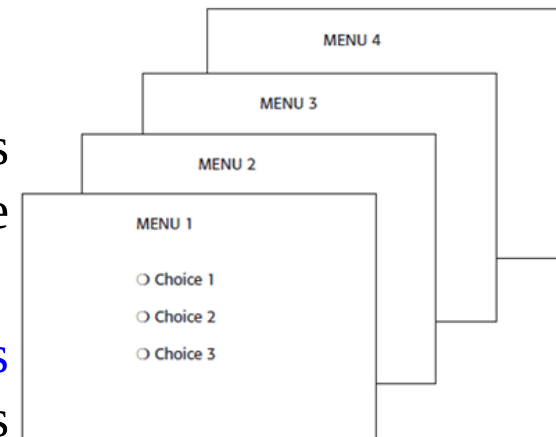
1. Single Menu

- ❑ Requires choices from this single menu only, and no other menus will follow necessitating additional user choices.
- ❑ may be iterative if it requires data to be entered into it and this data input is subjected to a validity check that fails.



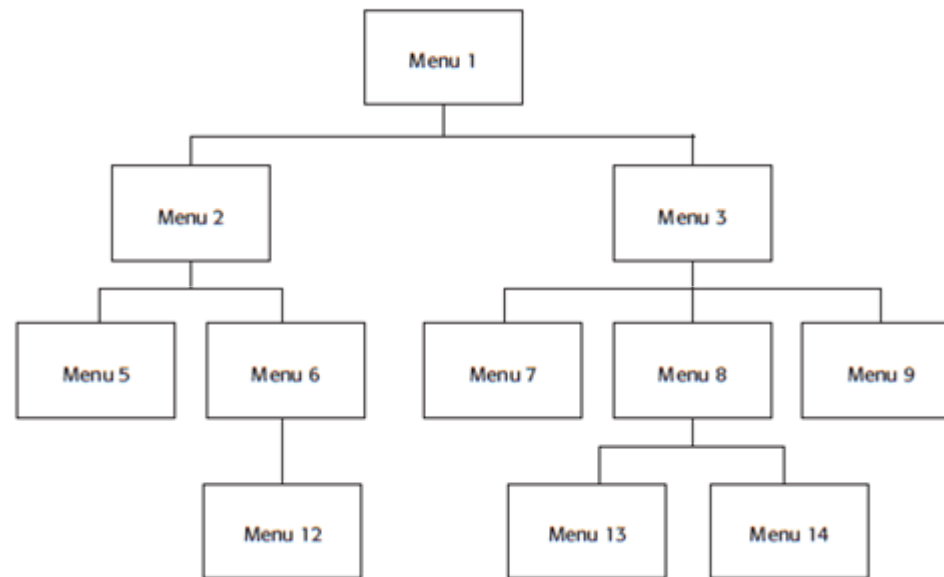
2. Linear menu

- ❖ Presents options in a single path, guiding users through a sequence of screens to complete a task like data entry or parameter selection.
- ❖ This structure can be effective for novice users performing simple tasks, but it can become tedious for longer sequences.



3. Arborescent menu

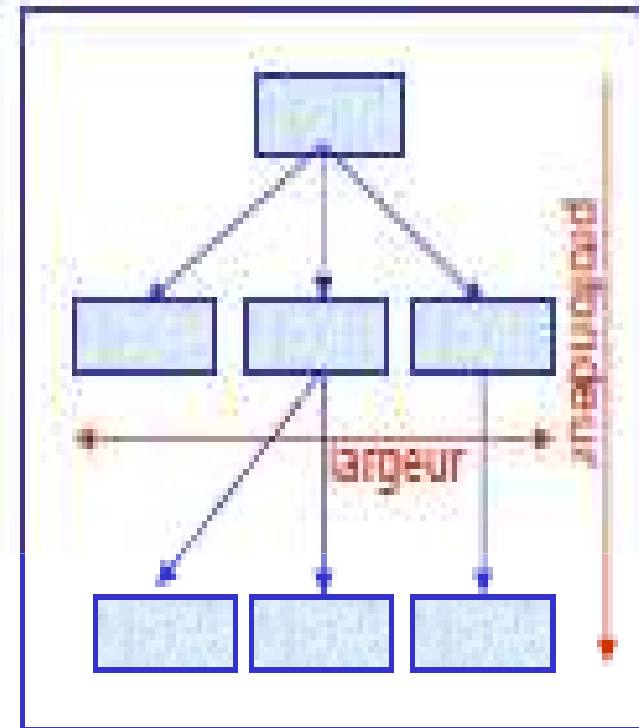
- ❑ A tree menu, where options are organized in a **hierarchical**, branching structure, similar to a tree.
- ❑ This structure can be **expanded** to reveal **sub-options** or **collapsed** to hide them.



