Session: 46CE

Building Java GUIs Using XML

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Agenda

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- **Overview**
  - XML & PDML overview
  - PCML
  - How it all fits together
  - Operations Navigator plug-in support
  - Where to get more information
- **What is the Java GUI Builder**
  - Advantages
  - Java development tools
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- **Creating & editing panels**
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  - Control / field types
  - Field properties
  - Recommended Naming conventions
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  - Cut, copy, paste
  - Alignment and spacing
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  - Toolbars
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  - Tabbed panes
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    - Context menu
  - Help generation
- **Exercises**

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XML and PDML Overview

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- **What is XML?**
  - XML (Extendible Markup Language) allows you to define your own tagged-based language.
- **What is PDML?**
  - PDML (Panel Definition Markup Language) is a set of tags that define a panel, what is on the panel, how it is laid out, etc.
  - PDML is a language that we developed using XML. It's similar in structure to HTML and SGML.
  - Here are some examples of PDML tags:
    - <panel> -- defines a panel
    - <title> -- specifies the title of the panel or field
    - <size> -- specifies the size of the panel or field
    - <label> -- defines a label on the panel (static text field)
    - <location> -- specifies the location of the field on the panel
    - <button> -- defines a button on the panel
    - <textfield> -- defines a textfield on the panel
    - and many more...

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PDML Example

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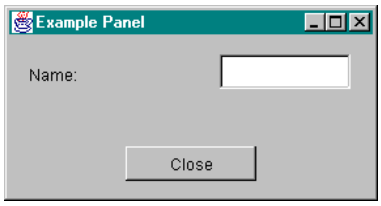
- **Here's what the PDML looks like for the simple panel shown below:**

```
<PDML version="1.0" source="JAVA" basescreensize="1024x768">

    <PANEL name="EXAMPLE_PANEL">
        <TITLE>EXAMPLE_PANEL</TITLE>
        <SIZE>278,120</SIZE>
        <LABEL name="NAME_LABEL" disabled="no">
            <TITLE>NAME_LABEL</TITLE>
            <LOCATION>15,20</LOCATION>
            <SIZE>100,19</SIZE>
        </LABEL>
        <TEXTFIELD name="NAME" masked="no" editable="yes" disabled="no">
            <TITLE>NAME</TITLE>
            <LOCATION>161,14</LOCATION>
            <SIZE>100,26</SIZE>
        </TEXTFIELD>
        <BUTTON name="CLOSE_BTN" disabled="no">
            <TITLE>CLOSE_BTN</TITLE>
            <LOCATION>89,83</LOCATION>
            <SIZE>100,26</SIZE>
        </BUTTON>
    </PANEL>

</PDML>
```



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Why PDML

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- **PDML was created because:**
  - Create a representation of GUIs that is platform and UI technology independent
  - Java LayoutManager classes provide little control over actual sizes and positions of user interface components. Initial results are often disappointing and require repeated rework in order to achieve the desired results on a specific platform.
  - Each change to the panel layout requires recompilation of Java code
  - Java LayoutManager classes attempt to compensate for varying length text strings in different NLVs of an application by adjusting the sizes of the user interface components. In practice, this results in visually unappealing GUIs.
- **PDML provides the following benefits:**
  - GUIs are represented in a descriptive tag language
  - Developers have precise control over the sizes and positions of user interface components
  - Changes to the panel layout do not require any code to be recompiled
  - Unique versions of a given panel can be easily created for each national language language supported by an application developer.
  - National language translators do not need specialized skills to modify panel definitions

Notes: Java GUI Technology Highlights

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- **Graphical User Interfaces**
  - Platform and technology independent representation of graphical user interfaces based on the Extensible Markup Language (XML) - Panel Definition Markup Language (PDML)
  - Pure-Java framework for interpreting the PDML language and constructing graphical user interfaces based on the Java Foundation Classes (JFC)
  - Set of tools for building GUIs in XML
- **AS/400 toolbox data objects**
  - XML language to assist in building AS/400 toolbox objects that represent AS/400 program call parameters - Program Call Markup Language (PCML)
  - Pure-Java framework for interpreting the PCML language and retrieving/storing information using the AS/400 Toolbox for Java
- **Operations Navigator Plug-ins**
  - Contains the capability of locating, loading, and executing GUI components and plug-ins developed in Java

Notes: Graphical User Interfaces using Java

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- **Panel definition markup language (PDML) for building GUIs using XML and pure-Java technology for rendering these GUI definitions using the Java Foundation Classes (JFC)**
  - Based on Java Beans
  - Contains three elements:
  - Platform and technology independent representation of graphical user interfaces using XML
  - Resource file converter and WYSIWYG Java GUI panel building
  - Java GUI runtime package
- **Design points**
  - Platform and technology independent representation of panels using XML
  - Other screen representations can be converted to XML (i.e. RCs) and used by the runtime package
  - Can be run:
  - As an AS/400 Operations Navigator plug-in
  - In a browser as an applet
  - In a Java application

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Notes: XML Panel Definition Markup Language

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- **Panel Definition Markup Language (PDML) is a tag language defined using the eXtensible Markup Language standard (XML)**
- **Extensible Markup Language (XML) is a evolving industry standard defined by the World Wide Web Consortium (W3C)**
  - Subset of the Standardized Generalized Markup Language (SGML) that is targeted for use on the Web
- **XML defines the grammar for creating your own markup language for a specific purpose**
- **Define a set of tags similar to HTML**
- **Parsed into its constituent parts by the IBM XML parser (written in Java) for use by Java beans/applets/applications**
  - Available from IBM Alphaworks - www.alphaworks.ibm.com

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PCML

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- **Program Call Markup Language (PCML)**
- **Used to access iSeries data**
- **Java runtime framework for supporting distributed iSeries program call to iSeries APIs using the iSeries Toolbox for Java**
  - Parsing of PCML (using the IBM XML parser integrated) or Serialized PCML
  - Java classes are supplied that use the PCML and iSeries Toolbox for Java classes
  - iSeries Distributed Program Call (DPC) server handles the remote program calls
  - For increased performance, a serialized version of the parsed PCML can be used to construct the remote program call
  - PCML program call support can run on the client or the iSeries JVM
  - ProgramCallDocument class is supplied with the following functions
    - ProgramCallDocument.setValue - sets an input parameter value
    - ProgramCallDocument.callProgram - calls a program on the AS/400
    - ProgramCallDocument.getValue - gets an output value

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How It All Fits Together

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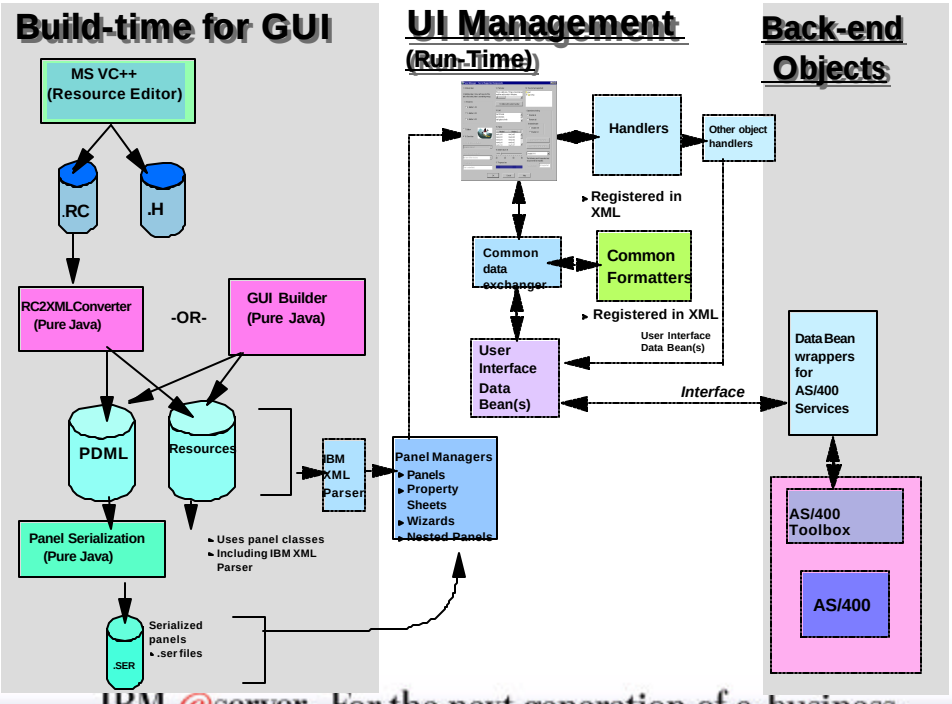

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Notes: PDML GUI Build-Time Contents

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- **3 ways to build panels in PDML:**
  - Windows tools can be used to create panels
    - Pure-Java tools supplied to convert .RC files to .PDML and Resource Bundle (Property/List)
    - PDML preserved for items directly edited (i.e. comments, supplemental tags (enable/disable), etc.)
  - Pure-Java WYSIWYG GUI builder can be used to create panels
    - Produces .PDML and Resource Bundle (Property/List)
    - PDML preserved for items directly edited (i.e. supplemental tags (enable/disable), etc.)
  - Manually type in PDML and Resource Bundle support
- **Panels can be serialized for better performance at run-time**
- **Translatable text separation for Internationalization via resource bundles (properties or list)**
- **HTML On-line help skeletons automatically generated for each panel**
- **Additional PDML tags supported for simpler GUI panel building**
  - PropertySheet
  - Wizard
  - Nested panels
  - Enable/Disable
  - Selected/Deselected
  - Data validation
  - Etc.

Notes: PDML GUI Run-Time Contents

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- **Java runtime framework for rendering GUIs using the Java Foundation Classes (JFC)**
  - Parsing of PDML (using the IBM XML parser integrated) or Serialized PDML
  - Panel layout manager supplied that supports dialog units or pixels
  - Data exchanger provided for automatic data exchange between user interface panel and Java beans via introspection
  - GUI managers supplied for rendering:
    - Panels
    - PropertySheets (TabbedPanes)
    - Wizards
    - Multiple Panes
    - On-line help HTML information
  - Data formatter classes supplied for data validation (can be extended)
  - User interface component level event handlers supplied (can be extended)
  - Look and feel handled at runtime by GUI managers via Pluggable Look and Feel (PLAF) in JFC
    - "Windows looks like Windows"
    - "AIX looks like AIX"

Operations Navigator Java Plug-In Support

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- **Java Runtime Environment (JRE) in Client Access**
- **Java Virtual Machine (JVM) is started by Operations Navigator**
- **AS/400 Toolbox for Java runtime support (including new PDML graphical user interface runtime and PCML data access) is included in Client Access**
  - PDML build-time tools will be included in the AS/400 Toolbox for Java
- **Operations Navigator Java enablement plug-in support includes:**
  - Plugging into the Operations Navigator function tree (code can be written in Java)
  - Plugging into the Operations Navigator lists (code can be written in Java)
  - Providing context menus for Operations Navigator (code can be written in Java)
  - Providing toolbars for Operations Navigator (code can be written in Java)
  - Graphical User Interface components can be written in Java
  - Remote AS/400 program calls can be built using the PCML
- **Note: Operations Navigator components that provide tree items or toolbars require a windows resource DLL for the icons, bitmaps and strings**

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More Plug-in Information

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ibm.com/eServer/iSeries/Oper_Nav

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Getting to Know the GUI Builder

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What is the GUI Builder?

