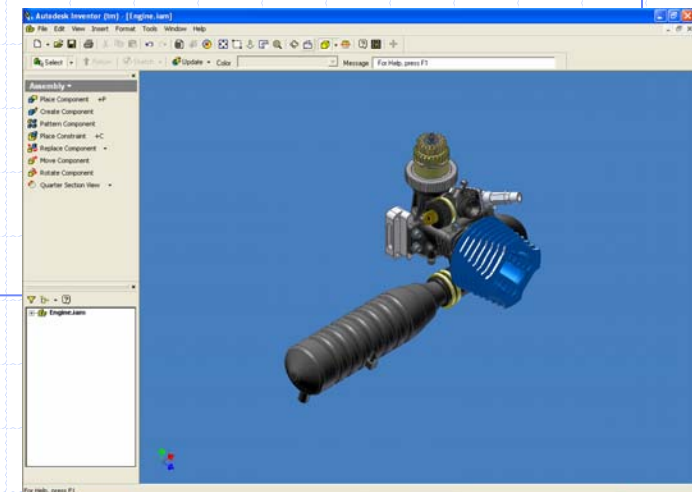
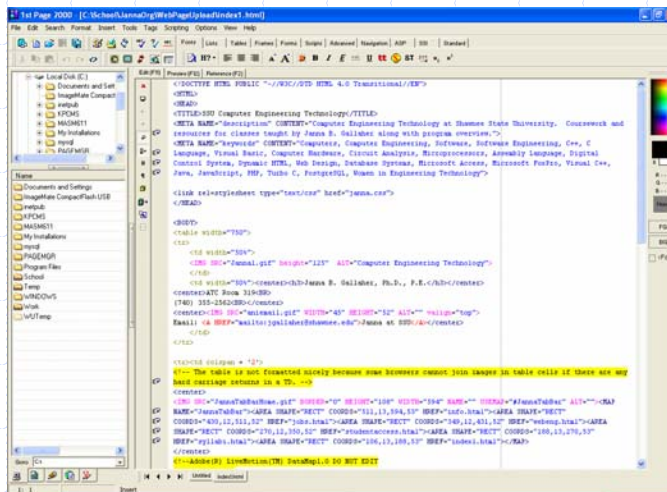


# The User Interface Design Process

## Step 5: Select the Proper Kinds of Windows



# Introduction

A window is an area of the screen, usually rectangular in shape, defined by a border that contains a particular view of some area of the computer or some portion of a person's dialog with the computer.

## ◆ This step addresses:

- A window's characteristics.
- A window's components.
- A window's presentation styles.
- The types of windows available.
- Organizing window system functions.
- A window's operations.
- Web system frames and pop-up windows.





# The Attraction of Windows

- ◆ Presentation of Different Levels of Information
- ◆ Presentation of Multiple Kinds of Information
- ◆ Sequential Presentation of Levels or Kinds of Information
- ◆ Access to Different Sources of Information
- ◆ Combining Multiple Sources of Information
- ◆ Performing More Than One Task
- ◆ Reminding
- ◆ Monitoring
- ◆ Multiple Representations of the Same Task

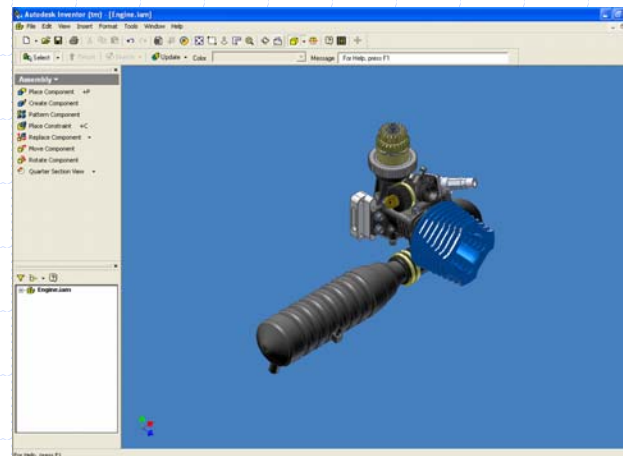
# Constraints in Window System Design

- ◆ Historical Considerations
- ◆ Hardware Limitations
- ◆ Human Limitations
- ◆ Other Limitations



# Components of a Window

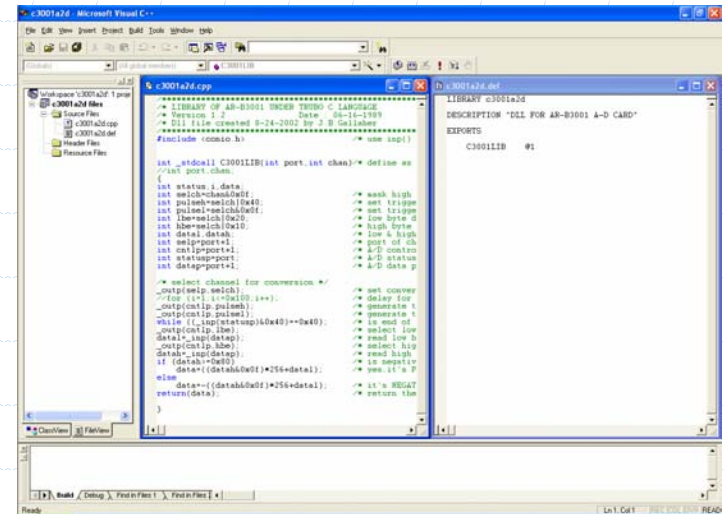
- ◆ Frame
- ◆ Title Bar
- ◆ Title Bar Icon
- ◆ Window Sizing Buttons
- ◆ What's This? Button
- ◆ Menu Bar
- ◆ Status Bar
- ◆ Scroll Bars
- ◆ Split Box
- ◆ Toolbar
- ◆ Command Area
- ◆ Size Grip
- ◆ Work Area



# Window Presentation Styles: Tiled Windows

## Advantages:

- The system usually allocates and positions windows for the user.
- Open windows are always visible.
- Every window is always completely visible
- They are perceived as less complex than overlapping windows.
- They are easier for novice people to learn and use
- They yield better user performance for tasks where the data requires little window manipulation.