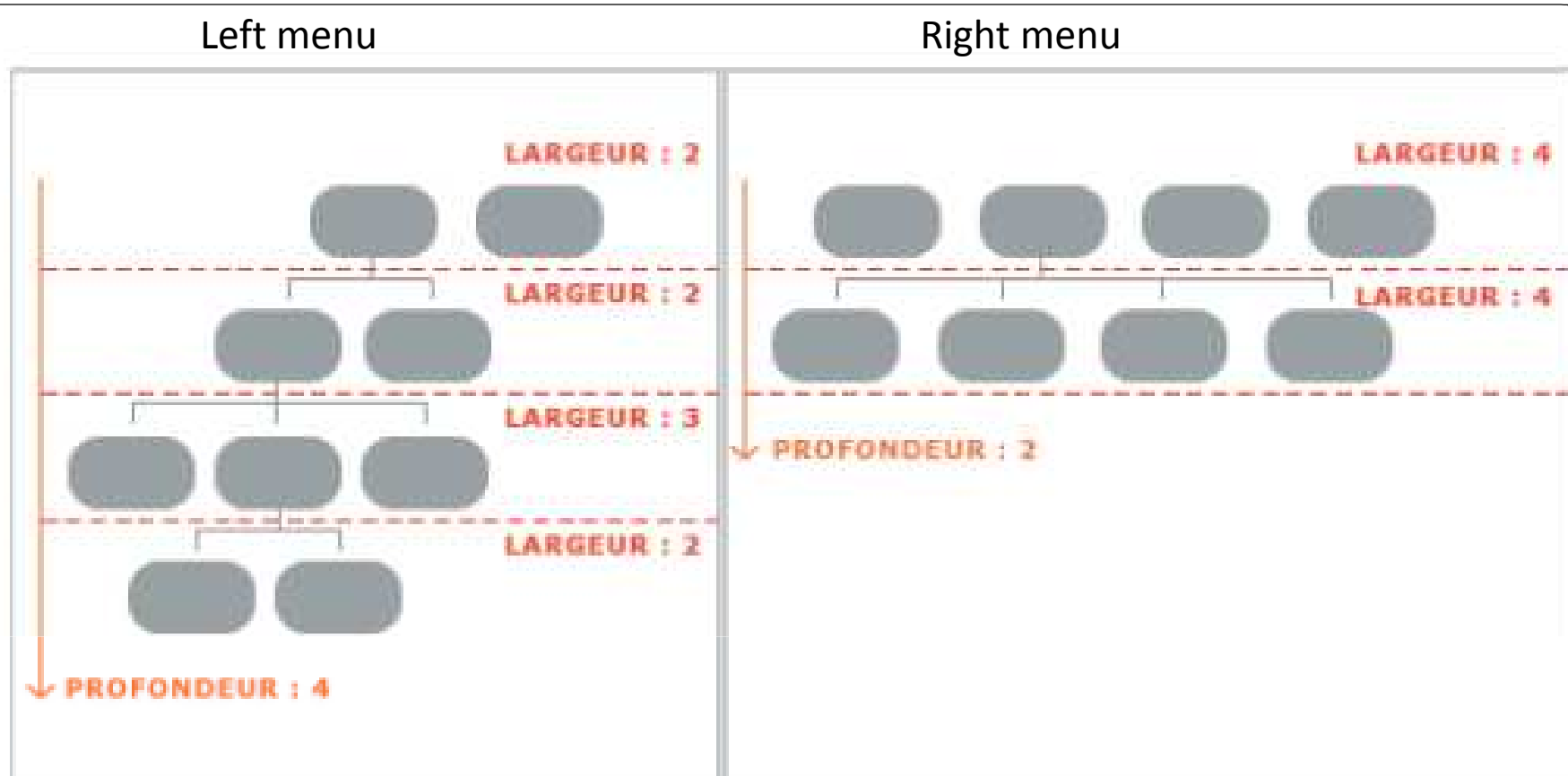
4. Connected menus

- ❑ Are **networks of menus** all **interconnected** in some manner.
- ❑ **Movement** through a structure of menus is not restricted to a hierarchical tree but is permitted between **most or all menus in the network**.

- ❖ **Menu depth (profondeur):**
the **number** of **submenu levels** it provides access to.
- ❖ **Menu breadth (width: largeur):**
the **number** of **items** it contains.



