ComponentOne

RichTextBox for UWP

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RichTextBox for UWP

Display and edit formatted text as HTML documents with **RichTextBox for UWP**. The **C1RichTextBox** control supports basic HTML formatting, CSS, lists, hyperlinks, tables, images, and more. Use the control to display HTML content from the Web or use it as a rich text editor.

Getting Started

Help with UWP Edition

Getting Started

For information on installing **ComponentOne Studio UWP Edition**, licensing, technical support, namespaces and creating a project with the control, please visit Getting Started with ComponentOne Studio UWP Edition.

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RichTextBox for UWP Assemblies and Controls

Add powerful rich text editing and viewing to your mobile apps. **RichTextBox for UWP Edition** supports common formatting tags, automatic line wrapping, HTML and RTF import/export, table support, images, annotations, and more.

The following table displays the assemblies and main classes included in them along with the descriptions:

C1.UWP.RichTextBox.dll	C1RichTextBox
Control used to view and edit **C1Document** documents. The control can import and export HTML, and supports rich formatting including fonts, foreground and background colors, borders, paragraph alignment, images, hyperlinks, lists, arbitrary UIElement objects, and more.	
C1.UWP.RichTextBox.dll	**C1Document**
Class that represents documents as a hierarchical list of elements that represent document components such as paragraphs, lists, images, and so on. The object model exposed by the C1Document object is similar to the one used in the WPF FlowDocument class and in the HTML DOM.	
C1.UWP.RichTextBox.AppBar.dll	**C1ApplicationBarToggleButton<T>**
Base class for ApplicationBar toggle buttons which includes built-in tools to create a simple command bar supporting Bold, Italic, Underline, Undo, Redo, Increase Font Size, Decrease Font Size, Center Align, Right Align, Left Align, and Justify commands.	
C1.UWP.RichTextBox.Menu.dll	**C1RichTextBoxMenu**
Control that acts as a complete radial context menu. It allows you to edit and format text that includes different fonts, decorations, sizes, colors, and other basic HTML and RTF style attributes supported by CSS and inline markup.	
C1.UWP.RichTextBox.PdfFilter.dll	**PDFFilter**
Class that allows you to export the RichTextBox content to PDF file.	

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RichTextBox for UWP Key Features

RichTextBox for UWP allows you to create customized, rich applications. Make the most of **RichTextBox for UWP** by taking advantage of the following key features:

- **Load, Display, and Save HTML Documents**

  The **C1RichTextBox** control supports displaying and editing rich text formatted as HTML. Load existing HTML content into the **C1RichTextBox** control, edit the document, and then save it back as HTML or plain text.

- **Mouse and Touch Support**

  Select text and move the input caret easily by either mouse or touch input. The text selection is modeled after the native TextBox behavior so it's familiar and easy to accomplish on a touch device.

- **Rich Formatting**

  Edit and format text containing multiple fonts, decorations, sizes, colors, and other basic HTML style attributes supported by CSS and inline markup.

- **Clipboard Support**

  The C1RichTextBox control fully supports the clipboard for both plain and rich text through the keyboard (CTRL+C, CTRL+V, CTRL+X) and UI commands for touch displays. Implement cut/copy/paste commands within your AppBar or any other way imaginable.

- **Built-in AppBar Tools**

  The AppBar library includes built-in tools that you can use with the C1RichTextBox control to speed up command creation for common editing features like text formatting and document history. The built-in tools support the following commands: Bold, Italic, Underline, Undo, Redo, Increase Font Size, Decrease Font Size, Center Align, Right Align, Left Align, and Justify.

- **Hyperlinks: Insert and Navigate**

  The C1RichTextBox control supports inserting and navigating hyperlinks. When the user clicks a hyperlink the RequestNavigate event is fired on the control and you can handle what happens from there.

- **Insert Tables and Images**

  The C1RichTextBox control supports inserting images from the Web or from the users machine. You can also insert tables. The Beta version has limited editing support for tables and images.

- **Undo/Redo Support**

  The C1RichTextBox control keeps track of all document history, so users have the ability to easily undo and redo changes. By default, keyboard commands (CTRL+Z/CTRL+Y) perform these actions.

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RichTextBox for UWP Quick Start

In this quick start you'll create a Universal Windows application in Visual Studio, add the **C1RichTextBox** control to the application, add code to customize the application, and run the application to view possible run-time interactions.

Step 1 of 3: Creating a Universal Windows Application

In this step you'll create a new Universal Windows application, set the application up, and add the **C1RichTextBox** control to the application. After completing this step, you should have a mostly functional Rich Text editor.

Complete the following steps:

1. In Visual Studio select **File | New | Project**.
2. In the **New Project** dialog box, select Templates | Visual C# | Windows | Universal. From the templates list, select Blank App (Universal Windows). Enter a Name and click **OK** to create your project.
3. Right-click the project name in the Solution Explorer and select **Add Reference**.
4. In the **Reference Manager** dialog box, expand Universal Windows and select Extensions; you should see the UWP assemblies in the center pane. Select C1.UWP.RichTextBox.
5. Open **MainPage.xaml** if it isn't already open, and add the following markup within the `<Page>` tag:

   XAML Markup

   ```
   xmlns:RichTextBox="using:C1.Xaml.RichTextBox"
   ```

   This adds references to the required assembly to the project.

