

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IAT – 2 SOLUTION 15CS832 - USER INTERFACE DESIGN

1. Explain the structure of menu's with neat diagram. 10 - CO3 - L2

Structures of Menu

Menus vary in form from very simple to very complex. They may range from small dialog boxes requesting the user to choose between one of two alternatives, to hierarchical tree schemes with many branches and level of depth. A menu's structure defines the amount of control given to the user in performing a task. The most common structures are the following.

1. Single Menu
2. Sequential Linear Menu
3. Simultaneous Menu
4. Hierarchical Menu
5. Connected Menu
6. Event-Trapping Menu

Single Menu

In this simplest form of menu, a single screen or window is presented to seek the user's input or request an action to be performed, as illustrated in Figure 4.1.

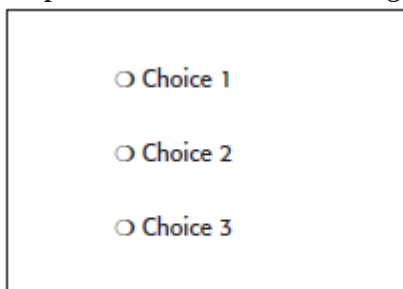


Figure 4.1 Single menu.

In using the Internet, for example, at a point in the dialog people may be asked if they wish to “Stay Connected” or “Disconnect.” In playing a game, choices presented may be “novice,” “intermediate,” or “expert.” Single menus conceptually require choices from this single menu only, and no other menus will follow necessitating additional user choices.

A single menu may be iterative if it requires data to be entered into it and this data input is subject to a validity check that fails.

Sequential Linear Menus

Sequential linear menus are presented on a series of screens possessing only one path. The menu screens are presented in a preset order, and, generally, their objective is for specifying parameters or for entering data. The length of

the path may be short, or long, depending upon the nature of the information being collected. A sequential linear menu is illustrated in Figure 4.2.

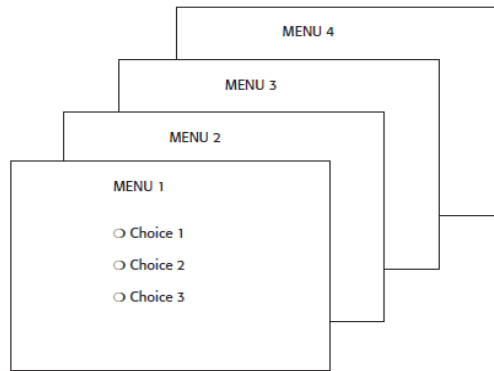


Figure 4.2 Sequential linear menus.

Disadvantages:

A long sequence may become tedious as menu after menu is presented. The user may not remember an answer to a previous question, a question important to the currently presented choices. The user may also want to return to a previous menu to change an answer or look at an answer, an awkward process that must be allowed.

Simultaneous Menus

Instead of being presented on separate screens, **all menu options are available simultaneously**, as illustrated in Figure 4.3. **The menu may be completed in the order desired by the user**, choices being skipped and returned to later. All alternatives are visible for reminding of choices, comparing choices, and changing answers. The tedium associated with a long series of sequential menus is greatly reduced.

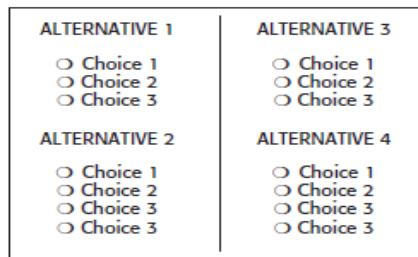


Figure 4.3 Simultaneous menus.

Disadvantages:

Problems with simultaneous menus are that for large collections of menu alternatives **screen clutter can easily occur**, and screen paging or scrolling may still be necessary to view all the choices.

Hierarchical Menus

When many relationships exist between menu alternatives, and some menu options are only appropriate depending upon a previous menu selection, a hierarchical structure is the best solution. A hierarchical structure results in an increasing refinement of choice as menus are stepped through, for example, from options, to suboptions, from categories to subcategories, from pages to sections to subsections, and so on. A hierarchical structure can best be represented as an inverse tree, leading to more and more branches as one moves downward through it.

Disadvantages:

The defined branching order may not fit the users conception of the task flow. If users are not familiar with the hierarchical menu, or are unable to predict what suboptions lie below a particular choice, they may go down wrong paths and find it necessary to go back up the tree to change a choice, or perhaps even return to the top-level menu.

A hierarchical menu is illustrated in Figure 4.4. Note that the top level of the tree is considered level 0 with subsequent levels numbered sequentially beginning with number 1. Starting at the top, level 0, two selections, or mouse clicks, are required to reach level 2.

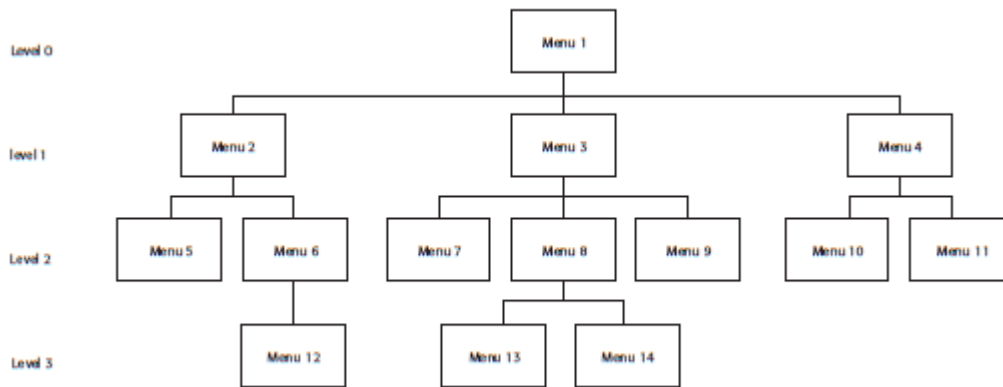


Figure 4.4 Hierarchical menus.

Connected Menus

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. From the user's perspective there is no top-down traversal of the menu system but an almost unhindered wandering between any two menus of interest. A connected menu system may be cyclical, with movement permitted in either direction between menus, or acyclical, with movement permitted in only one direction.

The biggest **advantage** of a connected menu network is that it gives the user full control over the navigation flow. Its disadvantage is its complexity, and its navigation may be daunting for an inexperienced user. An example connected menu structure is represented in Figure 4.5.

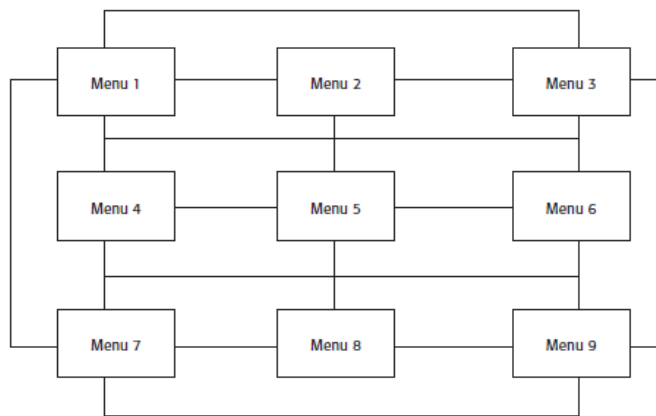


Figure 4.5 Connected menus.

Event-Trapping Menus

Event Trapping menus provide an ever-present background of control over the system's state and parameters while the user is working on a foreground task. They are, in essence, a set of simultaneous menus imposed on hierarchical menus. In a graphical system, for example, existing together are a simultaneous menu, the menu bar, and a hierarchy—the menu bar and its pull-downs.

Event-trapping menus generally **serve one of three functions**. (1) They may immediately change some parameter in the current environment (**bold a piece of text**), (2) they may take the user out of the current environment to perform a function without leaving the current environment (**perform a spell check**), or (3) they may exit the current environment and allow the user to move to a totally new environment (**Exit**).

2. What are the kinds of graphical menus? Explain any 5 with examples. 10 - CO3 - L2

The best kind of menu to use in each situation depends on several factors. The following must be considered:

- The number of items to be presented in the menu.

- How often the menu is used.
- How often the menu contents may change.

Providing the proper kinds of graphical menus to perform system tasks is also critical to system success.

1. Menu Bar
2. Pull-Down Menu
3. Cascading Menus
4. Pop-up Menu
5. Tear-off Menus
6. Iconic Menu
7. Pie Menu
8. Default Menu Items
9. Functions Not Represented by Default Items

1. Menu Bar

■ Proper usage:

— To identify and provide access to common and frequently used application actions that take place in a wide variety of different windows.

— A menu bar choice by itself should not initiate an action.



Figure 4.19 Menu bar composed of text.



Figure 4.20 Menu bar composed of buttons.

The *advantages* of menu bars are that they:

- Are always visible, reminding the user of their existence.
- Are easy to browse through.
- Are easy to locate consistently on the screen.
- Usually do not obscure the screen working area.
- Usually are not obscured by windows and dialog boxes.
- Allow for use of keyboard equivalents.

The *disadvantages* of menu bars are that:

- They consume a full row of screen space.
- They require looking away from the main working area to find.
- They require moving pointer from the main working area to select.
- The menu options are smaller than full-size buttons, slowing selection time.
- Their horizontal orientation is less efficient for scanning.
- Their horizontal orientation limits number of choices that can be displayed.

Display

- All primary windows must have a menu bar.
- All menu bars must have an associated pull-down menu containing at least two choices.
- Do not allow the user to turn off the display of the menu bar.
- If all the items in its associated pull-down menu are disabled, then disable the menu bar item.

— Display the disabled item in a visually subdued manner.

— However, the disabled pull-down menu must always be capable of being pulled down so that the choices may be seen.

Location

- Position choices horizontally over the entire row at the top of the screen, just below the screen title.

- A large number of choices may necessitate display over two rows.

Title

- The window title will be the menu bar title.

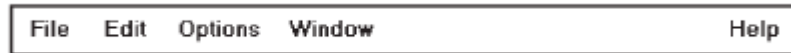
Item Descriptions

- The menu item descriptions must clearly reflect the kinds of choices available in the associated pull-down menus.
- Menu item descriptions will be the “titles” for pull-down menus associated with them.
- Use mixed-case letters to describe choices.
- Use single-word choices whenever possible.
- Do not display choices that are never available to the user.

Organization

- Follow standard platform ordering schemes where they exist.
 - Place application-specific choices where they fit best.
- Order choices left-to-right with:
 - Most frequent choices to the left.
 - Related information grouped together.
- Choices found on more than one menu bar should be consistently positioned.
- Left-justify choices within the line.
- When choices can be logically grouped, provide visual logical groupings, if possible.
- Help, when included, should be located at the right side of the bar.

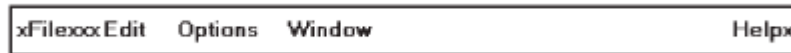
Figure 4.21



Layout

- Indent the first choice one space from the left margin.
- Leave at least three spaces between each of the succeeding choices (except for Help which will be right-justified).
- Leave one space between the final choice and the right margin.

Figure 4.22



Separation

- Separate the bar from the remainder of the screen by:
 - A different background, or
 - Solid lines above and below.

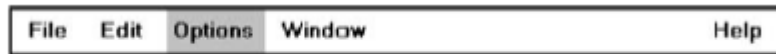
Other Components

- Keyboard equivalent mnemonics should be included on menu bars.
- Keyboard accelerators, to a window indicators, and cascade indicators need not be included.

Selection Indication

- Keyboard cursor:
 - Use a reverse video, or reverse color, selection cursor to surround the choice.
 - Cover the entire choice, including one blank space before and after the choice word.

Figure 4.23



- Pointer:
 - Use reverse video, or reverse color, to highlight the selected choice.

2. Pull-Down Menu

- Proper usage:
 - To initiate frequently used application actions that take place on a wide variety of different windows.
 - A small number of items.
 - Items best represented textually.
 - Items whose content rarely changes.

The **advantages** of pull-down menus are:

- The menu bar cues a reminder of their existence.

- They may be located relatively consistently on the screen.
- No window space is consumed when they are not used.
- They are easy to browse through.
- Their vertical orientation is most efficient for scanning.
- Their vertical orientation is most efficient for grouping.
- Their vertical orientation permits more choices to be displayed.
- They allow for display of both keyboard equivalents and accelerators.

