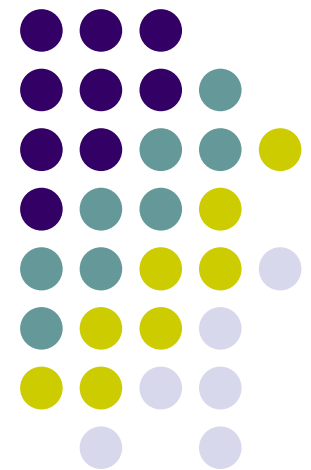


Tips Tricks and Techniques for Efficient LabVIEW Development

Presented by Nick Golas
Telephonics Corp.

IEEE I&M Society LI Section &
Long Island LabVIEW Users Group (LILUG)

Thursday 12/06/2007



Use the Right Tool Automatically



- Use the Automatic Tool Selection in the Tools Palette to avoid manually switching among many tools



Operate Value Tool



Position/Size/Select Tool



Edit Text Tool

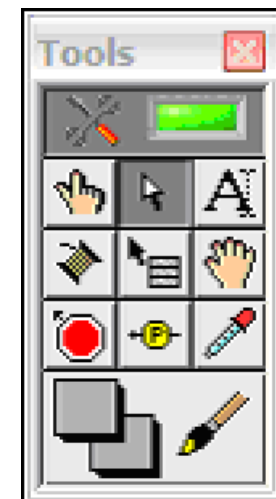


Connect Wire Tool

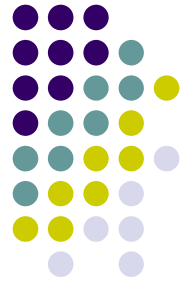


Automatic
Tool
Selection

Tools Palette



Access the Tools Palette Quickly







- Hold the <Shift> key and right-click to display a temporary version of the Tools Palette at the location of the cursor





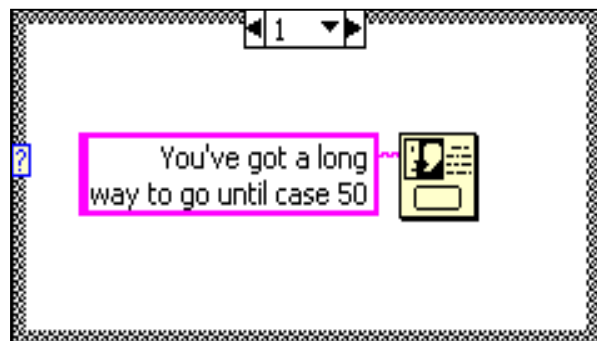
Easily Scroll Through Structures

➤ You can use **Ctrl + Mouse Scroll** to scroll through:

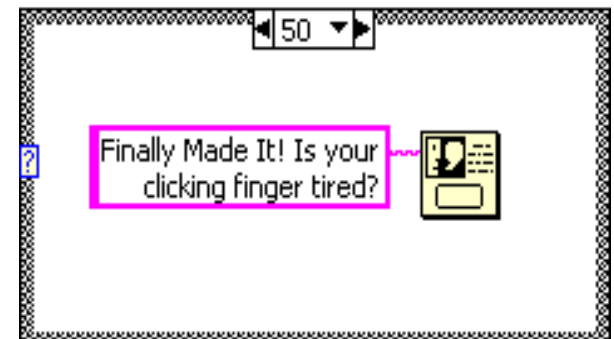
- Case Structures 
- Event Structures 
- Stacked Sequence Structures 
- Diagram Disable Structures 



Filename: Easily Scroll Through Structures LV8.5.vi



Ctrl + Mouse Scroll Wheel





Case Structure with Integer Selector

- Using the Labeling tool enter a single value or lists and ranges of values in the case selector label

Some Examples:

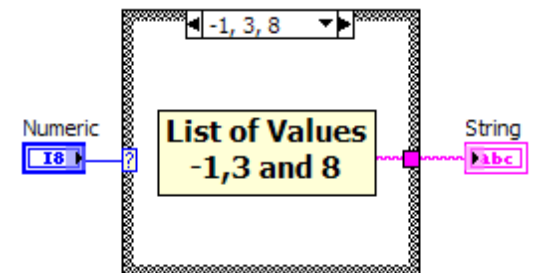
Numeric Range 1..20 → All Numbers from 1 through 20 Inclusively

Lists -1,3,8 → -1,3 and 8, Use Commas to Separate Values

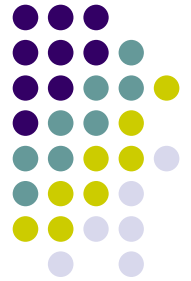
Open-ended ..4 → All Values Less or Equal to 4

Ranges 4.. → All Values Greater or Equal to 4

Default 20, Default → 20 and all values that are not set in other cases



Retain Wire Data Values in Wires



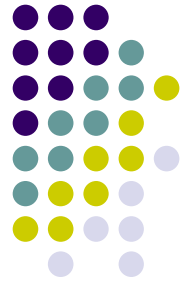
- Select **Retain Wire Values** on the toolbar to have LabVIEW store the last data item that flowed through any wire in the VI



- Use the **Probe Data** tool available on the Tools Palette to click on the wire of interest and obtain the last value through