6. In the XAML window of the project, place the cursor between the `<Grid x:Name="ContentPanel">` `</Grid>` tags and click once.

7. Add the following markup within the `<Grid>` tags to add the C1RichTextBox control. Note that this markup gives the control a name:

   XAML Markup

   ```
   <RichTextBox:C1RichTextBox Name="C1RTB" />
   ```

8. Place your cursor beneath the markup for the C1RichTextBox control you just added. Locate the C1RichTextBoxMenu control in the Visual Studio Toolbox and double-click to add it to your application.
9. Edit the C1RichTextBoxMenu markup so that it resembles the following sample. This will give the C1RichTextBoxMenu a name and bind it to the C1RichTextBox control:

   XAML Markup

   ```
   <RichTextBox:C1RichTextBoxMenu x:Name="rtbMenu" RichTextBox="{Binding
   ElementName=RTB1}" />
   ```

What You've Accomplished

If you run the application, you'll see an almost fully functional C1RichTextBox application. You can enter and edit text in the **C1RichTextBox** control. In the next step you'll customize the application further.

Step 2 of 3: Customizing the RichTextBox

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In the previous step you created a new Universal Windows application, set the application up, and added the control to the application. In this step you'll customize the application further.

Complete the following steps:

1. In the Solution Explorer, right-click the **MainPage.xaml** file and select **View Code** to open the code file.
2. In the Code Editor, add the following code to import the following namespaces:

Visual Basic

```
Imports C1.Xaml.RichTextBox
```

C#

```
using C1.Xaml.RichTextBox;
```

3. Add the following code to the MainPage constructor:

Visual Basic

```
Me.C1RTB.FontSize = 24
Me.C1RTB.Text = "Hello World! Welcome to the most complete rich text editor
 available for UWP Edition. Load, edit, and save formatted text as HTML or RTF
 documents with RichTextBox for UWP Edition. The C1RichTextBox
 control provides rich formatting, automatic line wrapping, HTML and RTF
 import/export, table support, images, annotations, and more."
```

C#

```
this.C1RTB.FontSize = 24;
this.C1RTB.Text = "Hello World! Welcome to the most complete rich text editor
 available for UWP Edition. Load, edit, and save formatted text as HTML or RTF
 documents with RichTextBox for UWP Edition. The C1RichTextBox
 control provides rich formatting, automatic line wrapping, HTML and RTF
 import/export, table support, images, annotations, and more.";
```

This code adds content to the **C1RichTextBox** control.

What You've Accomplished

In this step you added content to your C1RichTextBox application, now all that's left is to run it. In the next step you'll run the application and view some of the run-time interactions possible with the C1RichTextBox control.

Step 3 of 3: Running the Application

In the previous steps you created a new Universal Windows application, added the C1RichTextBox control, and customized the application. All that's left now is to run the application and view some possible run-time interactions.

Complete the following steps:

1. In the menu select **Debug | Start Debugging** to run the application.
2. Tap inside the **C1RichTextBox** control. The on-screen keyboard will appear allowing you to enter text.
3. Enter text inside the **C1RichTextBox** using the on-screen keyboard.
4. Select a word, for example "Welcome". Notice that the word is highlighted and selected. To change you selection, you can select and drag the handles that appear on either side of the selected word. For example, select part of the next sentence:

What You've Accomplished

Congratulations, you've completed this Quick Start! You learned a bit about using the C1RichTextBox control. In this

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tutorial you created a new application, added the **C1RichTextBox** control, and viewed some possible run-time interactions.

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Working with RichTextBox for UWP

The most complete rich text editor available for UWP Edition, load, edit, and save formatted text as HTML or RTF documents with **RichTextBox for UWP**. The C1RichTextBox control provides rich formatting, automatic line wrapping, HTML and RTF import/export, table support, images, annotations, and more.

The C1.UWP.RichTextBox assembly contains two main objects: the **C1RichTextBox** control and the C1Document object.

C1RichTextBox is a powerful text editor that allows you to display and edit formatted text. C1RichTextBox supports all the usual formatting options, including fonts, background and foreground colors, lists, hyperlinks, images, borders, and so on. C1RichTextBox also supports loading and saving documents in HTML format.

C1Document is the class that represents the contents of a **C1RichTextBox**. It is analogous to the FlowDocument class in WPF. As in WPF, a **C1Document** is composed of stacked elements (C1Block objects) which in turn are composed of inline elements (C1Run objects).

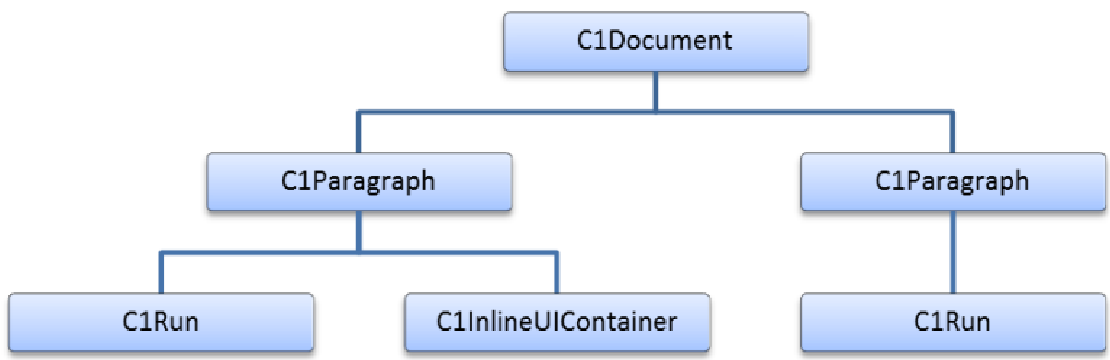
Many applications may deal only with the **C1RichTextBox** control, which provides a simple linear view of the document. Other applications may choose to use the rich object model provided by the C1Document class to create and manage documents directly, with full access to the document structure.