The *disadvantages* of pull-down menus are:

- They require searching and selecting from another menu before seeing options.
- They require looking away from main working area to read.
- They require moving the pointer out of working area to select (unless using keyboard equivalents).
- The items are smaller than full-size buttons, slowing selection time.
- They may obscure the screen working area.

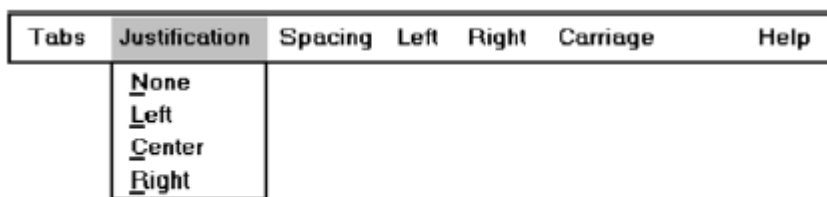


Figure 4.24 Menu bar pull-down.

Display

- Display all possible alternatives.
- Gray-out or dim items that cannot be chosen due to the current state of an application.

Location

- Position the pull-down directly below the selected menu bar choice.

Size

- Must contain a minimum of two choices.
- Restrict to no more than 5 to 10 choices, preferably 8 or less.

Title

- Not necessary on a pull-down menu. The title will be the name of the menu bar item chosen.

Item Descriptions

- Use mixed-case, headline-style words to describe choices.
 - If the choices can be displayed graphically, for example, as fill-in patterns, shades, or colors, textual descriptions are not necessary.
- Do not:
 - Identify a menu item by the same wording as its menu title.
 - Change the meaning of menu items through use of the Shift key.
 - Use scrolling in pull-downs.
 - Place instructions in pull-downs.

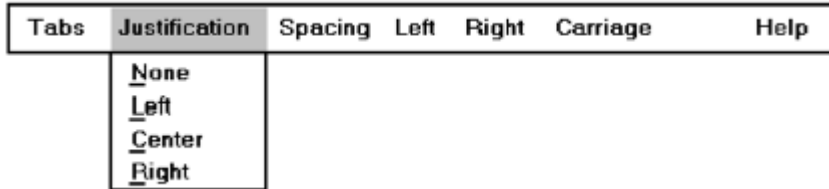
Organization

- Follow standard platform ordering schemes when they exist.
 - Place application-specific choices where they fit best.
- Place frequent or critical items at the top.
- Separate destructive choices from other choices.
- Align choices into columns, with:
 - Most frequent choices toward the top.
 - Related choices grouped together.
 - Choices found on more than one pull-down consistently positioned.
- Left-align choice descriptions.

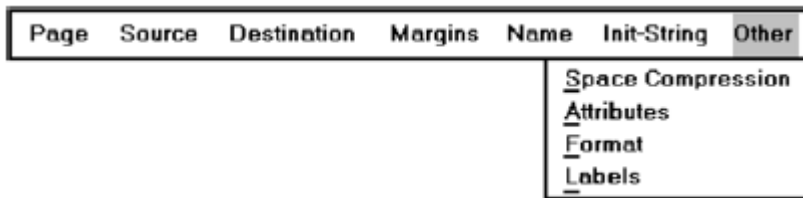
- Multicolumn menus are not desirable. If necessary, organize top-to-bottom, then left-to-right.

Layout

- Leave the menu bar choice leading to the pull-down highlighted in the selected manner (reverse video or reverse color).
- Physically, the pull-down menu must be wide enough to accommodate the longest menu item description and its cascade or accelerator indicator.
- Align the first character of the pull-down descriptions under the second character of the applicable menu bar choice.
- Horizontally, separate the pull-down choice descriptions from the pull-down borders by two spaces on the left side and at least two spaces on the right side.
 - The left-side border will align with the left side of the highlighted menu bar choice.
 - The right-side border should extend, at minimum, to the right side of its highlighted menu bar choice.



— Pull-downs for choices on the far right side of the menu bar, or long pull-down descriptions, may require alignment to the left of their menu bar choice to maintain visibility and clarity.



Groupings

- Provide groupings of related pull-down choices:
 - Incorporate a solid line between major groupings.
 - Incorporate a dotted or dashed line between subgroups.
 - Left-justify the lines under the first letter of the columnized choice descriptions.
 - Right-justify the lines under the last character of the longest choice description.
 - Display the solid line in the same color as the choice descriptions.



Mark Toggles or Settings

- If a menu item establishes or changes the attributes of data or properties of the interface, mark the pull-down choice or choices whose state is current or active “on.”
 - For nonexclusive items, display a check mark to the left of the item description.
 - If the two states of a setting are not obvious opposites, a pair of alternating menu item descriptions should be used to indicate the two states.
 - For exclusive choices, precede the choice with a contrasting symbol such as a diamond or circle.

Pull-Downs Leading to Another Pull-Down

- If a pull-down choice leads to another pull-down, provide a cascade indicator as follows:
 - Place an arrow or right-pointing triangle after the choice description.
 - Align the triangles to the right side of the pull-down.
 - Display the triangle in the same color as the choice descriptions.



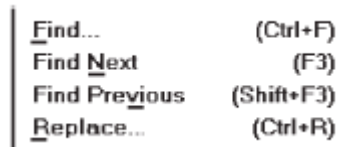
Pull-Downs Leading to a Window

- For pull-down choices leading to a window:
 - Place an ellipsis (three dots) after the choice description.
 - Do not separate the dots from the description by a space.
 - Display the ellipsis in the same color as the choice descriptions.



Keyboard Equivalents and Accelerators

- Provide unique mnemonic codes by which choices may be selected through the typewriter keyboard.
 - Indicate the mnemonic code by underlining the proper character.
- Provide key accelerators for choice selection.
 - Identify the keys by their actual key-top engravings.
 - Use a plus (+) sign to indicate that two or more keys must be pressed at the same time.
 - Enclose the key names within parentheses ().
 - Right-align the key names, beginning at least three spaces to the right of the longest choice description.
 - Display the key alternatives in the same color as the choice descriptions.

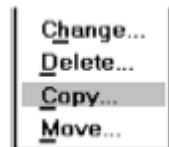


Separation

- Separate the pull-down from the remainder of the screen, but visually relate it to the menu bar by:
 - Using a background color the same as the menu bar.
 - Displaying choice descriptions in the same color as the menu bar.
 - Incorporating a solid-line border completely around the pull-down in the same color as the choice descriptions.
- A drop shadow (a heavier shaded line along two borders that meet) may also be included.

Selection Cursor

- Use a reverse video, or reverse color, selection cursor the same color as the menu bar to surround the choice.
- Create a consistently sized cursor as wide as the pull-down menu.



3. Cascading Menus

- Proper usage:
 - To reduce the number of choices presented together for selection (reduce menu breadth).
 - When a menu specifies many alternatives and the alternatives can be grouped in meaningful related sets on a lower-level menu.
 - When a choice leads to a short, fixed list of single-choice properties.
 - When there are several fixed sets of related options.
 - To simplify a menu.
 - Avoid using for frequent, repetitive commands.

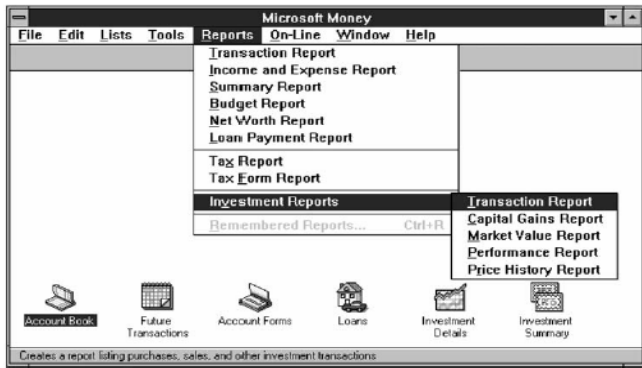


Figure 4.32 Cascading menu.

The *advantages* of cascading menus are that:

- The top-level menus are simplified because some choices are hidden.
- More first-letter mnemonics are available because menus possess fewer alternatives.
- High-level command browsing is easier because subtopics are hidden.

The *disadvantages* of cascading menus are:

- Access to submenu items requires more steps.
- Access to submenu items requires a change in pointer movement direction.
- Exhaustive browsing is more difficult; some alternatives remain hidden as pulldowns become visible.

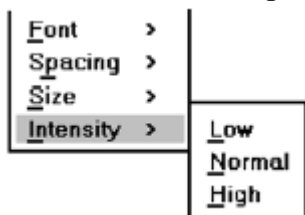
Cascade Indicator

- Place an arrow or right-pointing triangle to the right of each menu choice description leading to a cascade menu.
- Separate the indicator from the choice description by one space.
- Display the indicator in the same color as the choice descriptions.



Location

- Position the first choice in the cascading menu immediately to the right of the selected choice.
- Leave the choice leading to the cascading menu highlighted.



Levels

- Do not exceed three menu levels (two cascades).
- Only one cascading menu is preferred.

Title

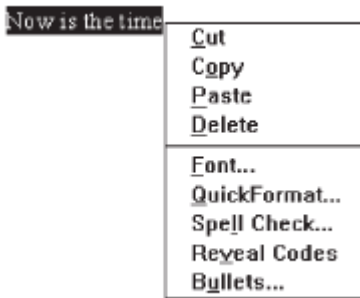
- Not necessary on the cascading menu.
- The title will be the name of the higher-level menu item chosen.

Other Guidelines

- Follow the organization, content, layout, separation, and selection cursor guidelines for the kind of menu from which the menu cascades.

4. Pop-up Menus

- Use to present alternatives or choices within the context of the task.



The *advantages* of pop-up menus are:

- They appear in the working area.
- They do not use window space when not displayed.
- No pointer movement is needed if selected by button.
- Their vertical orientation is most efficient scanning.
- Their vertical orientation most efficient for grouping.
- Their vertical orientation allows more choices to be displayed.
- They may be able to remain showing (“pinned”) when used frequently.
- They allow for display of both keyboard equivalents and accelerators.

The *disadvantages* of pop-up menus are:

- Their existence must be learned and remembered.
- Means for selecting them must be learned and remembered.
- They require a special action to see the menu (mouse click).
- Items are smaller than full-size buttons, slowing selection time.
- They may obscure the screen working area.
- Their display locations may not be consistent.

Display

- Provide a pop-up menu for common, frequent, contextual actions.
 - If the pointer is positioned over an object possessing more than one quality (for example, both text and graphics), at minimum present actions common to all object qualities.
- Items that cannot be chosen due to the current state of an application should not be displayed.
- Continue to display a pop-up until:
 - A choice is selected.
 - An action outside the pop-up is initiated.
 - The user removes the pop-up.

Location

- Position the pop-up:
 - Centered and to the right of the object from which it was requested.
 - Close enough to the pointer so that the pointer can be easily moved onto the menu.
 - But not so close that the pointer is positioned on an item, possibly leading to accidental selection.
- If the pointer is positioned in such a manner that the pop-up would appear offscreen or clipped, position the menu:
 - As close as possible to the object, but not covering the object.
 - So that it appears fully on the screen.

Size

- Restrict the pop-up to no more than 5 to 10 choices, preferably 8 or less.

Title

- Not necessary on a pop-up menu.
- If included, clearly describe the menu’s purpose.
- Locate in a centered position at the top.
- Display in uppercase or mixed-case letters.
- Separate it from the menu items by a line extending from the left menu border to the right border.

Other Guidelines

- Arrange logically organized and grouped choices into columns.
- If items are also contained in pull-down menus, organize pop-up menus in the same manner.
- Left-align choice descriptions.
- Use mixed-case headline-style words to describe choices.
- Separate groups with a solid line the length of the longest choice description.
- If the choice leads to a pop-up window, place an ellipsis after the choice description.
- To separate the pop-up from the screen background:
 - Use a contrasting, but complementary background.
 - Incorporate a solid line border around the pull-down.

5. Tear-off Menus

- Follow all relevant guidelines for pull-down menus.

Advantages/disadvantages. No space is consumed on the screen when the menu is not needed. When needed, it can remain continuously displayed. It does require extra steps to retrieve, and it may obscure the screen working area.