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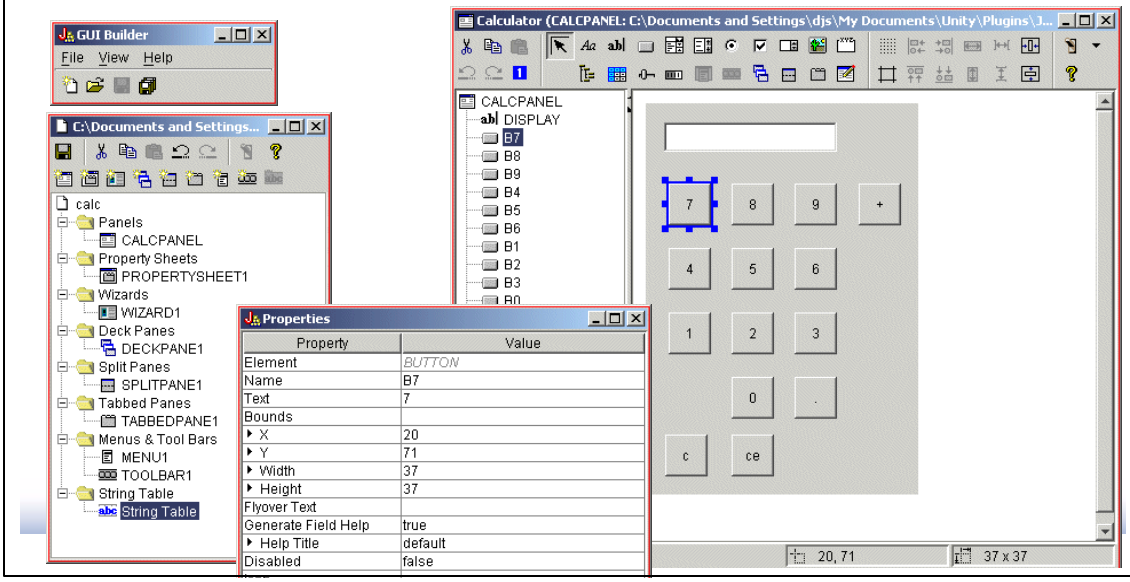
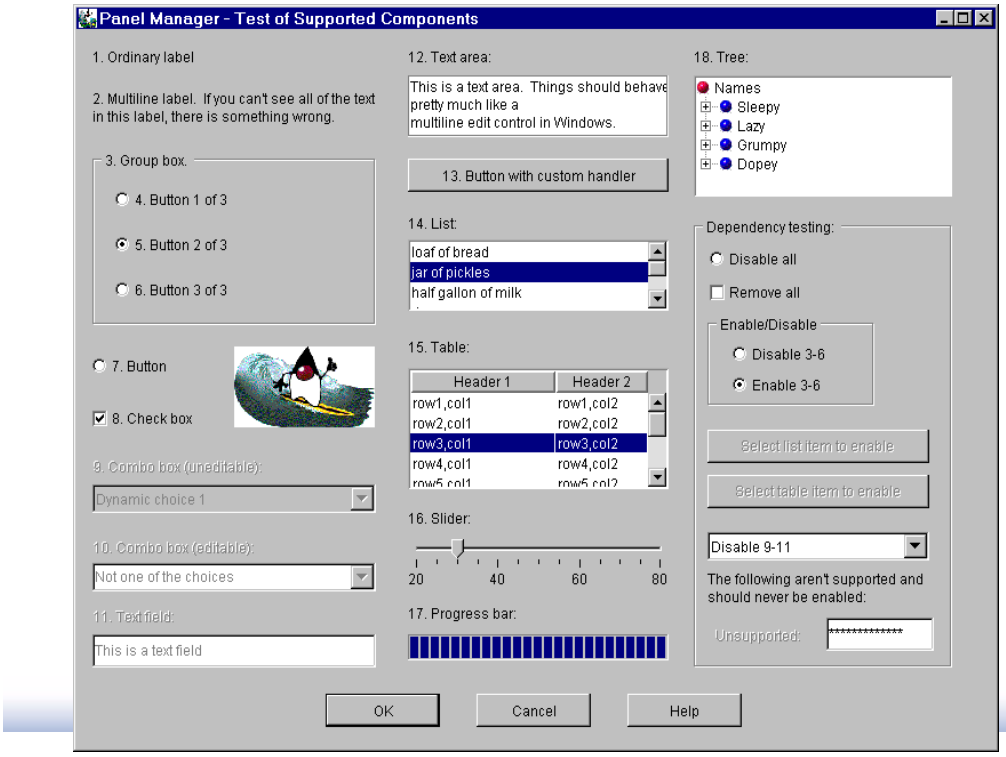
- **The GUI Builder is...**
  - a PDML generator
  - a graphical tool used to build Java windows
  - packaged with the iSeries Toolbox for Java
  - the starting point for all Java development!!



Java GUI Builder Examples



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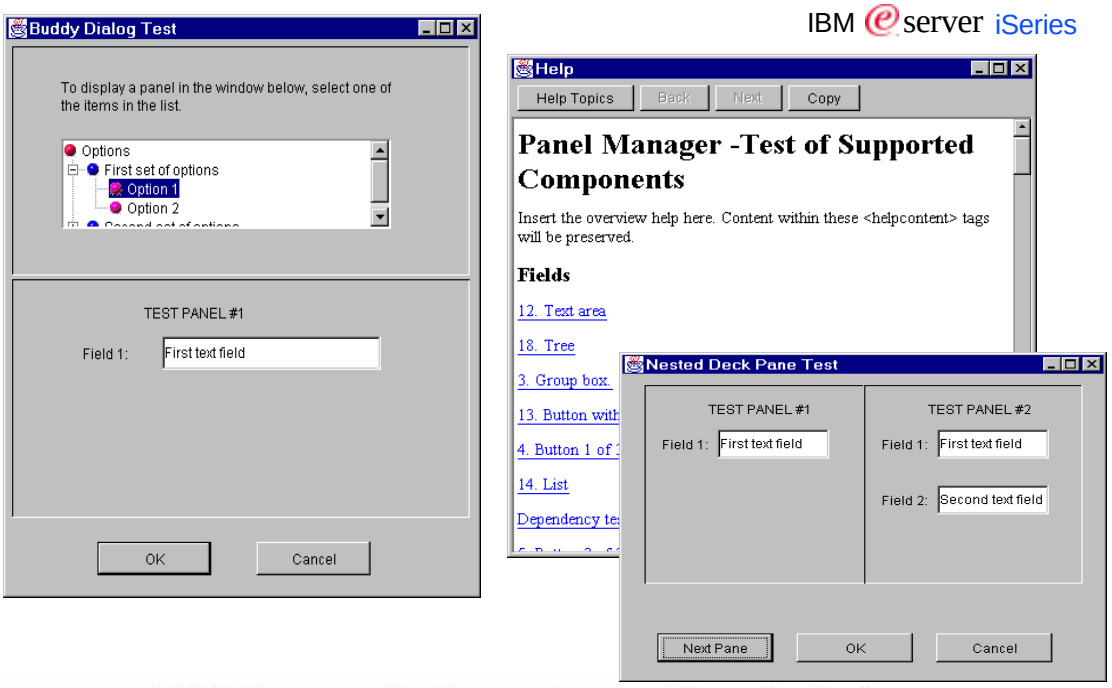
Java GUI Builder Examples



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GUI Builder and Java Development Tools

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- **What's the difference between the Java GUI Builder and other Java GUI development tools?**
- **Java GUI Builder**
  - Builds the end-user interface -- the panels
  - Creates Java windows
  - Manages translatable text
  - Creates menus and toolbars
  - Generates help text
  - Generates data beans
  - Generates event handlers
- **Java development tools**
  - Build, compile, and manage the Java code
  - Do not use to build the end-user interface -- the panels (use the GUI Builder instead)
  - Examples:
    - VisualAge for Java
    - Symantec Visual Cafe

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Why the Java GUI Builder

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- **2 Other methods to create Java panels:**
  - Write raw AWT code (without a graphical tool)
    - (+) Panel components automatically resize for each NLV
    - (-) Panel layout is defined in the Java code
    - (-) Requires many edit, compile, and debug cycles before getting it right
  - Use graphical tools that generate AWT code
    - (-) Panel component locations and sizes are absolute
    - (-) Panel layout is defined in the Java code
    - (-) Translators must know Java to resize panels for each language
- **How the GUI Builder compares**
  - Use GUI Builder
    - (-) Panel component locations and sizes are absolute
    - (+) Panel layout is defined in PDML (no compilation required)
    - (+) Supports translation to other languages:
      - Structure is similar to the Windows .rc files
      - Translators don't change Java code (fewer bugs)
      - Translators don't need to know Java to resize panels
    - (+) Provides additional functionality, such as generating the help and data beans
    - (+) User interface definition is separated from the underlying technology. If the underlying technology ever changes, the UI definition doesn't need to change.

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GUI Builder Requirements

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- **Required software**
  - Java Developers Kit 1.1.8
  - Swing 1.1
  - iSeries Toolbox for Java
  - Client Access Express (with Operations Navigator installed)
- **CLASSPATH must include**
  - ClassPath = .;c;\java;c\jdk1.1.8\lib\classes.zip;C:\jdk1.1.8\lib\classes.zip;
    C:\progra~1\IBM\client~1\jt400\lib\uitools.jar;
    C:\progra~1\IBM\client~1\jre\lib\swingall.jar;
    C:\progra~1\IBM\client~1\classes\jopnav.jar;
    C:\progra~1\IBM\client~1\jt400\lib\jt400.zip;
    C:\progra~1\IBM\client~1\jt400\lib\jui400.jar;
    C:\progra~1\IBM\client~1\jt400\lib\data400.jar;
    C:\progra~1\IBM\client~1\jt400\lib\util400.jar;
    C:\progra~1\IBM\client~1\jt400\lib\x4j400.jar;
- **PATH must include**
  - Path = ...;c:\jdk1.1.8\ bin;
- **Start the GUI Builder with**
  - java com.ibm.as400.ui.tools.GUIBuilder