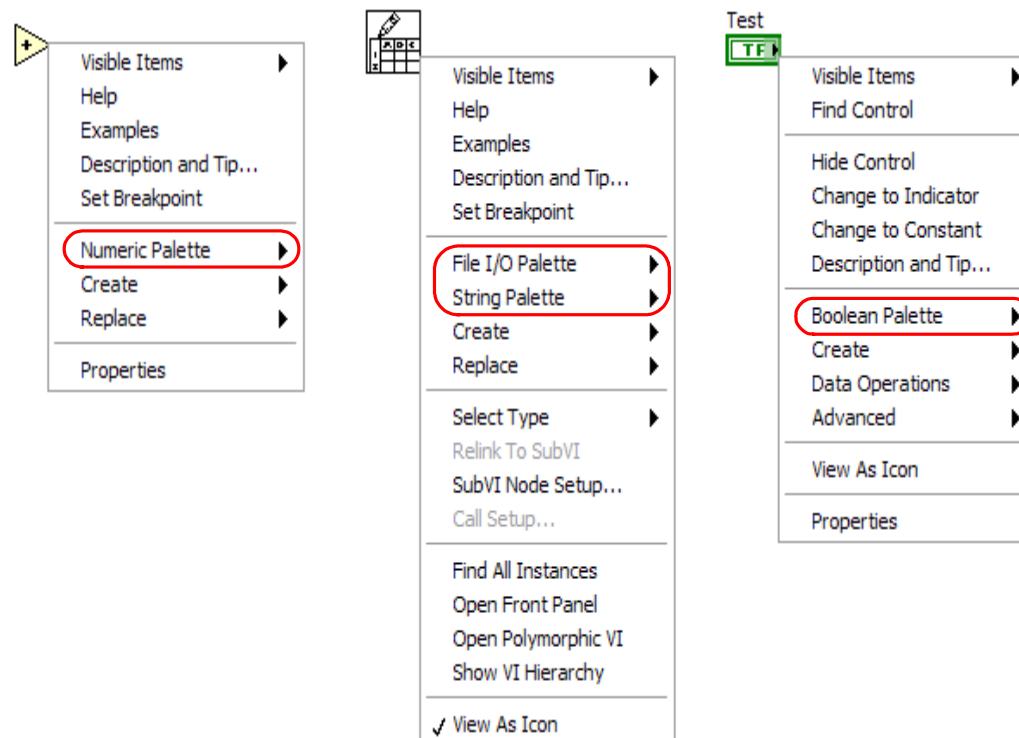


Filename: LV 8.5 Example Build String.vi



Quickly Find the Right Palette

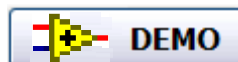
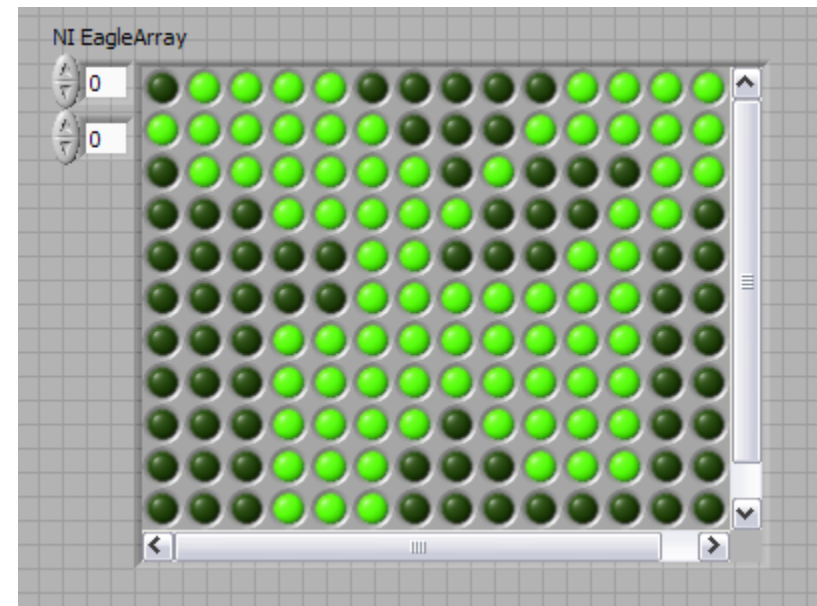
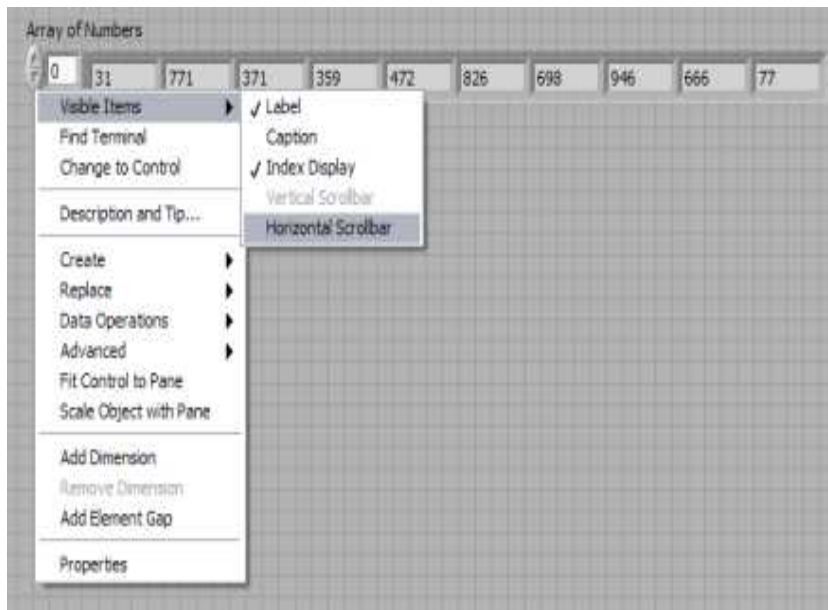
- Right-click on an object in the block diagram to get its palette shortcut





Navigate Large Arrays Easily

- Right-click on an array and select **Visible Items >> Horizontal Scrollbar**
- To view last element, select **Advanced >> Show Last Element**
- Both horizontal and vertical scrollbars available (depending on view)

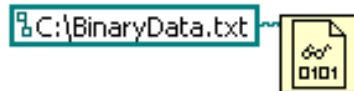
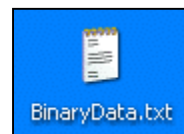


Filename: Navigate Arrays LV8.5.vi

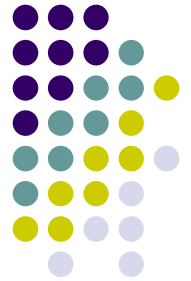


Drag and Drop to Save Time

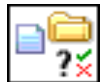
- Drag an image into your VI icon
- Select a file and drag into a path constant
- Take a URL from Internet Explorer and drag into a string constant
- Drag items from disk or Project Explorer into a LabVIEW block diagram



Utilize Advanced File I/O Functions



- **Note:** These New File I/O VIs are available in LabVIEW 8.20 or later



Check If File or Folder Exists → Checks whether a file or folder exists



Recursive File List → Obtain a listing of files and folders in a directory or LLB



Get File Extension → Retrieve the file extension of a file you specify



Compare Two Paths → Get the relative path from one file to the next



Generate Temporary File Path → Create unique file path in the temporary directory



MD5 Checksum File → Compute the MD5 message-digest of a file



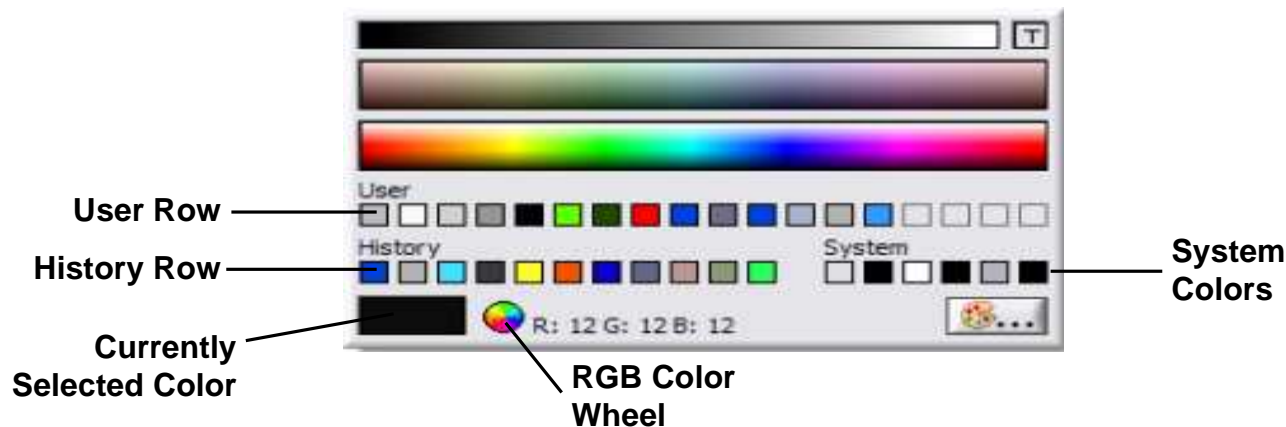
Demystify the LabVIEW Color Picker Part I



- **Grayscale Bar** – Select pure black, pure white, or any shade of gray in between. Good choice for panel backgrounds
- **Earth Tones/Muted Bar** - Colors for medium to large size objects
- **Highlight Bar** – Used these colors sparingly, one or two per panel to help draw attention to small objects
- **Transparent** - make front panel objects transparent to layer multiple controls and indicators so that they appear in the same place when a user selects a particular option
- **More Colors** - Select a specific color using the color utility on the operating system



Demystify the LabVIEW Color Picker Part II

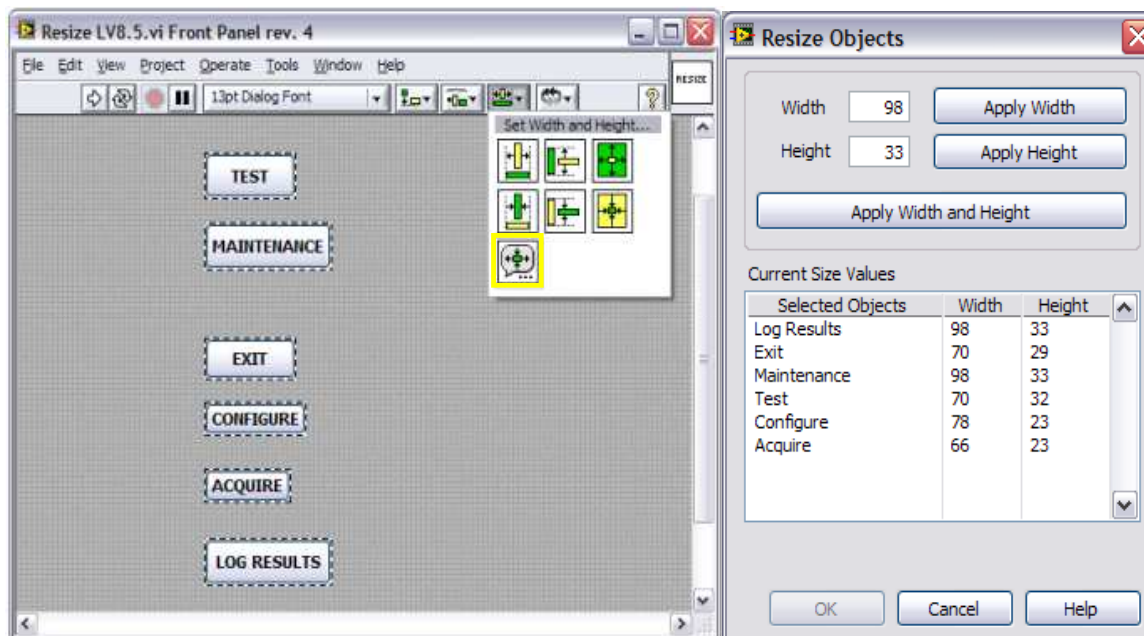


- **User Row** – Contains colors that you can define in **Tools>>Options**. Handy if you want to use the same RGB colors frequently
- **History Row** – Helps you re-use colors that you selected recently
- **System Colors** – Allows you to set the appearance of a front panel to match the system colors of any computer that runs the VI
- **Currently Selected Color** – Displays the currently selected color. Objects that have foreground and background colors display the foreground color in the left half of this box and the background color in the right half
- **RGB Color Wheel** - To the right of that it either displays the RGB value or the name for User colors and System colors that is the **Currently Selected Color**