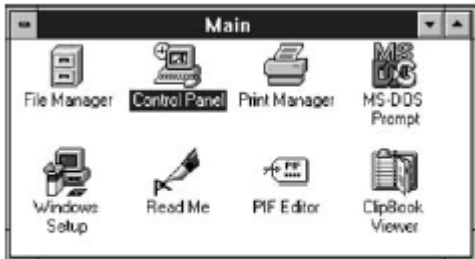


Figure 4.36 Iconic menu (from Microsoft Windows).

6. Iconic Menus

- Use to remind users of the functions, commands, attributes, or application choices available.
- Create icons that:
 - Help enhance recognition and hasten option selection.
 - Are concrete and meaningful.
 - Clearly represent choices.

Advantages/disadvantages.

Pictures help facilitate memory of applications, and their larger size increases speed of selection. Pictures do, however, consume considerably more screen space than text, and they are difficult to organize for scanning efficiency. To create meaningful icons requires special skills and an extended amount of time. Iconic menus should be used to designate applications or special functions within an application. Icons must be meaningful and clear. They should help enhance recognition and hasten option selection.

7. Pie Menus

- Consider using for:
 - Mouse-driven selections, with one- or two-level hierarchies, short lists, and choices conducive to the format.

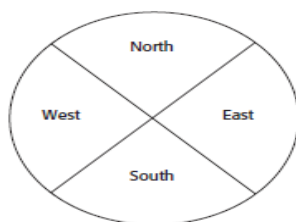


Figure 4.37 Pie menu.

A pie menu is a circular representation of menu items, as illustrated in Figure 4.37, that can be used as an alternative to a pull-down or pop-up menu. Research has found that this style of menu yields higher performance than the typical vertical

array, especially when the menu tasks are unrelated. Their basic advantage is that, when presented with the mouse pointer positioned in the pie's center, average movement to any pie wedge is shorter. Mayhew (1992) concludes that pie menus might work well for mouse-driven selections with one- or two-level hierarchies, short choice listings, and data conducive to the format. Performance advantages for keyboard selection are doubtful, however.

8. Default Menu Items

Every system will provide a set of standard menu items. Using the default items will reduce design time and encourage interface consistency. System learning time will also be reduced. Microsoft Windows, for example, provides the following standard and optional menu bar items and pull-down actions. Always follow industry standards for naming, menu bar choices, ordering, and keyboard equivalents and accelerators.

File

A standard element, the File menu provides all the commands needed to open, create, and save files. Some standard File functions are:

- New
- Open
- Close
- Save
- Save As
- Print Preview
- Print
- Exit

Edit

A standard element, the Edit menu provides commands that affect the state of selected objects. Some standard Edit functions are:

- Undo
- Cut
- Copy
- Paste
- Select All
- Find
- Replace

View

An optional element, the View menu provides commands that affect the perspective, details, and appearance of the application. They affect the view, not the data itself. The view functions are application-specific and include the following:

- Toolbars
- Status Bar
- Magnify
- Zoom In
- Zoom Out
- Grid Points

Window

The Window menu, an optional element, provides commands to manipulate entire windows. Included are items such as:

- New Window
- Arrange All
- Hide
- Show

Help

The Help menu, a standard element, provides Help commands, including:

- Contents
- Search for Help On
- How to Use Help
- About (Application)

Table 4.4 Menu Proper Usage Summary

Menu Bar	To identify and provide access to: <ul style="list-style-type: none"> • Common and frequently used application actions. • Actions that take place in a wide variety of different windows.
Pull-Down Menu	For frequently used application actions that take place in a wide variety of different windows: <ul style="list-style-type: none"> • A small number of items (5–10). • Items rarely changing in content.
Cascading Menu	To simplify a higher-level menu. To provide easier browsing of a higher-level menu. For mutually exclusive choices. Restrict to 1–2 cascades.
Pop-Up Menu	For: <ul style="list-style-type: none"> • Frequent users. • Frequently used contextual commands. • A small number of items (5–10). • Items rarely changing in content. • Items that require a small amount of screen space.
Tear-Off Menu	For items: <ul style="list-style-type: none"> • Sometimes frequently selected. • Sometimes infrequently selected. • Small in number (5–10). • Rarely changing in content.
Iconic Menu	To designate applications available. To designate special functions within an application.

9. Functions Not Represented by Default Items

Having established the usability of the standard menu functions, additional system functions must be identified. Commands to accomplish these functions must be created and added to the pertinent menus. Command design guidelines include the following.

Labels

- General:
 - Provide a label for each command.
 - Use labels that indicate:
 - The purpose of the command, or
 - The result of what happens when the command is selected.
 - Use familiar, short, clear, concise words.
 - Use distinctive wording.
 - Use mixed case, with the first letter capitalized.
 - Begin commands with verbs or adjectives, not nouns.
 - Preferably, use only one word.
 - If multiple words are required for clarity, capitalize the first letter of each significant word.
 - Do not use sentences as labels.
 - Provide an ellipsis (. . .) to indicate that another window will result from selection of a command.
 - Do not use the ellipsis when the following window is a confirmation or warning.
- Dynamic labels:
 - As contexts change, dynamically change the label wording to make its meaning clearer in the new context.
 - For example, after a cut operation, Undo may be changed to Undo Cut.

Disabled Commands

- When a command is not available, indicate its disabled status by displaying it grayed out or subdued.
- If selection of a disabled command is attempted, provide a message in the information area that the “Help” function will explain why it is disabled.

Navigation and Selection

- General:
 - Permit multiple methods for selecting commands.
- Keyboard equivalents:
 - Assign a mnemonic for each command.
 - A mnemonic should be as meaningful as possible. Use:
 - The first letter of the command, or if duplications exist,
 - The first letter of another word in the command, or
 - Another significant consonant in the command.
 - For standard commands, use mnemonics provided by the tool set.
- Keyboard accelerators:
 - Assign keyboard accelerators for frequently used commands.
 - For standard comm

3 a) Discuss phrasing the menu.

05 - CO3 - L2

Phrasing the Menu

A menu must communicate to the user information about: The nature and purpose of the menu itself. The nature and purpose of each presented choice. How the proper choice or choices may be selected.

- 1. Menu Titles**
- 2. Menu Choice Descriptions**
- 3. Menu Instructions**
- 4. Intent Indicators**
- 5. Keyboard Equivalents**
- 6. Keyboard Accelerators**

1. Menu Titles

- Main menu:
 - Create a short, simple, clear, and distinctive title, describing the purpose of the entire series of choices.
- Submenus:
 - Submenu titles must be worded exactly the same as the menu choice previously selected to display them.
- General:
 - Locate the title at the top of the listing of choices.
 - Spell out the title fully using either an:
 - Uppercase font.
 - Mixed-case font in the headline style.
 - Superfluous titles may be omitted.

2. Menu Choice Descriptions

- Create meaningful choice descriptions that are familiar, fully spelled out, concise, and distinctive.
- Descriptions may be single words, compound words, or multiple words or phrases.
 - Exception: Menu bar items should be a single word (if possible).
- Place the keyword first, usually a verb.
- Use the headline style, capitalizing the first letter of each significant word in the choice description.
- Use task-oriented not data-oriented wording.
- Use parallel construction.
- A menu choice must never have the same wording as its menu title.
- Identical choices on different menus should be worded identically.
- Choices should not be numbered.
 - Exception: If the listing is numeric in nature, graphic, or a list of varying items, it may be numbered.
- If menu options will be used in conjunction with a command language, the capitalization and syntax of the choices should be consistent with the command language.
- Word choices as commands to the computer.

- **Size.** Item descriptions may be single words, compound words, multiple words, or phrases. Menu bar items should be a single word, if possible. If a menu bar item must be a multiple word, visually tie the two words together by incorporating a hyphen between them. Web page content links will typically be phrases.
- **Keyword first.** Arrange multi-item descriptions so that the descriptive and unique words appear at its beginning. This optimizes scanning and recognition while the user is learning the menu. Description phrasing and wording should also be consistent across all menus to aid learning further.
- **Capitalization.** Use the headline style of presentation. Capitalize the first letter of each significant choice description word.
- **Task-oriented wording.** Task-oriented wording is preferable to data-oriented wording. Task-oriented wording usually positions a verb first, such as *Manage Customer Information*. An example of data-oriented wording would be to simply say *Customers*. What is being done with, for, or to customers is unclear in the latter.
- **Parallel construction.** When choices are composed of phrases, use a parallel word construction in creating descriptions for related choices. Parallel construction would be: *Print a File, Execute a Program, and Eject a Disk*. An example of nonparallel construction is: *Print; Execute a Program, and Disk Eject*.
- **Relationship to title.** A menu choice must never have the same wording as the title of the menu on which it is presented.
- **Consistency across menus.** Identical choices on different menus should be worded the same.
- **Numbering.** Items should not be numbered unless the listing is numeric in nature, graphic, or a list of varying items.
- **Command language.** If menu options will be used in conjunction with a command language, the capitalization and syntax of the captions should be consistent with those of the command language.
- **Word as a command to computer.** Phrase all menu choices as commands to the computer whenever possible.
 - For example, say: Choose one: Save and exit
Exit without saving
rather than:
Do you want to save and exit?
Yes
No

3. Menu Instructions

- For novice or inexperienced users, provide menu completion instructions.
 - Place the instructions in a position just preceding the part, or parts, of the menu to which they apply.
- Left-justify the instruction and indent the related menu choice descriptions a minimum of three spaces to the right.
- Leave a space line, if possible, between the instructions and the related menu choice descriptions.
 - Present instructions in a mixed-case font in sentence style.
- For expert users, make these instructions easy to ignore by:
 - Presenting them in a consistent location.
 - Displaying them in a unique type style and/or color.

4. Intent Indicators

- Cascade indicator:
 - To indicate that selection of an item will lead to a submenu, place a triangle or right-pointing solid arrow following the choice.
 - A cascade indicator must designate every cascaded menu.
- To a window indicator:
 - For choices that result in displaying a window to collect more information, place an ellipsis (. . .) immediately following the choice.
 - Exceptions—do not use when an action:
 - Causes a warning window to be displayed.
 - May or may not lead to a window.
- Direct action items:
 - For choices that directly perform an action, no special indicator should be placed on the menu.

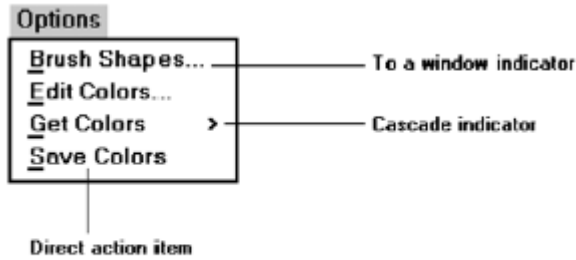


Figure 4.8 Intent indicators.

5. Keyboard Equivalents

- To facilitate keyboard selection of a menu choice, each menu item should be assigned a keyboard equivalent mnemonic.
- The mnemonic should be the first character of the menu item’s description.
 - If duplication exists in first characters, use another character in the duplicated item’s description.
 - Preferably choose the first succeeding consonant.
- Designate the mnemonic character by underlining it.
- Use industry-standard keyboard access equivalents when they exist.

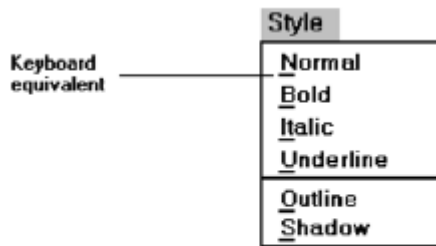


Figure 4.9 Keyboard equivalents.