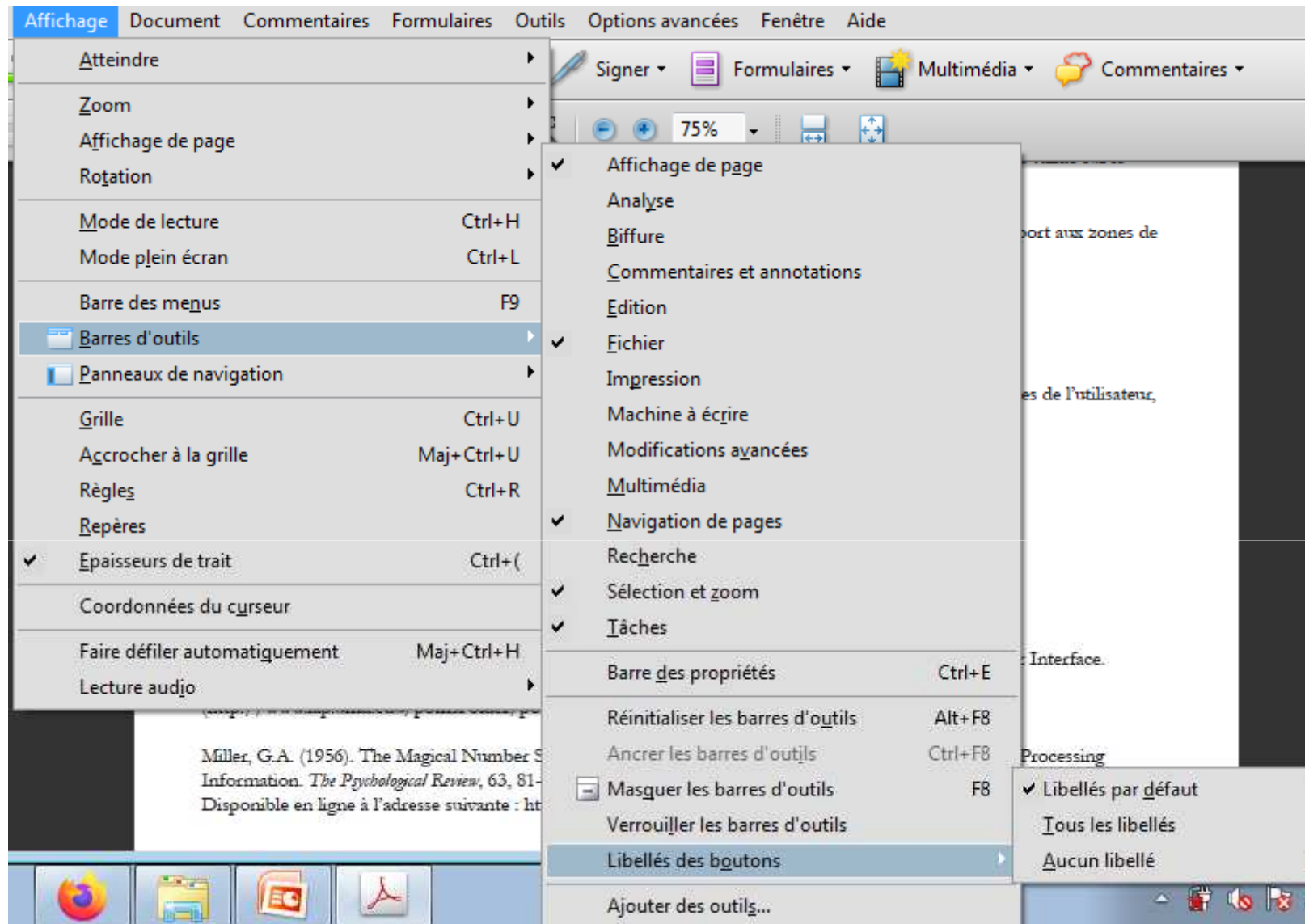




Comparaison of 2 menus:

- Le menu de gauche permet de **présenter 9 options** avec **4 niveaux** de profondeur,
- Le menu de droite permet de **présenter 8 options** avec seulement **2 niveaux** de profondeur.

