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from the notebooks of John Artim

Usability and User Interface

Basic User Interface Design Patterns

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- A Microsoft® PowerPoint file of this notebook is available by request. Send an email to John Artim (jartim@uistyle.com) requesting the Use Case Basics Notebook PowerPoint file in the Use Cases and Software Requirements Specification series. Please include your name, affiliation, and your intended use of the material.



Goals of this Notebook

- This notebook introduces the most commonly used UI design patterns in practice today.
- Use of these patterns is not discussed in this notebook.
- The patterns are limited to those needed for high-level user interface design and do not include user interface architecture or user interface mechanism patterns.



Background for this Notebook

- You need some background in use case modeling for requirements specification
- And the UI background discussion from the notebook, *User Interface and Use Case Authoring*

Pattern Template

- Task Characteristics

A list of task characteristics each of which should be found in the scenarios of the use case in question

- Examples of Use

Two or three examples of common use of the pattern

Basic Pattern Set

- Form
 - Map
 - Notebook
 - Table
 - Tree
- Form Elements
 - Checkbox
 - Command Button
 - Drop-Down Text Box
 - List Box
 - Menu and Menu Item
 - Picture Area
 - Radio Button Set
 - Static Label
 - Text Area
 - Text Box

Form

- Task completion requires that one to many attributes of an entity or related entities must be displayed or manipulated.
- The relationships among the attributes and entities aids in task completion.
- These relationships among attributes and entities can be usefully depicted in a two-dimensional display space.
 - That is, the relationships can be implied by how the presentation of entities and attributes is laid-out in a two-dimensional area.
- If the relationships are not usefully depicted in only two dimensions consider using the notebook pattern with the form pattern.
- Note: a Form contains Form Elements including other UI patterns such as Tree or Table.
- Examples are pervasive in computing:
 - The contents of many of the notebook tabs in Microsoft Windows® properties windows
 - Order entry forms on the web for purchasing goods
 - Property dialogs on the Apple Macintosh®

Form Element—Checkbox

- The Task requires the display and possibly manipulation of a binary-state property.
- The binary-state property can be identified by a one or two word text label.
- **Note:** A binary-state property is a property that can be on or off and which is typically independent of other properties.
- Examples include
 - Property dialogs in most operating systems
 - Web-based order entry systems featuring binary choices such as, “I want mailings from Acme Mail Order.” where a check means you do
 - In text-processing applications, font properties such as *bolding* and *italicization* are often selected by checkbox

Form Element—Command Button

- When the task—represented by a form—frequently requires activation of an action to complete that task.
- When a task—represented by a form—occasionally requires activation of an action to complete that task or as a consequence of the task where rapid time-to-completion is important.
- Examples:
 - The “Back” button on every web browser design
 - The “Save” button on most windowing systems’ *Save As* dialogs
 - The “OK” button selecting normal continuation on most windowing systems

Form Element—List Box

- Task completion requires a one-of-N selection—that is, single selection from a set of N choices.
- Or task completion requires an M-of-N selection—that is, multiple selection from a set of N choices.
- The choice itself requires display of only one text Attribute.
- For M-of-N selection, the entire set of N choices or at least a significant number of these choices can be seen in a single glance with the available display space.
 - Because of space considerations this constraint is frequently violated. The larger the choice set and the more spread out the selected items are throughout the larger choice set the more significant this concern becomes.
- Examples:
 - Some text-processing applications where font choice is substantial use a list box for font choice so that many font names can be seen at one glance
 - In Microsoft WindowsXP® the Windows Explorer *Choose Details* dialog features a multiple-selection list of attributes to display in *Details* views

Form Element—Menu and Menu Item

- Many actions must be displayed and possibly activated to facilitate task completion.
- The actions are most efficiently accessed when grouped into related categories.
- Example:
 - All modern operating systems feature window-based graphical user interfaces with menus

Form Element—Picture Area

- The task requires that a graphic attribute be displayed.
- Examples:
 - Microsoft Windows® Explorer displays graphic images as thumbnails (small-size images)
 - Slide Viewer applications
 - Fax Viewer applications

Form Element—Radio Button Set

- The task requires setting the value of an attribute specified by an enumeration.
- The enumeration features a fixed and limited number of valid values.
 - Ideally no more than seven or so.
 - In practice eight to twelve can be accommodated, but often usability suffers.
- For best results, the enumeration values can be specified by a one or two word text label of reasonable length or by a small, iconic graphic.
- Examples:
 - Choosing the type of shipping service from on on-line catalog vendor
 - Choosing the style of paragraph justification
 - Typically left, center, or right
 - Choosing the style of capitalization to use in Microsoft Office's® Change Case dialog