Main Concepts and Features

Accessing Layout Information

When C1RichTextBox creates the C1Document layout, it creates a parallel tree composed of C1TextElementView objects. For each C1TextElement in the C1Document tree, there is at least one C1TextElementView that is tasked with its layout and drawing.

Take this C1Document tree as an example:



Its corresponding view tree will look like the following:

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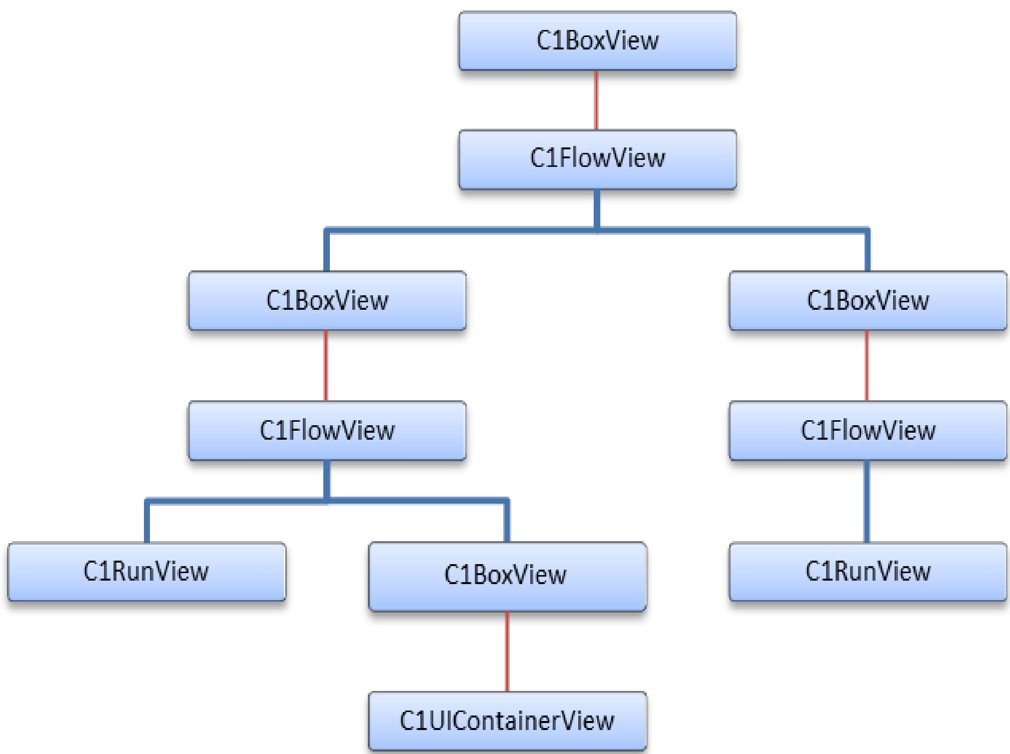

Each C1TextElementView provides some basic layout information for its corresponding C1TextElement:

C1TextElementView.Origin: this is the origin of the view in document coordinates.

C1TextElementView.DesiredSize: this is the desired size of the view from the last time it was measured.

Multiple **C1TextElementView**s can be composed to handle layout and drawing for out **C1TextElement**. When this is done, the C1TextElementView.Content property contains the inner most **C1TextElementView** in the composition. The content view's children correspond to the C1TextElementView.Children collection of the associated **C1TextElement**.

View composition is used in C1BoxView to handle margin, padding and border for its C1TextElementView.Content view. This means that the origin of each C1BoxView is outside the margin, padding and border box, while the origin of its **C1TextElementView.Content** is inside.

C1FlowView takes care of flowing boxes and text into lines. Each line is represented by a C1Line object. Note that a **C1Line** object not only contains single lines of text, but may also contain an entire paragraph. Each C1FlowView contains a list of C1Line, which are always vertically stacked. In turn, each **C1Line** is composed of C1LineFragments, which are horizontally stacked. C1LineFragments have a reference to the child element whose origin matches the position of the fragment.