Be Precise: Resize Objects Dialog Box

- On the Front Panel select all objects you want to resize using the position/size/select tool or use **<Ctrl-A>** in LabVIEW 8.0 or later. On the Resize Objects ring choose the "Set Width and Height..." on the VI's toolbar. The Resize Objects dialog box appears, which allows you to change the width and height or both of the selected objects
- On the Distribute Objects ring select the Vertical Centers option to distribute the objects evenly on the Front Panel

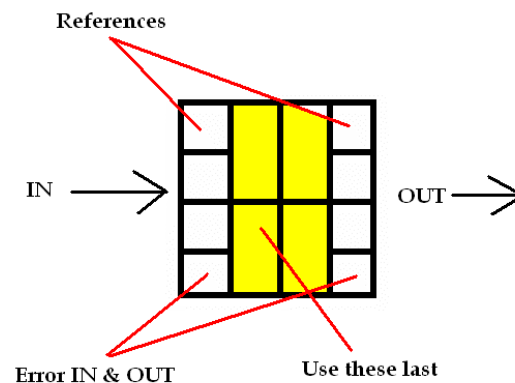


Filename: Resize LV8.5.vi

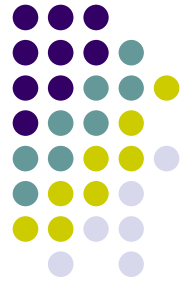
Design/Architecture – Main & SubVIs



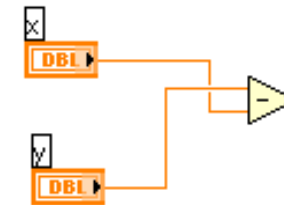
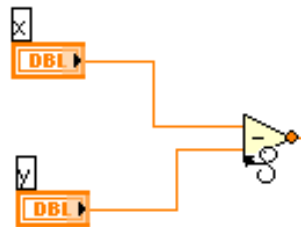
- Code should not use more than one screen
- Arrange controls to resemble the connector assignments
- Use the 4x2x2x4 connector to pass data between VIs (default connector pane starting with LabVIEW 8.0)
- Apply consistent fonts and capitalization
- Maximize the contrast between text color and background color



Switch Terminal Wires Easily Using the 'Switcheroo' Tool



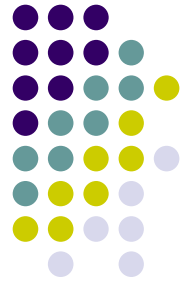
Hold Down **Ctrl**
and **Left-Click** on Input Terminal



Filename: Switcheroo LV7.1.vi

Note: This works only for functions with two inputs when both inputs have already been wired and when using the Auto Tool or Wiring Tool

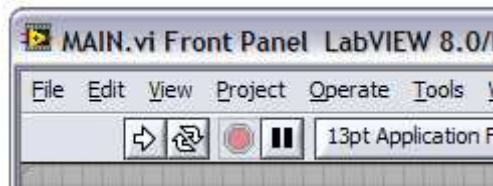
Display the LabVIEW.exe Version and VI Path in the VI Title Bar



- If you are working with multiple versions of LabVIEW place the following line in your LabVIEW.INI file to identify the version currently used:

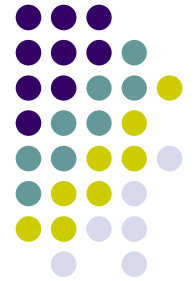
showExePathInWindowTitle=True

- It will display the LabVIEW.exe Version and the path to the current VI in the VI Title Bar



Note: Works in
LabVIEW 8.0 or later

Change the Default Connector Pane in LabVIEW



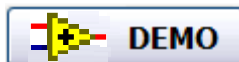
- If you need to change the default con pane for LabVIEW 8.0 which is 4x2x2x4 to 5x2x2x2x5 place the following line in your LabVIEW.INI file:



defaultConPane=4833

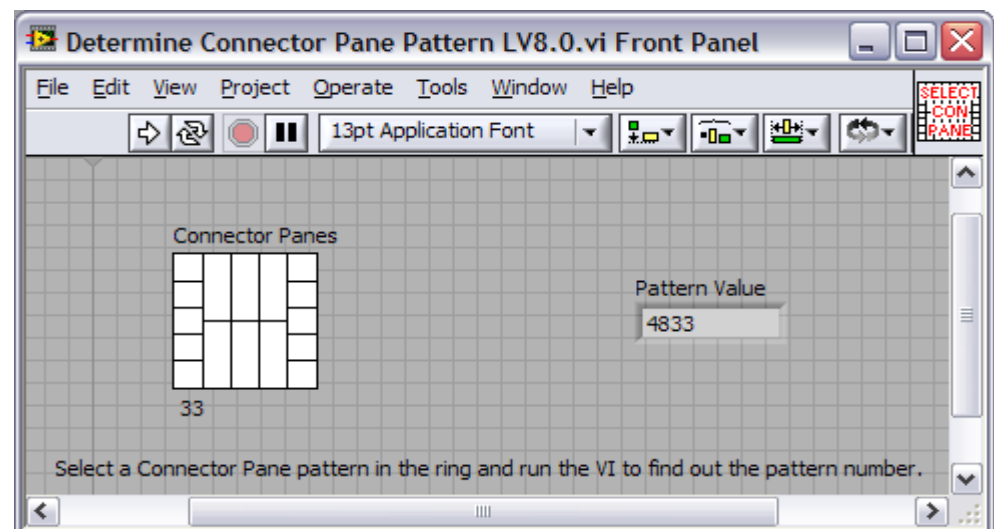
- The number inside the brackets represents the value obtained from the VI:
Determine Connector Pane Pattern LV8.0.vi
- If you prefer the LabVIEW 7.x and earlier behavior, where the pattern is auto selected to match the number of front panel controls/indicators, you can use

defaultConPane=-1



Filename: Determine Connector Pane Pattern LV8.0.vi

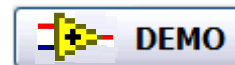
Note: Works in LabVIEW 8.0 or later



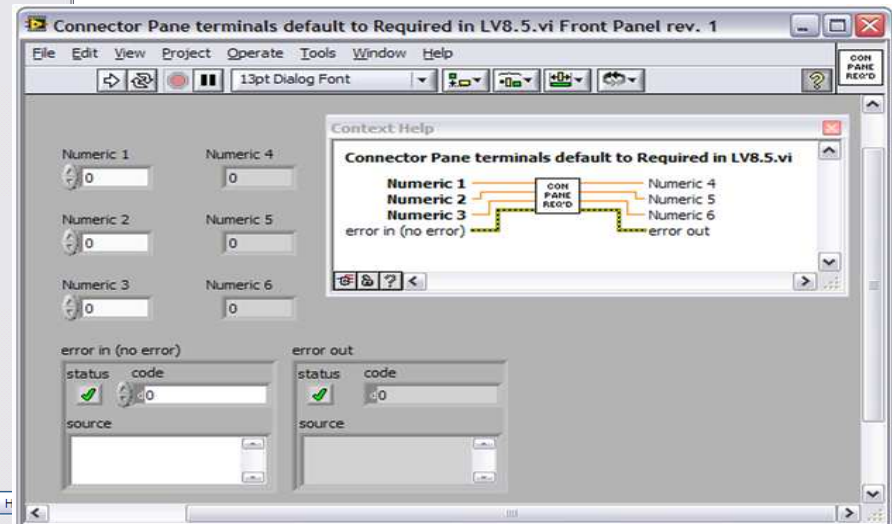
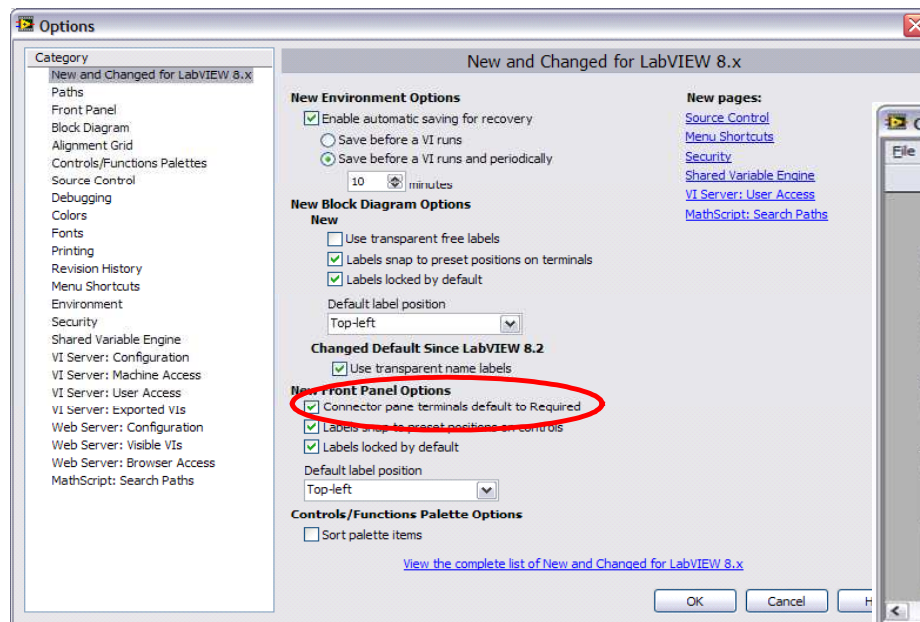
Connector Pane Terminals Default to Required in LabVIEW 8.5