Table 4.1 Standard Keyboard Equivalents

<u>A</u> bout	<u>H</u> elp	<u>P</u> rint	<u>S</u> end To
<u>A</u> pply	<u>H</u> elp <u>T</u> opics	<u>P</u> rint <u>P</u> review	<u>S</u> how
<u>B</u> ack	<u>I</u> nsert	<u>P</u> roperties	<u>S</u> ize
<u>B</u> rowse	<u>M</u> aximize	<u>R</u> edo	<u>S</u> plit
<u>C</u> lose	<u>M</u> inimize	<u>R</u> epeat	<u>S</u> top
<u>C</u> opy	<u>M</u> ove	<u>R</u> estore	<u>U</u> ndo
<u>C</u> ut	<u>N</u> ew	<u>R</u> esume	<u>V</u> iew
<u>D</u> elete	<u>N</u> ext	<u>R</u> etry	<u>Y</u> es
<u>E</u> dit	<u>N</u> o	<u>R</u> erun	
<u>E</u> xit	<u>O</u> pen	<u>S</u> ave	
<u>F</u> ile	<u>P</u> aste	<u>S</u> ave <u>A</u> s	
<u>F</u> ind	<u>P</u> age <u>S</u> etup	<u>S</u> elect <u>A</u> ll	

6. Keyboard Accelerators

- For frequently used items, provide a keyboard accelerator to facilitate keyboard selection.
- The accelerator may be one function key or a combination of keys.
 - Function key shortcuts are easier to learn than modifier plus letter shortcuts.
- Pressing no more than two keys simultaneously is preferred.
 - Do not exceed three simultaneous keystrokes.
- Use a plus (+) sign to indicate that two or more keys must be pressed at the same time.
- Accelerators should have some associative value to the item.
- Identify the keys by their actual key top engraving.
- If keyboard terminology differences exist, use:
 - The most common keyboard terminology.

- Terminology contained on the newest PCs.
- Separate the accelerator from the item description by three spaces.
- Right-align the key descriptions.
- Do not use accelerators for:
 - Menu items that have cascaded menus.
 - Pop-up menus.
- Use industry-standard keyboard accelerators when they exist.

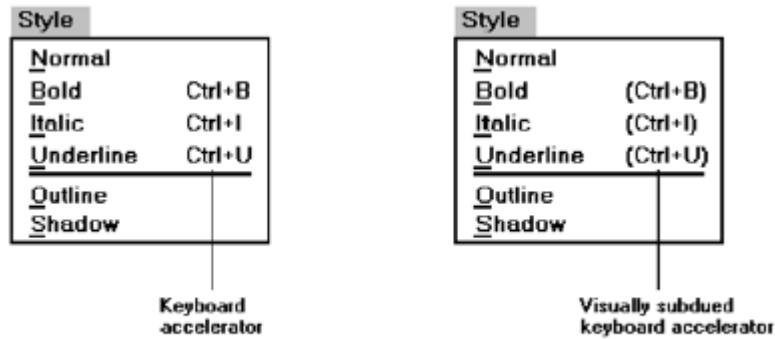


Figure 4.10 Keyboard accelerators.

Table 4.2 Standard Keyboard Accelerators

THIS ACCELERATOR:	DESIGNATES THIS ACTION:
Ctrl+C	Copy
Ctrl+N	New
Ctrl+O	Open
Ctrl+P	Print
Ctrl+S	Save
Ctrl+V	Paste
Ctrl+X	Cut
Ctrl+Z	Undo
F1	Display contextual help window
Shift+F1	Activate context-sensitive help
Shift+F10	Display pop-up menu
Spacebar	Select (single mouse click)
Esc	Cancel
Alt	Activate a menu bar

3.b) Explain any 5 guidelines for formatting menus. 05 - CO3 - L2

Formatting of Menus

The human-computer interface has a rich history of experimental studies with menus, the results of which can and have been applied to graphical screen and Web page menu design and presentation. The guidelines for formatting menus are:

1. Consistency
2. Display
3. Presentation

4. Organization

5. Complexity

6. Item Arrangement

7. Ordering

8. Grouping

9. List separators

1. Consistency

- Provide consistency with the user's expectations.
- Provide consistency in menu:
 - Formatting, including organization, presentation, and choice ordering.
 - Phrasing, including titles, choice descriptions, and instructions.
 - Choice selection methods.
 - Navigation schemes.

2. Display

- If continual or frequent references to menu options are necessary, permanently display the menu in an area of the screen that will not obscure other screen data.
- If only occasional references to menu options are necessary, the menu may be presented on demand.
 - Critical options should be continuously displayed, however.

3. Presentation

- Ensure that a menu and its choices are obvious to the user by presenting them with a unique and consistent structure, location, and/or display technique.
- Ensure that other system components do not possess the same visual qualities as menu choices.

4. Organization

- Provide a general or main menu.
- Display:
 - All relevant alternatives.
 - Only relevant alternatives.
- Delete or gray-out inactive choices.
- Match the menu structure to the structure of the task.
 - Organization should reflect the most efficient sequence of steps to accomplish a person's most frequent or most likely goals.
- Minimize number of menu levels within limits of clarity.
 - For Web sites, restrict it to two levels (requiring two mouse clicks) for fastest performance.
- Be conservative in the number of menu choices presented on a screen:
 - Without logical groupings of elements, limit choices to 4 to 8.
 - With logical groupings of elements, limit choices to 18 to 24.
- Provide decreasing direction menus, if sensible.
- Never require menus to be scrolled.
- Provide users with an easy way to restructure a menu according to how work is accomplished.

5. Complexity

- Provide both simple and complex menus.
- Simple: a minimal set of actions and menus.
- Complex: a complete set of actions and menus.

6. Item Arrangement

- Align alternatives or choices into single columns whenever possible.
 - Orient for top-to-bottom reading.
 - Left-justify descriptions.
- If a horizontal orientation of descriptions must be maintained:
 - Organize for left-to-right reading.

7. Ordering

- Order lists of choices by their natural order, or
 - For lists associated with numbers, use numeric order.
 - For textual lists with a small number of options (seven or less), order by:
 - Sequence of occurrence.
 - Frequency of occurrence.
 - Importance.
 - Semantic similarity.
 - Use alphabetic order for:
 - Long lists (eight or more options).
 - Short lists with no obvious pattern or frequency.
 - Separate potentially destructive actions from frequently chosen items.
 - If option usage changes, do not reorder menus.
 - Maintain a consistent ordering of options on all related menus.
 - For variable-length menus, maintain consistent relative positions.
 - For fixed-length menus, maintain consistent absolute positions.
- **Natural ordering.** If items have a natural sequence, such as chapters in a book, days in a week, or months in the year, the ordering scheme should follow this natural sequence. The screen viewer will have learned these ordering schemes very well.
 - **Numeric ordering.** Use numeric ordering for choices associated with numbers, for example, type size, baud rate, or number of pixels.
 - **Small number of options.** For groupings with a small number of options (about seven or fewer), *sequence of use*, *frequency of use*, or *importance* are good ordering schemes. Also consider ordering by *semantic similarity*, along a semantic dimension such as impact, potency, or emphasis. Type style, for example, may be ordered by emphasis from least to most: regular, underlined, italicized, and bold.
 - **Alphabetic order.** For a large number of options, alphabetic ordering of alternatives is desirable. Alphabetic ordering is also recommended for small lists where no frequency or sequence pattern is obvious.

8. Groupings

- Create groupings of items that are logical, distinctive, meaningful, and mutually exclusive.
- Categorize them in such a way as to:
 - Maximize the similarity of items within a category.
 - Minimize the similarity of items across categories.
- Present no more than six or seven groupings on a screen.
- Order categorized groupings in a meaningful way.
- If meaningful categories cannot be developed and more than eight options must be displayed on a screen, create arbitrary visual groupings that:
 - Consist of about four or five but never more than seven options.
 - Are of equal size.
- Separate groupings created through either:
 - Wider spacing, or
 - A thin ruled line.
- Provide immediate access to critical or frequently chosen items.

9. Line Separators

- Separate vertically arrayed groupings with subtle solid lines.
- Separate vertically arrayed subgroupings with subtle dotted or dashed lines.
- For subgroupings within a category:
 - Left-justify the lines under the first letter of the columnized choice descriptions.
 - Right-justify the lines under the last character of the longest choice description.

- For independent groupings:— Extend the line to the left and right menu borders.

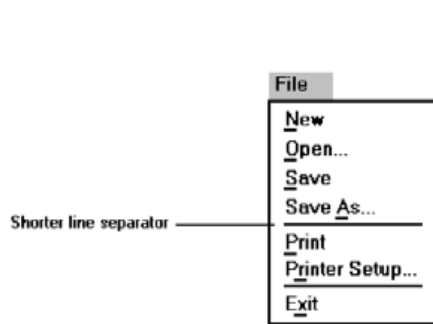


Figure 4.6 Partial line separators.

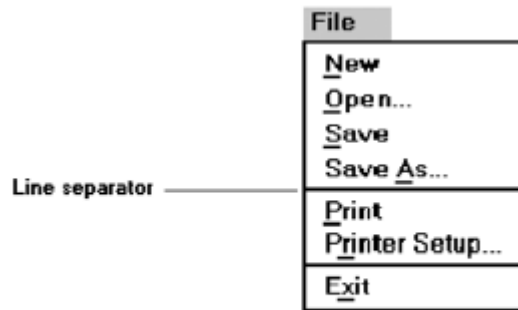


Figure 4.7 Extended line separators.

4. Explain the following screen based presentation controls. 10 - CO4 - L2

- i) Static text fields ii) group boxes iii) tool tips iv) balloon tips v) progress indicators

1. Static Text Fields

- Description:
 - Read-only textual information.
- Purpose:
 - To identify a control by displaying a control caption.
 - To clarify a screen by providing instructional or prompting information.
 - To present descriptive information.
- Proper usage:
 - To display a control caption.
 - To display instructional or prompting information.
 - To display descriptive information.



Figure 7.84 Static text field.

Static Text Field Guidelines

- Captions:
 - Include a colon (:) as part of the caption.
 - Include a mnemonic for keyboard access.
 - When the associated control is disabled, display it dimmed.
 - Follow all other presented guidelines for caption presentation and layout.
- Instructional or prompting information:
 - Display it in a unique and consistent font style for easy recognition and differentiation.
 - Follow all other presented guidelines for prompting and instructional information.
- Descriptive information:

— Follow all other guidelines for required screen or control descriptive information.

2. Group Boxes

■ Description:

- A rectangular frame that surrounds a control or group of controls.
- An optional caption may be included in the frame's upper-left corner.

■ Purpose:

- To visually relate the elements of a control.
- To visually relate a group of related controls.

■ Proper usage:

- To provide a border around radio button or check box controls.
- To provide a border around two or more functionally related controls.

■ Guidelines:

— Label or heading:

- Typically, use a noun or noun phrase for the label or heading.
- Provide a brief label or heading, preferably one or two words.
- Relate label or heading's content to the group box's content.
- Capitalize the first letter of each significant word.
- Do not include an ending colon (:).

— Follow all other guidelines presented for control and section borders.

3. ToolTips

■ Description:

— A small pop-up window containing descriptive text that appears when a pointer is moved over a control or element either:

- Not possessing a label.
- In need of additional descriptive or status information.

■ Purpose:

— To provide descriptive information about a control or screen element.

■ Advantages:

- Identifies an otherwise unidentified control.
- Reduces possible screen clutter caused by control captions and descriptive information.
- Enables control size to be reduced.

■ Disadvantages:

- Not obvious, must be discovered.
- Inadvertent appearance can be distracting.

■ Proper usage:

- To identify a control that has no caption.
- To provide additional descriptive or status information about a screen element.

ToolTip Guidelines

- Display after a short time-out.
- For toolbars, provide a brief word as a label.

- Use mixed case in the headline style of presentation with no ending punctuation.
- For other elements, provide a brief phrase presenting descriptive or status information.
- Use mixed case in the sentence style of presentation.
- Present ToolTips at the lower-right edge of the pointer.
- Display them fully on the screen.
- For text boxes, display ToolTips centered under the control.
- Display them in the standard system ToolTip colors.
- Remove the ToolTip when the control is activated or the pointer is moved away.
- Don't substitute ToolTips for good design.