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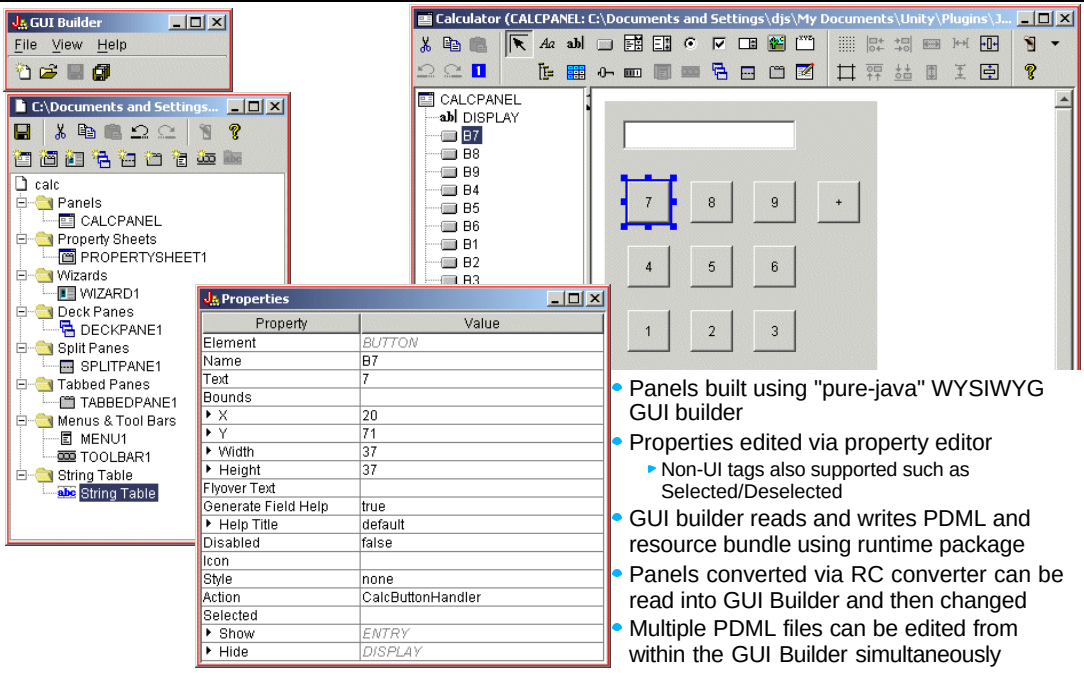
What's Where in the GUI Builder



- Panels built using "pure-java" WYSIWYG GUI builder
- Properties edited via property editor
  - Non-UI tags also supported such as Selected/Deselected
- GUI builder reads and writes PDML and resource bundle using runtime package
- Panels converted via RC converter can be read into GUI Builder and then changed
- Multiple PDML files can be edited from within the GUI Builder simultaneously

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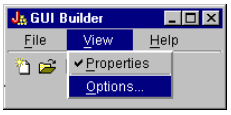
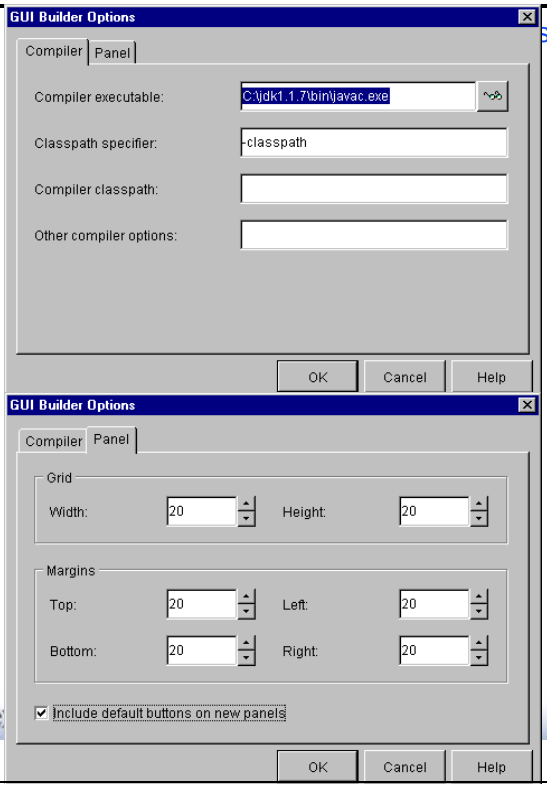
Customizing the GUI Builder





- **Compiler options**
  - Sets which compiler to use when compiling the List Resource Bundle, Data Beans, and Event Handlers
- **Panel options**
  - Sets defaults for panel creation and editing
    - Grid size
    - Margin size
    - Automatically adding OK, Cancel, Help buttons when creating a panel.

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Resource Converter

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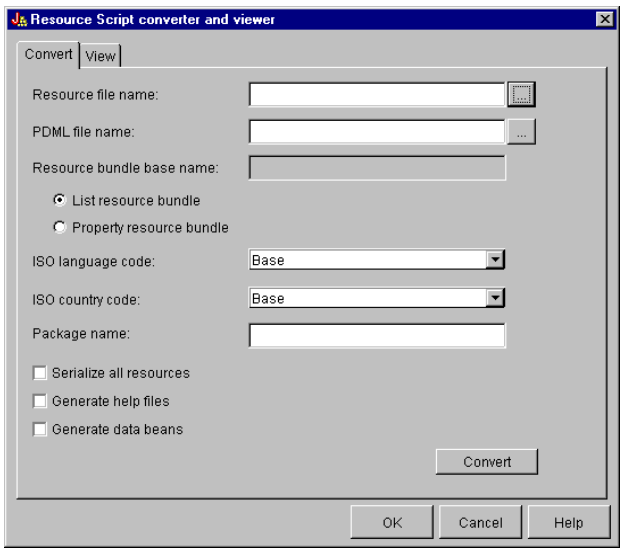
- **Resource Converter is...**
  - Tool to converts Windows resources (.rc files) to PDML
  - Can also be used to view the resources in the PDML.
  - .RC files converted to PDML using RC2XML converter/viewer "pure-java" tool (Microsoft and VisualAge for Windows)
  - Converter preserves PDML tags manually added
  - Resource Bundles can be created in any ISO language and country locale
  - Command line version also available for batch conversions



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What can I do with the GUI Builder?

GUI Builder Capabilities

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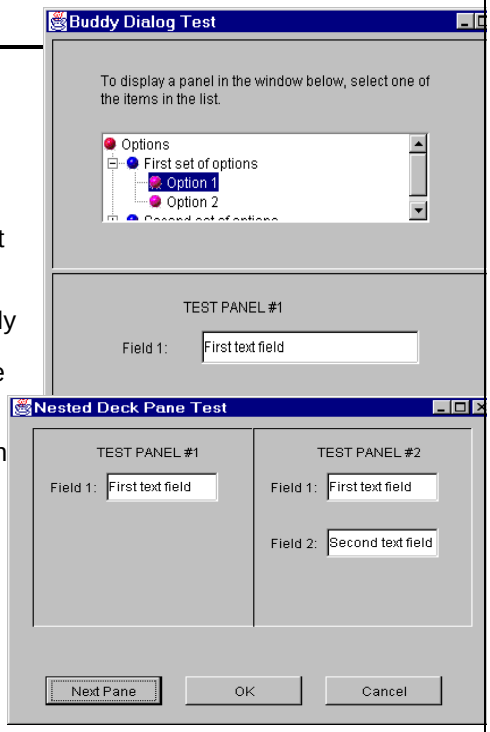
Types of Windows

- **GUI Builder creates different types of Java windows:**
  - **Panels** -- simple dialogs
  - **Property Sheets** -- Notebook pages with tabs at the top
  - **Wizards** -- multiple pages displayed sequentially
  - **Tabbed Panes** -- multiple pages with tabs at the top, bottom, right or left
  - **Split Panes** -- multiple pages displayed adjacen horizontally or vertically
  - **Deck Panes** -- multiple pages layed on top of each other



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Java Window Fields / Controls

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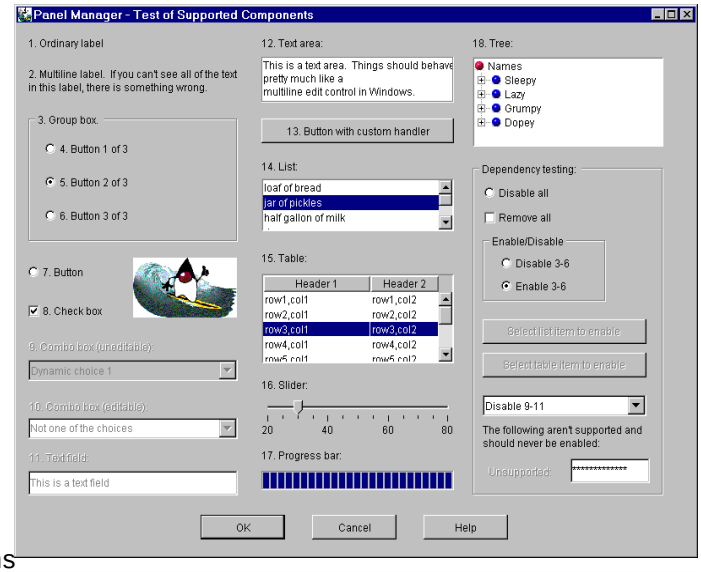
- **Field / Controls that can be added to your panels:**
  - Label
  - Text box (Edit field)
  - Button
  - Combo box (Drop down list)
  - List
  - Radio button
  - Check box
  - Spinner
  - Image
  - Group box
  - Tree
  - Table
  - Slider
  - Progress bar
  - Menu bar
  - Toolbar
  - Deck Pane
  - Split Pane
  - Tabbed Pane
  - Custom
  - Buttongroup for radio buttons



Java Field Example: Text Box

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- **GUI Builder Properties for Text Box**
  - Element -- Field Type (TEXTFIELD)
  - Name -- ID of the field (e.g. ID_NAME_EDIT)
  - Text -- Translated text that is displayed within the field by default
  - Bounds -- position and size of the fields (X, Y == position; Width, Height == Size)
  - Data Class -- Class name with the get and set methods for this field
  - Attribute -- attribute name used in the code to refer to this field
  - Flyover Text -- text that is displayed when the user hovers over this field
  - Generate Field Help -- specifies whether help should be generated for this field (or alias a link)
    - Help Title -- the label of the help index for this field (by default, it is the "Text" property)
  - Disabled -- specifies whether this field is grayed-out
  - Multiline -- specifies whether the edit field is a multiline or single-line edit box
  - Masked -- specifies whether the input/output to this field should be masked (e.g. passwords)
  - Editable -- specifies whether the user can edit the text in this field
  - Format -- the format of the input for this field (e.g. integer). This will enable format validation.

