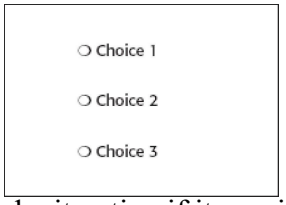
MODULE 3

Develop System Menus and Navigation Schemes

Structures of Menus

Single Menus

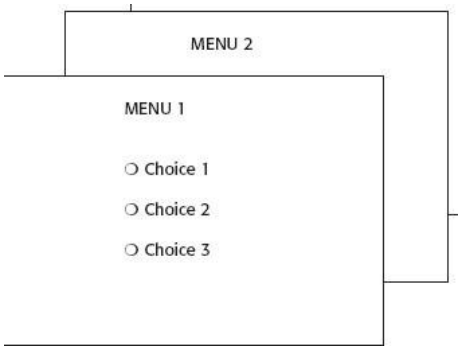
- In this simplest form of menu, a single screen or window is presented to seek the user's input or request an action to be performed



- 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. The menu will then be represented to the user with a message requesting reentry of valid data.

Sequential Linear Menus

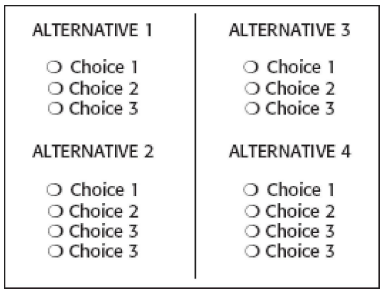
- Sequential linear menus are presented on a series of screens possessing only one path.
- The menu screens are presented in a preset order, and, generally, their objective is for specifying parameters or for entering data.



- Sequential path menus have several shortcomings. A long sequence may become tedious as menu after menu is presented.

Simultaneous Menus

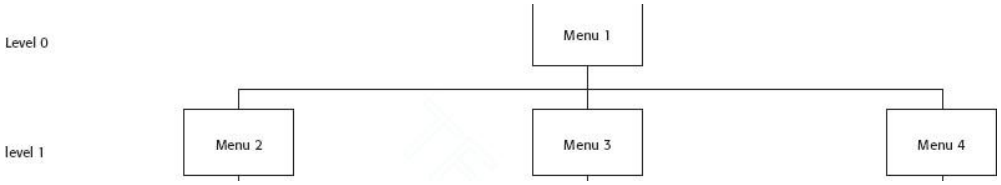
- Instead of being presented on separate screens, all menu options are available simultaneously.



- 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.
- Presenting many menu dependencies and relationships on a screen, especially if poorly indicated, can also be very confusing

Hierarchical Menus

- 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.
- Common examples of hierarchical design today are found in menu bars with their associated pull-downs

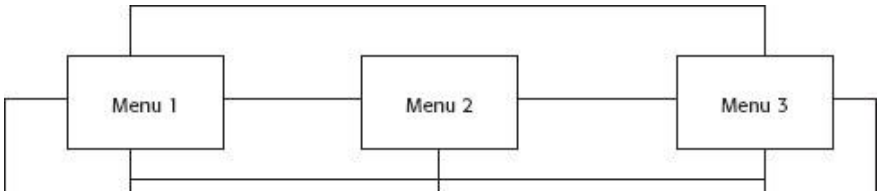


- A disadvantage of a hierarchical scheme is that the defined branching order may not fit the users conception of the task flow.
- If users are not familiar with the hierarchical menu, or are unable to predict what suboptions lie below
- a particular choice, they may go down wrong paths and find it necessary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

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.

- A connected menu system may be cyclical, with movement permitted in either direction between menus, or acyclical, with movement permitted in only one direction. These menus also vary in connectivity, the extent to which menus are linked by multiple paths.



- 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,

Event-Trapping Menus

- Event Trapping menus provide an ever-present background of control over the F

Functions of Menus

- a menu can be used to perform several functions, to navigate to a new menu, to execute an action or procedure, to display information, or to input data or parameters

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.

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.
- Accidental selection of critical irreversible actions must be prevented in interface design.

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 content material and the user's interests will determine the paths followed.
- The user's focus is primarily on the information desired and less on the selection function. Wrong turns in the process will again cost time and perhaps aggravation, but these errors are nondestructive and usually undoable.

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.

Content of Menus

- A menu consists of four elements, its context, its title, its choice descriptions, and its completion instructions.