For example, the following code counts the lines in a **C1RichTextBox**:

Visual Basic

```
Private Function CountLines(rtb As C1RichTextBox) As Integer
    Dim root = rtb.ViewManager.GetView(rtb.Document)
    Return CountLines(root)
End Function
Private Function CountLines(view As C1TextElementView) As Integer
    Dim count As Integer = 0
    Dim flow = TryCast(view, C1FlowView)
    If flow IsNot Nothing Then
        For Each line As var In flow.Lines
```

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```
            If TypeOf line.Fragments.First().Element Is C1Inline Then
                count += 1
            End If
        Next
    End If
    For Each child As var In view.Children
        count += CountLines(child)
    Next
    Return count
End Function
```

C#

```
int CountLines(C1RichTextBox rtb)
{
    var root = rtb.ViewManager.GetView(rtb.Document);
    return CountLines(root);
}
int CountLines(C1TextElementView view)
{
    int count = 0;
    var flow = view as C1FlowView;
    if (flow != null)
    {
        foreach (var line in flow.Lines)
        {
            if (line.Fragments.First().Element is C1Inline)
            {
                ++count;
            }
        }
    }
    foreach (var child in view.Children)
    {
        count += CountLines(child);
    }
    return count;
}
```

At first, the root view is obtained. That's the same as the view associated to root element, so C1RichTextViewManager.GetView is used to get the view of **rtb.Document**. After that, the view tree is traversed counting the lines in each C1FlowView found. Note that you only count the lines with C1Inline elements; otherwise you would also count paragraphs and other container blocks.

Copying, Cutting, and Pasting Text

The **C1RichTextBox** control fully supports the clipboard for both plain and rich text through the keyboard (CTRL+C, CTRL+V, CTRL+X) and UI commands for touch displays. Implement cut/copy/paste commands within your AppBar or any other way imaginable. Use the ClipboardMode property to indicate if you want to copy, cut, or paste plain text or rich text.

You can see the code within **button_Click** events:

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The code above allows you to quickly and easily implement copy/cut/paste commands.

C#

```
private void btnCopy_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
         {
             rtb.ClipboardCopy();
         }
private void btnCut_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
         {
                 rtb.ClipboardCopy();
         }
private void btnPaste_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
         {
                rtb.ClipboardPaste();
             }
         }
```

Hyperlinks

The C1RichTextBox supports hyperlinks. As in regular HTML documents, this feature allows you to make certain parts of the document active. When the user clicks them, the application receives a notification and takes some action.

The code below shows how you can create a hyperlink:

Visual Basic

```
Public Sub New()
    InitializeComponent()
    ' Set text
    rtb.Text = "This is some text with a hyperlink in it."
    ' Create hyperlink
    Dim pos As Integer = rtb.Text.IndexOf("hyperlink")
    rtb.[Select](pos, 9)
    Dim uri = New Uri("http://www.componentone.com", UriKind.Absolute)
    rtb.Selection.MakeHyperlink(uri)
    ' Handle navigation requests
    rtb.NavigationMode = NavigationMode.Always
    AddHandler _rtb.RequestNavigate, AddressOf _rtb_RequestNavigate
End Sub
```

C#

```
public MainPage()
{
  InitializeComponent();
  // Set text
  rtb.Text = "This is some text with a hyperlink in it.";
  // Create hyperlink
  int pos = rtb.Text.IndexOf("hyperlink");
  rtb.Select(pos, 9);
  var uri = new Uri("http://www.componentone.com", UriKind.Absolute);
  rtb.Selection.MakeHyperlink(uri);
```

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```
  // Handle navigation requests
  rtb.NavigationMode = C1.Xaml.RichTextBox.NavigationMode.Always;
  rtb.RequestNavigate += rtb_RequestNavigate;
}
```

The code starts by assigning some text to the **C1RichTextBox**. Next, it selects the word "hyperlink" and calls the EditExtensions.MakeHyperlink method to make it a hyperlink. The parameter is a URI that is assigned to the new hyperlink's C1Hyperlink.NavigateUri property.

Then, the code sets the C1RichTextBox.NavigationMode property to determine how the **C1RichTextBox** should handle the mouse over hyperlinks. The default behavior is moving the mouse over a hyperlink, and tapping fires the C1RichTextBox.RequestNavigate event. This allows users to edit the hyperlink text as they would edit regular text.

The C1RichTextBox.RequestNavigate event handler is responsible for handling the hyperlink navigation.

Note that hyperlink actions are not restricted to URI navigation. You could define a set of custom URI actions to be used as commands within your application. The custom URIs would be parsed and handled by the **C1RichTextBox.RequestNavigate** handler. For example, the code below uses hyperlinks to show message boxes:

Visual Basic

```
Public Sub New()
    InitializeComponent()
    ' Set text
    rtb.Text = "This is some text with a hyperlink in it."
    ' Create hyperlink
    Dim pos As Integer = _rtb.Text.IndexOf("hyperlink")
    rtb.[Select](pos, 9)
    Dim uri = New Uri("msgbox:Thanks for clicking!")
    rtb.Selection.MakeHyperlink(uri)
    ' Handle navigation requests
    rtb.NavigationMode = NavigationMode.Always
    AddHandler rtb.RequestNavigate, AddressOf _rtb_RequestNavigate
End Sub
Private Sub rtb_RequestNavigate(sender As Object, e As RequestNavigateEventArgs)
    Dim uri As Uri = e.Hyperlink.NavigateUri
    If uri.Scheme = "msgbox" Then
        MessageBox.Show(uri.LocalPath)
    End If
End Sub
```

