Compiler – a Parser Generator Program

Application Framework Option Configuration

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1 CPG Application Framework

The CPG application GUI interface is built from a set of C++ classes using the Qt object library. The classes comprise an application framework that can be used to implement interfaces with common window and user interaction constructs. The application framework classes incorporate a GUI layout and attribute configuration mechanism that can be directly accessed to control the appearance and characteristics of the interface. This document describes the controls that are used to create and store the option configuration data used by the application framework.

2 Option Configuration Data and Files

Each parser specification file that is opened by the GUI application causes an option configuration internal data structure to be initialized according to the following rules:

1) If the parser specification file has the form `*basename*.grammar` then an option configuration file of the form `*basename*.option` is searched for in the same directory.

2) If the parser specification file `*filename*` does not end with a `.grammar` extension then an option configuration file of the form `*filename*.option` is searched for in the same directory.

3) If no file is located by rules 1 and 2 above then a search is performed for an option configuration file with the name `compiler.option` in the same directory.

4) If an option configuration file is found then the option configuration internal data structure is initialized with the contents of the file. If no file is found then the option configuration internal data structure is initialized with a default structure provided by the application.

3 Option Editing

The option editing controls are accessed through the CPG submenu item:

View -> Options -> Edit Option Data

This submenu item causes all current mainview windows to close and displays the option editing control panel. All options can be modified through the control panel with the exception of mainview and subview size and position data. The size and position data is captured using a dialog described in section 3.5 that is accessed through the CPG submenu item:

View -> Options -> Size/Position

3.1 Top Level Controls

The top level controls are used to select configuration option files for editing and to apply and save changes. During the option editing process the option data exists in several forms.

1) Disk file – the data is stored on disk with a file name related to the parser specification file name.

2) Internal data structure – the data is stored in a structure maintained by the application. The user interface is configured according to this data structure. The structure is initialized from the corresponding disk file or from current application defaults.

3) Temporary data structure – the data is stored in a structure maintained by the application. The structure is used to accumulate changes made during the editing process and is initialized from the internal data structure.

All editing operations other than the top level controls act on the temporary data structure. The top level controls copy data from one storage form to another as follows:

1) Reload initializes the temporary data structure with the internal data structure values.

2) Default initializes the temporary data structure with the current application defaults.

3) Apply copies the temporary data structure to the internal data structure.

4) Save copies the temporary data structure to the internal data structure and saves the data to the corresponding disk file.

3.1.1 Option File

The Option File combo box lists the names of all option configuration files corresponding to all open parser specification files plus a default file named `compiler.option`. The current item in the combo box displays the file selected for editing. If a parser specification file does not have a corresponding option configuration file saved in the same directory then a derived option file name appears in the combo box and a corresponding internal data structure is initialized with the current application defaults. The derived option file name is generated using the following rules:

1) If the parser specification file has the form *`basename`*`.grammar` then an option configuration file name of the form *`basename`*`.option` is generated.

2) If the parser specification file *`filename`* does not end with a `.grammar` extension then an option configuration file name of the form *`filename`*`.option` is generated.

3.1.2 Undo

The Undo button control will undo the previous edit operation. There is one level of undo operations provided and a second undo operation will restore the edit operation reversed by the first undo.

3.1.3 Reload

The Reload button control will undo all editing operations since the last Apply or Save operation.

3.1.4 Default

The Default button control initializes the option configuration data for the selected file to the current application defaults.

3.1.5 Apply

The Apply button control activates the current edit changes for the selected option file. The changes will be reflected in the user interface after exiting the option editing control panel. Use

Save to both apply the changes and to save the data to disk.

3.1.6 Save

The Save button control activates the current edit changes for the selected option file and writes the data to disk.

3.1.7 Quit

The Quit button control exits the option editing control panel. Changes which have not been activated using Apply or Save are lost.

3.2 Main View Edit

The Main View Edit tab contains two tab controls, View Select and Tree Edit, and a window to the right which displays the configuration and attributes of a selected mainview. All window selections and editing operations are performed by the controls in the View Select and Tree Edit tabs.

3.2.1 View Select

The View Select tab contains a list box which lists the mainviews defined. The current item in the list box selects the mainview displayed and on which edit operations will be performed.

3.2.1.1 Sort Views

The Sort Views button in the View Select tab displays a dialog to reorder the mainviews as displayed by the application main menu. In the Sort Main View dialog the Up button moves the selected item up one position, the Down button moves the selected item down one position, the First button moves the selected item to the top, and the Last button moves the selected item to the bottom.