(Continued on Next Page)

# Window Presentation Styles: Tiled Windows (Continued)

## ◆ Disadvantages:

- Only a limited number can be displayed.
- As windows are opened, existing windows change size.
- As windows change size, the movement can be disconcerting.
- As the number of displayed windows increases, each window can get very tiny.
- Changes in sizes and locations are difficult to predict.
- Configuration of windows may not meet the user's needs.
- They are perceived as crowded because window borders are flush against one another and they fill up the whole screen.
- They permit less user control because the system actively manages the windows.

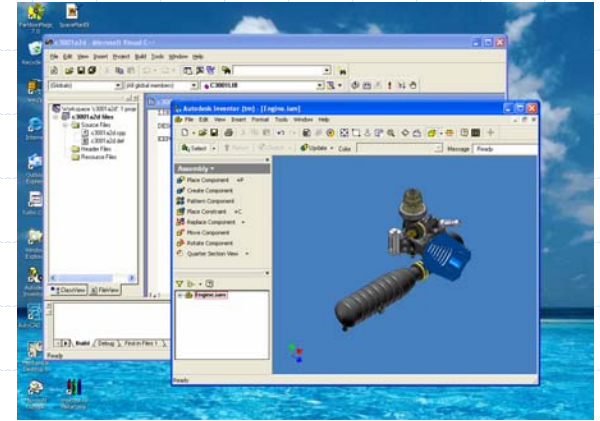


# Window Presentation Styles: Overlapping Windows



## Advantages:

- Their look is three-dimensional
- Greater control allows the user to organize the windows.
- Windows can maintain larger sizes.
- Windows can maintain consistent sizes.
- Windows can maintain consistent positions.
- Screen space is conserved because windows are placed on top of one another.
- There is less pressure to close or delete windows. Larger borders can be maintained around window information.
- They yield better user performance for tasks where the data requires much window manipulation.

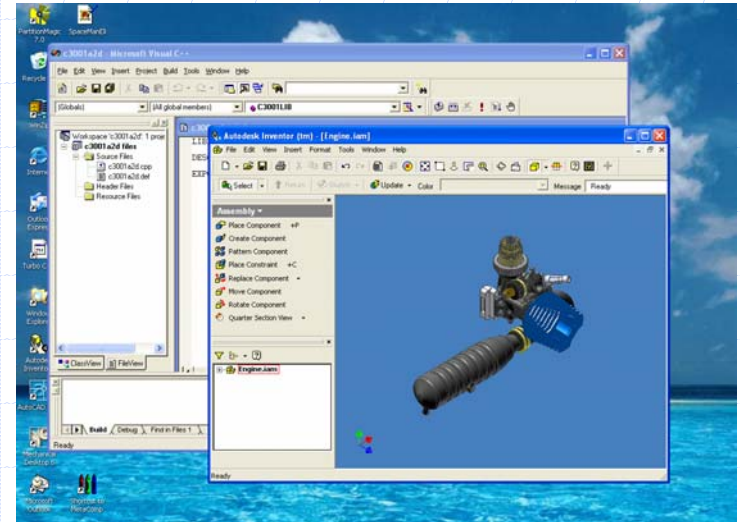


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# Window Presentation Styles: Overlapping Windows (Continued)

## ❖ Disadvantages:

- They are operationally much more complex than tiled windows.
- Information can be obscured behind other windows.
- Windows themselves can be lost behind other windows. The three-dimensional space representation is not always realized by the user.
- Control freedom increases the possibility for greater visual complexity and crowding.