Menu Context

- A menu's context provides information to keep the user oriented.
- 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
- 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.

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.

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.

Completion Instructions

- Completion instructions tell users how to indicate their choices
- 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.

Formatting of Menus

- What follows is a series of guidelines for formatting menus.

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.

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.

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.

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.
- In general, the more choices contained on a menu (greater breadth), the less will be its depth; the fewer choices on a menu (less breadth), the greater will be its depth.
- The advantages of a menu system with greater breadth and less depth are:
    - Fewer steps and shorter time to reach one's objective.
    - Fewer opportunities to wander down wrong paths.
    - Easier learning by allowing the user to see relationships of menu items.
- A broad menu's disadvantages are:
    - A more crowded menu that may reduce the clarity of the wording of choices.
    - Increased likelihood of confusing similar choices because they are seen together.
- The advantages of greater depth are:
    - Less crowding on the menu.
    - Fewer choices to be scanned.
    - Easier hiding of inappropriate choices.
    - Less likelihood of confusing similar choices since there is less likelihood that they will be seen together.
- Greater depth disadvantages are:
    - More steps and longer time to reach one's objective.
    - More difficulties in learning since relationships between elements cannot always be seen.
    - More difficulties in predicting what lies below, resulting in increased likelihood of going down wrong paths or getting lost.
    - Higher error rates.

Complexity

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

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.

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.
- A meaningful ordering is necessary to:
  - Facilitate search for an item.
  - Provide information about the structure and relationships among items.
  - Provide compatibility with the user's mental model of the item structure.
  - Enhance the user's ability to anticipate a choice's location.

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.

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.

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.

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.

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.

Menu Instructions

- For novice or inexperienced users, provide menu completion instructions.

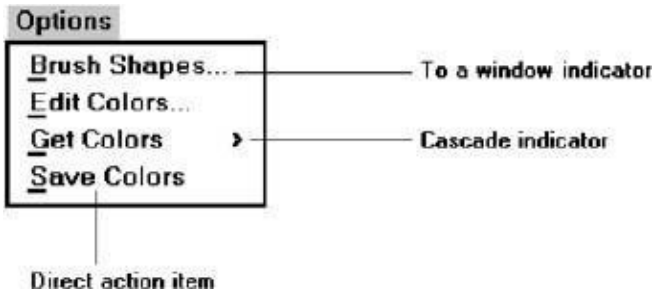
— Place the instructions in a position just preceding the part, or parts, of the menu to which they apply.
    - Left-justify the instruction and indent the related menu choice descriptions a minimum of three spaces to the right.
    - Leave a space line, if possible, between the instructions and the 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.

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.

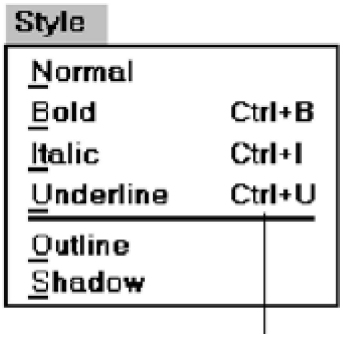


Keyboard Equivalents

- 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.

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



Selecting Menu Choices

Initial Cursor Positioning

- If one option has a significantly higher probability of selection, position the cursor at that option.
- If repeating the previously selected option has the highest probability of occurrence, position the cursor at this option.
- If no option has a significantly higher probability of selection, position the cursor at the first option.

Choice Selection

- Pointers:
  — Select the choice by directly pointing at it with a mechanical device such as amouse or trackball pointer, or light pen, or pointing with one's finger.
  — Visually indicate:
    • Which options can be selected.
    • When the option is directly under the pointer and can be selected.
  — Visually distinguish single- and multiple-choice menu alternatives.
  — If pointing with a mechanical device is the selection method used:
    • The selectable target area should be at least twice the size of the active area of the pointing device or displayed pointer. In no case should it be less than 6 millimeters square.
    • Adequate separation must be provided between adjacent target areas.
  — If finger pointing is the selection method used:
    • The touch area must be a minimum of 20 to 30 millimeters square.
    • The touch area must encompass the entire caption plus one character around it.
- Keyboard:
  — If moving the cursor to a menu choice:
    • The up and down arrow keys should move the cursor up or downvertically oriented menu options.
    • The left and right cursor keys should move the cursor left or right between horizontally oriented menu options.
  — If keying a choice identifier value within an entry field:
    • Locate the entry field at the bottom of the last choice in the array of choices.
    • Uppercase, lowercase, and mixed -case typed entries should all be acceptable.
- Selection/execution:
  — Provide separate actions for selecting and executing menu options.
  — Indicate the selected choice through either:
    • Highlighting it with a distinctive display technique.
    • Modifying the shape of the cursor.
  — Permit unselecting choice before execution.
    • If a menu is multiple choice, permit all options to be selected before execution.
- Combining techniques:
  — Permit alternative selection techniques, to provide flexibility.