3.2.1.2 Default Flag

The Default Flag button in the View Select tab marks a mainview for automatic display when the corresponding parser specification file is opened. The default display status is indicated by an asterisk at the left of the list box item text and is also displayed in the View submenu of the application.

3.2.1.3 Add View Before

The Add View Before button in the View Select tab adds a blank mainview before the current list box item. A dialog is displayed to enter the mainview name.

3.2.1.4 Add View After

The Add View After button in the View Select tab adds a blank mainview after the current list box item. A dialog is displayed to enter the mainview name.

3.2.1.5 Delete View

The Delete View button in the View Select tab deletes the mainview selected by the current list box item.

3.2.1.6 Rename View

The Rename View button in the View Select tab renames the mainview selected by the current list box item. A dialog is displayed to enter the mainview name.

3.2.1.7 Copy View

The Copy View button in the View Select tab copies the mainview selected by the current list box item to a copy buffer for use in Paste operations.

3.2.1.8 Paste View

The Paste View button in the View Select tab adds a mainview stored in the copy buffer by the Copy View button operation to the list of defined mainviews. The mainview is added at the bottom of the list box.

3.2.2 Tree Edit

The Tree Edit tab contains the controls used to modify the mainview selected by the View Select tab.

3.2.2.1 Reset Options

The Reset Options button changes the attributes for the window currently selected in the Navigate tree to the current application defaults.

3.2.2.2 Highlight Tree

The Highlight Tree button toggles the highlight rendering of the window currently selected in the Navigate tree.

3.2.2.3 Descend

The Descend button moves the current window selection in the Navigate tree down one level.

3.2.2.4 Ascend

The Ascend button moves the current window selection in the Navigate tree up one level.

3.2.2.5 Previous

The Previous button moves the current window selection in the Navigate tree to the previous item in the current subtree at the same level.

3.2.2.6 Next

The Next button moves the current window selection in the Navigate tree to the next item in the current subtree at the same level.

3.2.2.7 Navigate

The Navigate tab contains a tree view control that displays the window tree structure for the currently selected mainview. The current tree view item selected is highlighted in the display window to the right and is the window on which editing operations are performed by controls in the Subview tab. Selecting the item directly in the tree view control has exactly the same effect as using the Descend, Ascend, Previous, and Next buttons. The buttons are provided to enable navigation when the Subview tab is active.

3.2.2.8 Subview

The Subview tab contains the controls used to modify the splitter or subview selected by the navigation controls. The list box at the bottom of the tab lists the available subviews for the application. The Subview column contains the name of the subview. The M column is set to the multiplicity of the subview, which is the maximum number of subviews of that type counting over all mainviews. An asterisk indicates no limit on the number of subviews of that type. The Count column indicates the number of subviews instantiated of that type counting over all mainviews. The available subviews, their multiplicities, and their interactions are defined by the derived application classes and not the framework base classes.

3.2.2.8.1 Select Font

The Select Font button displays a dialog to set the font for the currently selected splitter or subview. The Add Auxiliary button of the dialog will add the font to the auxiliary font list.

3.2.2.8.2 Subtree Font

The Subtree Font check box will cause a Select Font operation to propagate to all splitters and subviews contained in the subtree with the currently selected splitter or subview as root.

3.2.2.8.3 Select Palette

The Select Palette button displays a dialog to set the palette for the currently selected splitter or subview. The Add Auxiliary button of the dialog will add the palette to the auxiliary palette list.

3.2.2.8.4 Subtree Palette

The Subtree Palette check box will cause a Select Palette operation to propagate to all splitters and subviews contained in the subtree with the currently selected splitter or subview as root.

3.2.2.8.5 Add Before

The Add Before button adds a splitter or the subview selected in the Subview list box before the current selected subview in the current subtree at the same level. The button can also be used to set the initial splitter or subview for a blank mainview.

3.2.2.8.6 Add After

The Add After button adds a splitter or the subview selected in the Subview list box after the current selected subview in the current subtree at the same level. The button can also be used to set the initial splitter or subview for a blank mainview.

3.2.2.8.7 Replace

The Replace button replaces the current selected splitter or subview with the window specified by the Subview list box, Splitter / Subview radio buttons, Hztl / Vrtl radio buttons, and # Panes spin box.

3.2.2.8.8 Delete

The Delete button deletes the current selected splitter and subtree or subview.

3.2.2.8.9 Splitter / Subview

The Splitter and Subview radio buttons select a splitter or a subview as selected by the Subview list box for the Add Before, Add After, and Replace operations.