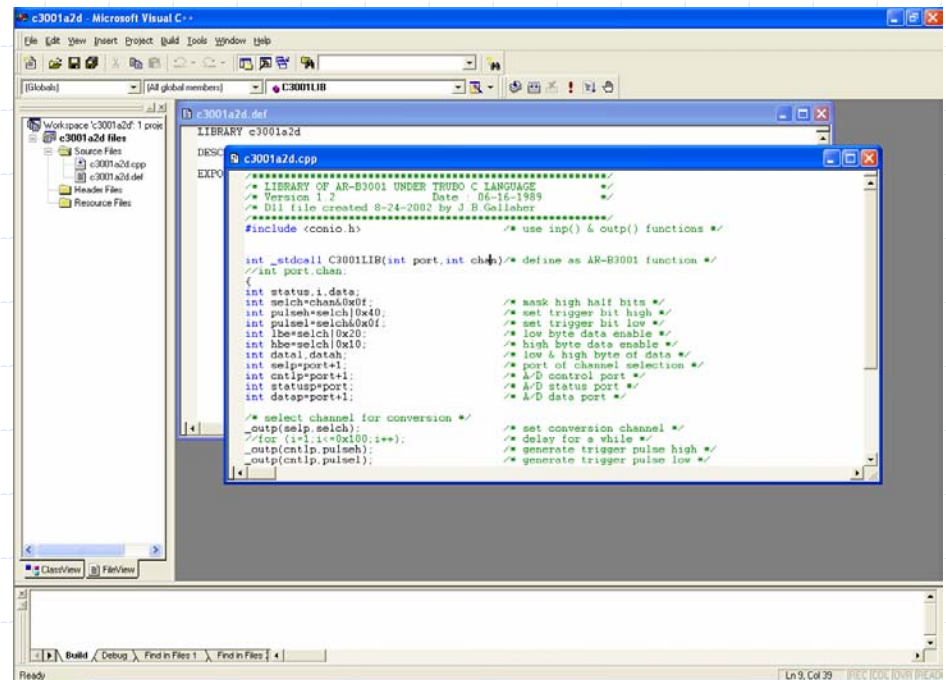


# Window Presentation Styles: Cascading Windows



## Advantages:

- No window is ever completely hidden.
- Bringing any window to the front is easier.
- It provides simplicity in visual presentation and cleanness.



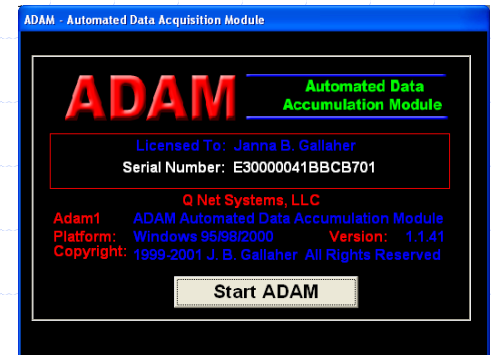
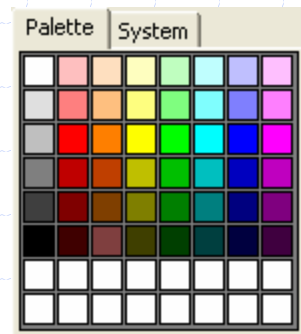
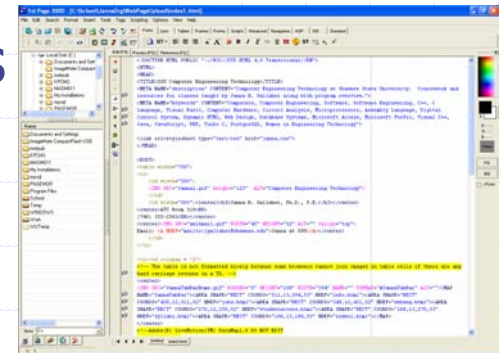
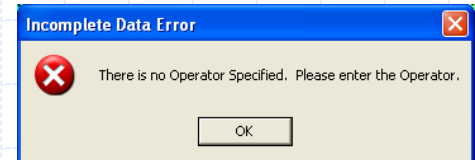
# Window Presentation Styles:

## Picking a Presentation Style

- ◆ Use tiled windows for:
  - Single-task activities.
  - Data that needs to be seen simultaneously.
  - Tasks requiring little window manipulation.
  - Novice or inexperienced users.
- ◆ Use overlapping windows for:
  - Switching between tasks.
  - Tasks necessitating a greater amount of window manipulation.
  - Expert or Experienced users.
  - Unpredictable display contents.

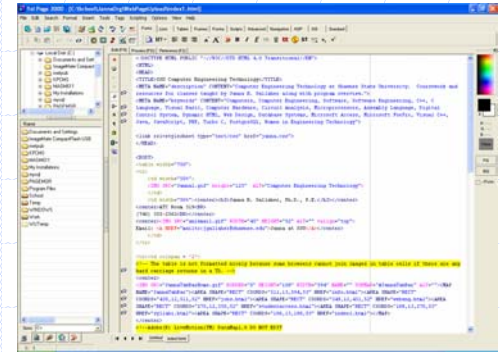
# Types of Windows

- ◆ Primary Window
- ◆ Secondary Windows
- ◆ Dialog Boxes
- ◆ Property Sheets and Property Inspectors
- ◆ Message Boxes
- ◆ Palette Windows
- ◆ Pop-up Windows





# Primary Window



## Proper usage:

- Represent an independent function or application
- Use to present constantly used window components and controls
  - ◆ Menu bar items that are used frequently or used by most, or all, primary or secondary windows.
  - ◆ Controls used by dependent windows.
- Use for presenting information that is continually updated. (e.g. time and date)
- Use of providing context for dependent windows.
- Do not:
  - ◆ Divide an independent function into two or more primary windows.
  - ◆ Present unrelated functions in one primary window..

# Secondary Window

## ◆ Proper usage:

- For performing subordinate, supplemental, or ancillary actions that are:
  - ◆ extended or more complex in nature.
  - ◆ Related to objects in the primary window.
- For presenting frequently or occasionally used window components.

## ◆ Important guidelines:

- Should typically not appear as an entry on the taskbar.
- Should not be larger than 263 dialog units x 263 dialog units.



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# Secondary Window (Continued)

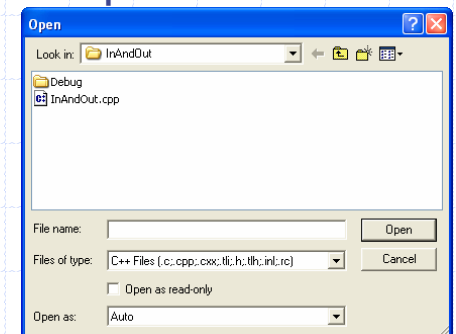
## ◆ Modal and Modeless

### ■ Modal:

- ◆ Use when interaction with any other window must not be permitted
- ◆ Use for: Presenting information, receiving input, asking questions.
- ◆ Use carefully because it constrains what the user can do and stops the program flow.