Steps to Create Java Windows

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- **Steps to create Java Windows in the GUI Builder:**

1. **Create a "Panel"**
2. **Add the Fields to the Panels using the Toolbox**
3. **If creating a multi-page window:**
   - A. Create the additional "Panels" for each page in the multi-page window.
   - B. Create the Property Sheet, Wizard, Tabbed Pane, Split Pane, or Deck Pane.
   - C. Add the panels to the multi-page window.
4. **Click on the Preview button to verify it looks correct.**

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Notes: Recommended Naming Conventions

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- **Stand-alone panels:**
  - COMPONENT_PANEL
  - Example, Status Dialog in sv.guix: SV_STATUS
- **Panels within a parent window (Property Sheet, Wizard, Pane):**
  - COMPONENT_PARENT_PANEL
  - Example, General Tab on Auditing Properties: SV_AUDITING_GENERAL
- **Property Sheets, Wizards, Panes:**
  - COMPONENT_PARENT
  - Example, Auditing Properties: SV_AUDITING
- **Descriptive Labels:**
  - COMPONENT_FIELD
  - Example, "Name:" label: SV_NAME
- **Edit fields (text boxes, drop down lists, listboxes, etc.):**
  - COMPONENT_FIELD_EDIT
  - Example, textbox for "Name:": SV_NAME_EDIT
- **Radio buttons, Listbox items, Drop down list items:**
  - COMPONENT_FIELD_ITEM_ITEM
  - Example, "No maximum" radio button for Maximum jobs: SV_MAXJOB_NOMAX_ITEM

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Additional Functions

Selected & Deselected

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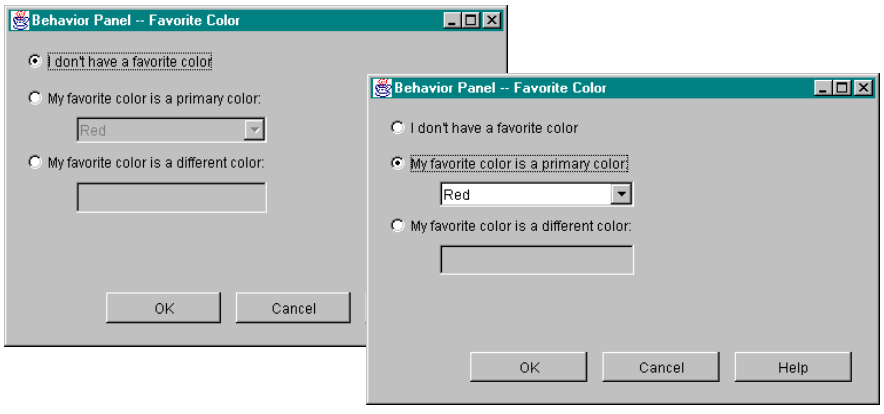
- **Selected & Deselected:**
  - You can add behaviors to these fields, such as disabling an edit box when it's associated radio button is not selected.



Tab Order

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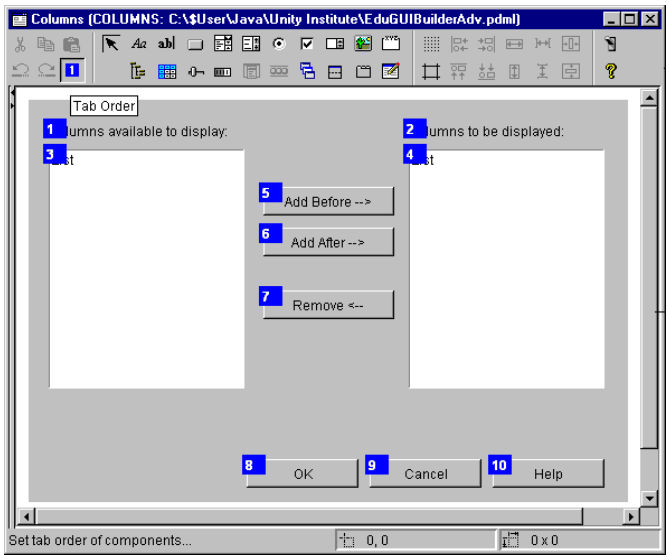
- **Tab Order**
  - You can use the GUI Builder to set up the tabbing order through your windows. Tabbing order is important for accessibility.



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Cut, Copy, Paste

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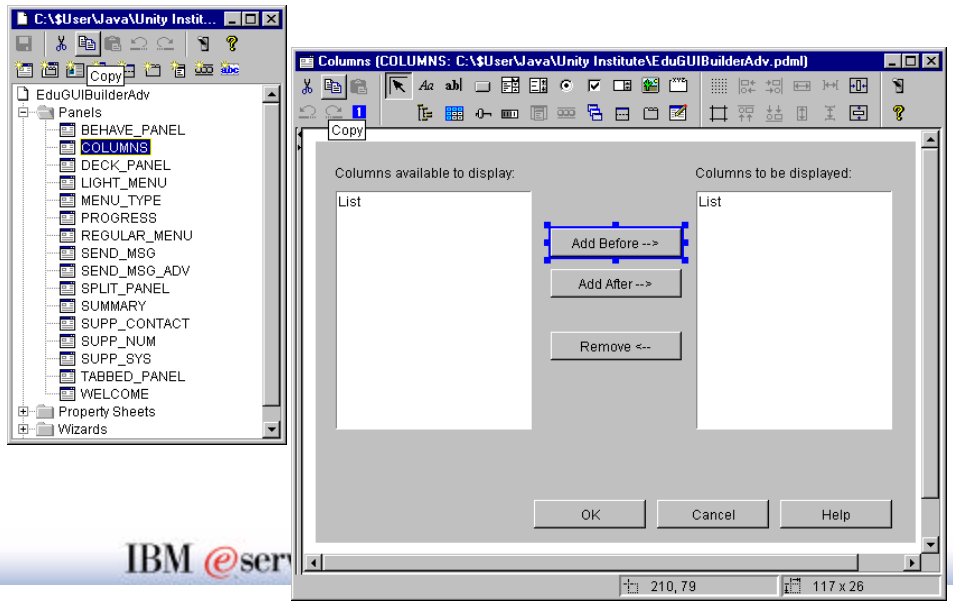
- **Cut, Copy, Paste to copy**
  - Fields to other panels
  - Panels, Property Sheets, Wizards, Panes, Menus, or the String Table to another file



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Alignment & Spacing

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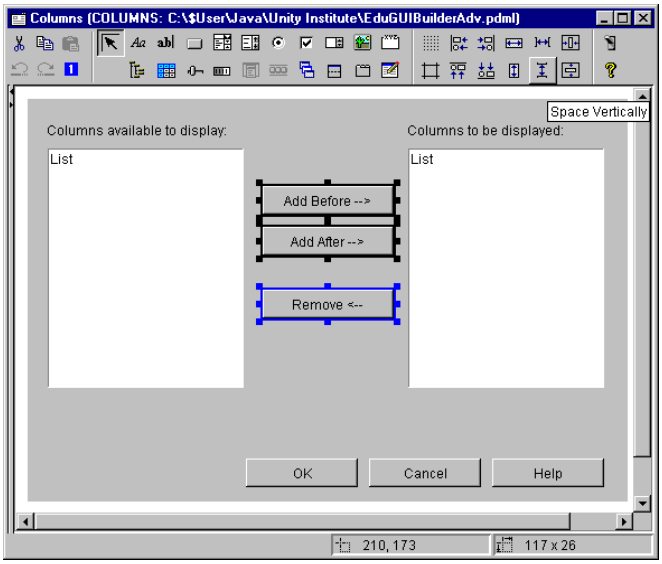
- **Alignment and Spacing options**
  - Left, Right, Top, or Bottom align fields
  - Equalize Width or Height of selected fields
  - Space Horizontally or Vertically
  - Center Horizontally or Vertically
- **Multi-select the fields to enable the options**
  - Use CTRL key with mouse
- **Blue selected field is the reference field**
  - Alignment and equalizing size



Types of Windows

Properties Sheets

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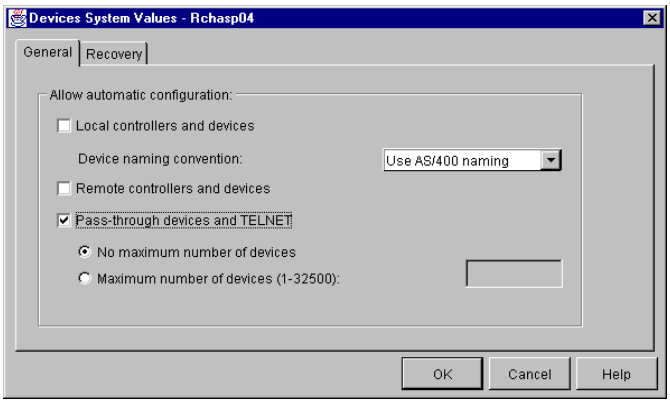
- **Property Sheet contains Panels**
- **Each tab in the Properties sheet is a separate panel.**
  - Tab name is the panel title
- **OK, Cancel, and Help buttons are automatically added to the Property Sheet.**
- **To create a Property Sheet:**
  - Create a panel for each tab in the property sheet
  - Create a Property Sheet
  - Add the Panels to the Property Sheet



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Wizards

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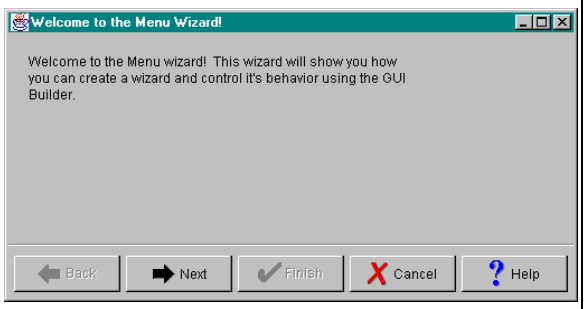
- **Wizards contain Panels**
  - Each wizard page is a separate panel
- **Back, Next, Finish, Cancel and Help buttons are added automatically**
- **You must write Java code (Wizard State Machine) to control the flow through the wizard.**
  - Use your Java development tool to do this part.
- **To create a Wizard:**
  - Create a panel for each page in the wizard
  - Create a Wizard
  - Add all of the Panels to the Wizard
  - Write a Wizard State Machine to control flow of wizard



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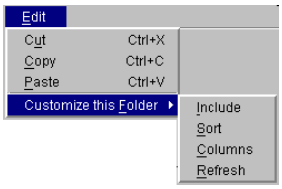
Menus

IBM @server iSeries

- **Menus can be used for:**
  - Context menus
  - Within a Menu Bar
  - To build a Toolbar

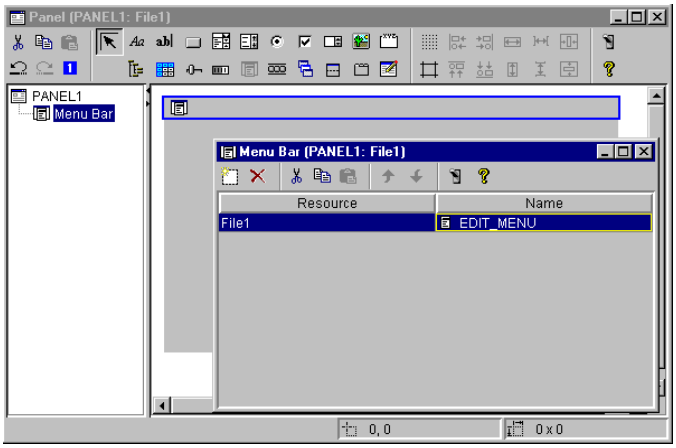


- **Types of menu items:**
  - menu item -- standard menu item
  - sub menu -- cascading menu item
  - check box -- toggling menu item (e.g. Status bar on View menu)
  - radio button -- selection menu item (e.g. Large Icon, Small Icon, List, Details on View menu)
  - Menu items can include icons on them (also used in toolbar)
- **To create a Menu, click on "Insert Menu" in the File window.**
  - Use "%" to add a mnemonic (underlined character) to a menu item
  - Click on "Insert Separator" to add separators to the menu