✓ Prefer **broad** menus to **deep** menus
(Préférer des menus **larges** aux menus **profonds**)

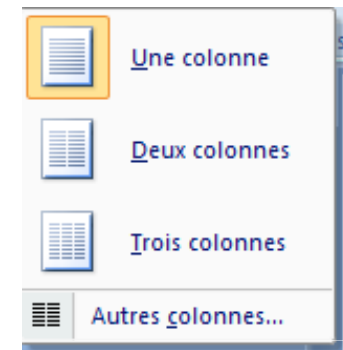
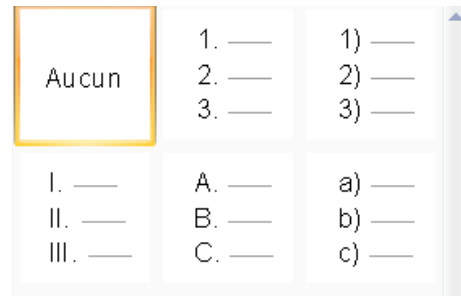


Donner la profondeur et la largeur de ce menu ...

Order of presentation of items

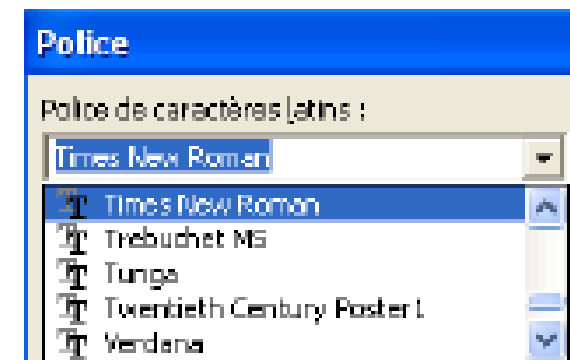
1. Natural sorting for sequential data

Dates, numbers, prices, pagination, etc.



2. Statique sorting

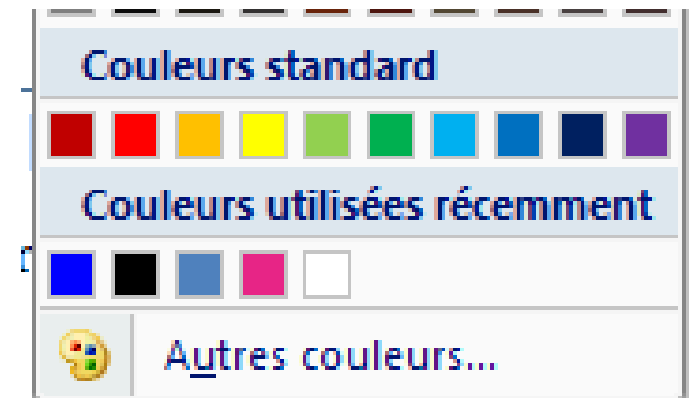
- Frequent: most **used** items **first**
- Functional: most **important** items **first**
- Non-task-related: alphabetical order of items



Order of presentation of items (suite)

3. Dynamique sorting

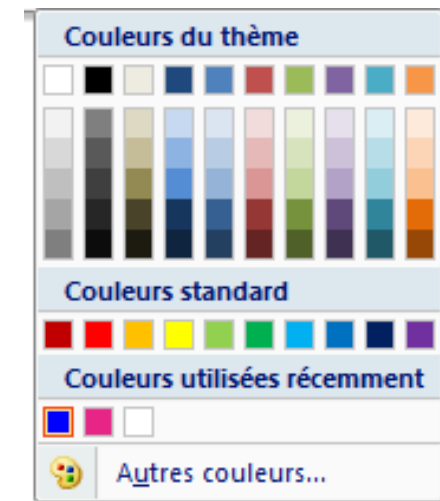
- ❖ Most **recently used** items **first**,
- ❖ Adaptive frequency



4. Shared menus

Compromise of previous solutions:

- ❖ 3-4 most frequent items,
- ❖ Recently selected items,
- ❖ Static menu functional for the rest,