### ■ Modeless:

- ◆ Use when interaction with other windows must be permitted.
- ◆ Use when interaction with other windows must be repeated.





# Secondary Window (Continued)



## ◆ Cascading:

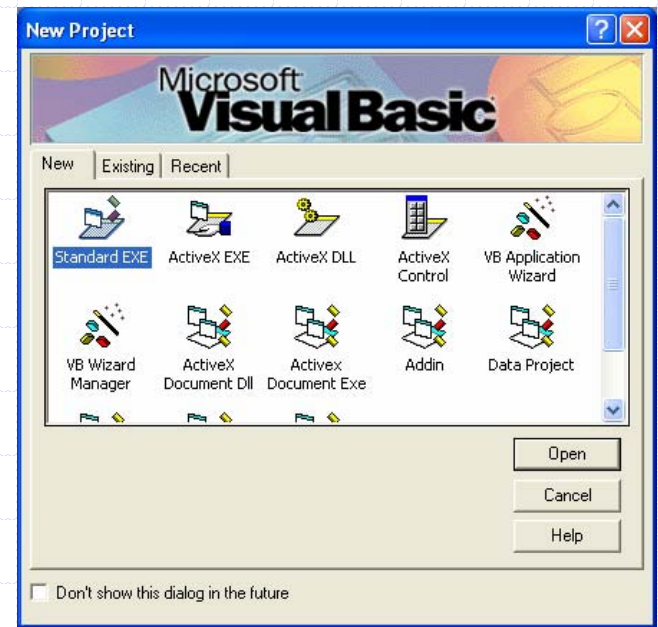
- Provides advanced options at a lower level in a complex dialog.
- Guidelines:
  - ◆ Provide a command button leading to the next dialog box with a “To a Window” indicator (...).
  - ◆ Present the additional dialog box in cascaded form.
  - ◆ Provide no more than two cascades in a given path.
  - ◆ Do not cover previous critical information.
  - ◆ If independent, close the secondary window from which it was opened.

## ◆ Unfolding:

- Provide advanced options at the same level in a complex dialog.
- Guidelines:
  - ◆ Provide a command button with an expanding dialog symbol (>>).
  - ◆ Expand to right or downward.

# Dialog Boxes

- ◆ Use for presenting brief messages.
- ◆ Use for requesting specific, transient actions.
- ◆ Use for performing actions that:
  - Take a short time to complete.
  - Are not frequently changed.
- ◆ Command buttons to include: Ok, Cancel, and others as necessary.



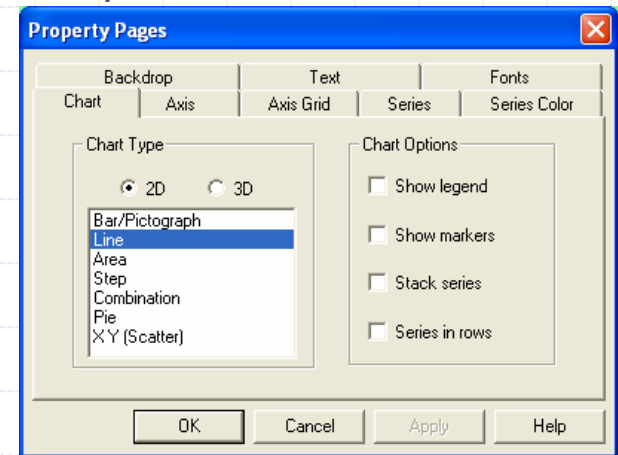
# Property Sheets and Property Inspectors

## ◆ Property Sheets

- Presents the complete set of properties for an object
- Categorize and group within property pages
- Command buttons: Ok, Cancel, Apply, Reset, and others
- For a single property sheet, place the commands on the sheet.
- For a tabbed property page, place the commands outside the tabbed pages.

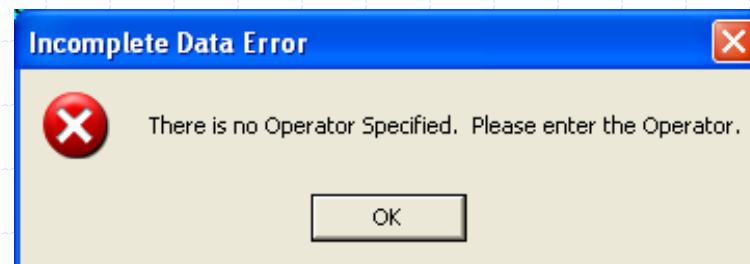
## ◆ Property Inspectors

- Displays only the most common or frequently accessed object properties.
- Make changes dynamically.



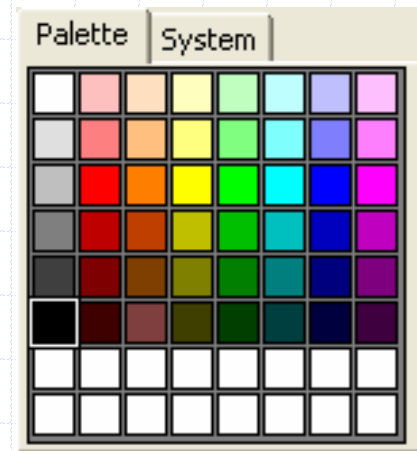
# Message Boxes

- ◆ Use for displaying a message about a particular situation or condition.
- ◆ Command buttons to include: OK, Cancel, Help, Yes and No, Stop, and buttons to correct the action that caused the message box to be displayed.
- ◆ Enable the title bar close box only if the message includes a cancel button.
- ◆ Designate the most frequent or least destructive option as the default command button.