Menu Bars

IBM @server iSeries

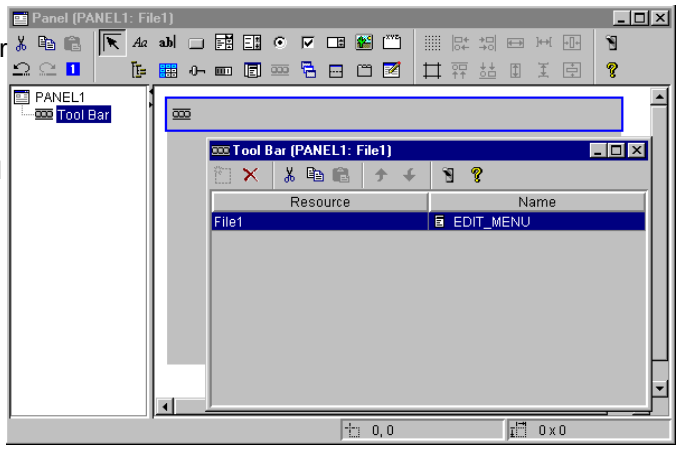
- **Menubars are built from menus**
- **Menubars can only be created on panels**
- **To create a Menu Bar:**
  - Create a menu for each drop down menu in the Menu Bar
  - Create the panel for the Menu Bar
  - Insert a Menu Bar on the Panel
  - Add all of the Menus to the Menu Bar



Toolbars

IBM @server iSeries

- **Toolbars are built from menu items**
- **Toolbars can only be created on panels**
- **The graphics on the toolbar is icon on the menu item**
- **To create a Tool Bar:**
  - Create a menu with all of your toolbar items on it
  - Create the panel for the Tool Bar
  - Insert a Tool Bar on the Panel
  - Add the Menu to the Tool Bar



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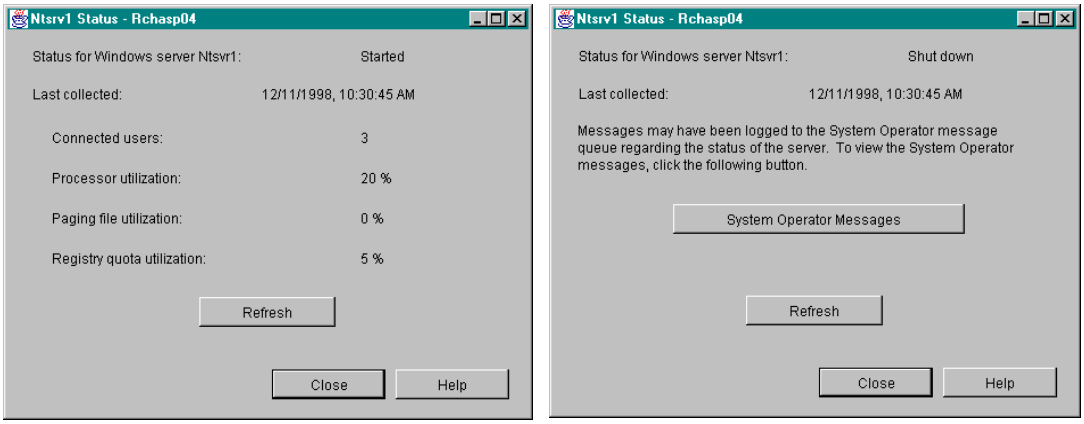
Deck Panes

IBM @server iSeries

- **Deck Panes**
  - Allow you to conditionally show different panels within a panel. When you show the panel can either be determined by the state of a field or in your java code.
- **Example**
  - One status dialog with different information depending on the status. Use a deck pane to show one panel when started versus when stopped.



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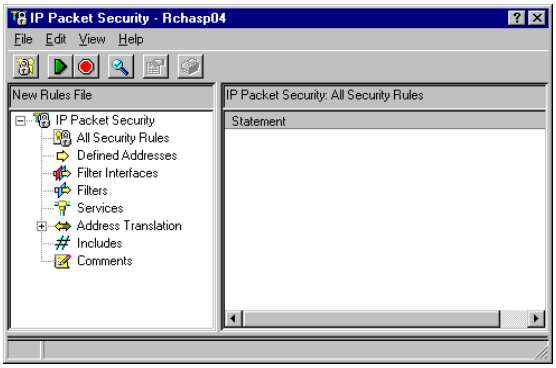
Split Panes

IBM eserver iSeries

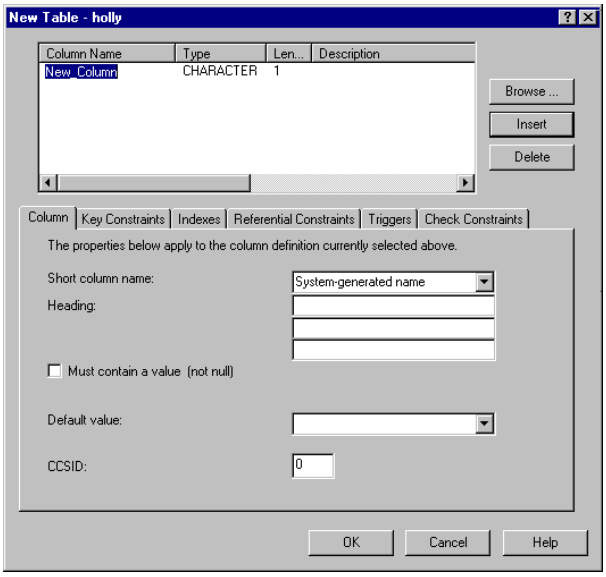
- **Split Panes**
  - Allow you to show different panels side by side.
- **Example**
  - A window similar to the Operations Navigator window would use a Split pane to show the left and right panes.



Tabbed Panes

IBM eserver iSeries

- **Tabbed Panes**
  - Allow you to imbed property sheets within panels.
- **Example**
  - A panel with a table of objects and then a set of tabbed properties below the table. (Similar to the C++ version of Create Table)



Creating Java Panes within a Panel

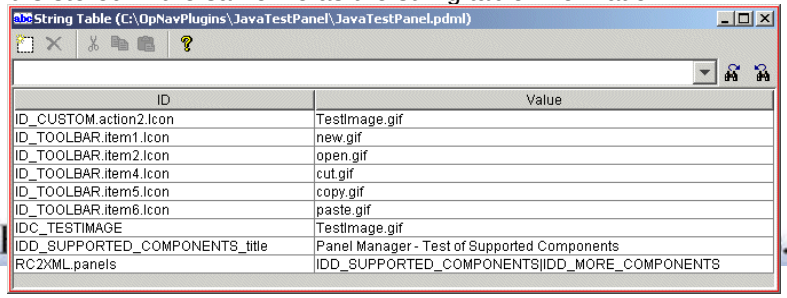
IBM eserver iSeries

- **There are two ways to create panes (deck, split, or tabbed):**
  - **Click on "Insert Deck Pane" in the File window**
    - Do this if you want to insert the pane into another pane.
    - For example, if you have a split pane with a tabbed pane inside of it, you would use this method to create the Tabbed Pane (not the split pane)
  - **Create a panel and click on "Deck Pane" to add a pane to the panel**
    - Do this when you are adding a pane to a panel.
    - For example, if you have a split pane, you would add the split pane to the panel and then specify which panels are in the split pane.

Managing Translatable Text

IBM eserver iSeries

- **GUI Builder provides the String Table function in order to manage translatable text**
- **Use the string table for:**
  - Messages
  - Operations Navigator Menu text and Status bar help for menu items
  - Additional status bar information (e.g. User Hlucke created)
- **What about the text on the panels?**
  - Field text on each panel can be translated
  - Field text does not need to be added to the string table
  - Field text is stored in the same file as the string table information



What types of files does it generate?

Behind the Scenes -- The Files

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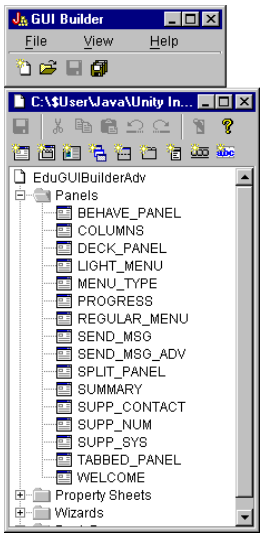
Putting Panels Into Files

IBM @server iSeries

- **Should I split up my panels into multiple files?**
  - Split up the panels based on convenience:
    - n panels == 1 file:
      Easier to manage all of your panels if they are in one file.
    - n panels == 2-3 files:
      You may want to split them into separate files if there are multiple people working on the development. This avoids the circumstance where multiple people need to make changes to the PDML at the same time.
    - n panels == n files:
      It is not recommended that you place each panel in a separate file. You'll spend a lot of time managing the files themselves
  - Size of the PDML file does NOT affect run-time performance. Serialized panel files (not the PDML files) are used during run-time.
  - Each PDML file == HTML file for Help



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Files generated by GUI Builder

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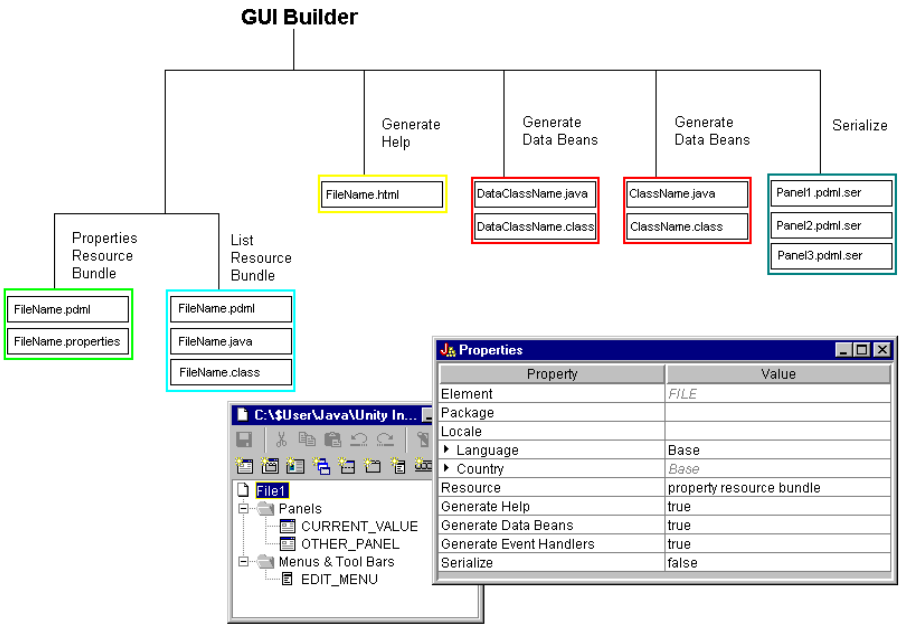