C#

```
public MainPage()
        {
            this.InitializeComponent();
            // Set text
                rtb.Text = "This is some text with a hyperlink in it.";
            // Create hyperlink
             int pos = rtb.Text.IndexOf("hyperlink");
            rtb.Select(pos, 9);
            var uri = new Uri("http://www.componentone.com", UriKind.Absolute);
            rtb.Selection.MakeHyperlink(uri);
            // Handle navigation requests
            rtb.NavigationMode = C1.Xaml.RichTextBox.NavigationMode.Always;
```

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```
            rtb.RequestNavigate += rtb_RequestNavigate;
        }
        private async void rtb_RequestNavigate(object sender,
RequestNavigateEventArgs e)
        {
            var md = new MessageDialog("The document is requesting to navigate to " +
e.Hyperlink.NavigateUri, "Navigate");
            md.Commands.Add(new UICommand("OK", (UICommandInvokedHandler) =>
            {
                Windows.System.Launcher.LaunchUriAsync(e.Hyperlink.NavigateUri);
            }));
            md.Commands.Add(new UICommand("Cancel", (UICommandInvokedHandler) =>
            {
                rtb.Select(e.Hyperlink.ContentStart.TextOffset,
e.Hyperlink.ContentRange.Text.Length);
            }));
            await md.ShowAsync();
        }
```

The **C1RichTextBox.RequestNavigate** handler uses the URI members to parse the command and argument. You could use this technique to create documents with embedded menus for example.

Note that the **MakeHyperlink** method is just a quick and easy way to turn an existing part of a document into a hyperlink. You can also create hyperlinks by adding C1Hyperlink elements to C1Document objects. This is described in later sections.

Hit Testing

The C1RichTextBox supports hyperlinks, which provide a standard mechanism for implementing user interactivity. In some cases, you may want to go beyond that and provide additional, custom mouse interactions. For example, you may want to apply some custom formatting or show a context menu when the user clicks an element.

To enable these scenarios, the C1RichTextBox exposes ElementTapped events and a C1RichTextBox.GetPositionFromPoint method.

If all you need to know is the element that triggered the mouse event, you can get it from the source parameter in the event handler. If you need more detailed information (the specific word that was clicked within the element for example), then you need the C1RichTextBox.GetPositionFromPoint method. C1RichTextBox.GetPositionFromPoint takes a point in client coordinates and returns a **C1TextPosition** object that expresses the position in document coordinates.

The **C1TextPosition** object has two main properties: **Element** and **Offset**. The **Element** property represents an element within the document; **Offset** is a character index (if the element is a C1Run) or the index of the child element at the given point.

For example, the code below creates a **C1RichTextBox** and attaches a handler to the C1RichTextBox.RightTapped event:

C#

```
public sealed partial class MainPage : Page
    {
        C1RichTextBox rtb;
        public MainPage()
        {
```

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```
            this.InitializeComponent();
            // Create a C1RichTextBox and add it to the page
            rtb = new C1RichTextBox();
            LayoutRoot.Children.Add(rtb);
            // Attach event handler
            rtb.RightTapped += rtb_RightTapped;
        }
```

If you wanted to toggle the C1TextElement.FontWeight value of a single word, then you would need to determine which character was clicked and expand the selection to the whole word. This is where the C1RichTextBox.GetPositionFromPoint method becomes necessary. Here is a version of the event handler that accomplishes that:

C#

```
void rtb_RightTapped(object sender, RightTappedRoutedEventArgs e)
{
   // Get position in control coordinates
       var pt = e.GetPosition(rtb);
   // Get text pointer at position
       var pointer = rtb.GetPositionFromPoint(pt);
   // Check that the pointer is pointing to a C1Run
       var run = pointer.Element as C1Run;
         if (run != null)
          {
   // Get the word within the C1Run
       var text = run.Text;
       var start = pointer.Offset;
       var end = pointer.Offset;
        while (start > 0 && char.IsLetterOrDigit(text, start - 1))
        start--;
       while (end < text.Length - 1 && char.IsLetterOrDigit(text, end + 1))
        end++;
   // Toggle the bold property for the run that was clicked
       var word = new C1TextRange(pointer.Element, start, end - start + 1);
        word.FontWeight = word.FontWeight.HasValue && word.FontWeight.Value.Weight ==
FontWeights.Bold.Weight
         ? FontWeights.Normal
         : FontWeights.Bold;
        }
     }
  }
}
```

Notice that the C1TextElement.FontWeight property returns a nullable value. If the range contains a mix of values for this attribute, the property returns null. The code used to toggle the C1TextElement.FontWeight property is the same we used earlier when implementing the formatting toolbar.

The **GetPositionFromPoint** method allows you to get a **C1TextPosition** object from a point on the screen. The GetRectFromPosition method performs the reverse operation, returning a **Rect** that represents the screen position of a **C1TextPosition** object. This is useful in situations where you want to present a UI element near a specific portion of a document.

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Printing

C1RichTextBox for UWP supports printing through standard Windows printing techniques. The control also supports paged layout, so users can see how the document will look when printed.

For more information on printing in C1RichTextBox, please see the Printing C1RichTextBox Contents topic.

A **Printing** sample was installed on your machine in the **ComponentOne Samples** folder.

Spell Checking

RichTextBox for UWP supports as-you-type spell checking with a wavy, red underline that highlights misspelled words.

The end-user may right-click the mistake in the document to see a menu with options that include selecting one of the correction suggestions. Users can also choose to ignore the misspelled word or to add it to the dictionary.