# Palette Windows

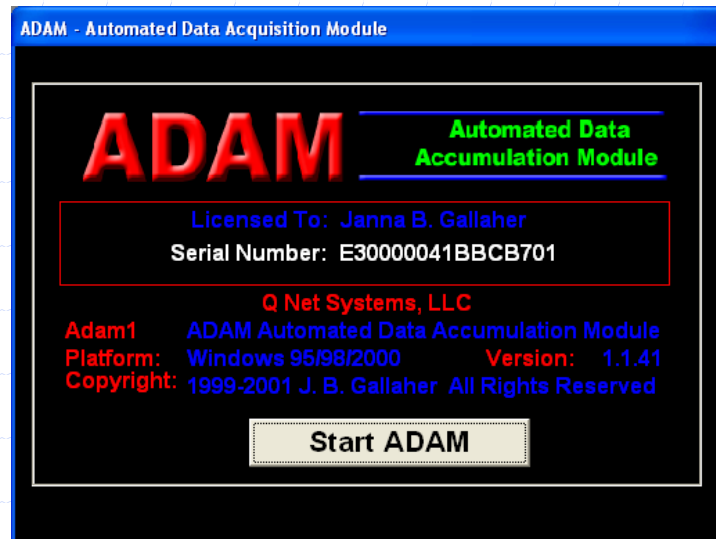
- ◆ Use to present a set of controls.
- ◆ Design as resizable or, if it fits, fixed in size.



# Pop-up Windows

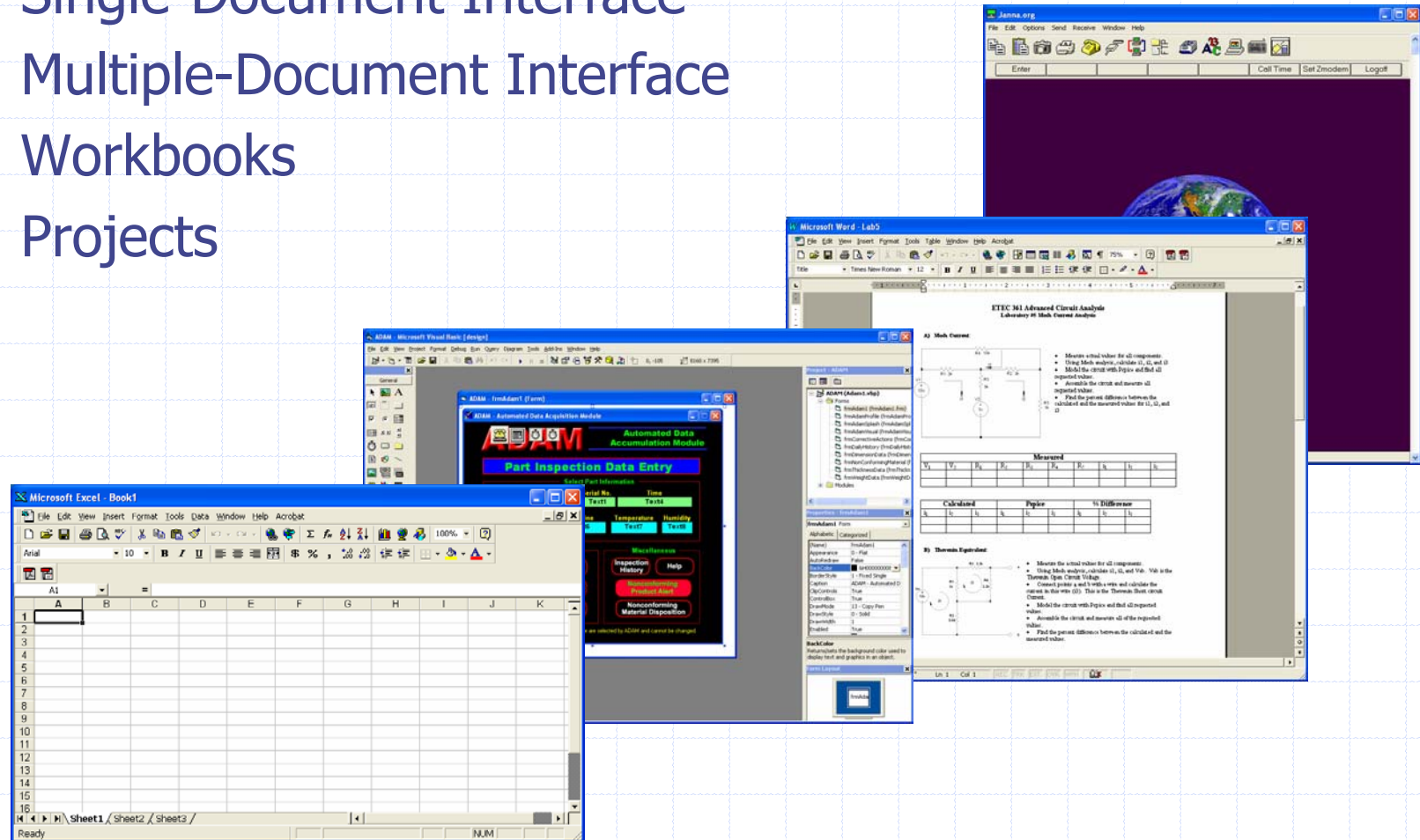
## ◆ Use to display:

- Additional information when an abbreviated form of the information is the main presentation.
- Textual labels for graphical controls.
- Context-sensitive Help information.