- Select the new 'Connector pane terminals default to Required' option in **Tools >> Options...**
- This option sets new terminals connected on any VI's connector pane to Required (except error controls) instead of Recommended. This applies to connections made using the wiring tool and to subVIs created using **Create SubVI**.



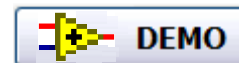
Filename: Connector Pane terminals default to Required in LV8.5.vi



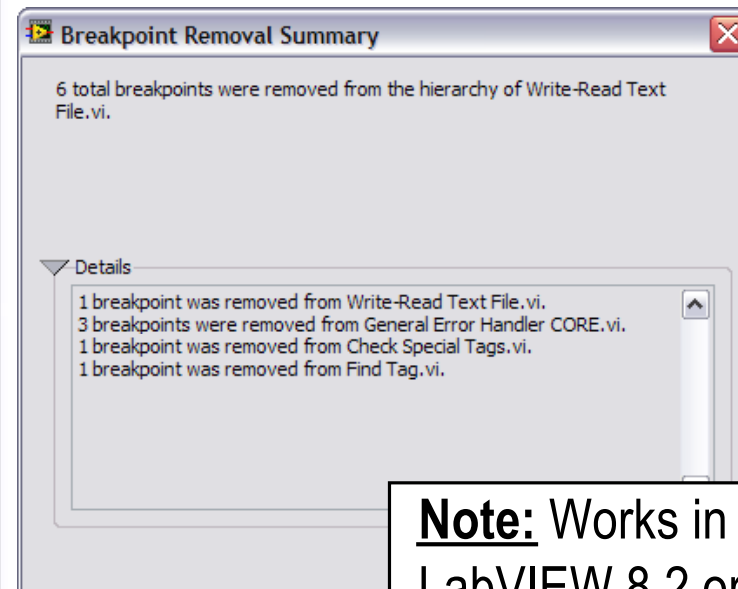
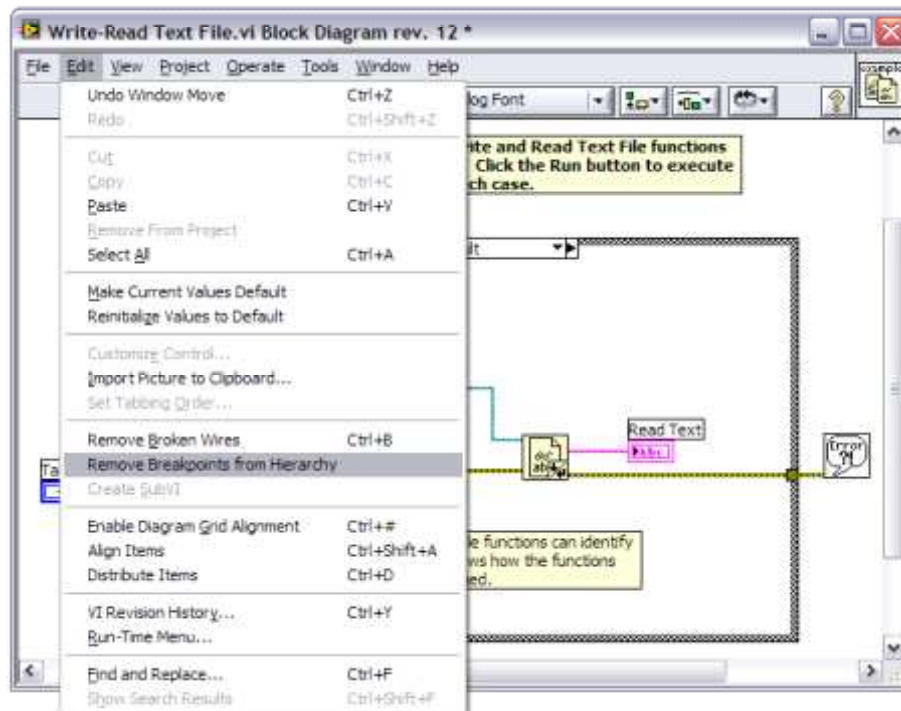


Remove Many Breakpoints

- Select **Edit >> Remove Breakpoints from Hierarchy**
- A Breakpoint Removal Summary will display all breakpoints removed
- Great tool for removing all breakpoints after debugging a section of code



Filename: Write-Read Text File LV8.5.vi

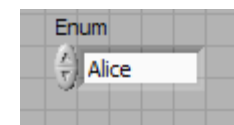
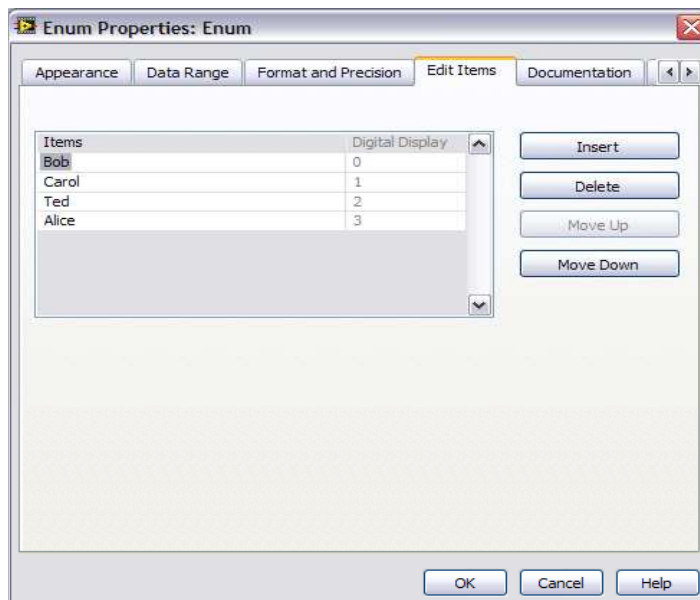


Note: Works in LabVIEW 8.2 or later



Add Enumeration Items Easily

- Press **Ctrl** while over Enum and click inside in order to use the Edit Text Tool
- Use **Shift + Enter** to repeatedly add items
- This convenient trick also works for Rings