Spell checking is done using the **C1SpellChecker** component, which is included in **ComponentOne Studio UWP Edition**.

There are 4 steps for adding spell-checking to your application.

1. Declare a new **C1SpellChecker** control.
2. Assign **C1SpellChecker** to the SpellChecker property of your C1RichTextBox control.
3. Obtain the stream for your resource file.
4. Load the MainDictionary of your choice.

To add spell-checking to your application, see the Adding Spell Checking Task-Based Help topic.

Dictionary Support

RichTextBox for UWP supports 22 different, customizable dictionaries.

Adding Spell Checking

In this topic you'll add spell-checking to your application. This topic assumes you have added a **C1RichTextBox** control and a **C1RichTextBoxMenu** control to your page.

In this help topic, you'll use an English dictionary resource. If you wish to use a different dictionary, you may choose any from the 22 supported dictionaries

The main steps for adding spell-checking are to declare a new **C1SpellChecker**, load the Main Dictionary of your choice, and to assign **C1SpellChecker** to the SpellChecker property of your C1RichTextBox.

1. Edit the **C1RichTextBox** and **C1RichTextBoxMenu** controls to reflect the following:

   XAML Markup
   ```
   <c1RTB:C1RichTextBoxMenu x:Name="rtbMenu" RichTextBox="{Binding
   ElementName=rtb}"/>
      <c1RTB:C1RichTextBox x:Name="rtb"  BorderThickness="2" BorderBrush="DarkGray"
   />
   ```

2. In the Solution Explorer, right-click your application's name and select **Add | New Folder**. Name the folder **Resources**.
3. In the Solution Explorer, right-click the **Resources** folder and select **Add | Existing Item**. The **Add Existing Item** dialog box will appear.
4. In the **Add Existing Item** dialog box locate the **C1Spell_en-US.dct** file included in the **RichTextBoxSamples**

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sample folder.

This is a US English dictionary file – if you add another file, instead, you can adapt the steps below with the appropriate code.

5. In the Properties window, set the **C1Spell_en-US.dct** file's **Build Action** to **Embedded Resource**.
6. Right-click your **MainPage.xaml** page and select **View Code** from the context menu.
7. Add the following import statements to the top of the page:

C#
```
using C1.Xaml.SpellChecker;
using C1.Xaml.RichTextBox;
```

8. Set the Text property in the **MainPage()** constructor:

C#
```
rtb.Text = @"Some facts about Mark Twain (spelling errors intentional ;-) A
steambat pilot neded a vast knowldege of the ever-chaging river to be able to
stop at any of the hundreds of ports and wood-lots along the river banks. Twain
meticulosly studied 2,000 miles (3,200 km) of the Mississipi for more than two
years before he received his steamboat pilot license in 1859.";
```

9. Declare a new **C1SpellChecker**:

C#
```
var spell = new C1SpellChecker();
```

10. Assign **C1SpellChecker** to the SpellChecker property of your **C1RichTextBox** control:

C#
```
rtb.SpellChecker = spell;
```

11. Obtain the stream to your resource file. Make sure you insert your application name where indicated:

C#
```
Assembly asm = typeof(MainPage).GetTypeInfo().Assembly;
Stream stream =
asm.GetManifestResourceStream("YourApplicationName.Resources.C1Spell_en-
US.dct");
```

12. Load the **MainDictionary** of your choice:

C#
```
spell.MainDictionary.Load(stream);
```

What You've Accomplished

In this topic, you added text to your **C1RichTextBox** control, and then added some code to handle spell-checking.

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Localization

Localizing strings can be done easily with just a bit of code and the built-in localization files. If the language needed is not one that is included, you can create your own localization resource file.

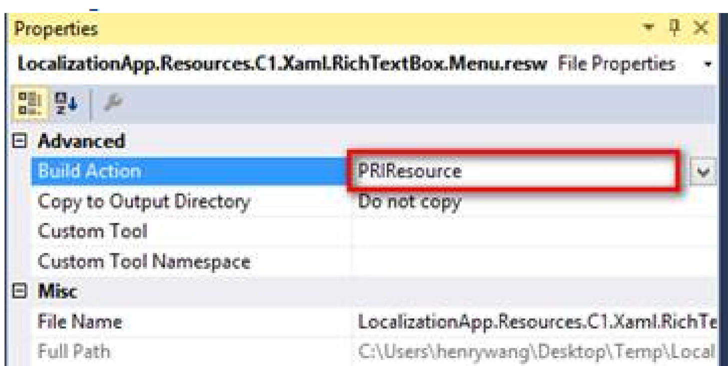
Note: The file extension for a UWP Edition Resource file is .resw.