Defaults

- Provide a default whenever possible.
- Display as bold text.

Unavailable Choices

- Unavailable choices should be dimmed or “grayed out.”
- Do not add or remove items from a menu unless the user takes explicit action to add or remove them through the application.

Mark Toggles or Settings

- Purpose:
  — Use to designate that an item or feature is active or inactive over a relatively long period of time.
  — Use to provide a reminder that an item or feature is active or inactive.
- Guidelines:
  — Position the indicator directly to the left of the option.
  — For situations where several nonexclusive choices may be selected, consider including one alternative that deselects all the items and reverts the state to the "normal" condition.

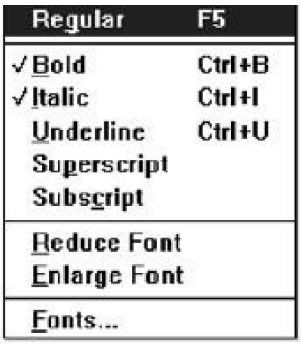


Figure 4.11 Mark toggles.

Toggled Menu Items

- Purpose:
  — Use to designate two opposite commands that are accessed frequently.
  — Use when the menu item displayed will clearly indicate that the opposite condition currently exists.
- Guidelines:
  — Provide a meaningful, fully spelled-out description of the action.
  — Begin with a verb that unambiguously represents the outcome of the command.
  — Use mixed-case letters, with the first letter of each word capitalized.

Kinds of Graphical Menus

- 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.

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Menu Bar

- Proper usage:
  — To identify and provide access to common and frequently used application actions that takes place in a wide variety of different windows.
  — A menu bar choice by itself should not initiate an action.
- 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.

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.

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.

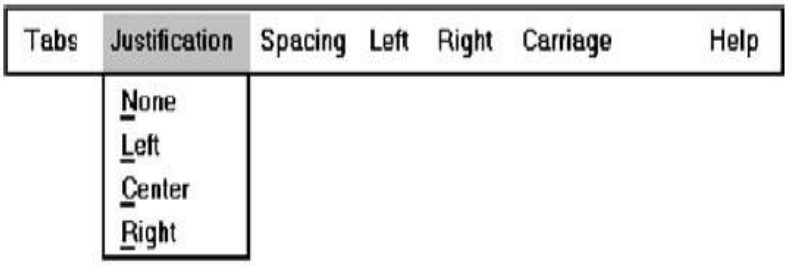
- Pointer:
  — Use reverse video, or reverse color, to highlight the selected choice.

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.
  - The 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.
  - The may obscure the screen working area.



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 adiamond 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.

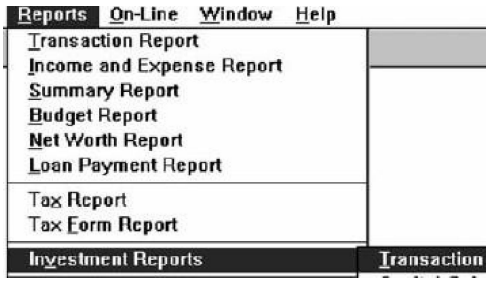
Selection Cursor

- 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.

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.
- 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 pull downs 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.

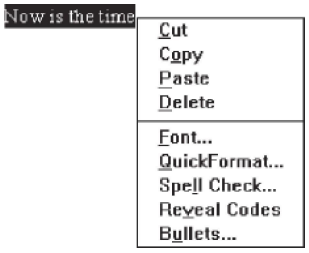
Other Guidelines

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

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.

Tear-off Menus

- It may also be called a pushpin, detachable, or roll-up menu. Its purpose is to present alternatives or choices to the screen user that are needed infrequently at some times
- 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.