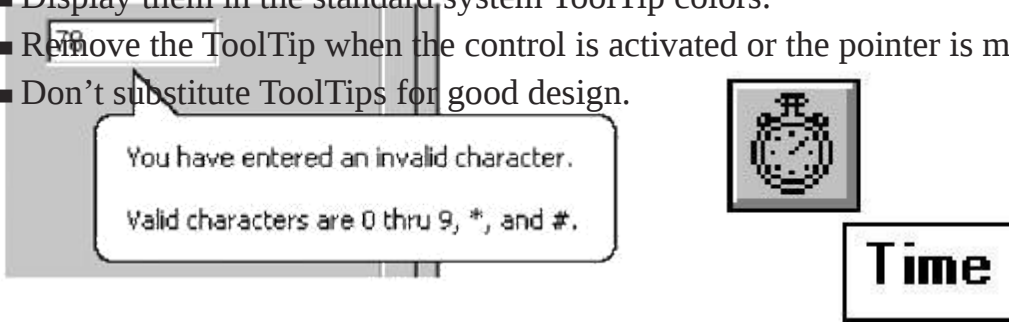


Fig : Tool Tip

4. Balloon Tips

- Description:
 - A small pop-up window that contains information in a word balloon.
 - Components can include:
 - Title.
 - Body text.
 - Message Icons.
 - Appear adjacent to the item to which they apply, generally above or to left.
 - Only one tip, the last posted, is visible at any time.
 - Tips are removed after a specified time period.
 - Purpose:
 - To provide additional descriptive or status information about a screen element.
- Advantages:
 - Provides useful reminder and status information.
 - Disadvantages:
 - If overused they lose their attention-getting value.
 - If overused in situations the user considers not very important, their continual appearance can be aggravating.
- Proper usage:
 - To display noncritical:
 - Reminder information.
 - Notification information.
 - Do not use tips to display critical information.

Fig:Balloon Tip

Balloon Tip Guidelines

- General:
 - Use a notification tip to inform the user about state changes.
 - Use a reminder tip for state changes that the user might not usually notice.
 - Point the tip of the balloon to the item it references.
 - Do not use them to replace ToolTips.
 - Do not overuse balloon tips.
 - Content:
 - Restrict them to a length of 100 characters, including title and body text.
 - Title text should:
 - If the tip refers to an icon or other image representing a specific object, include:
 - The object's name, using its normal capitalization.
 - The object's status, using sentence-style presentation without ending punctuation.
 - Be presented in bold.
 - Body text should:
 - Include a description of the situation in one or two brief sentences.
 - Include a brief suggestion for correcting the situation.
 - Be presented using mixed-case in the sentence style.

5. Progress Indicators

- Description:
 - A rectangular bar that fills as a process is being performed, indicating the percentage of the process that has been completed.
- Purpose:
 - To provide feedback concerning the completion of a lengthy operation.
- Proper usage:
 - To provide an indication of the proportion of a process completed.

Progress Indicator Guidelines

- When filling the indicator:
 - If horizontally arrayed, fill it from left to right.
 - If vertically arrayed, fill it from bottom to top.
- Fill it with a color or a shade of gray.

- Include descriptive text for the process, as necessary.
- Place text outside of the control.



Fig : Progress Bar

5. State the different selection control mechanism. Explain any 5. 10 - CO4 - L2

Selection Controls

A selection control presents on the screen all the possible alternatives, conditions, or choices that may exist for an entity, property, or value. The relevant item or items are selected from those displayed. Some selection controls present all the alternatives together, visibly on a screen; others may require an action to retrieve the entire listing and/ or scrolling to view all the alternatives. Selection controls include

1. radio buttons
2. check boxes
3. list boxes
4. drop-down / pop-up list boxes
5. palettes

1. Radio Buttons

■ Description:

— A two-part control consisting of the following:

- Small circles, diamonds, or rectangles.
 - Choice descriptions.
- When a choice is selected:
- The option is highlighted.
 - Any existing choice is automatically unhighlighted and deselected.

■ Purpose:

— To set one item from a small set of mutually exclusive options (2 to 8).

■ Advantages:

— Easy-to-access choices.

- Easy-to-compare choices.
- Preferred by users.
- Disadvantages:
 - Consume screen space.
 - Limited number of choices.
- Proper usage:
 - For setting attributes, properties, or values.
 - For mutually exclusive choices (that is, only one can be selected).
 - Where adequate screen space is available.
 - Most useful for data and choices that are:
 - Discrete.
 - Small and fixed in number.
 - Not easily remembered.
 - In need of a textual description to meaningfully describe the alternatives.
 - Most easily understood when the alternatives can be seen together and compared to one another.
 - Never changed in content.
 - Do not use:
 - For commands.
 - Singly to indicate the presence or absence of a state.

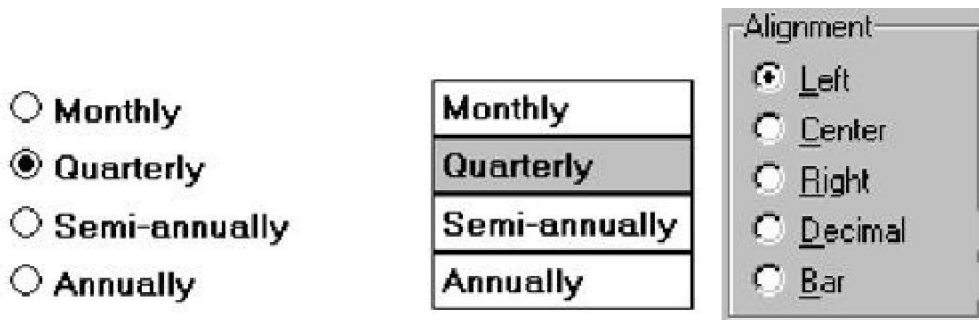


Fig : Radio Buttons

Choice Descriptions

- Provide meaningful, fully spelled-out choice descriptions clearly describing the values or effects set by the radio buttons.
- Display in a single line of text.
- Display using mixed-case letters, using the sentence style.
- Position descriptions to the right of the button. Separate them by at least one space from the button.
- When a choice is conditionally unavailable for selection, display the choice description grayed out or dimmed.
- Include a None choice if it adds clarity.

Size

- Show a minimum of two choices, a maximum of eight.

Defaults

- When the control possesses a state or affect that has been predetermined to have a higher probability of selection than the others, designate it as the default and display its button filled in.
- When the control includes choices whose states cannot be predetermined, display all the buttons without setting a dot, or in the *indeterminate* state.
- When a multiple selection includes choices whose states vary, display the buttons in another unique manner, or in the *mixed value* state.

Structure

- A columnar orientation is the preferred manner of presentation.
- Left-align the buttons and choice descriptions.

Red
 Yellow
 Green
 Blue

- If vertical space on the screen is limited, orient the buttons horizontally.
- Provide adequate separation between choices so that the buttons are associated with the proper description.
— A distance equal to three spaces is usually sufficient.

Green Blue Yellow Red

- Enclose the buttons in a border to visually strengthen the relationship they possess.

<input type="radio"/> Red
<input type="radio"/> Yellow
<input type="radio"/> Green
<input type="radio"/> Blue

<input type="radio"/> Green	<input type="radio"/> Blue	<input type="radio"/> Yellow	<input type="radio"/> Red
-----------------------------	----------------------------	------------------------------	---------------------------

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Poor

Plan Choice: Limited Basic Superior Premium

Better

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Still Better

Plan Choice: Limited Basic Superior Premium

Plan Choice: Limited Basic Superior Premium

Best

Fig : Ways to, and not to, present radio buttons.

Organization

- Arrange selections in expected order or follow other patterns such as frequency of occurrence, sequence of use, or importance.
 - For selections arrayed top to bottom, begin ordering at the top.
 - For selections arrayed left to right, begin ordering at the left.
- If, under certain conditions, a choice is not available, display it subdued or less brightly than the available choices.

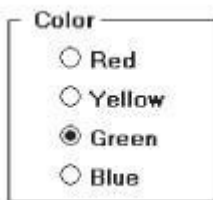
Related Control

- Position any control related to a radio button immediately to the right of the choice description.
- If the radio button choice description also acts as the label for the control that follows it, end the label with an arrow (>).

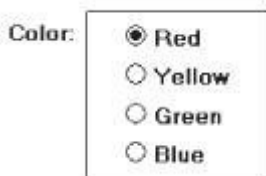


Captions

- Structure:
 - Provide a caption for each radio button control.
 - Exception: In screens containing only one radio button control, the screen title may serve as the caption.
- Display:
 - Fully spelled out.
 - In mixed-case letters, capitalizing the first letter of all significant words.
- Columnar orientation:
 - With a control border, position the caption:
 - Upper-left-justified within the border.



- Alternately, the caption may be located to the left of the topmost choice description.



- Without an enclosing control border, position the caption:
 - Left-justified above the choice descriptions, separated by one space line.



- Alternately, the caption may be located to the left of the topmost choice description.

Color: Red
 Yellow
 Green
 Blue

■ Horizontal orientation:

— Position the caption to the left of the choice descriptions.

Color: Green Blue Yellow Red

• Alternately, with an enclosing control border, left-justified within the border.

Color
 Green Blue Yellow Red

Keyboard Equivalents

■ Assign a keyboard mnemonic to each choice description.

■ Designate the mnemonic by underlining the applicable letter in the choice description.

Red

Assign unique keyboard mnemonics for each alternative in the standard way, choosing the first letter (or another) and designating it by character underlining.

Selection Method and Indication

■ Pointing:

— The selection target area should be as large as possible.

• Include the button and the choice description text.

— Highlight the selection choice in some visually distinctive way when the cursor's resting on it and the choice is available for selection.

• This cursor should be as long as the longest choice description plus one space at each end. Do not place the cursor over the small button.

Red
 Yellow
 Green
 Blue

■ Activation:

— When a choice is selected, distinguish it visually from the unselected choices.

• A radio button should be filled in with a solid dark dot or made to look depressed or higher through use of a shadow.

— When a choice is selected, any other selected choice must be deselected.

■ Defaults:

— If a radio button control is displayed that contains a choice previously selected or a default choice, display the selected choice as set in the control.

2. Check Boxes

■ Description:

- A two-part control consisting of a square box and choice description.
- Each option acts as a switch and can be either “on” or “off.”
- When an option is selected (on), a mark such as an “X” or “check” appears within the square box, or the box is highlighted in some other manner.
- Otherwise the square box is unselected or empty (off).
- Each box can be:
 - Switched on or off independently.
 - Used alone or grouped in sets.
- Purpose:
 - To set one or more options as either on or off.
- Advantages
 - Easy-to-access choices.
 - Easy-to-compare choices.
 - Preferred by users.
- Disadvantages:
 - Consume screen space.
 - Limited number of choices.
 - Single check boxes difficult to align with other screen controls.
- Proper usage:
 - For setting attributes, properties, or values.
 - For nonexclusive choices (that is, more than one can be selected).
 - Where adequate screen space is available.
 - Most useful for data and choices that are:
 - Discrete.
 - Small and fixed in number.
 - Not easily remembered.
 - In need of a textual description to describe meaningfully.
 - Most easily understood when the alternatives can be seen together and compared to one another.
 - Never changed in content.
 - Can be used to affect other controls.
 - Use only when both states of a choice are clearly opposite and unambiguous.

- Bold**
- Italic*
- _{Subscript}
- Underline



Figure 7.39 Check boxes.

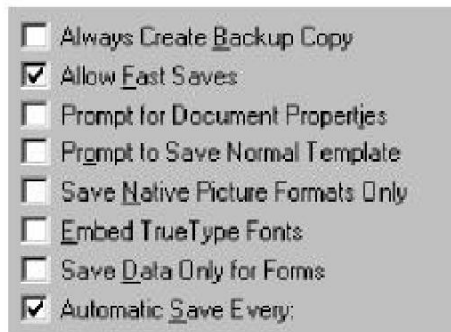


Figure 7.40 Check boxes.

Choice Descriptions

- Provide meaningful, fully spelled-out choice descriptions clearly describing the values or effects set by the check boxes.
- Display them in a single line of text.
- Display them using mixed-case letters in sentence style.
- Position descriptions to the right of the check box. Separate by at least one space from the box.
- When a choice is unavailable for selection under a certain condition, display the choice description visually dimmed.

Size

- Show a minimum of one choice, a maximum of eight.

Defaults

- When the control possesses a state or affect that has been preset, designate it as the default and display its check box marked.
- When a multiple selection includes choices whose states vary, display the buttons in another unique manner, or the *mixed value* state.

Structure

- Provide groupings of related check boxes.
- A columnar orientation is the preferred manner of presentation for multiple related check boxes.
- Left-align the check boxes and choice descriptions.

Bold
 Italic
 Underline

- If vertical space on the screen is limited, orient the boxes horizontally.
- Provide adequate separation between boxes so that the buttons are associated with the proper description.
— A distance equal to three spaces is usually sufficient.

Bold Italic Underline

- Enclose the boxes in a border to visually strengthen the relationship they possess.