Follow these steps:

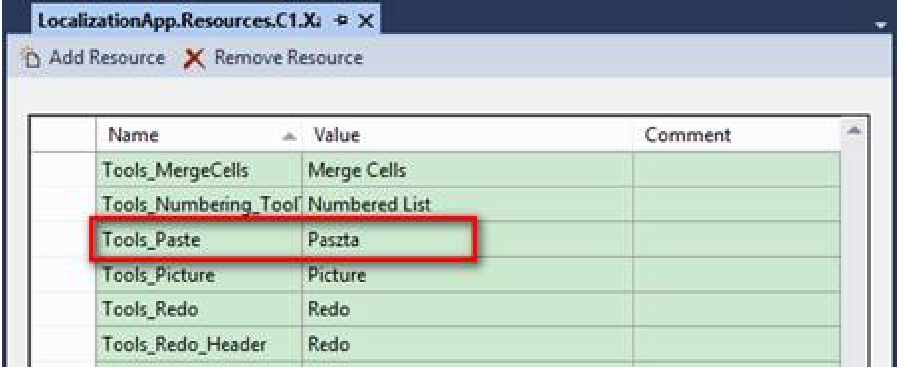
1. Add a resource file to your application:
   1. Right-click or tap your application name and select **Add | New Item**.
   2. In the **Add New Item** dialog box, select **Resource File (.resw)**.
   3. Name your resource file so the name reflects the following format:

      [Windows Apps Assembly Name].Resources.[C1 Control].resw

   4. Select **Add** to add your file.
   5. When your file opens, add or edit the strings to reflect the changes you need to make.
2. Select the resource file your just added and change the **Build Action** to **PRIResource** in the Properties window.



3. Run your sample and see the changes you made to the resource strings. In the following images, only the text for the "Paste" function was changed:



Setting and Formatting Content

The **C1RichTextBox** control allows you to create, load, or save different types of content. The following topics describe the types of content that can be specified in the **C1RichTextBox**, creating hyperlinks in the control, spell checking, and performing some editing tasks.

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Text Content

The content of the **C1RichTextBox** can be specified in two ways, using the C1RichTextBox.Text property or the C1RichTextBox.Html property. The C1RichTextBox.Text property is used to assign and retrieve the control content as plain text. There are a few different ways to set the text content.

At Design Time

To set the **C1RichTextBox.Text** property, complete the following steps:

1. Click the **C1RichTextBox** control once to select it.
2. Navigate to the Properties window, and enter text, for example "Hello World!", in the text box next to the **C1RichTextBox.Text** property.

This will set the **C1RichTextBox.Text** property to the value you chose.

In XAML

For example, to set the **C1RichTextBox.Text** property add **Text="Hello World!"** to the `<c1rtb:C1RichTextBox>` tag so that it appears similar to the following:

XAML Markup

```
<c1rtb:C1RichTextBox HorizontalAlignment="Left" Margin="10,10,0,0"
Name="C1RichTextBox1" VerticalAlignment="Top" Height="83" Width="208" Text="Hello
World!" />
```

In Code

For example, to set the **C1RichTextBox.Text** property add the following code to your project:

Visual Basic

```
Me.C1RichTextBox1.Text = "Hello World!"
```

C#

```
this.c1RichTextBox1.Text = "Hello World!";
```

The **C1RichTextBox** also exposes a C1RichTextBox.TextWrapping property that specifies whether the control should wrap long lines or whether it should keep the lines together and provide a horizontal scrollbar instead.

Visual Basic

```
Me.C1RichTextBox1.TextWrapping = TextWrapping.NoWrap
```

C#

```
this.c1RichTextBox1.TextWrapping = TextWrapping.NoWrap;
```

The code above sets the **C1RichTextBox** control so that text content will not wrap in the control and will appear in a continuous line.

Html Content

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The C1RichTextBox.Html property is used to assign and retrieve formatted text as HTML. When the Html property is set, the Html document is converted to a **C1Document** that, when displayed, resembles the Html content as much as possible. The original structure and styles are not kept.

When the **Html** property is read, or exported, an Html document is generated from the current **C1Document**. There are two ways that html can be generated, with a stylesheet or with inline styles. You can use the GetHtml method, passing HtmlEncoding.Inline as the second parameter, to generate Html with inline style.

The HTML text needs to be encoded in the XAML file, so, for example, instead of <b> for bold, tags are encoded as <b>;.

At Design Time

To set the **C1RichTextBox.Html** property, complete the following steps:

1. Click the **C1RichTextBox** control once to select it.
2. Navigate to the Properties window, and enter text, for example **<h1>Hello World<h1>",** in the text box next to the **C1RichTextBox.Html** property.

This will set the **C1RichTextBox.Html** property to the value you chose.

In XAML

For example, to set the **C1RichTextBox.Html** property add **Html="Hello World!"** to the <c1rtb:C1RichTextBox> tag so that it appears similar to the following:

XAML Markup

```
<c1rtb:C1RichTextBox HorizontalAlignment="Left" Margin="10,10,0,0"
Name="C1RichTextBox1" VerticalAlignment="Top" Height="83" Width="208"
Html="&lt;h1&gt;Hello World!&lt;/h1&gt;" />
```

In Code

For example, to set the **C1RichTextBox.Html** property add the following code to your project:

Visual Basic

```
Me.C1RichTextBox1.Html = "&lt;b&gt;Hello World!&lt;/b&gt;"
```

C#

```
this.c1RichTextBox1.Html = "&lt;b&gt;Hello World!&lt;/b&gt;"
```

Setting Rtf Content

You can read, edit, and display rich text formatted documents using the **C1RichTextBox** control. To set RTF content in the **C1RichTextBox** control, you must use a separate RtfFilter class. This class allows you to convert RTF to a Document that the control can understand.

