

Windows Dialog Boxes, Text Boxes, and List Boxes

Dialog Boxes

- Popup child windows created by Windows
- Used for special-purpose input & output
 - A principal I/O mechanism in Windows
- Contain several child window controls
- Layout & what it does is are predefined
- In .NET they're just another Form
 - Derived from class Form
- We can design our own dialog boxes
- Five predefined “Common Dialog Boxes”

Types of Dialog Boxes

- Modal
- Modeless
- System Modal

Common Dialog Boxes

- Predefined Modal Dialog Boxes that enable user to perform common I/O operations in a standard way
- Five of them -- all date back to Windows 3.1
 - FileDialog
 - Open/Save files in an easy and standard way
 - ColorDialog
 - Choose colors in an easy and standard way
 - FontDialog
 - Select fonts in an easy and standard way
 - PageSetupDialog
 - PrintDialog
 - Both related to printing
- Contained in classes derived from `System.Windows.Forms.CommonDialog`
- User interactions with common dialog box set properties that can be read & used afterwards

Using Common Dialog Boxes

1. Instantiate a common dialog object, e.g. ColorDialog:
`ColorDialog colordlg = new ColorDialog();`
2. Set its properties (optional)
`colordlg.Color = this.BackColor;`
3. Call its `ShowDialog()` method to invoke the dialog box
 - Since Modal, execution halts until user dismisses the dialog box`colordlg.ShowDialog();`
4. After it returns, use its properties changed by user actions
`this.BackColor = colordlg.Color;`
 - Almost always contain “OK” & “Cancel” buttons
 - “Abort”, “Ignore”, “No”, “Retry”, “Yes” buttons are also defined
 - Button pressed by user is contained in `ShowDialog()` return value
 - E.g., `DialogResult.OK`, `DialogResult.Cancel`, etc.
 - Example program: Common-Color-Dialog
 - Note button inherits the new color

Common Font Dialog Box

- Allows the user to change fonts
- Class `FontDialog`
 - Properties:
 - `Font` `font`
 - `Color` `Color`
 - `bool` `ShowColor`
 - `bool` `ShowEffects`
 - `bool` `ShowApply`
 - `bool` `ShowHelp`
 - Instantiate and start with `ShowDialog()` member function just as for the Common Color dialog Box
- Example program: Common-Color-Font-Dialog

Using Visual Studio Designer to Create Common Dialog Boxes

- Just drag them from the toolbox onto the form
- Their properties can be accessed easily in their Properties Windows
- Still have to write code to invoke them
 - `ShowDialog()`
- And code to use their changed properties
 - [Common-Color-Dialog-Designer](#) example

Programmer-Defined Dialog Boxes

- Define our own dialog boxes containing whatever controls are required for custom I/O
- Just define and instantiate a second class derived from class Form in the application
 - Encapsulates everything about the dialog box
 - Set desired properties
 - Add desired controls and event handlers
 - Start it with the object's `ShowDialog()` method
 - Main form's code stops executing until user dismisses the dialog box
 - `DialogResult` property returned by `ShowDialog()` will identify which button in dialog box was pressed to terminate it

Dialog-Manual Example Program

- Main form created with VS Designer as usual
 - Contains a “Start Dialog Box” button And a Label control
 - When user clicks the button, a modal dialog box with “OK” and “Cancel” buttons appears
 - The name of the button pressed by the user to dismiss the dialog box will be displayed in the main form’s label control
 - The dialog box’s buttons, properties, and button click handler methods are all defined in a second Form class
 - Handlers should set Dialog Box’s DialogResult property
 - The second form class was coded manually in same file
 - Easier to use Visual Studio to add the second dialog box class, set its properties, and add its button click handlers

Dialog-Designer Example Program

- Same functionality as Dialog-Manual application
- Add dialog box
 - With project name selected in Solution Explorer:
 - Select from main menu: Project | Add New Item | Windows Form
 - Or right click on project name and select Add | Windows Form
 - In either case the “Add New Item” dialog box comes up
 - Change the default name to SimpleDialogBox
 - VS Designer will create a new file containing the new class
 - As usual, add the “OK” & “Cancel” buttons to the new form by dragging them from the tool box
 - And add their click event handlers by double clicking on them or using the properties window (lightning bolt)
- Add “Start Dialog Box” button on main form
- And its click event handler as usual
 - In this handler add code to instantiate the dialog box, set its properties, and start it

Getting Data from a Dialog Box

- Dialog boxes usually allow user to provide data for the application
- How to get data from the dialog box to the parent form:
 - Could use public fields (variables)
 - So other classes (the parent form) can access them
 - Better to use public properties
 - For protected access to private fields
 - Must be defined in the dialog box class
 - Properties with their get/set accessors can be coded manually
 - See DlgBoxPropertiesTest Example
 - Displays which of three buttons in a Dialog Box was pressed
 - Note use of this.Close() in Exit button handler to dismiss the Dialog Box

Radio-Check-Dialog Example

- Radio-Check application modified using a dialog box
 - Two classes:
 - ColorFillDialogBox class encapsulates a dialog box that allows the user to choose a color and fill option
 - Colors are shown in radio buttons in a “Color” group box
 - » Create and add the radio buttons in a loop
 - » Selected color (ColorRect) is a public Property added to the class get/set accessors index thru all controls in the Color groupbox
 - » Note use of Color.FromName(...) that creates a Color from a string
 - “Fill Rectangle” is a check box
 - » Check box state (Fill) is another public Property added to the class get/set accessors return/set the Checked state of the checkbox
 - Main Form1 class has a button to start the dialog box
 - Dialog Box’s ColorRect and Fill Properties are used to change class-level variables colorRect and bFillRect after dialog box is dismissed
 - Paint event is forced
 - » Paint handler draws or fills a rectangle according to the values of colorRect and BFillRect