Files generated by GUI Builder

IBM @server iSeries

- **Properties Resource Bundle**
  - By default, it uses the Properties Resource Bundle which will create two files for you:
  - FileName.pdml -- holds the panel definition information, such as the type of fields, their location, etc.
  - FileName.properties -- holds all of the translatable text
- **List Resource Bundle**
  - Used to enhance performance of the application.
  - Compiles the panel definitions and translatable text, so performance is better at run-time. However, it will slow down performance in the GUI Builder when previewing panels.
  - This bundle creates three files:
    - FileName.pdml -- holds the panel definition information, such as the type of fields, their location, etc.
    - FileName.java -- holds all of the translatable text
    - FileName.class -- compiled version of FileName.java

Files generated by GUI Builder

IBM @server iSeries

- **Generating Data Beans**
  - Generates data beans (get and set methods) for fields in the PDML.
  - Makes it easy for you to get started on the Java code for the panels.
  - Creates these files for you:
    - DataClassName.java (for each data class specified in the PDML file) -- file with get and set methods for each attribute in the data class
    - DataClassName.class (for each data class specified in the PDML file) -- compiled version of the corresponding .java file
- **Generating Help**
  - Generates ONE help skeleton for the entire PDML file. This help skeleton will be used to write the help.
  - Does not overwrite any existing Help in the Help skeleton.
  - Includes topics for all of the fields specified by the developer to generate help for
  - Creates this file for you:
    - FileName.html

Files generated by GUI Builder

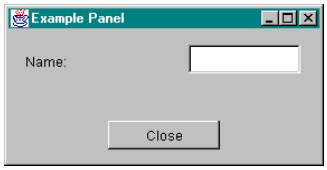
IBM @server iSeries

- **Generates Event Handlers for:**
  - Button Handlers
  - Activation Handlers
  - Double-click Handlers
  - Slider Handlers
- **Context Menu Handlers**
  - Makes it easy for you to get started on the Java code for the panels.
  - Creates these files for you:
    - ClassName.java (for each class specified in the PDML file) -- file with EventHandler code
    - ClassName.class (for each class specified in the PDML file) -- compiled version of the corresponding .java file
- **Serialization**
  - Compresses the information for each window in the PDML file.
  - Enhances performance of your Java panels.
  - Creates these files for you:
    - PanelName.pdml.ser (for each panel in the PDML file)

Data Bean Generation

IBM @server iSeries

- **Creates data bean skeletons (get and set methods) for each data class and attribute specified in the PDML file.**
- **Change the File Properties to Generate Data Beans (true/false)**

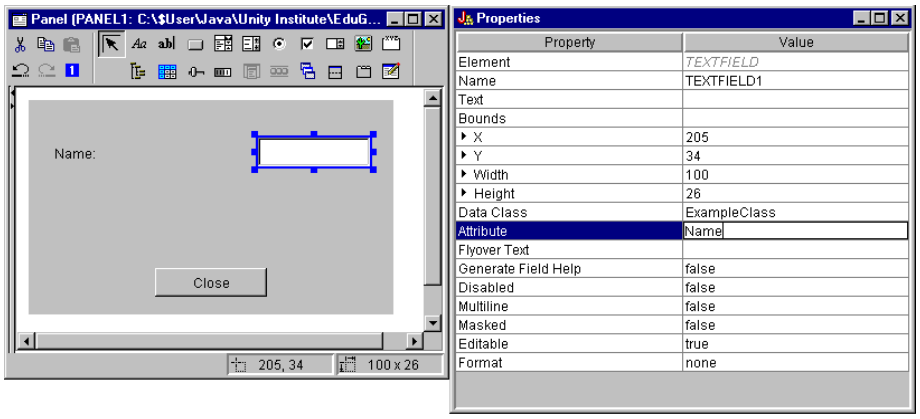



```
import com.ibm.as400.ui.framework.java.*;

public class ExampleClass extends Object implements DataBean
{
   private String m_sName;

  public String getName()
   {      return m_sName;    }

   public void setName(String s)
   {      m_sName = s;   }

   public Capabilities getCapabilities()
   {      return null;   }

   public void verifyChanges()
   {  }

   public void save()
   {  }

   public void load()
   {      m_sName = "";   }
}
```


Data Bean Generation

IBM @server iSeries

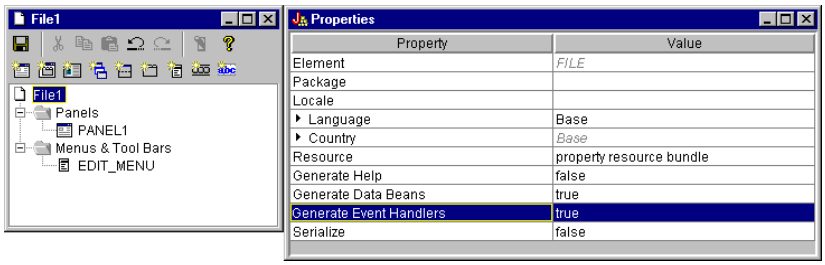
- **Data Class and Attributes**
  - Sends and receives information to and from individual fields on the panels
  - Specify the Data Class and Attribute in the Properties for each field



Event Handler Generation

IBM eserver iSeries

- **Creates event handler skeletons for each type of event handler specified in the PDML file.**
- **Change the File Properties to Generate Event Handlers (true/false)**



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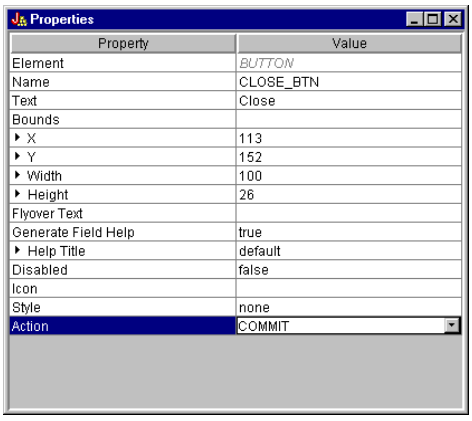
Event Handler: Button

IBM eserver iSeries

- **Button Actions**
  - Specify each button's Action handler in the Properties (by specifying the class name)
  - Three Button Action's are available without having to write a button handler (must specify in Properties):
    - COMMIT -- For OK buttons
    - CANCEL -- For Cancel buttons
    - HELP -- For Help buttons



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Event Handler: Button

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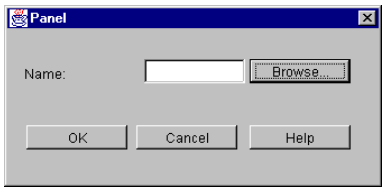
- **Button Handler**
  - Extends Event Handler
  - Implements ActionListener




```
import com.ibm.as400.ui.framework.java.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

public class BrowseName extends EventHandler
   implements ActionListener
{
   public BrowseName(PanelManager pm)
   {
      super(pm);
   }
   public void actionPerformed(ActionEvent e)
   {
      System.out.println(e);
   }
}
```


Event Handler: Activation

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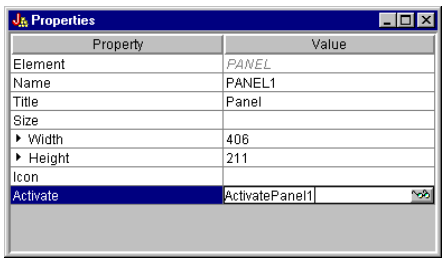
- **Activation Handler**
  - Used to specify what you want to do when the panel appears (hide fields, resize the panel, etc.)
  - Specify the class name in the Activate property for the panel
  - Extends Event Handler
  - Implements ActionListener



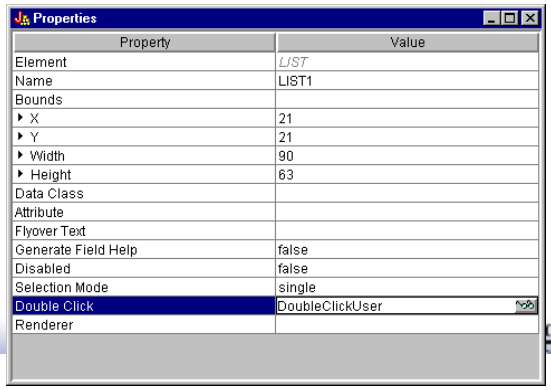

```
import com.ibm.as400.ui.framework.java.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

public class ActivatePanel1 extends EventHandler
   implements ActionListener
{
   public ActivatePanel1(PanelManager pm)
   {
      super(pm);
   }
   public void actionPerformed(ActionEvent e)
   {
      System.out.println(e);
   }
}
```

Event Handler: Double-click

IBM @server iSeries

- **Double-Click Handler**
  - Used to specify what you want to do when the user double-clicks on an item. For example, launch an edit panel when the user double clicks on a user in a list.
  - Specify the class name in the Double-Click property for a List, Table, or Tree
  - Extends Event Handler
  - Implements ActionListener



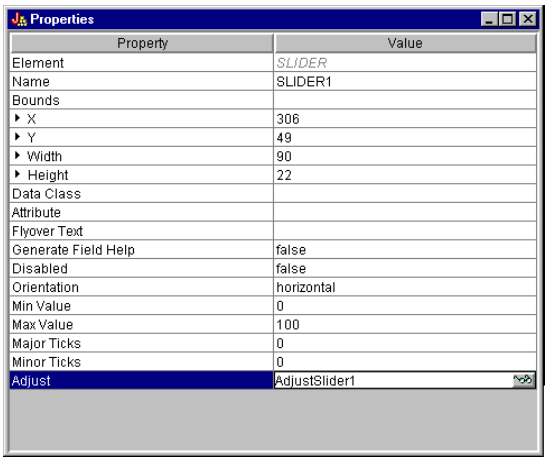

```
import com.ibm.as400.ui.framework.java.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

public class DoubleClickUser extends EventHandle
   implements ActionListener
{
   public DoubleClickUser(PanelManager pm)
   {
      super(pm);
   }
   public void actionPerformed(ActionEvent e)
   {
      System.out.println(e);
   }
}
```


Event Handler: Slider

IBM @server iSeries

- **Slider Handler**
  - Used to specify what you want to do when the user changes the value in the slider control on a panel.
  - Specify the class name in the Adjust property for a Slider



Event Handler: Slider

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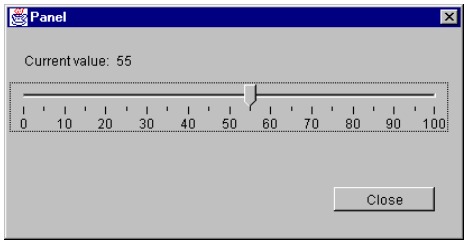
- **Slider Handler**
  - Extends Event Handler
  - Implements ChangeListener




```
import com.ibm.as400.ui.framework.java.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

public class AdjustSlider1 extends
EventHandler
   implements ChangeListener
{
   public AdjustSlider1(PanelManager pm)
   {
      super(pm);
   }
   public void stateChanged(ChangeEvent e)
   {
      System.out.println(e);
   }
}
```