# Window Management

- ◆ Single-Document Interface
- ◆ Multiple-Document Interface
- ◆ Workbooks
- ◆ Projects



# Single-Document Interface

- ◆ A single primary window with a set of secondary windows.
- ◆ Proper usage:
  - Where object and window have a simple, one-to-one relationship.
  - Where the object's primary presentation or use is as a single unit.
  - To support alternate views with a control that allows the view to be changed.
  - To support simultaneous views by splitting the window into panes.
- ◆ Advantages:
  - Most common usage.
  - Window manipulation is easier and less confusing.
  - Data-centered approach.
- ◆ Disadvantage:
  - Information is displayed or edited in separate windows.



# Multiple Document Interface

## ◆ Description:

- A technique for managing a set of windows where documents are opened into windows.
- It contains a single primary window, called the parent.
- A set of related document or child windows, each also essentially a primary window.
- Each child window is constrained to appear only within the parent window.
- The child windows share the parent window's operational elements.
- The parent window's elements can be dynamically changed to reflect the requirements of the active child window.

# Multiple Document Interface (Continued)

## ◆ Proper usage:

- To present multiple occurrences of an object.
- To compare data within two or more windows.
- To present multiple parts of an application.
- Best suited for viewing homogeneous object types.
- To clearly segregate the objects and their windows used in a task.

## ◆ Advantages:

- The child windows share the parent window's interface components.
- Useful for managing a set of objects.
- Provides a grouping and focus for a set of activities within the larger environment of the desktop.

# Multiple Document Interface (Continued)

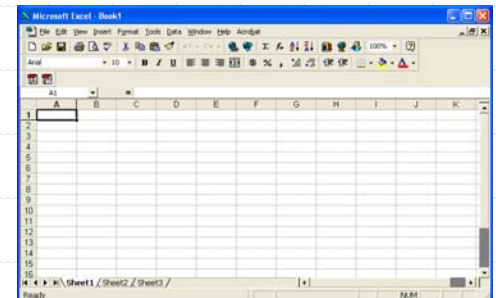
## ◆ Disadvantages:

- Reinforces an application as the primary focus.
- Containment for secondary windows within child windows does not exist, obscuring window relationships and possibly creating confusion.
- Because the parent window does not actually contain objects, context cannot always be maintained on closing and opening.
- The relationship between files and their windows is abstract, making an MDI application more challenging for beginning users to learn.
- Confining child windows to the parent window can be inconvenient or inappropriate for some tasks.
- The nested nature of child windows may make it difficult for the user to distinguish a child window in a parent window from a primary window that is a peer with the parent window positioned on top.

# Workbooks

## ◆ Description:

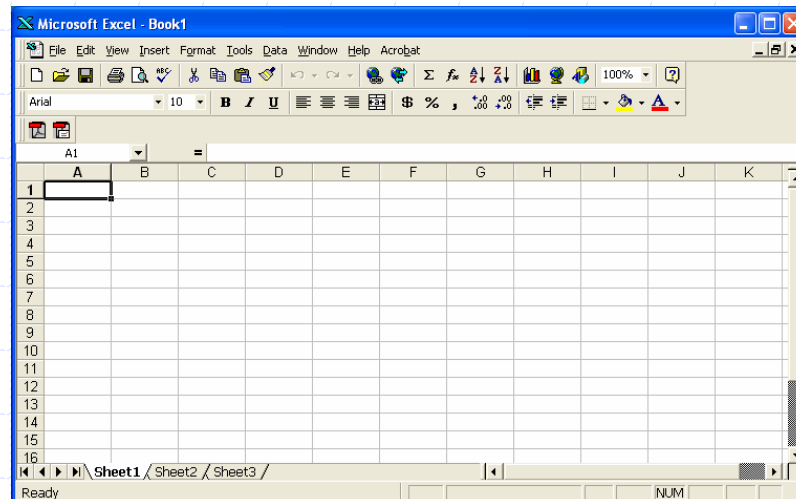
- A window or task management technique that consists of a set of views organized like a tabbed notebook.
- It is based upon the metaphor of a book or notebook.
- Views of objects are presented as sections within the workbook's primary windows; child windows do not exist.
- Each section represents a view of data.
- Tables can be included and used to navigate between sections.
- Otherwise, its characteristics and behavior are similar to those of the multiple-document interface with all child windows maximized.



# Workbooks (Continued)

## ◆ Proper usage:

- To manage a set of views of an object.
- To optimize quick navigation of multiple views.
- For content where the order of the sections is significant.



# Workbooks (Continued)

## ◆ Advantages:

- Provides a grouping and focus for a set of activities within the larger environment of the desktop.
- Conserves screen real estate.
- Provides the greater simplicity of the single-document window interface.
- Provides greater simplicity by eliminating child window management.
- Preserves some management capabilities of the multiple-document interface.

## ◆ Disadvantage:

- Cannot present simultaneous views.

# Projects

## ◆ Description:

- A technique that consists of a container: a project window holding a set of objects.
- The objects being held within the project window can be opened in primary windows that are peers with the project window.
- Visual containment of the peer windows within the project window is not necessary.
- Each opened peer window must possess its own menu bar and other interface elements.
- Each opened peer window can have its own entry on the task bar.
- When a project window is closed, all the peer windows of object also close
- When the project window is opened, the peer windows of the contained objects are restored to their former positions.
- Peer windows of a project may be restored without the project window itself being restored.



# Projects (Continued)

## ◆ Proper usage:

- To manage a set of objects that do not necessarily need to be contained.
- When child windows are not to be constrained.