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.

Pie Menus

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

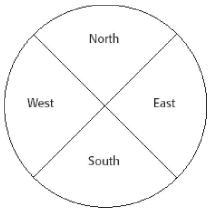


Table 4.4 Menu Proper Usage Summary

Menu Bar	To identify and provide access to: • 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: • 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: • 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: • 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.

Default Menu

Items 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)

Functions Not Represented by Default Items

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 commands, use keyboard accelerators provided by the tool set.

Navigating Menus

Navigation, and an efficient navigational structure, is the most important element in system usability. A simple and clear navigational structure is the backbone upon which all system features are draped. A system's
organizational structure and its navigational tools, including elements such as menus, links, toolbars, and command buttons influence the system's navigational ease of use.

Web Site Navigation Problems

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.

Web users, especially novices, often do not recognize where the browser ends and the Web site application
begins.

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.

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.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."

Navigation Goals

Control

■ For multilevel menus, provide one simple action to:
— Return to the next higher-level menu.

— Return to the main menu.
■ Provide multiple pathways through a menu hierarchy whenever possible.

Menu Navigation Aids

■ To aid menu navigation and learning, provide an easily accessible:
— Menu map or overview of the menu hierarchy.
— A "look ahead" at the next level of choices, alternatives that will be presented when a currently viewed choice is selected.
— Navigation history.

Menu maps : The value of a menu map in reducing disorientation. In these studies, providing a graphic representation of the menu structure in map form, either in hard copy or online, resulted in fewer errors or wrong choices, faster navigation, and greater user satisfaction when compared to providing no guides or simply providing indexes or narrative descriptions of the menu structure.

Look-aheads :
Menu navigation and learning will be assisted if a person is able to browse the next level of choices before the currently displayed choice is selected.

Navigation history :
It has been found that being able to view, on the screen, the path one is following improves learning and performance, and reduces feelings of disorientation. Provide a navigation history that summarizes the menu choices made leading to the currently displayed menu or screen.

Web Site Organization

■ Divide content into logical fragments, units, or chunks.
■ Establish a hierarchy of generality or importance.
■ Structure the relationships among content fragments, units, or chunks.
— Establish global or site-wide navigation requirements.
■ Create a well-balanced hierarchical tree.
— Restrict to two levels requiring no more than two clicks to reach deepest content, whenever possible.

Logical fragments, units, or chunks. Because of limitations in short-term human memory, smaller discrete fragments or chunks of information are often easier to navigate than long, undifferentiated units. The concept employed in Web site design, in reaction to this human memory frailty, is called *hypertext*.

Hypertext is a nonlinear way of organizing information based upon the following principles:
A large body of information exists that can be organized into fragments.
The fragments relate to one another.
The user needs only a small fraction of the fragments at any one time.

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.