Bold
 Italic
 Underline

Bold Italic Underline

Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
Earnings:	Annual <input type="checkbox"/>	Quarterly <input type="checkbox"/>	Monthly <input type="checkbox"/>	Weekly <input type="checkbox"/>
Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
Earnings:	Annual <input type="checkbox"/>	Quarterly <input type="checkbox"/>	Monthly <input type="checkbox"/>	Weekly <input type="checkbox"/>

Poor

Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
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Better

Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
Earnings:	<input type="checkbox"/> Annual <input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Weekly			

Still Better

Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly
Earnings:	<input type="checkbox"/> Annual	<input type="checkbox"/> Quarterly	<input type="checkbox"/> Monthly	<input type="checkbox"/> Weekly

Best

Fig : Ways to, and not to, present check boxes.

Organization

- Arrange selections in logical order or follow other patterns such as frequency of occurrence, sequence of use, or importance.
 - For selections arrayed top to bottom, begin ordering at the top.
 - For selections arrayed left to right, begin ordering at the left.
- If, under certain conditions, a choice is not available, display it subdued or less brightly than the available choices.

Related Control

- Position any control related to a check box immediately to the right of the choice description.
 - If a the check box choice description also acts as the label for the control that follows it , end the label with an arrow (>).

Day of Week >

Month of Year >

Captions

■ Structure:

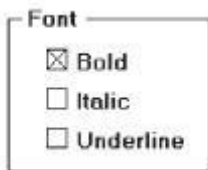
- Provide a caption for each grouping of related check boxes.
 - Exception: In screens containing only one check box grouping, the screen title may serve as the caption.

— Display:

- Fully spelled out.
- In mixed-case letters capitalizing the first letter of all significant words.

■ Columnar orientation:

- With a control border, position the caption:
 - Upper-left-justified within the border.



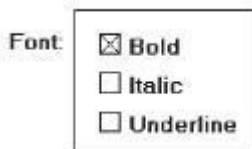
Font

Bold

Italic

Underline

- Alternately, the caption may be located to the left of the topmost choice description.



Font: Bold

Italic

Underline

— Without an enclosing control border, position the caption:

- Left-justified above the choice descriptions separated by one space line.

Font:

Bold

Italic

Underline

- Alternately, the caption may be located to the left of the topmost choice description.

Font: Bold

Italic

Underline

■ Horizontal orientation

— Position the caption to the left of the choice descriptions.

Font: Bold Italic Underline

Font: Bold Italic Underline

• Alternately, with an enclosing control border, it should be left-justified within the border.

Font Bold Italic Underline

— Be consistent in caption style and orientation within a screen.

Keyboard Equivalents

■ Assign a keyboard mnemonic to each check box.

■ Designate the mnemonic by underlining the applicable letter in the choice description.

Underline

Selection Method and Indication

■ Pointing:

— The selection target area should be as large as possible.

• Include the check box and the choice description text.

— Highlight the selection choice in some visually distinctive way when the cursor's resting on it and the choice is available for selection.

• This cursor should be as long as the longest choice description plus one space at each end. Do not place the cursor over the check box.

Bold

Italic

Underline

■ Activation:

— When a choice is selected, distinguish it visually from the non-selected choices.

• A check box should be filled in or made to look depressed or higher through use of a shadow.

■ Defaults:

— If a check box is displayed that contains a choice previously selected or default choice, display the selected choice as set in the control.

■ Select/deselect all:

— Do not use *Select All* and *Deselect All* check boxes.

Bold

Italic

Underline

■ Mixed-value state:

— When a check box represents a value, and a multiple selection encompasses multiple value occurrences set in both the on and off state, display the check box in a *mixed value* state.

• Fill the check box with another easily differentiable symbol or pattern.

— Toggle the check box as follows:

- Selection 1: Set the associated value for all elements. Fill the check box with an “X” or “check.”
- Selection 2: Unset the value for all associated elements. Blank-out the check box.
- Selection 3: Return all elements to their original state. Fill the check box with the mixed value symbol or pattern.

3. List Boxes

■ Description:

— A permanently displayed box-shaped control containing a list of attributes or objects from which:

- A single selection is made (mutually exclusive), or
- Multiple selections are made (non-mutually-exclusive).

— The choice may be text, pictorial representations, or graphics.

— Selections are made by using a mouse to point and click.

— Capable of being scrolled to view large lists of choices.

— No text entry field exists in which to type text.

— A list box may be associated with a *summary list box* control, which allows the selected choice to be displayed or an item added to the list.

■ Purpose:

— To display a collection of items containing:

- Mutually exclusive options.
- Non-mutually-exclusive options.

■ Advantages:

— Unlimited number of choices.

— Reminds users of available options.

— Box always visible.

■ Disadvantages:

— Consumes screen space.

— Often requires an action (scrolling) to see all list choices.

— The list content may change, making it hard to find items.

— The list may be ordered in an unpredictable way, making it hard to find items.

■ Proper usage:

— For selecting values or setting attributes.

— For choices that are:

- Mutually exclusive (only one can be selected).
- Non-mutually-exclusive (one or more may be selected).

— Where screen space is available.

— For data and choices that are:

- Best represented textually.

- Not frequently selected.
- Not well known, easily learned, or remembered.
- Ordered in an unpredictable fashion.
- Frequently changed.
- Large in number.
- Fixed or variable in list length.

— When screen space or layout considerations make radio buttons or check boxes impractical.

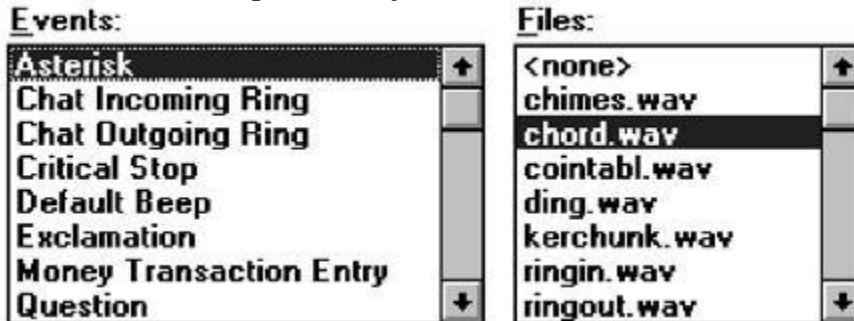


Fig : List Box

List Box General Guidelines

First, general list box guidelines will be presented. Then, specific guidelines for single and multiple-selection lists will be reviewed.

Selection Descriptions

- Clearly and meaningfully describe the choices available. Spell them out as fully as possible.
 - Graphical representations must clearly represent the options.
- Present in mixed case, using the sentence style structure.
- Left-align into columns.
- Not actual limit in size.
- Present all available alternatives.
- Require no more than 40 page-downs to search a list.
 - If more are required, provide a method for using search criteria or scoping the options.

Box Size

- Must be long enough to display 6 to 8 choices without requiring scrolling.
 - Exceptions:
 - If screen space constraints exist, the box may be reduced in size to display at least three items.
 - If it is the major control within a window, the box may be larger.
 - If more items are available than are visible in the box, provide vertical scrolling to display all items.
- Must be wide enough to display the longest possible choice.



— When box cannot be made wide enough to display the longest entry:

- Make it wide enough to permit entries to be distinguishable, or,
- Break the long entries with an ellipsis (...) in the middle, or,
- Provide horizontal scrolling.

Organization

- Order in a logical and meaningful way to permit easy browsing.

— Consider using separate controls to enable the user to change the sort order or filter items displayed in the list.

- If a particular choice is not available in the current context, omit it from the list.

— Exception: If it is important that the existence and unavailability of a particular list item be communicated, display the choice dimmed or grayed out instead of deleting it.

Layout and Separation

- Enclose the choices in a box with a solid border.

— The border should be the same color as the choice descriptions.

- Leave one blank character position between the choice descriptions and the left border.

- Leave one blank character position between the longest choice description in the list and the right border, if possible.

Captions

- Use mixed-case letters.

- The preferred position of the control caption is above the upper-left corner of the list box.

Destination:





Destination:



Alternately, the caption may be located to the left of the topmost choice description.

- Be consistent in caption style and orientation within a screen, and related screens.

Disabling

- When a list box is disabled, display its caption and show its entries as grayed out or dimmed.

Selection Method and Indication

■ Pointing:

— Highlight the selection choice in some visually distinctive way when the pointer or cursor is resting on it and the choice is available for selection.

■ Selection:

— Use a reverse video or reverse color bar to surround the choice description when it is selected.

— The cursor should be as wide as the box itself.



— Mark the selected choice in a distinguishing way.

■ Activation:

— Require the pressing of a command button when an item, or items, is selected.

Single-Selection List Boxes

■ Purpose:

— To permit selection of only one item from a large listing.

■ Design guidelines:

— Related text box

- If presented with an associated text box control:

— Position the list box below and as close as possible to the text box.

— The list box caption should be worded similarly to the text box caption.

— If the related text box and the list box are very close in proximity, the caption may be omitted from the list box.



— Use the same background color for the text box as is used in the list box.

— Defaults:

- When the list box is first displayed:

— Present the currently active choice highlighted or marked with a circle or diamond to the left of the entry.

— If a choice has not been previously selected, provide a default choice and display it in the same manner that is used in selecting it.

— If the list represents mixed values for a multiple selection, do not highlight an entry.

— Other:

- Follow other relevant list box guidelines.

Extended and Multiple-Selection List Boxes

- Purpose:

— To permit selection of more than one item in a long listing.

- Extended list box: Optimized for individual item or range selection.

- Multiple-selection list box: Optimized for independent item selection.

- Design guidelines:

— Selection indication:

- Mark the selected choice with an X or check mark to the left of the entry.



- Consider providing a *summary list box*.
- Position it to the right of the list box.
- Use the same colors for the summary list box as are used in the list box.

Groceries:

- Bread
- Cereal
- Dairy Foods
- Desserts
- Drinks
- Fruit
- Meat, Fish and Poultry
- Vegetables

Groceries Selected:

Bread
Dairy Foods
Meat, Fish and Poultry

— Provide command buttons to *Add* (one item) or *Add All* (items) to the summary list box, and *Remove* (one item) or *Remove All* (items) from the summary list box.

- Consider providing a display-only text control indicating how many choices have been selected.

— Position it justified upper-right above the list box.

Groceries: selected

- Bread
- Cereal
- Dairy Foods
- Desserts
- Drinks
- Fruit
- Meat, Fish and Poultry
- Vegetables

— Select All and Deselect All buttons

- Provide command buttons to accomplish fast *Select All* and *Deselect All* actions, when these actions must be frequently or quickly performed.

— Defaults:

- When the list box is first displayed:

— Display the currently active choices highlighted.

— Mark with an X or check mark to the left of the entry.

— If the list represents mixed values for a multiple selection, do not highlight an entry.

— Other:

- Follow other relevant list box guidelines.

List View Controls

■ Description:

— A special extended-selection list box that displays a collection of items, consisting of an icon and a label.

— The contents can be displayed in four different views:

- Large Icon: Items appear as a full-sized icon with a label below.
- Small Icon: Items appear as a small icon with label to the right.
- List: Items appear as a small icon with label to the right.

— Arrayed in a columnar, sorted layout.

- Report: Items appear as a line in a multicolumn format.

— Leftmost column includes icon and its label.

— Subsequent columns include application-specific information.

■ Purpose and usage:

— Where the representation of objects as icons is appropriate.

— To represent items with multiple columns of information.

4. Drop-down/Pop-up List Boxes

■ Description

— A single rectangular control that shows one item with a small button to the right side.

- The button provides a visual cue that an associated selection box is available but hidden.

— When the button is selected, a larger associated box appears, containing a list of choices from which one may be selected.

— Selections are made by using the mouse to point and click.

— Text may not be typed into the control.

■ Purpose:

— To select one item from a large list of mutually exclusive options when screen space is limited.

■ Advantages:

— Unlimited number of choices.

— Reminds users of available options.

— Conserves screen space.

■ Disadvantages:

— Requires an extra action to display the list of choices.

— When displayed, all choices may not always be visible, requiring scrolling.

— The list may be ordered in an unpredictable way, making it hard to find items.

■ Proper usage:

— For selecting values or setting attributes.

— For choices that are mutually exclusive (only one can be selected).