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Event Handler: Context Menu

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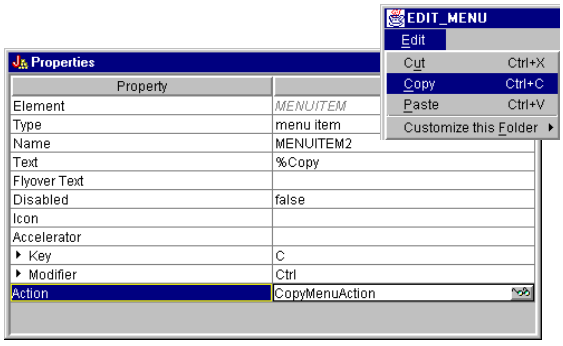
- **Context Menu Handler**
  - Used to specify what you want to do when the user selects the menu item.
  - Specify the class name in the Action property for each menu item.
  - Extends Event Handler
  - Implements ActionListener




```
import com.ibm.as400.ui.framework.java.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import javax.swing.event.*;

public class CopyMenuAction extends
ActionHandler
   implements ItemListener
{
   public CopyMenuAction(MenuManager mm)
   {
      super(mm);
   }
   public void actionPerformed(ActionEvent e)
   {
      System.out.println(e);
   }
   public void itemStateChanged(ItemEvent e)
   {
      System.out.println(e);
   }
}
```

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Help Generation

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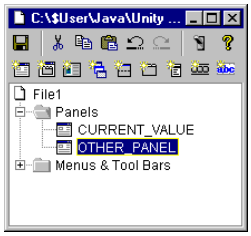
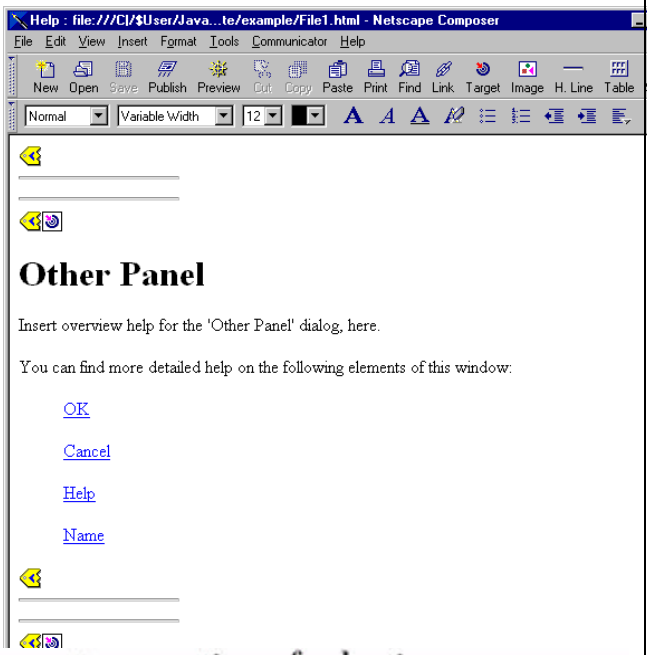
- **Creates ONE help skeleton for all of the panels in the PDML file**
- **Help skeletons can be used by the help writer (not necessarily the developer) to build the help for each panel**





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Help Generation

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- **Generate Help & Help Title**
  - Help Generation is now developer-specified in the properties for each field.
  - You can generate help for any field. The Help title specifies what text will be used as the topic ID in the help file. "DEFAULT" indicates that it will use the Label text.
  - The Generate Help condition is set to TRUE by default for the following fields:
    - radio buttons
    - checkboxes
    - group boxes
    - buttons
    - label

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Help Generation

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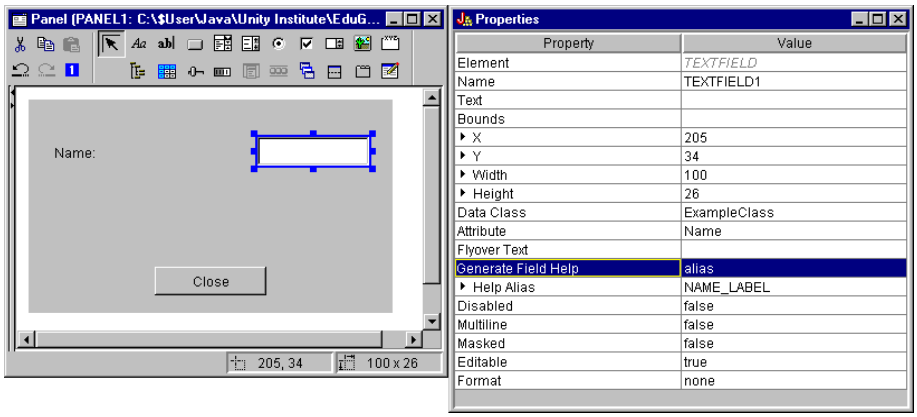
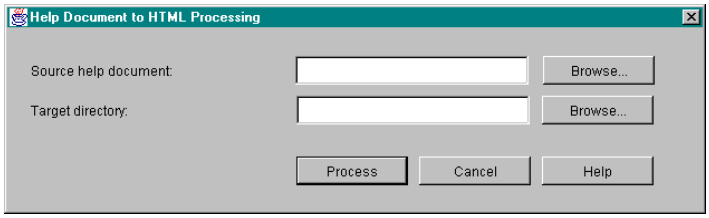
- **Help Alias**
  - Points to another field which already has help, such as a label that ends with a colon
  - Specify the Help alias in the Properties



Help Generation

IBM @server iSeries

- **hdoc2htmViewer tool**
  - Located in uitools.jar: com.ibm.as400.ui.tools.hdoc2htmViewer
  - Use this tool after the help is written to separate the help file into multiple files
  - This tool must be run for Help to appear during run-time.



Summary

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- **Overview**
  - XML & PDML overview
  - PCML
  - How it all fits together
  - Operations Navigator plug-in support
  - Where to get more information
- **What is the Java GUI Builder**
  - Advantages
  - Java development tools
  - GUI Builder requirements
  - Customizing the GUI Builder
- **Creating & editing panels**
  - Window types
  - Control / field types
  - Field properties
  - Recommended Naming conventions
  - Selected & Deselected
  - Tab order
  - Cut, copy, paste
  - Alignment and spacing
- **Window Types**
  - Property sheets
  - Wizard
  - Menus & Menu bars
  - Toolbars
  - Deck panes
  - Split panes
  - Tabbed panes
- **Generating Files**
  - Generated files
  - Translatable text
  - Databean generation
  - Event handler generation
    - Buttons
    - Activation
    - Double-click
    - Slider
    - Context menu
  - Help generation
- **Exercises**

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Summary

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Any questions?

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Exercises: Using the GUI Builder

Hands-on practice with the GUI Builder

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Exercises

IBM @server iSeries

- **These exercises are intended to give you some experience with the GUI Builder so that you are familiar with how it works**
- **The Objectives of these Exercises:**
  - Install the GUI Builder (at least V4R5) and get it up and running
  - Build a simple panel
  - Try different types of fields
  - Add conditional behaviors to the fields
  - Update the String Table

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Exercises

Simple Panels & String Table

Exercises -- Simple Panels & String Table

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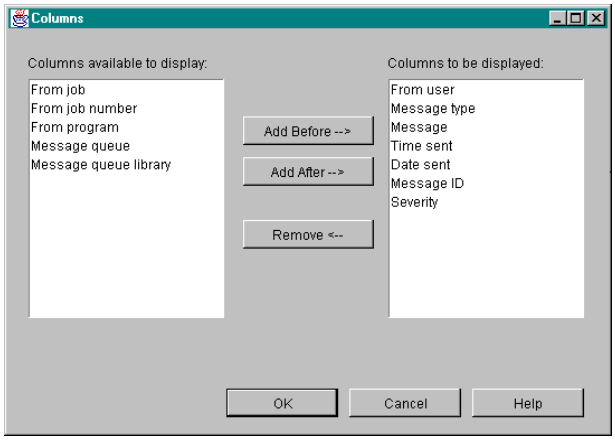
- **Build the following panels. After building each panel, preview the panel and verify that you can answer all of the questions for each panel.**
  - Tips to keep in mind while creating the panels:
    - Right click -- there are context menus in many places
    - Double click to edit a field
    - Use the Preview function to verify the panel is working as expected
    - F1 can be used to bring up help

Exercises -- Panels

IBM @server iSeries

- **Panel: Columns**



Preview questions

- ✔ Can you select multiple items in the listboxes?
- ✔ Is OK the "default" button (extra black outline around it)?
- ✔ Is the tab order correct (see tabbing order slide)?

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Exercises -- Panels

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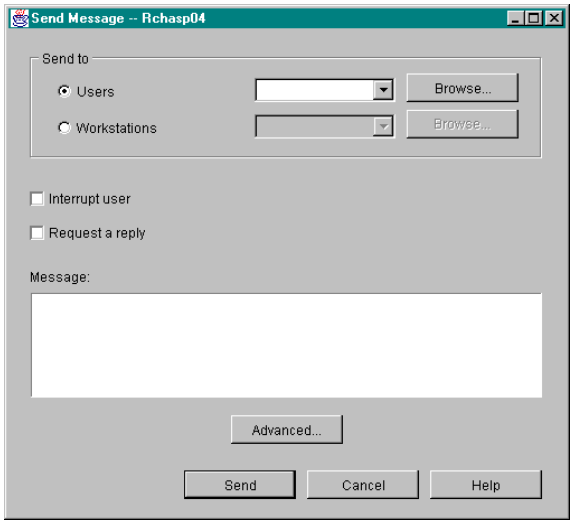
- **Panel: Send Message**



Preview questions

- ✔ Can you only select one radio button at a time?
- ✔ Can you check both checkboxes?
- ✔ Is Advanced centered in the panel?
- ✔ Can you type multiple lines in the Message area?
- ✔ Can you type a user name or workstation name into the drop down boxes?

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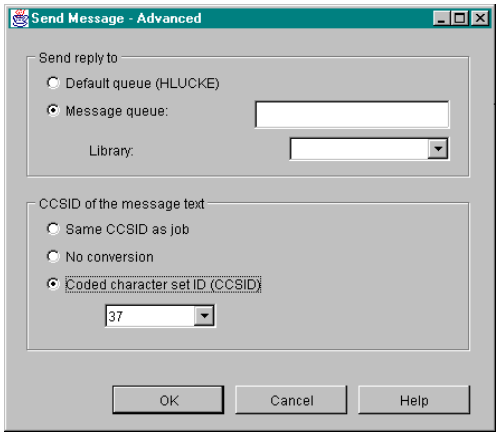
Exercises -- Panels

IBM @server iSeries

- **Panel: Send Message - Advanced**



Preview questions

- ✔Can you only select one radio button for each group box?
- ✔Can you type in a library name?
- ✔Do both comboboxes contain the right choices?
- ✔Can you type in a Message queue?