## ◆ Advantages:

- Provides a grouping and focus for a set of activities within the larger environment of the desktop.
- Preserves some management capabilities of the multiple document interface.
- Provides the greatest flexibility in the placement and arrangement of windows.

## ◆ Disadvantages:

- Increased complexity due to difficulty in differentiating peer primary windows of the project from windows of other applications.



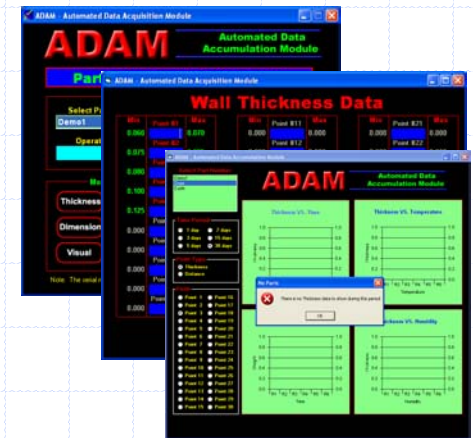
# Organizing Window Functions

## ◆ Window Organization

- Organize windows to support user tasks.
- Support the most common tasks in the most efficient sequence.
- Use primary windows to:
  - ◆ Begin an interaction and provide a top-level context for dependent windows.
  - ◆ Perform a major interaction.
- Use secondary windows to:
  - ◆ Extend the interaction.
  - ◆ Obtain or display supplemental info.
- Use dialog boxes for:
  - ◆ Infrequently used or needed info.
  - ◆ “Nice-to-know” info.

## ◆ Number of Windows

- Minimize the number of windows needed to accomplish an objective.



# Window Operations

## ◆ Active Window

- A window should be made active with as few steps as possible.
- Visually differentiate the active window from the other windows.

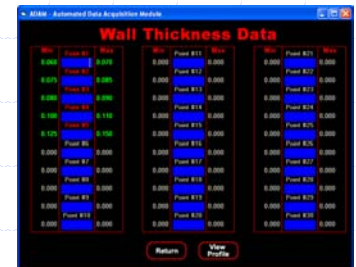
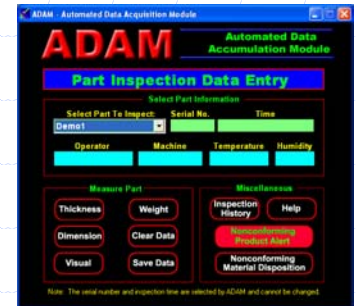
## ◆ General Guidelines

- Design easy to user and learn windowing operations (direct manipulation is better than indirect manipulation).
- Minimize the number of window operations necessary to achieve a desired effect.
- Make navigating between windows particularly easy and efficient to do.
- Make the setting up of windows particularly easy to remember.
- In overlapping systems, provide powerful commands for arranging windows on the screen in user-tailorable configurations.

# Window Operations (Continued)

## ◆ Opening a Window

- Provide an iconic representation or textual list of available windows.
- When opening a window:
  - ◆ Position the opening window in the most forward plane of the screen.
  - ◆ Adapt the window to the size and shape of the monitor on which it will be presented.
  - ◆ Designate it as the active window.
  - ◆ Set it off against a neutral background.
  - ◆ Ensure that its title bar is visible.
- When a primary window is opened or restored, position it on top.
  - ◆ Restore all secondary windows to the states that exited when the primary window was closed.



# Window Operations (Continued)

## ◆ Opening a Window (Continued)

- When a dependent secondary window is opened, position it on top of its associated primary window.
  - ◆ Position a secondary window with peer windows on top of its peers.
  - ◆ Present layered or cascaded windows with any related peer secondary windows.
- When a dependent secondary window is activated, its primary window and related peer windows should also be positioned at the top.
- If more than one object is selected and opened, display each object in a separate window. Designate the last window selected as the active window.
- Display a window in the same state as when it was last accessed.
  - ◆ If the task requires particular sequence of windows, use a fixed or consistent presentation sequence.
- With tiled windows, provide an easy way to resize and move newly opened windows.

# Window Operations (Continued)

## ◆ Sizing Windows

- Provide large-enough windows to:
  - ◆ Present all relevant and expected information for the task.
  - ◆ Avoid hiding important information.
  - ◆ Avoid crowding or visual confusion.
  - ◆ Minimize the need for scrolling.
- If a window is too large, determine:
  - ◆ Is all the information needed?
  - ◆ Is all the information related?
- Otherwise, make the window as small as possible.
  - ◆ Optimum window sizes:
    - For text, about 12 lines.
    - For alphanumeric information, about seven lines.



# Window Operations (Continued)

## ◆ Window Placement

- Considerations:
  - ◆ the use of the window
  - ◆ The overall display dimensions.
  - ◆ The reason for the window's appearance.
- General:
  - ◆ Place the window so it is entirely visible.
  - ◆ If the window is being restored, place the window where it last appeared.
  - ◆ If the window is new, and a location has not yet been established, place it:
    - At the point of the viewer's attention, usually the location of the pointer or cursor.
    - In a position convenient to navigate to.
    - So that it is not obscuring important or related underlying window information.