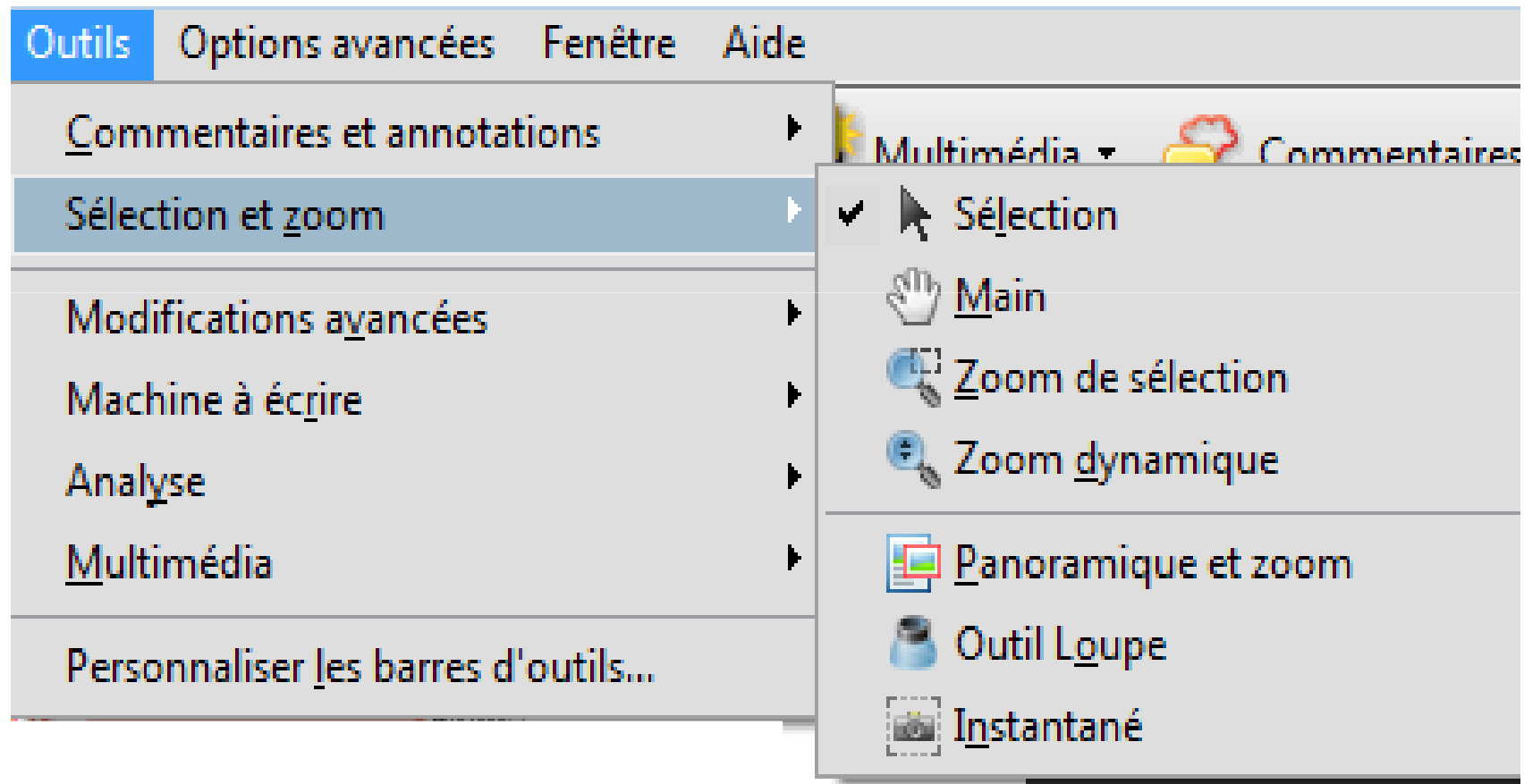
General Guidelines (Shneidermann, Plaisant 2005)

- ☐ Rely on task **semantics** to organize menus;
- ☐ Group menus in a **coherent** manner;
- ☐ **Prefer** broad menus to **deep** menus;
- ☐ A **static** menu promotes **learnability** vs. a dynamic menu;
- ☐ A **dynamic** menu can improve the **speed** of interaction;
- ☐ Prefer **short item names**: verbs (actions) or nouns/adjectives (attributes);
- ☐ Use **items** as names for **submenus**;
- ☐ Allow **shortcuts**.

Rules for menu items

- ✓ Limit the number of items to 7 ± 2 (otherwise, use another component or a different distribution)
- ✓ Labels can be multiple words (max. 4)
- ✓ Items of the same type grouped and separated by a horizontal line:
 - Take into account: theme, frequency of use, order of use, alphabetical order
- ✓ Menu items that lead to a dialog followed by ...
- ✓ Grayed out if the action is unavailable,

- ✓ Mark menu items of active properties or modes:
active / inactive
- ✓ Select the active property from several



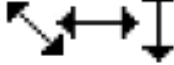
VII. Pointers

Pointing devices:
mouse, trackball, joysticks, etc.



► Curseurs

► curseur différent → action différente

-  ► positionnement
-  ► positionnement dans un texte
-  ► attente
-  ► lien hypertexte, objet cliquable
-  ► déplacement
-  ► redimensionnement
- ...

Questions ...