3.2.2.8.10 Hztl / Vrtl

The Hztl and Vrtl radio buttons select horizontal or vertical orientation for splitter windows.

3.2.2.8.11 # Panes

The # Panes spin box sets the number of panes for splitter windows.

3.3 Application Edit

The Application Edit tab controls are used to modify application main window attributes and auxiliary graphic elements and strings.

3.3.1 Main Window and Help Window Attributes

3.3.1.1 Main Font / Default and Help Font / Default

The Main Font and Help Font buttons select the fonts for the main application windows. The corresponding Default buttons set the fonts to default values.

3.3.1.2 Main Palette / Default and Help Palette / Default

The Main Palette and Help Palette buttons select the palettes for the main application windows. The corresponding Default buttons set the palettes to default values.

3.3.1.3 Copy

The Copy buttons copy the Main Font and Main Palette data or the Help Font and Help Palette data to a copy buffer.

3.3.1.4 Paste

The Paste buttons set the Main Font and Main Palette data or the Help Font and Help Palette data to the data stored in a copy buffer by the corresponding Copy operation.

3.3.2 Auxiliary Application Elements

3.3.2.1 Common Controls

The common controls perform similar functions for each auxiliary element type.

3.3.2.1.1 Auxiliary Name

The Auxiliary Name edit field is used to enter and edit the name of an auxiliary element.

3.3.2.1.2 Add

The Add button displays a dialog to add a new auxiliary element. The dialog is initialized with the auxiliary element selected in the list box below.

3.3.2.1.3 Edit

The Edit button displays a dialog to edit an auxiliary element selected in the list box below.

3.3.2.1.4 Rename

The Rename button displays a dialog to rename or edit an auxiliary element selected in the list box below.

3.3.2.1.5 Delete

The Delete button deletes the auxiliary element selected in the list box below.

3.3.2.1.6 Copy

The Copy button copies the data for the auxiliary element selected in the list box below to a copy buffer.

3.3.2.1.7 Paste

The Paste button adds the auxiliary element stored in the copy buffer to the element list.

3.3.2.1.8 Name / Ok / Cancel

The Name edit field, Ok button, and Cancel button are common to all auxiliary element dialogs.

3.3.2.2 Auxiliary Palette Dialog

The auxiliary palette dialog has controls for specifying all attributes of a palette and a display window for showing the effects on different graphic elements.

3.3.2.2.1 Active / Inactive / Disabled

The Active, Inactive, and Disabled tabs select the corresponding set of palette attributes to modify. For each attribute there is a check box, a button with a solid color bitmap, a button with the name of the attribute, and a solid color rectangle in a border. If the check box is checked then the attribute setting will be explicitly stored in the option configuration data. If the check box is not checked then the attribute is set to a precalculated value when the palette object is created. The button with a solid color bitmap will set the attribute to the value calculated by the Precalculated Colors controls. The button with the name of the attribute will display a color dialog to edit the color value. The solid color rectangle displays the color setting of the attribute.

3.3.2.2.2 Calculate / Button / Background

The Calculate check box, Button button, and Background button are used to compute precalculated attribute values. If the Calculate check box is checked then precalculated attributes are initialized, and if the check box is not checked then each attribute must be individually set. The Button and Background buttons display a dialog to edit the colors used in the precalculated color computation.

3.3.2.2.3 Reset

The Reset button sets the palette attributes to system defaults.

3.3.2.3 Auxiliary Color Dialog

The auxiliary color dialog has controls for specifying a color in several different formats. The primary controls for specifying a color are a rectangular hue versus saturation plot and an intensity scale plot. The plot controls have cursors which indicate the current value selected by mouse input. A rectangular display window shows the selected color.

3.3.2.3.1 Red / Green / Blue

The Red, Green, and Blue spin box controls display and set the current color in that format.

3.3.2.3.2 Hue / Saturation / Value

The Hue, Saturation, and Value spin box controls display and set the current color in that format.

3.3.2.3.3 Color Name / Display

The Color Name edit field and Display button are used to specify a color by a color database name. The color name is entered into the edit field and the button causes the name database lookup and initializes all controls with the value found.

3.3.2.3.4 Specifier Type / Rgb / Hsv / Colorname

The Specifier Type control group contains the Rgb, Hsv, and Colorname radio buttons. The radio button selected determines the storage format of the color in the option configuration data.

3.3.2.4 Auxiliary Brush Dialog

The auxiliary brush dialog has controls for specifying a graphics brush.

3.3.2.4.1 Brush Style

The Brush Style radio button group is used to select the brush style. The CustomPattern style uses an image specified by the Xpm Image control to create the brush pattern.