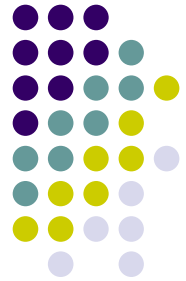


Shift + Enter



Change the Windows File Dialog

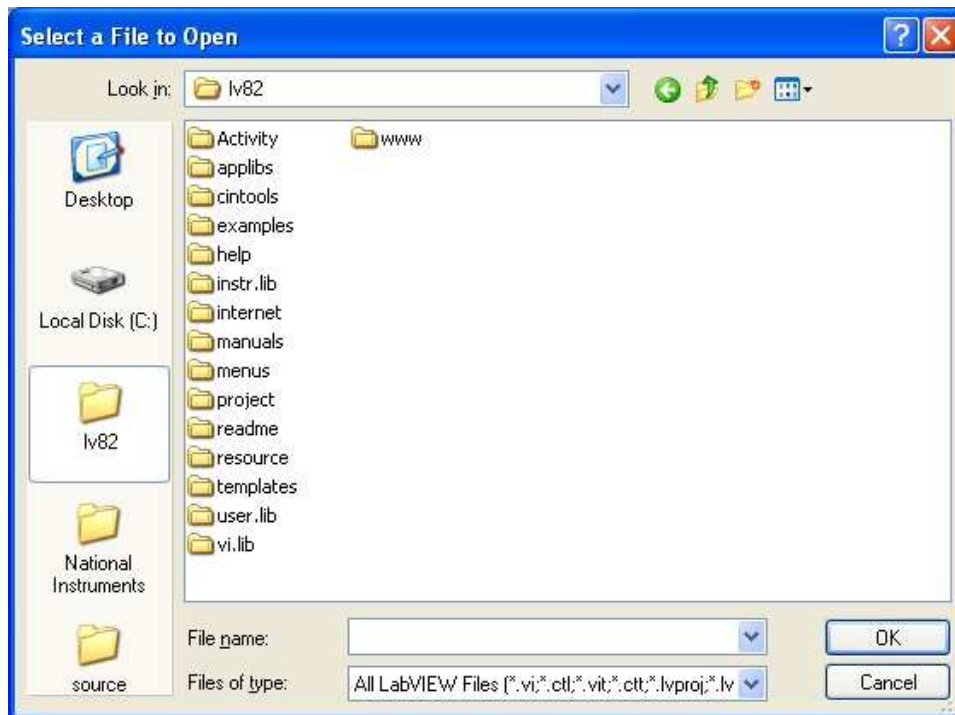
(to contain recently used folders in LabVIEW)



- Add the following line in your LabVIEW.INI file to identify the version currently used:

MRUFolders=True

- Access to the last 5 directories used in LabVIEW conveniently



Note 1: Works in
LabVIEW 8.2 or later

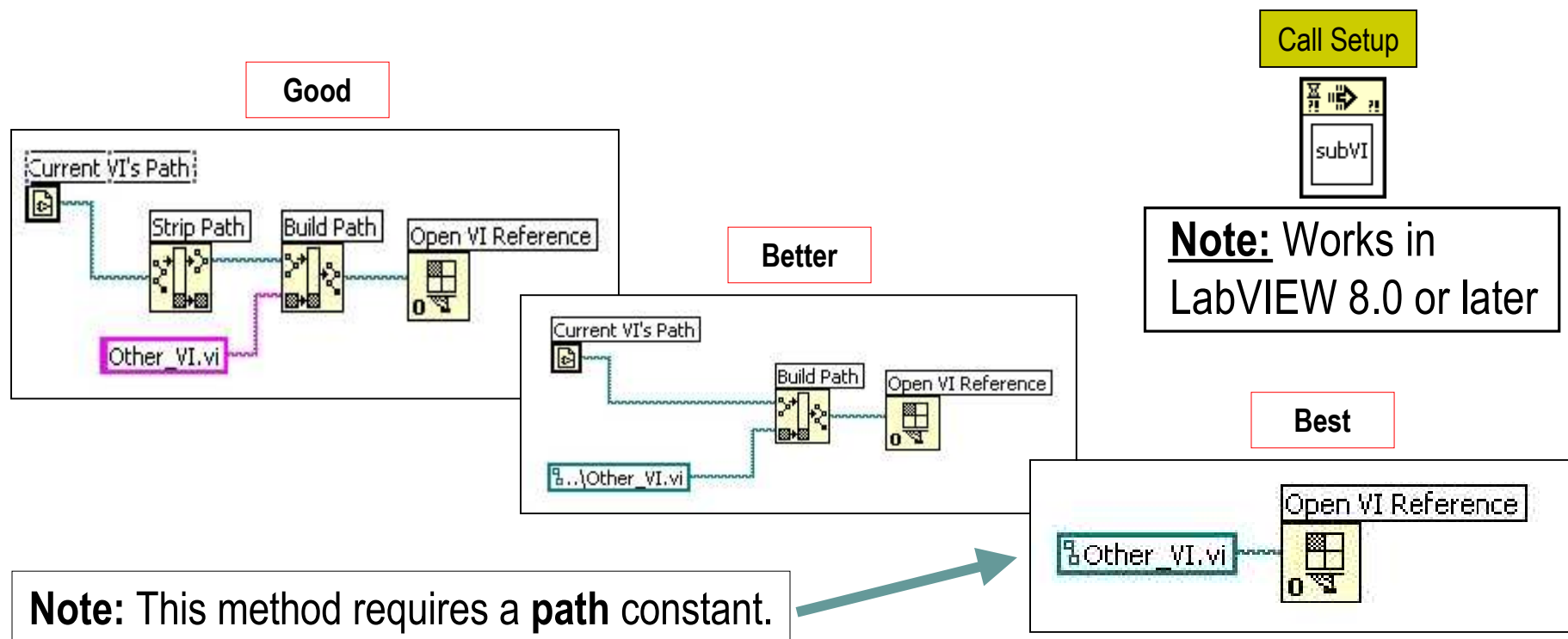
Note 2: Overrides
TweakUI settings

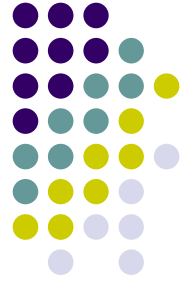


Quickly Open a VI Reference

(next to current VI on disk)

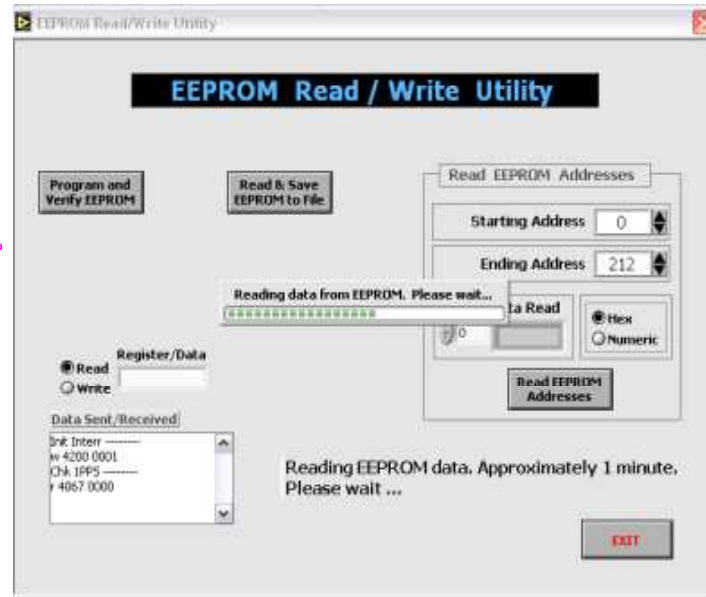
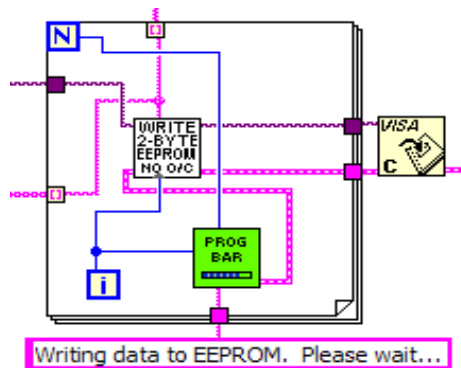
- LabVIEW automatically looks in the current directory
- Right-click on VI and select Call Setup to call it dynamically





Implement a For Loop Progress Bar

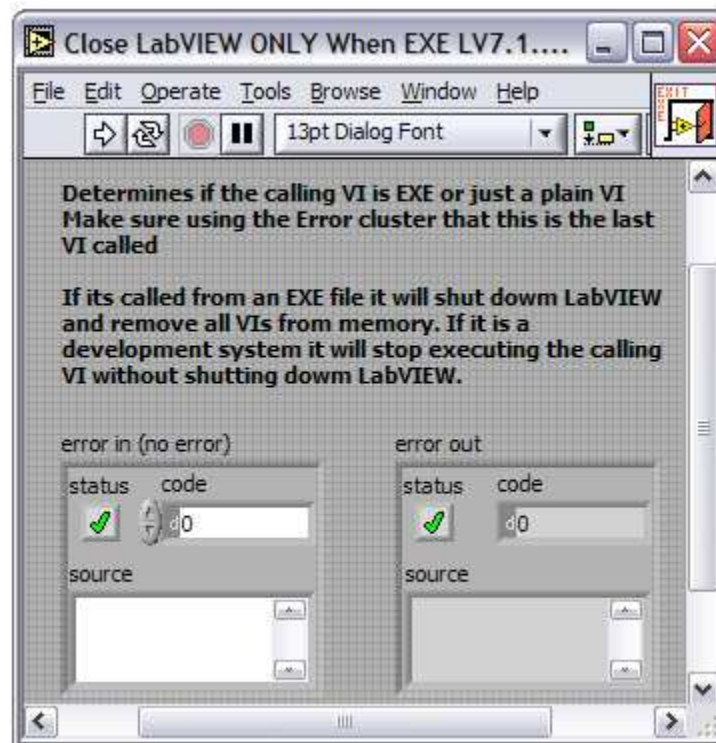
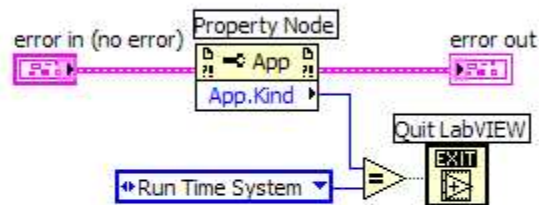
- Place Progress Bar VI inside a For Loop
- Opens automatically after a specified amount of time
- Filename: For Loop Progress Bar LV7.0.vi