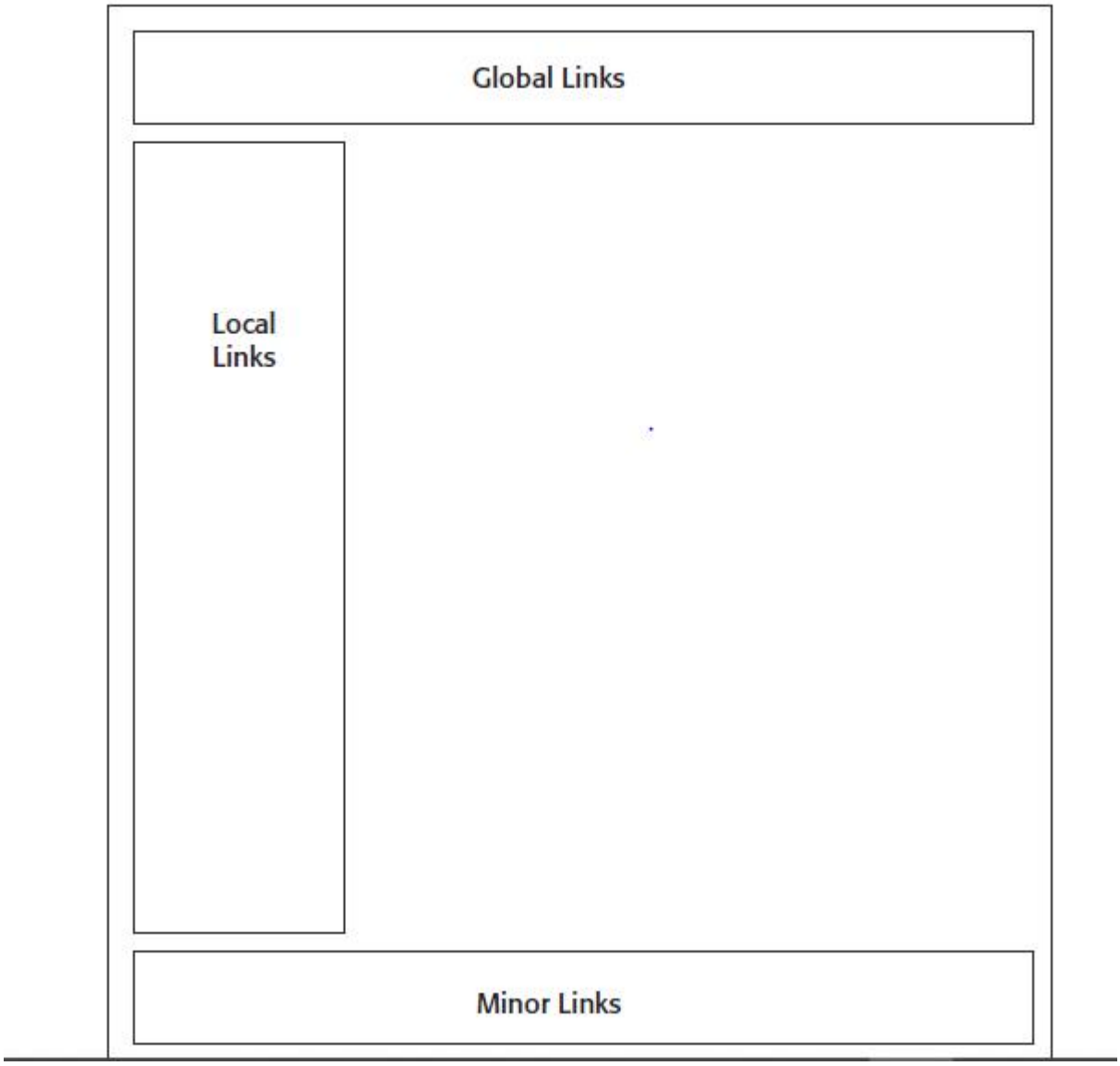
Consistent. Like all elements of the interface, navigation links, toolbars, and command buttons must be consistent in appearance and behavior.

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 nonsequentially, and provide command buttons, such as *Next* and *Previous,* to move sequentially.

Web Site Navigation Bars

■ Provide a global navigation bar at the top of each page.
■ Provide a local category or topical links navigation bar on the left side of a page.
■ Place minor illustrative, parenthetical, or footnote links at the end of the page.
■ For long pages, provide a navigation bar repeating important global or local links at the page bottom.



Textual Phrases

■ Provide a mix of textual phrase links:
— In explicit menus.
— Embedded within page text.

Graphical Images or Icons

Graphical images or icons may appear in an array in the form of a navigation bar, or be individually located at relevant points in a page.

Command Buttons

Command buttons may appear in an array in the form of a navigation bar, or be individually located at relevant points in a page.

Other Web Site Navigation Elements

Provide:
— An executive summary that provides a preview of the site and contains links to all major concepts.
— A site map illustrating the site's hierarchical structure and the relationships of components.
— Both global and local maps.
— An alphabetized site index.
— A table of contents.
■ Allow accessibility from any point in the Web site.

Historical Trails
■ Provide:
— Breadcrumb Trails.
• Locate at the top of the page below the navigation links.
— History Lists.
— History Trees.
— Footprints.
— Bookmarks.

Historical navigation aids try to show the user's position in an information space by showing where they have come from, or where they have been. A *breadcrumb trail* in a hierarchical Web site structure is a sequential textual listing of pages traversed from the parent page to the page currently being displayed.

A trail, illustrated in Figure 4.18, is also a series of links that permit the user to go back to any page in the
sequence with one click. At this moment no standard exists for how to separate the page names in a trail. Symbols used include an arrow (->), a colon (:), a greater than sign (>), and a slash (/).

Figure 4.18 Breadcrumb trails.