3.3.2.4.2 Color

The Color button displays a dialog to set the brush color.

3.3.2.4.3 Xpm Image

The Xpm Image button displays a dialog to set the brush pattern when the brush style is set to CustomPattern. The results are generally best when the xpm image is composed of black and white pixels.

3.3.2.5 Auxiliary Xpm Image Dialog

The auxiliary xpm image dialog has controls for specifying an xpm bitmap image. The editor window displays and edits the image data in a C language format consisting of an array of constant character string data. Two display windows show the image drawn on a black and a white background.

3.3.2.5.1 Display

The Display button redraws the image display windows after changes have been made in the editor window.

3.3.2.5.2 Load / Save

The Load and Save buttons display dialogs for loading or saving the xpm image text data from or to disk files.

3.3.2.6 Auxiliary Font Dialog

The auxiliary font dialog has controls for specifying a font. A character display window shows the characters for codes 32 through 127 and 160 through 255.

3.3.2.6.1 Value / Display

The Value edit field and Display button are used to specify a font directly and to display the character set in the display window.

3.3.2.6.2 Family / Style / Size

The Family, Style, and Size list box controls are used to specify the corresponding font characteristics.

3.3.2.7 Auxiliary String Dialog

The auxiliary string dialog is used to edit string values.

3.3.2.7.1 Value

The Value edit field specifies the string value.

3.4 Connection Edit

The Connection Edit tab contains the controls for setting the functional interaction between subviews. The tree view control is configured for check box items to be selectable. When a check box item is checked the pointer to the immediate subview object is delivered to the tree path related root subview object. The CPG application requires all connection check box items to be checked. Any option editing operations that modify mainview and subview layouts will disconnect all subviews. The connections must be reestablished using the Connect All control.

3.4.1 Connect

The Connect button checks all selected check box items.

3.4.2 Disconnect

The Disconnect button unchecks all selected check box items.

3.4.3 Connect All

The Connect All button checks all check box items.

3.4.4 Disconnect All

The Disconnect All button unchecks all check box items.

3.5 Size and Position Capture

The size and position capture dialog is displayed during application mainview display and not during the option editing control panel display. The size and position capture function is performed on the application windows as they appear during usage.

3.5.1 Reset Size / Position Data

The Reset Size / Position Data check box causes all size and position data to be deleted from the option configuration data which will cause the application to use system default values.

3.5.2 Capture Application Window

The Capture Application Window check box will cause the capture function to include size and position data for the main application window.

3.5.3 Capture Help Window

The Capture Help Window check box will cause the capture function to include size and position data for the help window.

3.5.4 Capture Main View Windows

The Capture Main View Windows list box lists the current option configuration files for all open parser specification files. For each file name item selected the size and position data for the corresponding visible mainviews is captured.

4 CPG Specific Auxiliary Elements

The CPG specific auxiliary elements are those elements which control attributes or operational aspects of the application. The names of the elements determine their special use within the application. The following sections give the names and uses of the application specific elements.

4.1 Dialog Palettes

The following named palettes set the attributes for the corresponding dialogs.

1) `CALCULATE_DIALOG`
2) `ERROR_ENTRIES_DIALOG`
3) `GENERATE_CODE_DIALOG`
4) `SIMULATOR_CONTROL_DIALOG`
5) `SIMULATOR_ERROR_DIALOG`
6) `UNIT_RULES_DIALOG`

4.2 Dialog Fonts

The following named fonts set the attributes for the corresponding dialogs.

1) `CALCULATE_DIALOG`
2) `ERROR_ENTRIES_DIALOG`
3) `GENERATE_CODE_DIALOG`
4) `SIMULATOR_CONTROL_DIALOG`
5) `SIMULATOR_ERROR_DIALOG`
6) `UNIT_RULES_DIALOG`

4.3 Application Control Strings

1) `MULTI_LINE_EDIT_TAB_STOP_WIDTH` – sets the tab stop positions for edit windows.
2) `Application_Style` – sets the graphical motif for the windows and controls, possible values are `windows`, `motif`, `cde`, `motifplus`, `platinum`, `sgi`, or `compact`.
3) `HTML_Source` – sets the absolute path of the start page for the help viewer contents.
4) `Option_Edit_Tab_Widget_Height` – adjusts the sizing of the option edit control panel.

4.4 Simulator XPM Images

To set the xpm image displayed in the simulator parse tree control for a grammar symbol `name` add an auxiliary xpm image with a name formed as `XPM_IMAGE_name`.