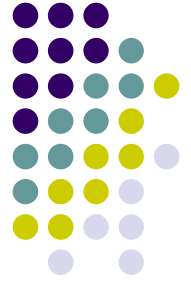




Close LabVIEW Programmatically if EXE

- Use Filename: Close LabVIEW ONLY When EXE LV7.1.vi





Icon Tips Part I

➤ Icon Editor Tools



Pencil — Draws and erases pixel by pixel. **TIP:** To draw horizontal or vertical lines, press the **<Shift>** key while you use this tool to drag the cursor.



Line — Draws straight lines. **TIP:** To draw horizontal, vertical, and diagonal lines, press the **<Shift>** key while you use this tool to drag the cursor



Color Copy — Copies the foreground color from an element in the icon. Automatically returns to the tool you were using before you selected the Color Copy tool.



Fill — Fills an outlined area with the foreground color



Rectangle — Draws a rectangular border in the foreground color. **TIP:** Double-click this tool to frame the icon in the foreground color



Filled Rectangle — Draws a rectangle with a foreground color frame and filled with the background color. **TIP:** Double-click this tool to frame the icon in the foreground color and fill it with the background color



Select — Selects an area of the icon to cut, copy, move, or make other changes. **TIP:** Double-click this tool and press the **<Delete>** key to delete the entire icon

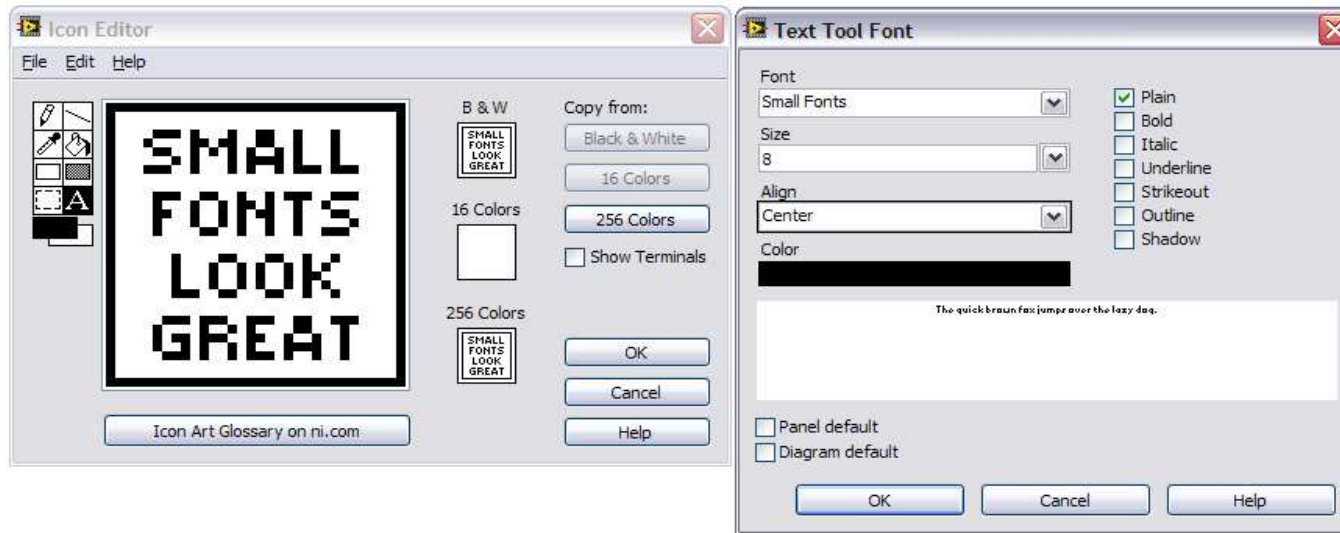


Text — Enters text into the icon. **TIP:** Double-click this tool to select a different font. **TIP:** While still typing and before selecting another tool you can move the text around pixel by pixel by pressing the arrow keys

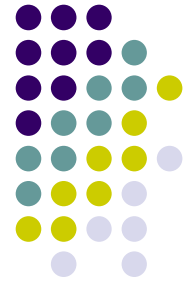


Foreground/Background — Displays the current foreground and background colors. Click each rectangle to access a color picker from which you can select new colors to use

Icon Tips Part II



- Select the SMALL FONTS font & use CAPS with size 8. Fit up to 4 lines of text
- After selecting a rectangle area on the icon paste anything from the clipboard (image, text, control) into the Icon Editor and have it automatically resized to fit area set
- Holding down the **<Ctrl>** key will switch to the **Color Copy** (Eyedropper) selection tool
- Copy an image to a VI icon by dragging the image file and place it on the icon located in the upper right corner of the Front Panel or Block Diagram



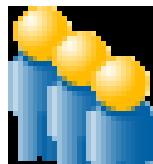
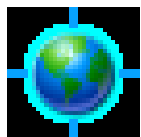
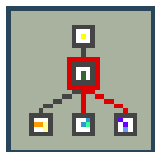
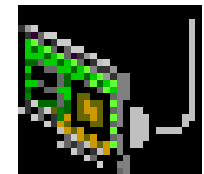
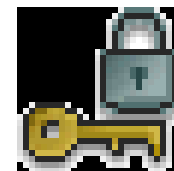
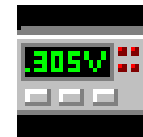
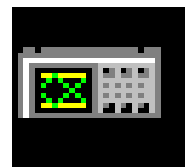
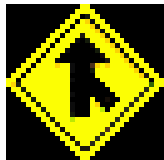
Icon Tips Part III

- National Instruments Icon Library

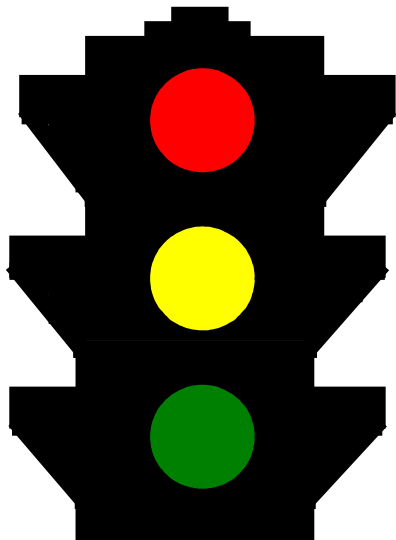
http://www.ni.com/devzone/idnet/library/icon_art_glossary.htm

This resource offers you a selection of over 500 pre-made icons that you can download and use for free in your own VIs, toolbars, and applications

Sample Icons from NI's Icon Library Collection

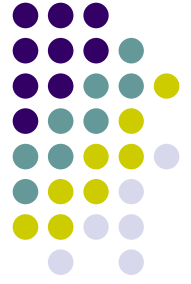


Abide by Universal Conventions for Green, Yellow, and Red

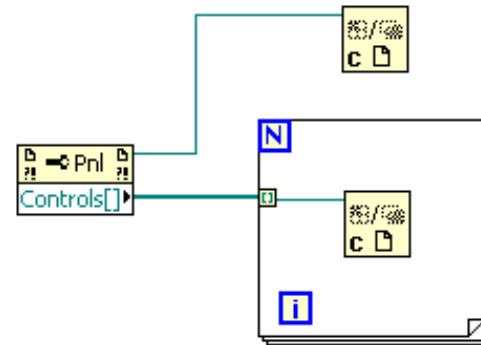


- Red indicates alarm or emergency
- Yellow indicates caution or warning
- Green indicates normal operating conditions