Form Elements—Static Label

- Identifying the function of a chunk of UI or identifying the attribute or entity a chunk of UI represents facilitates task completion.
- The function of a chunk of UI or the attribute or entity a chunk of UI represents can most compactly be represented by a text label.
- Examples are pervasive across all windowing platforms:
 - Field labels identifying, for example, first and last name in an online catalog ordering system
 - Names of properties represented by text boxes in property dialogs

Form Element—Text Area

- A text attribute must be displayed and optionally manipulated to facilitate task completion.
- The text attribute is not limited in size.
- For example:
 - The comment field in an online catalog ordering system
 - In Microsoft WindowsXP® the Windows Explorer *Properties* dialog on individual files has a *Summary* tab where text areas are available on demand for editable fields.

Form Element—Text Box

- A text attribute must be displayed and optionally manipulated to facilitate task completion.
- The text attribute is of limited size.
 - In practice, this means that a single-line display of the longest value of the text attribute fits within the available display space.
 - Horizontal scrolling can be used to extend limited display space but is not recommended. Horizontal scrolling frequently causes usability difficulties.
- Examples are pervasive in all windowing systems.

Drop-Down Text Box

- A text attribute must be displayed.
 - The text attribute has a fixed set of valid values.
 - The task requires selection of one of these valid values.
 - Ideally, the set of valid values is no more than seven or so long.
 - In practice, the set of valid values can be displayed in the drop-down list with all valid values in view.
- Note:** drop-down text boxes are often used to choose country or state/province choices. This is often not good practice as these lists are very long though it does usually work for users.
- For example:
 - Font selection in text-processing applications
 - Color palette selection in graphic editors
 - Phone number selection in the Connection dialog in Microsoft Windows®
 - Windows lets you set up multiple numbers for a single ISP

Map

- A task requires representation of the physical relationship of
 - Points in space to each other or to routes through that space.
 - Regions within the space to each other.
- Maps are increasingly used in graphical user interfaces, for example:
 - Mapit® and similar web services provide street maps for urban navigation
 - Map applications providing topographic maps of popular hiking areas are also readily available
 - Many cell phone providers have interactive maps showing their areas of coverage

Note: There are many kinds of maps. They all share in common the representation of spatial relationships.

Notebook

- Task completion involves browsing or manipulating multiple categories.
 - Categories can be :
 - Entities in the domain.
 - Tasks in the domain.
 - Anything else relevant to the task at hand.
 - Task completion is facilitated by visibility of all categories at once.
- Note:** This pattern is often used when display space is at a premium. Take care if the categories are not immediately obvious to the user and based on the nature of the task at hand.
- Note:** Think of the tabs of a notebook each as a separate Form.
- For example,
 - The Notebook pattern, with different graphics, is frequently used as a way of dividing a corporate web site into digestible chunks
 - Adobe applications such as Illustrator® use notebooks to partition illustration control areas by category so that less display space is taken from the primary task, displaying a drawing
 - Spreadsheets, such as Microsoft Excel® use a notebook to support multiple sheets in one file—the notebook tabs each represent a sheet

Table

- Task completion involves searching a list of objects for one or more entity instances based on one or more text, graphic, or enumeration attributes.
 - Entity instances should be identified by one of the text attributes.
 - If one of the text attributes does not serve as an instance name unique within the scope of the list of entities shown in the table, cognitive load on the user increases as they manipulate the list items.
 - Entity type can be shown as a graphic.
 - If a graphic attribute reflecting entity type is included as a column in the table, the user perception of the rows as entities is increased.
- Note:** This does not include a generalized Table-of-Cells as in a spreadsheet.
- Tables of instances are now frequently used, for example:
 - In Microsoft Windows®, the *Details* view in *Windows Explorer* is a table-based view—note that an icon shows the type of each item and items can be dragged in or out of this view
 - Apple Macintosh® pioneered the commercial use of table in its filesystem views
 - Google® search results are provided in a modified table view, though without provision for direct manipulation

Tree

- The task space is a whole-part structure—or its equivalent—from a domain network rooted on a single entity.
 - In the whole-part structure each node in the network decomposes into child nodes by traversing one step in the whole-part hierarchy.
- Task completion involves search or exploration through successive steps in the hierarchy.
- Or task completion involves comparison of two or more paths through the hierarchy.
- Examples:
 - File system explorers as featured on Microsoft Windows®, Apple Macintosh®, various Linux window managers, and other operating systems
 - Composed component views in various integrated development environments such as Microsoft Visual Basic®