# Window Operations (Continued)

## ◆ Window Placement (Continued)

### ■ General (Continued);

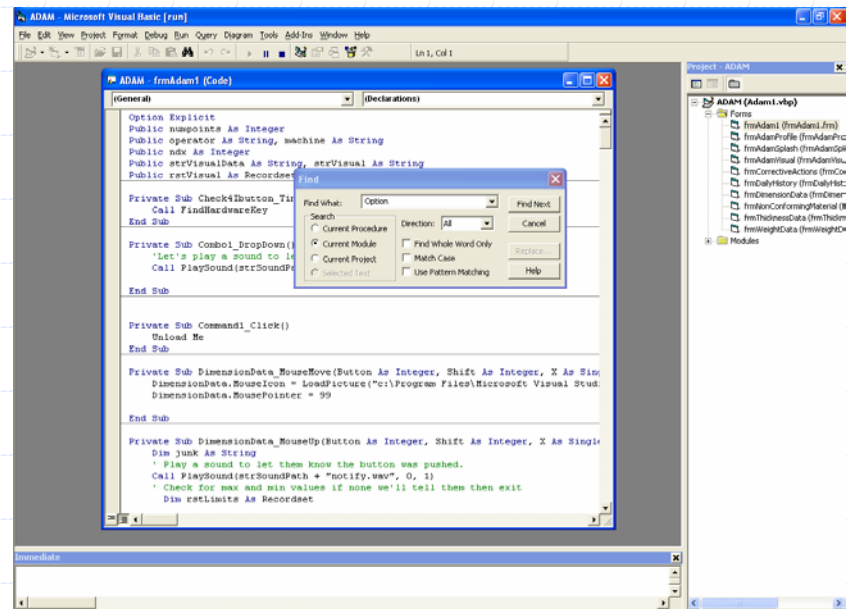
- ◆ For multiple windows, give each additional window its own unique and discernible location.
  - A cascading presentation is recommended.
- ◆ In multiple-monitor configuration, display the secondary window on the same monitor as its primary window.
- ◆ If none of the above location considerations apply, then:
  - Horizontally center a secondary window within its primary window just below the title bar, menu bar, and any docked toolbars.
- ◆ If the user then moves the window, display it at this new location the next time the user opens the window.
  - Adjust it as necessary to the current display configuration.
- ◆ Do not let the user move a window to a position where it cannot be easily repositioned.

# Window Operations (Continued)

## ◆ Window Placement (Continued)

### ■ Dialog boxes:

- ◆ If the dialog box relates to the entire system, center it on the screen.
- ◆ Keep key information on the underlying screen visible.
- ◆ If one dialog box calls another, make the new one movable whenever possible.





# Window Operations (Continued)

## ◆ Window Separation

- Crisply, clearly, and pleasingly demarcate a window from the background of the screen on which it appears.
  - ◆ Provide a surrounding solid line border for the window.
  - ◆ Provide a window background that sets the window off well against the overall screen background.
  - ◆ Consider incorporating a drop shadow beneath the window.

## ◆ Moving a Window

- Permit the user to change the position of all windows.
- Change the pointer shape to indicate that the move selection is successful.
- Move the entire window as the pointer moves.
  - ◆ If it is impossible to move the entire window, move the window outline while leaving the window displayed in its original position.
- Permit the moving of a window without its being active.

# Window Operations (Continued)

## ◆ Resizing a Window

- Permit the user to change the size of primary windows.
  - ◆ Unless the information displayed in the window is fixed or cannot be scaled to provide more information.
- Change the pointer shape to indicate that the resizing selection is successful.
- The simplest operation is to anchor the upper-left corner and resize from the lower right corner.
  - ◆ Also permit resizing from any point on the window.
- Show the changing window as the pointer moves.
  - ◆ If it is impossible to show the entire window being resized, show the window's outline while leaving the window displayed in its original position.

# Window Operations (Continued)

## ◆ Resizing a Window (Continued)

- When window size changes and content remains the same:
  - ◆ Change the image size proportionally as window size changes.
- If resizing creates a window or image too small for easy use, do one of the following:
  - ◆ Clip (truncate) information arranged in some logical structure or layout when minimum size is attained, or
  - ◆ When no layout considerations exist, format (restructure) information as size is reduced, or
  - ◆ Remove less useful information ( if it can be determined), or
  - ◆ When minimum size is attained, replace information with a message that indicates that the minimum size has been reached and that the window must be enlarged to continue working.
- Permit resizing a window without its being active.

# Window Operations (Continued)

## ◆ Other Operations

- Permit primary window to be maximized, minimized, and restored.

## ◆ Window Shuffling

- Window shuffling must be easy to accomplish.

## ◆ Keyboard Control/Mouseless Operation

- Window actions should be capable of being performed through the keyboard as well as with a mouse.
- Keyboard alternatives should be designated through use of mnemonic codes as much as possible.
- Keyboard designations should be capable of being modified by the user.

# Window Operations (Continued)

## ◆ Closing a Window

- Close a window when:
  - ◆ The user requests that it be closed.
  - ◆ The user performs the action required in the window.
  - ◆ The window has no further relevance.
- If a primary window is close, also close all of its secondary windows.
- When a window is closed, save its current state, including size and position, for use when the window is opened again.

# Web Systems

## ◆ Frames

- Description:
  - ◆ Multiple Web screen panes that permit the displaying of multiple documents on a page.
  - ◆ These documents can be independently viewed, scrolled, and updated.
  - ◆ The documents are presented in a tiled format.
- Proper usage:
  - ◆ For content expected to change frequently.
  - ◆ To allow users to change partial screen content.
  - ◆ To permit users to compare multiple pieces of information.
- Guidelines:
  - ◆ Use only a few frames (three or less) at a given time.
  - ◆ Choose sizes based upon the type of information to be presented.
  - ◆ Never force viewers to resize frames to see information.
  - ◆ Never use more than one scrolling region on a page.



# Web Systems (Continued)

## ◆ Pop-Up Windows

- Be extremely cautious in the use of pop-up windows.