LabVIEW 8.5 - Close Arrays of References

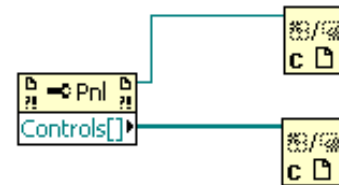


- In LabVIEW 8.2, you must close multiple references in a For Loop



LabVIEW 8.2

- In LabVIEW 8.5, Close Reference now accepts a 1D array of references

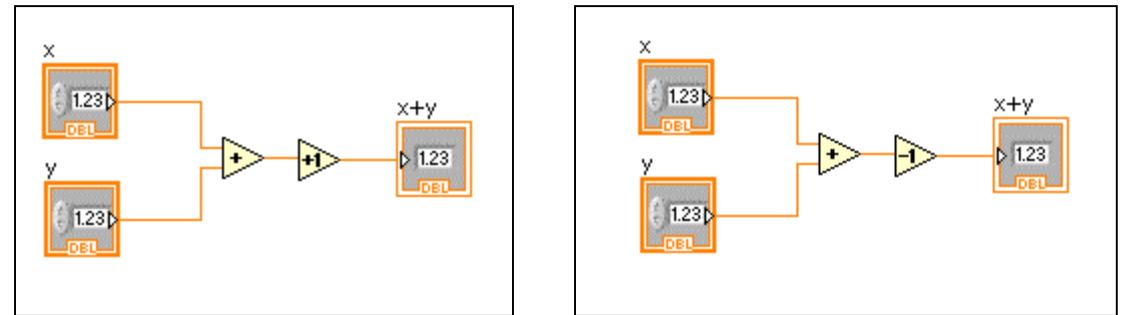


LabVIEW 8.5

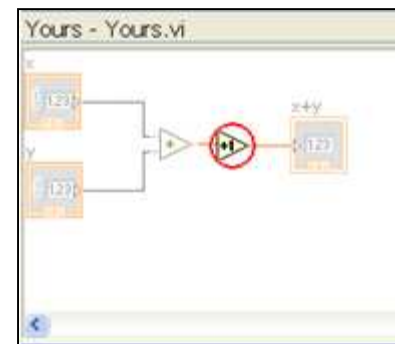


LabVIEW 8.5 - Merge Two VIs

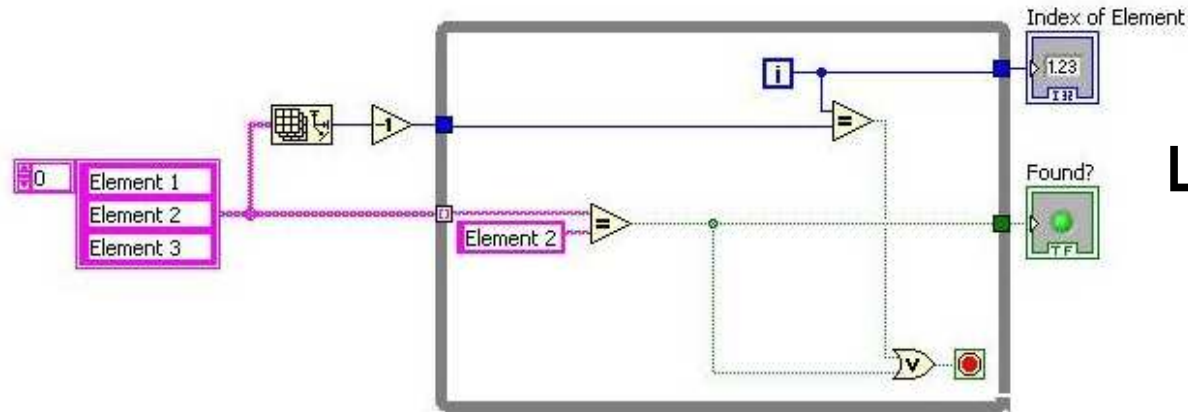
- Track changes made to a base VI
(Tools >> Merge VIs)



- Interactively decide which changes to incorporate



LabVIEW 8.5 - For Loop with Break

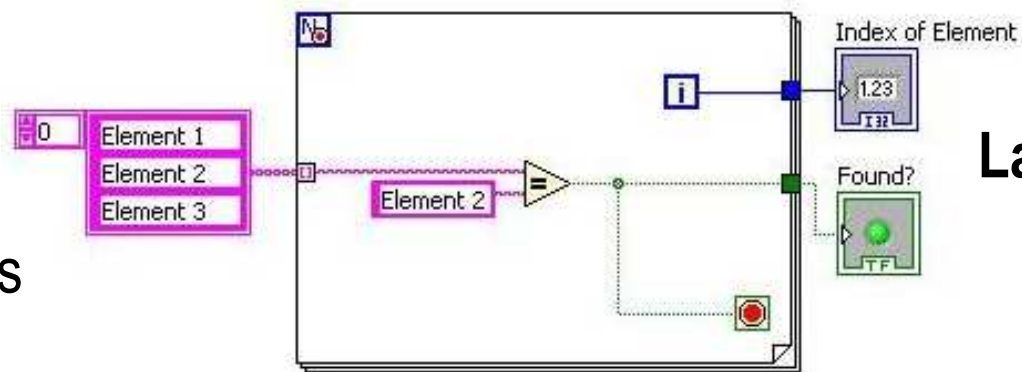


LabVIEW 8.2

Run a fixed
number of times

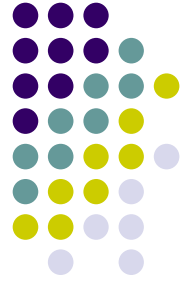
or

until a condition is
met



LabVIEW 8.5

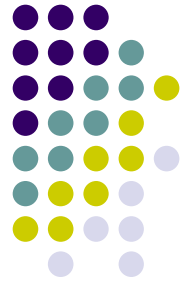
LabVIEW Keyboard Shortcuts



Object/Movement Execution

Shift-click	Selects multiple objects; adds object to current selection.
Arrow keys	Moves selected objects one pixel at a time.
Shift-Arrow keys	Moves selected objects several pixels at a time.
Shift-click (drag)	Moves selected objects in one axis.
Ctrl-click (drag)	Duplicates selected object.
Ctrl-Shift-click (drag)	Duplicates selected object and moves it in one axis.
Shift-resize	Resizes selected object while maintaining aspect ratio.
Ctrl-resize	Resizes selected object while maintaining center point.
Ctrl-Shift-resize	Resizes selected object while maintaining center point and aspect ratio.
Ctrl-drag a rectangle	Adds more working space to the front panel or block diagram.
Ctrl-A	Selects all front panel or block diagram items.
Ctrl-Shift-A	Performs last alignment operation on objects.
Ctrl-D	Performs last distribution operation on objects.
Double-click open space	Adds a free label to the front panel or block diagram if automatic tool selection is enabled.
Ctrl-mouse wheel	Scrolls through subdiagrams of a Case, Event, or Stacked Sequence structure.
Spacebar (drag)	Disables preset alignment positions when moving object labels or captions.

LabVIEW Keyboard Shortcuts



Navigating the LabVIEW Environment

Ctrl-F	Finds objects or text.
Ctrl-Shift-F	Displays Search Results window or the Find Project Items dialog box with the previous search results.
Ctrl-G	Searches for next instance of object or text.
Ctrl-Shift-G	Searches for previous instance of VIs, object, or text.
Ctrl-Tab	Cycles through LabVIEW windows in the order the windows appear onscreen.
Ctrl-Shift-Tab	Cycles the opposite direction through LabVIEW windows.
Ctrl-L	Displays the Error List window.
Ctrl-Shift-W	Displays the All Windows dialog box.




Navigating the VI Hierarchy Window

Ctrl-D	Redraws the VI Hierarchy window.
Ctrl-A	Shows all VIs in the VI Hierarchy window.
Ctrl-click VI	Displays the subVIs and other nodes that make up the VI you select in the VI Hierarchy window.
Enter	Finds the next node that matches the search string after initiating a search by typing in the VI Hierarchy window.
Shift-Enter	Finds the previous node that matches the search string after initiating a search by typing in the VI Hierarchy window.

Navigating Front Panels and Block Diagrams

Ctrl-E	Displays block diagram or front panel window.
Ctrl-#	Enables or disables grid alignment.
Ctrl-/	Maximizes and restores window.
Ctrl-T	Tiles front panel and block diagram windows.
Ctrl-Shift-N	Displays the Navigation window.
Ctrl-I	Displays the VI Properties dialog box.
Ctrl-Y	Displays the History window.