— Where screen space is limited.

— For data and choices that are:

- Best represented textually.
- Infrequently selected.
- Not well known, easily learned, or remembered.
- Ordered in a unpredictable fashion.
- Large in number.

- Variable or fixed in list length.
- Use drop-down/pop-up lists when:
 - Screen space or layout considerations make radio buttons or single-selection list boxes impractical.
 - The first, or displayed, item will be selected most of the time.
- Do not use a drop-down list if it important that all options be seen together.

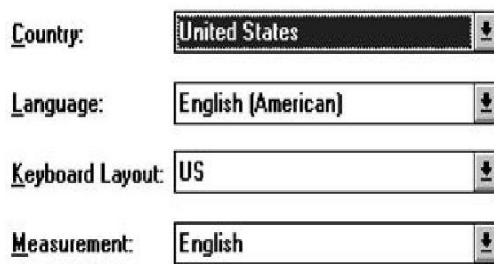


Fig: Drop-down list boxes.



Fig: Drop-down list box opened for Country.

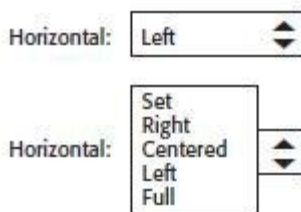


Fig : Pop-up list box, closed and opened.

Prompt Button

- Provide a visual cue that a box is hidden by including a downward pointing arrow, or other meaningful image, to the right side of the selection field.
- Position the button directly against, or within, the selection field.



Selection Descriptions

- Clearly and meaningfully describe the choices available. Spell them out as fully as possible.
- Graphical representations must clearly represent the options.
- Left-align them in columns.
- Display the descriptions using mixed-case letters.

List Size

- Not limited in size.
- Present all available alternatives.

Box Size

- Long enough to display 6 to 8 choices without scrolling.
- If more than eight choices are available, provide vertical scrolling to display all items.
- Wide enough to display the longest possible choice.

- When a box cannot be made wide enough to display the longest entry:
 - Make it wide enough to permit entries to be distinguishable, or,
 - Break long entries with ellipses (...) in the middle, or,
 - Provide horizontal scrolling.

Organization

- Order in a logical and meaningful way to permit easy browsing.
- If a particular choice is not available in the current context, omit it from the list.
 - Exception: If it is important that the existence and unavailability of a particular list item be communicated, display the choice dimmed or grayed out instead of deleting it.

Layout and Separation

- Enclose the choices in a box composed of a solid line border.
 - The border should be the same color as the choice descriptions.
 - Leave one blank character position between the choices and the left border.
 - Leave one blank character position between the longest choice description in the list and the right border, if possible.

Captions

- Display using mixed-case letters.
- Position the caption to the left of the box.
 - Alternately, it may be positioned left-justified above the box.

Defaults

- When the drop-down/pop-up listing is first presented, display the currently set value.
- If a choice has not been previously selected, provide a default choice.

Disabling

- When a drop-down/pop-up list box is disabled, display its caption and entries as disabled or dimmed.

Selection Method and Indication

- Pointing:
 - Highlight the selection choice in some visually distinctive way when the pointer or cursor is resting on it and the choice is available for selection.
- Activation:
 - Close the drop-down/pop-up list box when an item is selected.

5. Palettes

- Description:
 - A control consisting of a series of graphical alternatives. The choices themselves are descriptive, being composed of colors, patterns, or images.
 - In addition to being a standard screen control, a palette may also be presented on a pull-down or pop-up menu or a toolbar.
- Purpose:
 - To set one of a series of mutually exclusive options presented graphically or pictorially.
- Advantages:
 - Pictures aid comprehension.
 - Easy-to-compare choices.

— Usually consume less screen space than textual equivalents.

■ **Disadvantages:**

— A limited number of choices can be displayed.

— Difficult to organize for scanning efficiency.

— Requires skill and time to design meaningful and attractive graphical representations.

■ **Proper usage:**

— For setting attributes, properties, or values.

— For mutually exclusive choices (that is, only one can be selected).

— Where adequate screen space is available.

— Most useful for data and choices that are:

- Discrete.
- Frequently selected.
- Limited in number.
- Variable in number.
- Not easily remembered.
- Most easily understood when the alternatives may be seen together and compared to one another.
- Most meaningfully represented pictorially or by example.
- Can be clearly represented pictorially.
- Rarely changed in content.

— Do not use:

• Where the alternatives cannot be meaningfully and clearly represented pictorially.

• Where words are clearer than images.

• Where the choices are going to change.

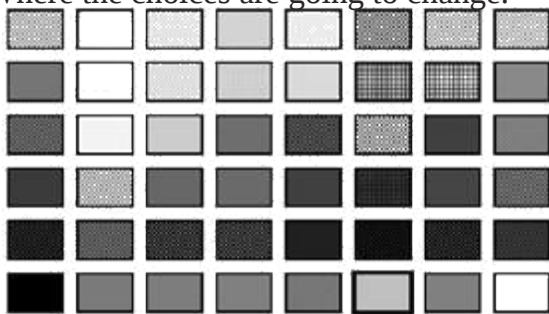


Fig : Palette

Graphical Representations

■ Provide meaningful, accurate, and clear illustrations or representations of choices.

■ Create images large enough to:

— Clearly illustrate the available alternatives.

— Permit ease in pointing and selecting.

■ Create images of equal size.

■ Always test illustrations before implementing them.

Size

■ Present all available alternatives within the limits imposed by:

— The size of the graphical representations.

— The screen display's capabilities.

Layout

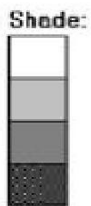
- Create boxes large enough to:
 - Effectively illustrate the available alternatives.
 - Permit ease in pointing and selecting.
- Create boxes of equal size.
- Position the boxes adjacent to, or butted up against, one another.
- A columnar orientation is the preferred manner.
- If vertical space on the screen is limited, orient the choices horizontally.

Organization

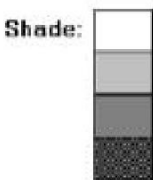
- Arrange palettes in expected or normal order.
 - For palettes arrayed top to bottom, begin ordering at the top.
 - For palettes arrayed left to right, begin ordering at the left.
- If an expected or normal order does not exist, arrange choices by frequency of occurrence, sequence of use, importance, or alphabetically (if textual).
- If, under certain conditions, a choice is not available, display it subdued or less brightly than the other choices.

Captions

- Provide a caption for each palette.
 - On screens containing only one palette, the screen title may serve as the caption.
- Display the caption fully spelled out using mixed-case letters.
- Columnar orientation:
 - The field caption may be positioned left-aligned above the palette.



- Alternately, the caption may be positioned to the left of the topmost alternative.



- Horizontal orientation:
 - The field caption may be positioned above the palette.



- Alternately, the caption may be positioned to the left of the alternatives.



Selection Method and Indication

- Pointing:
 - Highlight the choice in some visually distinctive way when the pointer or cursor is resting on it and the choice is available for selection.

■ Activation:

— When a choice is selected, distinguish it visually from the unselected choices by highlighting it in a manner different from when it is pointed at, or by placing a bold border around it.

■ Defaults:

— If a palette is displayed with a choice previously selected or a default choice, display the currently active choice in the manner used when it was selected.

Pointing. The selection target should be as large as possible in order to make it easy to move to. Highlight the selection choice in some visually distinctive way when the pointer or cursor is resting on it and the choice is available for selection.

Activation. When a choice is selected, distinguish it visually from the unselected choices by highlighting it in a manner different from when it is pointed at, or by placing a bolder border around it.

Defaults. If a palette is displayed with a choice previously selected or a default choice, display the currently active choice in the manner used when it was selected.

6. Briefly explain the different kinds of test. 10 - CO5 - L2

A test is a tool that is used to measure something. The “something” may be:

- Conformance with a requirement.
- Conformance with guidelines for good design.
- Identification of design problems.
- Ease of system learning.
- Retention of learning over time.
- Speed of task completion.
- Speed of need fulfillment.
- Error rates.
- Subjective user satisfaction.

A test is usually formal; it is created and applied intentionally and with a purpose. It is usually based upon some kind of criteria, an understanding of what a good result would be. Several testing techniques, at varying levels of sophistication and cost, are available to exercise the system.

Guidelines Review

■ Description:

— A review of the interface in terms of an organization’s standards and design guidelines.

■ Advantages:

— Can be performed by developers.

— Low cost.

— Can identify general and recurring problems

— Particularly useful for identifying screen design and layout problems.

■ Disadvantages:

— May miss severe conceptual, navigation, and operational problems.

Heuristic Evaluation

■ Description:

— A detailed evaluation of a system by interface design specialists to identify problems.

■ Advantages:

- Easy to do.
- Relatively low cost.
- Does not waste user's time.
- Can identify many problems.

■ Disadvantages:

- Evaluators must possess interface design expertise.
- Evaluators may not possess an adequate understanding of the tasks and user communities.
- Difficult to identify systemwide structural problems.
- Difficult to uncover missing exits and interface elements.
- Difficult to identify the most important problems among all problems uncovered.
- Does not provide any systematic way to generate solutions to the problems Uncovered.

■ Guidelines:

- Use 3 to 5 expert evaluators.
- Choose knowledgeable people:
 - Familiar with the project situation.
 - Possessing a long-term relationship with the organization.

Heuristic Evaluation Process

■ Preparing the session:

- Select evaluators.
- Prepare or assemble:
 - A project overview.
 - A checklist of heuristics.
- Provide briefing to evaluators to:
 - Review the purpose of the evaluation session.
 - Preview the evaluation process.
 - Present the project overview and heuristics.
 - Answer any evaluator questions.
 - Provide any special evaluator training that may be necessary.

■ Conducting the session:

- Have each evaluator review the system alone.
- The evaluator should:
 - Establish own process or method of reviewing the system.
- Provide usage scenarios, if necessary.
- Compare his or her findings with the list of usability principles.
- Identify any other relevant problems or issues.
- Make at least two passes through the system.
- Detected problems should be related to the specific heuristics they violate.
- Comments are recorded either:
 - By the evaluator.
 - By an observer.
- The observer may answer questions and provide hints.
- Restrict the length of the session to no more than 2 hours.

■ After the session:

- Hold a debriefing session including observers and design team members where:
 - Each evaluator presents problems detected and the heuristic it violated.
 - A composite problem listing is assembled.

- Design suggestions for improving the problematic aspects of the system are discussed.
- After the debriefing session:
 - Generate a composite list of violations as a ratings form.
 - Request evaluators to assign severity ratings to each violation.
 - Analyze results and establish a program to correct violations and deficiencies.

Heuristic Evaluation Effectiveness

Table 14.1 Severity Ratings in Heuristic Evaluation

0 = I don't agree that this is a usability problem at all.
1 = A cosmetic problem only. Need not be fixed unless extra time is available.
2 = A minor usability problem. Fixing should be given a low priority.
3 = A major usability problem. Important to fix and should be given a high priority.
4 = A usability catastrophe. Imperative to fix before the product can be released.

Table 14.2 Research-Based Set of Heuristics

1. Automate unwanted workload. <ul style="list-style-type: none"> • Free cognitive resources for high-level tasks. • Eliminate mental calculations, estimations, comparisons, and unnecessary thinking.
2. Reduce uncertainty. <ul style="list-style-type: none"> • Display data in a manner that is clear and obvious.
3. Fuse data. <ul style="list-style-type: none"> • Reduce cognitive load by bringing together lower-level data into a higher-level summation.
4. Present new information with meaningful aids to interpretation. <ul style="list-style-type: none"> • Use a familiar framework, making it easier to absorb. • Use everyday terms, metaphors, and so on.
5. Use names that are conceptually related to functions. <ul style="list-style-type: none"> • Context-dependent. • Attempt to improve recall and recognition.
6. Group data in consistently meaningful ways to decrease search time.
7. Limit data-driven tasks. <ul style="list-style-type: none"> • Reduce the time needed to assimilate raw data. • Make appropriate use of color and graphics.
8. Include in the displays only that information needed by a user at a given time. <ul style="list-style-type: none"> • Allow users to remain focused on critical data. • Exclude extraneous information that is not relevant to current tasks.

9. Provide multiple coding of data where appropriate.

 10. Practice judicious redundancy.
 - To resolve the conflict between heuristics 6 and 8.
-

From Gerhardt-Powals (1996).