Modeless Dialog Boxes

- Stick around after invoked
- Start with Show() member method of DialogBox class
 - Not ShowDialog(), which starts it as a modal dialog box
 - We'll come back to these later

More Windows Controls

Text Input Controls

- **TextBox**
 - Formerly called an Edit Control
 - Allows user to type in text
 - Can be single line or multiline
- **ListBox**
 - Presents a scrollable list of selections for user to choose
- **ComboBox**
 - Combines the features of a Text Box and a List Box

Text Boxes

- Simplest is derived from **TextBox** class
 - RichTextBox class provides additional functionality
 - Both are derived from **TextBoxBase** class
 - Some Properties:
 - string Text
 - int MaxLength // max # of characters
 - int TextLength // (get only)
 - bool Multiline
 - string[] Lines // for multiline text boxes
 - int Lines.Length // # of lines
 - Most useful event:
 - TextChanged -- actually defined in Control parent class
 - Method: OnTextChanged()
 - Delegate: EventHandler
 - Argument: EventArgs

TextBox-Simple Example Program

- Creates a TextBox and a Label control
- Any time user changes text in the TextBox, it is reproduced in the Label control
 - Program handles the TextBox's TextChanged event
- Created with VS Designer
 - Just drag the TextBox and Label from the toolbox, change their properties, and add the TextChanged event handler

MultiLine Text Boxes

- Just set Multiline property to true
- Another property:
 - Lines
 - An array of strings that contains the text entered by user
 - Since it's an array, Lines also has a Length property
- Can add scrollbars
 - ScrollBars property:
 - None, Horizontal, Vertical, Both
 - For horizontal to work, WordWrap property must be set to false
- Give Notepad-like functionality
- Example: TextBox-Multiline

Non-textual Data in a TextBox

- Use Parse() method to convert Text property of a control to its numeric form before using it in a computation
- Each data type has its own Parse() method, e.g.:
 - int.Parse(); float.Parse(); decimal.Parse();
- Example – two text boxes contain strings that represent numbers:
 - numTextBox and priceTextBox
 - To do computations need to convert to numeric values:

```
int num = int.Parse(numTextBox.Text); //get number of items
decimal price = decimal.Parse(priceTextBox.Text); //get price per item
float totPrice = price*num; //compute total price
```

Formatting Data for Display

- Display numeric data in the Text property of a Label, Textbox, or Listbox
- Use ToString() and “format specifier codes”
 - Can format a numeric value to a string containing such features as: \$, comma, decimal point, %
 - Also can specify # of digits to right of decimal point
 - xxx.ToString(“format code”)
- Some format codes (example: 1123.42817):
 - “C” currency \$1,123.43
 - “F0” fixed point 1123
 - “F3” fixed point 1123.428
 - “N” number 1,123.43
 - “N3” number 1123.428

Compute-Interest Example

- Text Boxes for:
 - Principal, Interest Rate, Number of Years
- Labels for each
- Label for computed Total Interest
- Computes Total Interest:
 - $\text{Interest} = \text{Principal} * \text{Rate} * \text{Years}$
 - Note Parsing to get values from Text Boxes
 - And formatting to display result
 - Also note use of M or F suffix on numeric constants
 - M: decimal
 - F: float
 - C# defaults to double
- But what if user enters the wrong type of data?
 - Use a try/catch block
 - See [ComputeInterestTryCatch](#) example

List Boxes and Combo Boxes

- **List Box**
 - Contains lists of items that can be selected
 - Entire list is shown
 - User selects items
 - Selected item is highlighted
 - Encapsulated in class `ListBox`
- **Combo Box**
 - Text box combined with a list box
 - List box can be displayed at all times or pulled down
 - User selects item from list & item is copied to text box
 - One type allows user to type into text box
 - Encapsulated in class `ComboBox`
- For both, scroll bars are added automatically as needed

List Box “Items” Property

- The list of Items in a list box is a collection (like ArrayList)
 - These collections have methods that allow programmer to:
 - Add items, insert items, remove items, refer to individual items, count items, get selected item, & clear the collection
 - listBox1.Items.Add(ItemValue);
 - listBox1.Items.Insert(IndexPosition, ItemValue);
 - listBox1.Items.Remove(ItemValue);
 - listBox1.Items.RemoveAt(IndexPosition);
 - Referring to a given item:
 - listBox1.Items[IndexPosition];
 - Number of items in list
 - listBox1.Items.Count
 - SelectedIndex Property – stores index of item selected
 - int x = listBox1.SelectedIndex; // retrieve index of selected item
 - listBox1.SelectedIndex = 3; // select item 3 (will appear selected)
 - listBox1.Items.Clear(); // remove all items from list

Using Designer to Fill a List Box at Design Time

- Select the List Box control on the form
- Scroll Properties window to “Items” property
- Click on “...” to open “String Collection Editor”
 - Type in the items in the list, ending each with Enter key
- Note in Designer Generated Code:
 - listBox1.Items.AddRange(new object[] {"str1", "str2", ...});

ListBox-Simple Example

- Initial list box contents set at design time
- “Add Item” button allows user to add items to the list box using a text box
- “Get Current Selection” button displays currently-selected item from the list box in a label control

Combo Box

- Very Similar to a List Box
- Has an associated Text Box control
 - Text property is what is typed by user
 - Text property can be set in code
- DropDownListStyle Property
 - Simple, DropDown