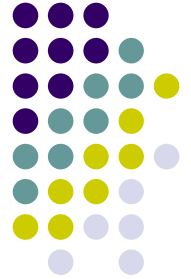
Debug

Ctrl-↓	Steps into node.	
Ctrl-→	Steps over node.	
Ctrl-↑	Steps out of node.	

File Operations

Ctrl-N	Opens a new, blank VI.
Ctrl-O	Opens an existing VI.
Ctrl-W	Closes the VI.
Ctrl-S	Saves the VI.
Ctrl-Shift-S	Saves all open files.
Ctrl-P	Prints the window.
Ctrl-Q	Quits LabVIEW.

LabVIEW Keyboard Shortcuts



Tools and Palettes

Ctrl	Switches to next most useful tool.
Shift	Switches to Positioning tool.
Ctrl-Shift over open space	Switches to Scrolling tool.
Spacebar	Toggles between two most common tools if automatic tool selection is disabled.
Shift-Tab	Enables automatic tool selection.
Tab	Cycles through four most common tools if you disabled automatic tool selection by clicking the Automatic Tool Selection button. Otherwise, enables automatic tool selection.
Arrow keys	Navigates temporary Controls and Functions palettes.
Enter	Navigates into a temporary palette.
Esc	Navigates out of a temporary palette.
Shift-right-click	Displays a temporary version of the Tools palette at the location of the cursor.

SubVIs

Double-click subVI	Displays subVI front panel.
Ctrl-double-click subVI	Displays subVI block diagram and front panel.
Drag VI icon to block diagram	Places that VI as a subVI on the block diagram.
Shift-drag VI icon to block diagram	Places that VI as a subVI on the block diagram with constants wired for controls that have non-default values.
Ctrl-right-click block diagram and select VI from palette	Opens front panel of that VI.

Basic Editing

Ctrl-Z	Undoes last action.
Ctrl-Shift-Z	Redoes last action.
Ctrl-X	Cuts an object.
Ctrl-C	Copies an object.
Ctrl-V	Pastes an object.

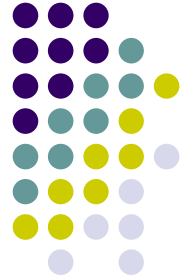
Help

Ctrl-H	Displays Context Help window
Ctrl-Shift-L	Locks Context Help window.
Ctrl- ? or <F1>	Displays LabVIEW Help.

Execution

Ctrl-R	Runs the VI.
Ctrl-.	Stops the VI, when used while VI is running.
Ctrl-M	Changes to run or edit mode.
Ctrl-Run button	Recompiles the current VI.
Ctrl-Shift-Run button	Recompiles all VIs in memory.
Ctrl-Down arrow	Moves key focus inside an array or cluster, when used while VI is running.
Ctrl-Up arrow	Moves key focus outside an array or cluster, when used while VI is running.
Tab	Navigates the controls or indicators according to tabbing order, when used while VI is running.
Shift-Tab	Navigates backward through the controls or indicators, when used while VI is running.

LabVIEW Keyboard Shortcuts



Text

- Double-click** Selects a single word in a string.
- Triple-click** Selects an entire string.
- Ctrl-Right arrow** Moves forward in string by one word when using text that has characters that use single bytes, such as Western character sets. Moves forward in string by one character when using text that has characters that use multiple bytes, such as Asian character sets.
- Ctrl-Left arrow** Moves backward in string by one word when using text that has characters that use single bytes, such as Western character sets. Moves backward in string by one character when using text that has characters that use multiple bytes, such as Asian character sets.
- Home** Moves to beginning of current line in string.
- End** Moves to end of current line in string.
- Ctrl-Home** Moves to beginning of entire string.
- Ctrl-End** Moves to end of entire string.
- Shift-Enter** Adds new items when entering items in enumerated type controls and constants, ring controls and constants, or Case structures. In string constants, press the <Shift-Enter> keys on the keyboard to disable autosizing if it is enabled. If autosizing is disabled, press the <Shift-Enter> keys on the keyboard to display a scroll bar in the constant.
- Esc** Cancels current edit in a string.
- Ctrl-Enter** Ends text entry.

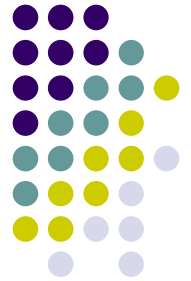
Fonts

- Ctrl=** Increases the current font size.
- Ctrl-** Decreases the current font size.
- Ctrl-0** Displays the Font dialog box.
- Ctrl-1** Changes to the Application font in **Font** dialog box.
- Ctrl-2** Changes to the System font in the **Font** dialog box.
- Ctrl-3** Changes to the Dialog font in the **Font** dialog box.
- Ctrl-4** Changes to the current font in the **Font** dialog box.

Wiring

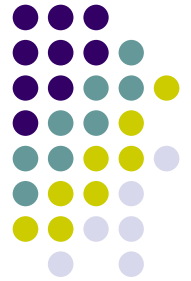
- Ctrl-B** Deletes all broken wires in a VI.
- Esc, right-click, or click terminal** Cancels a wire you started.
- Single-click wire** Selects one segment.
- Double-click wire** Selects a branch.
- Triple-click wire** Selects entire wire.
- A** While wiring, disables automatic wire routing temporarily.
- Double-click (while wiring)** Tacks down wire without connecting it.
- Spacebar** Toggles automatic wiring while moving objects.
- Shift-click** Undoes last point where you set a wire.
- Ctrl-click input on function with two inputs** Switches the two input wires ['Switcheroo' Function].
- Spacebar** Switches the direction of a wire between horizontal and vertical.

LabVIEW Resources & Bibliography



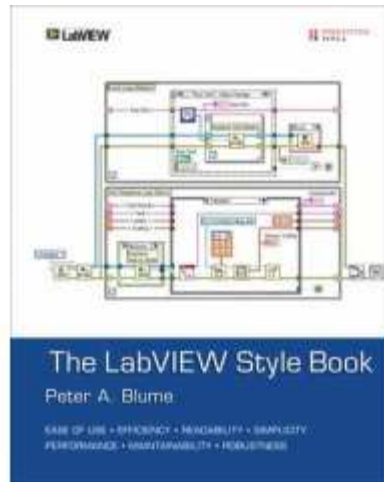
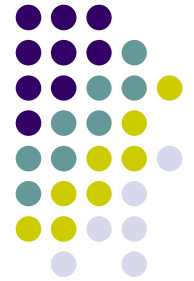
- Weekly LabVIEW Nuggets
<http://ni.com/forums>
and search for “nuggets”
- LAVA: Favorite Tips and Shortcuts
<http://forums.lavag.org>
- LabVIEW Style Guide
<http://zone.ni.com/devzone/cda/tut/p/id/4434>

LabVIEW Resources & Bibliography



- Christina's Eyes on VIs Blog
<http://eyesonvis.blogspot.com/>
- BetterVIEW - Interface Designer's Workshop
<http://www.bettervi.com/Pages/designer.html>
- G'ossip in G'enerality Blog
http://forums.lavag.org/blog/pjm_labview/index.php
- LabVIEW Wiki
<http://wiki.lavag.org>

LabVIEW Resources & Bibliography



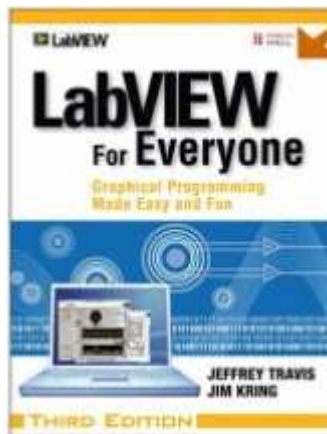
Title: The LabVIEW Style Book

Author: Peter A. Blume

Publisher: Prentice Hall PTR; 1st ed. (2007)

ISBN: 0131458353

Buy the PDF eBook its in **COLOR** the book is NOT

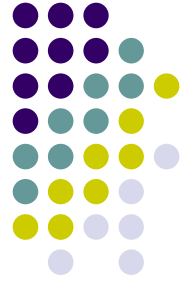


Title: LabVIEW for Everyone: Graphical Programming Made Easy and Fun

Author: Jeffrey Travis, Jim Kring

Publisher: Prentice Hall PTR; 3rd ed. (2006)

ISBN: 0131856723



Viewgraphs & Examples

The Viewgraphs and Examples of the presentation will be available in a few days at:

- IEEE Long Island Section website, Instrumentation & Measurement Society page

www.ieee.li

- ALE System Integration website User Group page

www.aleconsultants.com