Table 14.3 Possible Web Page Heuristics

-
1. Speak the user's language.
 - Use familiar words, phrases, and concepts.
 - Present information in a logical and natural order.

 2. Be consistent.
 - Indicate similar concepts through identical terminology and graphics.
 - Adhere to uniform conventions for layout, formatting, typefaces, labeling, and so on.

 3. Minimize the user's memory load.
 - Take advantage of recognition rather than recall.
 - Do not force users to remember key information across documents.

 4. Build flexible and efficient systems.
 - Accommodate a range of user sophistication and diverse user goals.
 - Provide instructions where useful.
 - Lay out screens so that frequently accessed information is easily found.

 5. Design aesthetic and minimalist systems.
 - Create visually pleasing displays.
 - Eliminate information that is irrelevant or distracting.

 6. Use chunking.
 - Write materials so that documents are short and contain only one topic.
 - Do not force the user to access multiple documents to complete a single thought.

 7. Provide progressive levels of detail.
 - Organize information hierarchically, with more general information appearing before more specific detail.
 - Encourage the user to delve as deeply as needed, but to stop whenever sufficient information has been obtained.

 8. Give navigational feedback.
 - Facilitate jumping between related topics.
 - Allow the user to determine his/her current position in the document structure.
 - Make it easy to return to an initial state.

 9. Don't lie to the user.
 - Eliminate erroneous or misleading links.
 - Do not refer to missing information.
-

Cognitive Walkthroughs

■ Description:

— Reviews of the interface in the context of tasks users perform.

■ Advantages:

— Allow a clear evaluation of the task flow early in the design process.

— Do not require a functioning prototype.

— Low cost.

— Can be used to evaluate alternate solutions.

— Can be performed by developers.

— More structured than a heuristic evaluation.

— Useful for assessing “exploratory learning.”

■ Disadvantages:

— Tedious to perform.

— May miss inconsistencies and general and recurring problems.

■ Guidelines:

— Needed to conduct the walkthrough are:

- A general description of proposed system users and what relevant knowledge they possess.

- A specific description of one or more core or representative tasks to be performed.

- A list of the correct actions required to complete each of the tasks.

— Review:

- Several core or representative tasks across a range of functions.

- Proposed tasks of particular concern.

— Developers must be assigned roles of:

- Scribe to record results of the action.

- Facilitator to keep the evaluation moving.

— Start with simple tasks.

— Don't get bogged down demanding

Think-Aloud Evaluations

■ Description:

— Users perform specific tasks while thinking out loud.

— Comments are recorded and analyzed.

■ Advantages:

— Utilizes actual representative tasks.

— Provides insights into the user's reasoning.

■ Disadvantages:

— May be difficult to get users to think out loud.

■ Guidelines:

— Develop:

- Several core or representative tasks.

- Tasks of particular concern.

— Limit session to 60 to 90 minutes.

Usability Test

■ Description:

- An interface evaluation under real-world or controlled conditions.
- Measures of performance are derived for specific tasks.
- Problems are identified.
- Advantages:
 - Utilizes an actual work environment.
 - Identifies serious or recurring problems.
- Disadvantages:
 - High cost for establishing facility.
 - Requires a test conductor with user interface expertise.
 - Emphasizes first-time system usage.
 - Poorly suited for detecting inconsistency problems.

Classic Experiments

- Description:
 - An objective comparison of two or more prototypes identical in all aspects except for one design issue.
- Advantages:
 - Objective measures of performance are obtained.
 - Subjective measures of user satisfaction may be obtained.
- Disadvantages:
 - Requires a rigorously controlled experiment to conduct the evaluation.
 - The experiment conductor must have expertise in setting up, running, and analyzing the data collected.
 - Requires creation of multiple prototypes.
- Guidelines:
 - State a clear and testable hypothesis.
 - Specify a small number of independent variables to be manipulated.
 - Carefully choose the measurements.
 - Judiciously select study participants and carefully or randomly assign them to groups.
 - Control for biasing factors.
 - Collect the data in a controlled environment.
 - Apply statistical methods to data analysis.
 - Resolve the problem that led to conducting the experiment.

Focus Groups

- Description:
 - A discussion with users about interface design prototypes or tasks.
- Advantages:
 - Useful for:
 - Obtaining initial user thoughts.
 - Trying out ideas.
 - Easy to set up and run.
 - Low cost.
- Disadvantages:
 - Requires experienced moderator.
 - Not useful for establishing:
 - How people really work.
 - What kinds of usability problems people have.
- Guidelines:
 - Restrict group size to 8 to 12.
 - Limit to 90 to 120 minutes in length.

— Record session for later detailed analysis.

Choosing a Testing Method

Unfortunately, there is little published detailed advice on which tests to use, when to use them, and which tests work best together. Beer, Anodenko, and Sears (1997) suggest a good pairing is cognitive walkthroughs followed by think-aloud evaluations. Using cognitive walkthroughs early in the development process permits the identification and correction of the most serious problems. Later, when a functioning prototype is available, the remaining problems can be identified using a think-aloud evaluation.

A substantial leap forward in the testing process would be the creation of a software tool simulating the behavior of people. This will allow usability tests to be performed without requiring real users to perform the necessary tasks. One such example is asystem, described by Hornof and Kieras (1997), called Executive Process Interactive Control (EPIC). Formal evaluations by a tool such as this have the potential to greatly improve the quality of many user interfaces.

In conclusion, each testing method has strengths and weaknesses. A well-rounded testing program will use a combination of some, or all, of these methods to guarantee the usability of its created product. It is very important that testing start as early as possible in the design process and, continue through all developmental stages.

7. Briefly explain the function and contents of menus.

10 - CO3 - L2

Functions of Menus

From the user's perspective, a menu can be used to perform several functions,

1. Navigation to a New Menu
2. Execute an Action or Procedure
3. Displaying Information
4. Data or Parameter Input

1. Navigation to a New Menu

Each user selection causes another menu in a hierarchical menu tree to be displayed. The purpose of each selection is to steer the user toward an objective or goal. Selection errors may lead the user down wrong paths, and cost time and, perhaps, aggravation, but these errors are nondestructive and usually undoable.

2. Execute an Action or Procedure

A user selection directs the computer to implement an action or perform a procedure. The action may be something like opening or closing a file, copying text, or sending a message. In some cases execution may only occur after a hierarchical menu tree is navigated. In other cases actions may be performed as successive hierarchical menus are encountered and traversed. Selection errors may or may not have serious consequences, depending upon the nature of the action. Accidental selection of critical irreversible actions must be prevented in interface design.

3. Displaying Information

The main purpose of selecting a menu choice may simply be to display information. The user may be searching for specific information in a database or browsing the Web. The user's focus is primarily on the information desired and less on the selection function. In many cases, information retrieval may occur only after a hierarchical menu tree is navigated. The content material and the user's interests will determine the paths followed. Users may spend considerable time and effort understanding and processing uncovered

information in order to evaluate subsequently displayed menu choices. Wrong turns in the process will again cost time and perhaps aggravation, but these errors are nondestructive and usually undoable.

4. Data or Parameter Input

Each selection specifies a piece of input data for the system or provides a parameter value. Data or values may be input on a single menu or spread over a hierarchy of menus. The user's focus is primarily on the information being provided and, again, less on the selection function. Selection errors can easily be corrected if detected by the system.

Content of Menus

A menu consists of four elements:

1. **Menu's context**
2. **Menu Title**
3. **Choice Descriptions**
4. **Completion Instructions**

1. Menu's Context

A menu's context provides information to keep the user oriented. This kind of information is critical in complex or hierarchical menu systems, where loss of position or disorientation can easily occur. Feedback is necessary that tells users where they are in a process, what their past choices were, and possibly how much farther they still have to navigate.

Verbal linkage, spatial linkage, or both may be used to provide navigation feedback.

Verbal linkage involves providing, on the current menu screen, a listing of choices made on previous menus that have led to this position. It also involves assuring the user that the displayed menu is the menu desired. Its title should mirror the option selected on the previous menu, and its content should reflect its title.

Spatial linkage can be accomplished by graphic methods. Each succeeding menu screen can be displayed overlapping the previous menu screen so a succession of choices can be seen in a single view. A sense of progress and distance can then be easily ascertained.

2. Menu Title

A menu's title provides the context for the current set of choices. The title must reflect the choice selected on the previously displayed menu.

3. Choice Descriptions

Choice descriptions are the alternatives available to the user. These descriptions can range from a mnemonic, numeric, or alphabetized listing of choices to single words or phrases to full sentences or more. The style chosen will reflect the experience of the user (novice or expert), the nature of the choices (well-learned alternatives or not), the nature of the selection mechanism (keyboard or mouse), and the nature of the system (business system application or Web page).

4. Completion Instructions

Completion instructions tell users how to indicate their choices. They may include the rationale for why the user is being asked to make this choice and the impact the choice will have on subsequent processes. Explicit instructions may be needed for first time or casual users of a system. Experienced users will find overly verbose instructions unnecessary. The needs of all system users, and the nature of the system, must again be considered in creating this kind of on-screen guidance.

8. a) What are website navigational problem? Explain

05 - CO3 - L2

Web Site Navigation Problems:

1. Technical issues:

Unlike a graphical system application, whose screens tend to flow in an orderly and predictable manner, a Web application is composed of pages, each of which can, theoretically, be linked to any other page in the application. The graphical application user normally begins a process at a prescribed starting point and proceeds sequentially until a process or task is finished. Web users can perform tasks or satisfy needs at will, easily moving between most screens in the application “spider web” in any order desired, and even jumping to other spider webs when the urge arises.

Another problem: Because of the rapidly evolving and expanding nature of the Web, Web sites also have a tendency to grow and grow. As more and more is added, what may have been initially a reasonable structure and menu scheme slowly dissolves into a confusing mass of listings and linked pages. The result is unrelated information that is presented in no particular order.

2. Usage problems. The two most serious user problems in Web navigation are the heavy mental loads imposed to use the Web and the feeling of spatial disorientation that often occurs. This problem may also occur in hierarchically structured graphical systems. The **cognitive or mental overhead** the user must expend in making decisions concerning which links to follow, or to abandon, can be overwhelming. Often, there are too many links presented on a page, many of whose meanings are not clear.

Feelings of **disorientation** are easily experienced when one becomes “lost in Web space.” Studies have shown that most people do not seem to become familiar with the layout of sites or develop useful mental models of their structure.

8.b) Explain the components of web navigation system.

05 - CO3 - L2

Components of a Web Navigation System

■ All navigation controls must:

- Make sense in the absence of site context.
- Be continually available.
- Be obvious and distinctive.
- Be consistent in appearance, function, and ordering.
- Possess a textual label or description.
- Offer multiple navigation paths.

- **Sensible.** All navigation controls, in the absence of site context, must make sense to the user. The user may have “lost” the context, or the page or Web site may have been entered from almost anywhere.
- **Available.** All navigational controls must be easy to access. If they are not readily available, the full advantages of hypermedia may not be achieved.
- **Obvious and distinctive.** A navigation link or control must look like a navigation control. Its appearance to the user must immediately suggest that it is an entity to be clicked or otherwise selected. This is accomplished through a tool’s appearance as well as its location. Non-obvious control choices lead to aimless and tedious page clicking and ultimately confusion and frustration. Conversely, do not make any other screen element look like a navigation tool if it is not one. The obviousness of a link is called its *affordance*. A control with high affordance will be quickly identified as a control. Techniques to create the necessary affordance and distinctiveness differ depending upon the kind of link. Guidelines enabling the various controls to achieve distinctiveness are described in the following control-specific sections.
- **Consistent.** Like all elements of the interface, navigation links, toolbars, and command buttons must be consistent in appearance and behavior.
- **Textual.** All navigation must have a textual label or description. Navigation using textual descriptions is much preferable to graphical-only navigation because the purpose and function of graphic images are often unclear. They also take longer to download. Textual links are also necessary for users who do not have graphics, or who have chosen not to display graphics.
- **Provide multiple navigation paths.** Offer multiple paths or ways to move around the Web. Provide structural components such as site maps, a table of contents, and indexes to go directly to a point of interest, provide content links to move around non sequentially, and provide command buttons, such as *Next* and *Previous*, to move sequentially.