A *history list* is a sequential textual listing of sites or pages visited over a specific time period, a session, a day, or some other time period. A *history tree* is an overview map of a site's structure with pages already visited marked by an indicator such as a plus sign, check mark, or asterisk. The markings serve as *footprints*, guiding the user back to pages of interest, and/or signaling

which have already been seen and may no longer be of interest. A *bookmark* is similar to a history list except that it is designated by the user to mark locations of continuing interest.

Search Facility
■ Provide a search facility.

Web Site Navigation Guidelines

Scrolling

■ Do not require scrolling of navigation-only pages.
■ Minimize the need for scrolling to view all links on pages containing content.
■ Never require horizontal scrolling.

Number of Links
■ Every page should contain at least one link.
■ Be conservative in the total number of links presented on a screen:
— Without logical groupings of elements, limit links to 4 to 8.
— With logical groupings of elements, limit links to 18 to 24.
■ Restrict embedded links to those most important, pertinent, and interesting.
— Place less relevant links in a listing.

Presenting Links
■ Link text:
— Underline all link text, including that:
• Embedded in page content.
• Contained in explicit menu listings.
• Contained in headings.
• Used as graphical labels.
— Distinguish between unselected/unvisited links and selected/visited links.
• Make unselected/unvisited links blue.
• Make selected/visited links purple.
■ Kinds of links:
— Distinguish links leading to different Web destinations through a differentiating symbol:
• Precede links to content within the same page with a pound sign (#).
– For links moving downward in the page, use: #The principles of design.
– For links moving upward in the page use: #^ Principles introduction.
• Precede links to external or foreign sites with another unique symbol such as an asterisk (*): * Additional information.
• Do not precede links to other site pages with any symbol:
– More principles of design.
— Also distinguish links leading to different Web destinations by presenting them in consistent locations.
■ Graphical links:
— Distinguish graphical links from decorative graphics through:
• Underlining graphical text labels.
■ Links in toolbars:
— Distinguish links contained in toolbars through:

• Presenting in consistent locations.
• Using different colored backgrounds.

Table 4.3 Links to Avoid (or Links to Aggravate the User)

Orphan Link	A link leading to a page that does not possess any navigation options.
Boomerang Link	A links that returns to the exact same spot.
Gotcha Link	A link that leads to little or no content.
False Alarm Link	A warning to not follow a link you really should follow.
Mystery Link	A link that does not look like a link because it is not properly labeled or does not possess a raised appearance.
Link-mania	Linking every time the same keyword is mentioned in a page.
Link-drunk	A long succession of links that must be followed to reach the destination.
Stairmaster Links	No *Next* link in a series of pages, necessitating continual return to a table of contents.
Gratuitous Link	A link to other sites to return a favor.
Missed opportunities	For useful links.

Kinds of Links

■ Within a page:
— For long pages, include links to internal page content.
■ Within a Web site:
— On all pages include links to:
• The Web site home page.
• Global Web site features.
• Other main pages, navigation points, or categories.
• The likely Web site starting point.
• Main pages with links to the page.
— On sequential pages, include links to the:
• Next page.
• Previous page.
— Also consider including links to:
• Places of related interest.
• Background or explanatory information.
• Supplemental information.
• New or changed content.
• Web site Quit or Exit.
■ External links:
— Most appropriate for informational sites.
— Provide links to relevant information on other Web sites.

• Related content.
• Reference information.
• Background reading.
— Place external links on a separate page.
— Provide an indication when a link goes outside the current site.

Maintaining a Sense of Place

Design Characteristics That Aid in Maintaining a Sense of Place

■ To assist maintaining a sense of place within a Web site:
— Provide a simple hierarchical tree structure.
— Provide ease of movement to important site features.
■ To assist maintaining a sense of place across multiple Web sites:
— Provide consistency in all Web site design elements, including:
• Graphical identity schemes.
• Component presentation.
• Component organization and location.

Design Elements That Aid in Maintaining a Sense of Place

■ Provide a home base.
■ Use recurring navigation tools on all pages.
■ Use recurring elements on all pages.
■ Provide page numbers for sequential pages.
■ Provide ongoing feedback that shows where users are in a site.
■ Provide on-demand aids that illustrate the user's location within a site.
— Site maps.
— Table of contents.
■ Provide clearly written link labels.