For Library, use the following choices in the drop down:

- Library list, Current library

For CCSID, add a choice in the drop down for each of the following numbers:

- 37, 256, 273, 277, 278, 280, 284

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Exercises -- String Table

IBM @server iSeries

- **String table -- Add the following strings to the string table**

  - ▶Are you sure you want to delete user DSchmidt?
  - ▶P&roperties
  - ▶Displays the properties of the selected items.
  - ▶{0} of {1} files copied to Clipboard

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Exercises

Advanced Panels & Menus

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Exercises -- Advanced Panels & Menus

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- **The following exercises demonstrate some of the advanced features of the GUI Builder. These exercises are recommended, but are not required.**
- **The following exercises demonstrate how to create and use a**
  - Wizard
  - Tabbed Pane
  - Split Pane
  - Deck Pane
  - Menu
- **Keep in mind that throughout the next few exercises, you will be able to reuse many of the panels for each different type of advanced panel.**

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Exercises -- Properties

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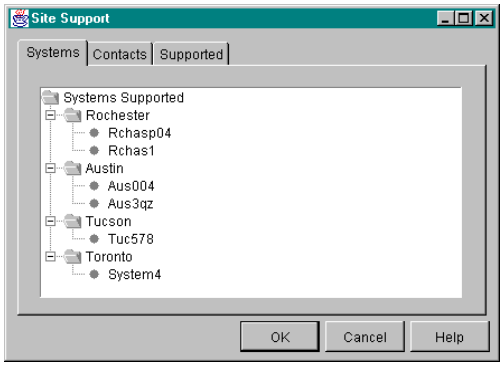
- **Panel: Site Support -- Systems**



Preview questions

- ✔ Does the panel title say "Site Support"?
- ✔ Does the tab title say "Systems"?

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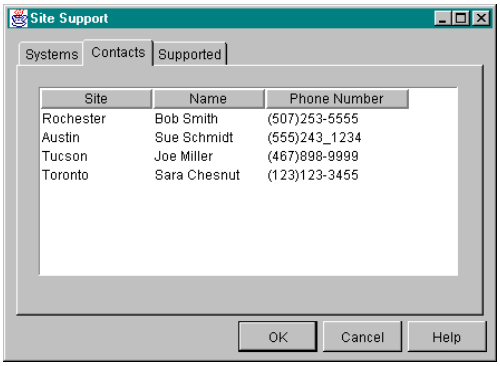
Exercises -- Properties

IBM @server iSeries

- **Panel: Site Support -- Contacts**



Make all columns, except "Site" editable.

Preview questions

- ✔ Can you change the information about the contact?
- ✔ Is the column for the site read-only?

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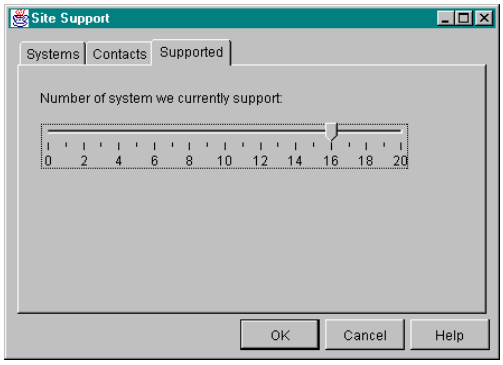
Exercises -- Properties

IBM @server iSeries

- **Panel: Site Support -- Support**



Preview questions

- ✔ Do the tick marks show up correctly?

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Exercises -- Wizard

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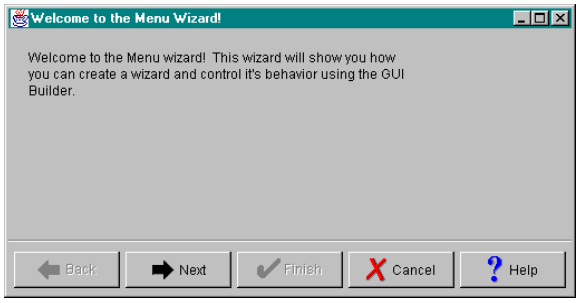
- **Wizard: Restaurant -- Welcome Panel**



Preview questions

- ✔ Have you told the wizard not to show the steps?

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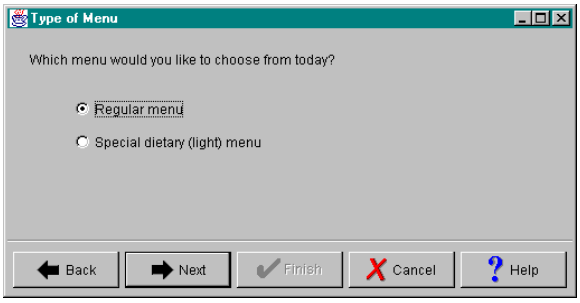
Exercises -- Wizard

IBM @server iSeries

- **Wizard: Restaurant -- Menu Type Panel**



Preview questions

- ✔ Can you only select one radio button?

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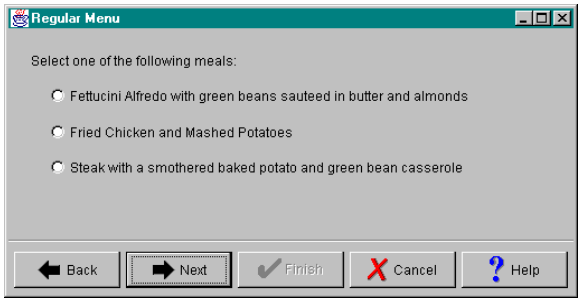
Exercises -- Wizard

IBM @server iSeries

- **Wizard: Restaurant -- Regular Menu Panel**



Preview questions

- ✔ Can you only select one radio button?

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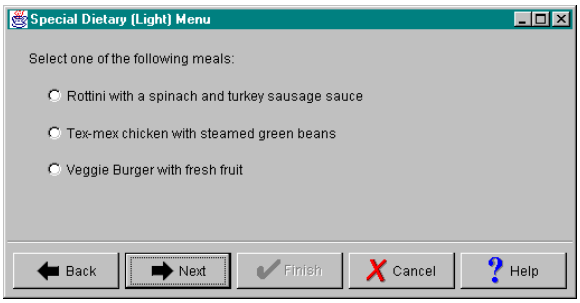
Exercises -- Wizard

IBM @server iSeries

- **Wizard: Restaurant -- Light Menu Panel**



Preview questions

- ✔ Can you only select one radio button?

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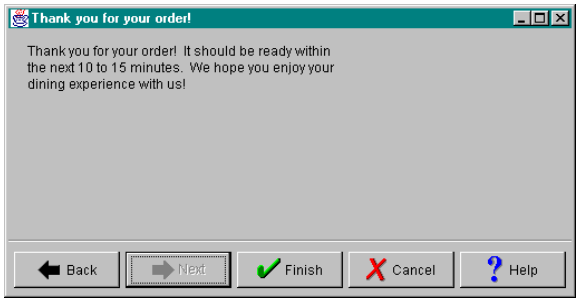
Exercises -- Wizard

IBM @server iSeries

- **Wizard: Restaurant -- Summary Panel**



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Exercises --Tabbed Pane

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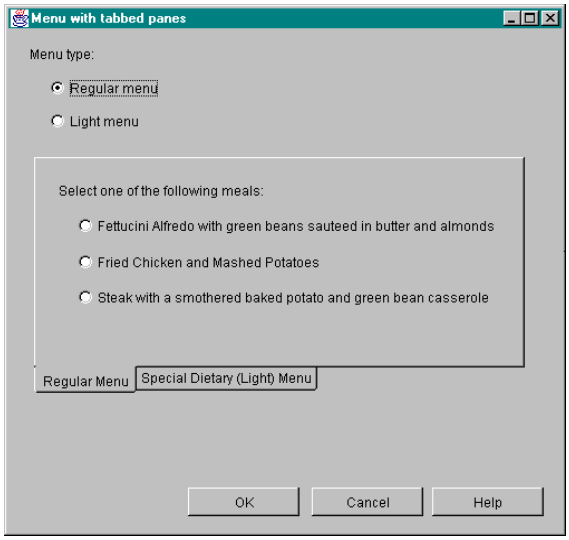
- **Tabbed Panes: Restaurant**



Preview questions

- ✔ Are the tabs displayed at the bottom left corner?
- ✔ Are the OK, Cancel, and Help buttons displayed?
- ✔ Do the tabs change when you switch between the menu type radio buttons?

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Exercises --Split Pane

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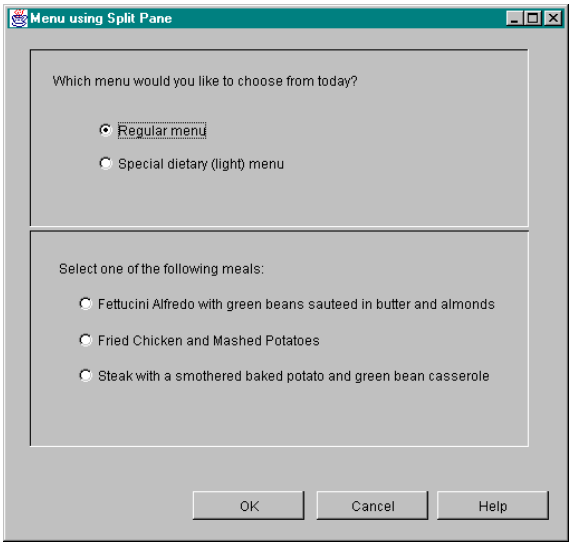
- **Split Pane: Restaurant**



Preview questions

- ✔ Are the OK, Cancel, and Help buttons displayed?
- ✔ Does the menu in the bottom pane change when you switch between the menu type radio buttons? (Hint: the bottom pane needs to be a deck pane in order for it to change)

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Exercises --Deck Pane

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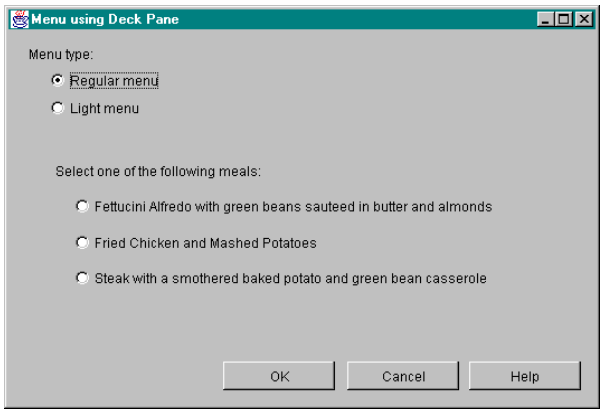
- **Deck Pane: Restaurant**



Preview questions

- ✔ Are the OK, Cancel, and Help buttons displayed?
- ✔ Does the menu change when you switch between the menu type radio buttons? (Hint: you need to create a deck pane on the panel in order for it to switch)

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Exercises -- Menu

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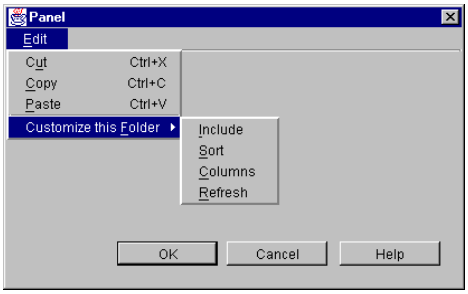
- **Panel with a menubar**



Preview questions

- ✔ Does the menu bar item say "Edit"?
- ✔ Do all of the menu options have mnemonics (underlined characters)?
- ✔ Do Cut, Copy, and Paste have accelerators?
- ✔ Is "Customize this Folder" a cascading menu?

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Exercises

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Congratulations!

You have completed the GUI Builder exercises.

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