The RtfFilter includes support for images, fonts, tables, and most formatting supported by Microsoft WordPad. You can also use the control to convert RTF to HTML and vice versa, since the C1RichTextBox control also supports reading and writing HTML.

To load an RTF string into a **C1RichTextBox** control, call the ConvertToDocument method from the RtfFilter class:

C#

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```
string rtf = @"{\rtf1\ansi\ansicpg1252\deff0\deflang1033{\fonttbl{\f0\fnil\fcharset0
Calibri;}}
{\*\generator Msftedit
5.41.21.2510;}\viewkind4\uc1\pard\sa200\sl276\slmult1\lang9\f0\fs22 some rtf
content\par
}";
C1RichTextBox1.Document = new RtfFilter().ConvertToDocument(rtf);
```

To output the content of C1RichTextBox as RTF, call the ConvertFromDocument method.

C#

```
string rtf = new RtfFilter().ConvertFromDocument(c1RichTextBox1.Document);
```

HtmlFilter Customization

HtmlFilter is the component in **C1RichTextBox** that transforms HTML strings to **C1Document**s and back. It's also capable of transforming to and from an intermediate representation of an HTML document called C1HtmlDocument.

When transforming between C1HtmlDocument and C1Document, several events are fired allowing customization of each node that is transformed. These events are:

- **HtmlFilter.ConvertingHtmlNode**

  This event is fired just before an HTML node is transformed. If marked as handled by the event handler then **HtmlFilter** assumes the node was transformed and skips it.

- **HtmlFilter.ConvertedHtmlNode**

  This event is fired after a node was transformed. It can be used to make minor changes to the transformation result.

- **HtmlFilter.ConvertingTextElement**

  This event is fired just before a **C1TextElement** is transformed. If marked as handled by the event handler then **HtmlFilter** assumes the element was transformed and skips it.

- **HtmlFilter.ConvertedTextElement**

  This event is fired after a C1TextElement is transformed. It can be used to make minor changes to the transformation result.

As an example, you can see how the **HtmlFilterCustomization** sample adds support for GIF images using **C1.Xaml.Imaging**. It uses both HtmlFilter.ConvertingHtmlNode and HtmlFilter.ConvertingTextElement events.

HtmlFilter.ConvertinHtmlNode

Here is the HtmlFilter.ConvertingHtmlNode event handler:

Visual Basic

```
Private Sub HtmlFilter_ConvertingHtmlNode(sender As Object, e As
ConvertingHtmlNodeEventArgs)
    Dim htmlElement = TryCast(e.HtmlNode, C1HtmlElement)
    If htmlElement IsNot Nothing AndAlso htmlElement.Name = "img" Then
```

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```
        Dim src As String
        If htmlElement.Attributes.TryGetValue("src", src) Then
            Dim uri = New Uri("/HtmlFilterCustomization;component/" & src,
UriKind.Relative)
            Dim resource = Application.GetResourceStream(uri)
            If resource IsNot Nothing Then
                Dim imageSource = New C1Bitmap(resource.Stream).ImageSource
                Dim image = New Image() With { _
                    Key .Source = imageSource _
                }
                SetImageSource(image, src)
                e.Parent.Children.Add(New C1InlineUIContainer() With { _
                    Key .Child = image _
                })
                e.Handled = True
            End If
        End If
    End If
End Sub
```

C#

```
void HtmlFilter_ConvertingHtmlNode(object sender, ConvertingHtmlNodeEventArgs e)
{
    var htmlElement = e.HtmlNode as C1HtmlElement;
    if (htmlElement != null && htmlElement.Name == "img")
    {
        string src;
        if (htmlElement.Attributes.TryGetValue("src", out src))
        {
            var uri = new Uri("/HtmlFilterCustomization;component/" + src,
UriKind.Relative);
            var resource = Application.GetResourceStream(uri);
            if(resource != null)
            {
                var imageSource = new C1Bitmap(resource.Stream).ImageSource;
                var image = new Image { Source = imageSource };
                SetImageSource(image, src);
                e.Parent.Children.Add(new C1InlineUIContainer { Child = image });
                e.Handled = true;
            }
        }
    }
}
```

The first thing the event handler does is cast **e.HtmlNode** to C1HtmlElement. There are two types that inherit from C1HtmlNode: C1HtmlElement, which represents an HTML element like <img/>, and C1HtmlText, which represents a text node.

Once the C1HtmlNode object has been cast to C1HtmlElement, it's possible to check the tag name, and access its attributes. This is done to see if the element is in fact an IMG tag, and to obtain the SRC attribute. The rest of the code

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takes care of creating the appropriate element, which is then added to **e.Parent**. Note that the SRC value is saved as an attached property, to be accessed when exporting.

Once the transformation is done, the handler can set **e.Handled** to True in order to prevent **HtmlFilter** from transforming this **C1HtmlNode**.

HtmlFilter.ConvertingTextElement

The HtmlFilter.ConvertingTextElement event handler looks like the following:

Visual Basic

```
Private Sub HtmlFilter_ConvertingTextElement(sender As Object, e As
ConvertingTextElementEventArgs)
    Dim inlineContainer = TryCast(e.TextElement, C1InlineUIContainer)
    If inlineContainer IsNot Nothing Then
        Dim src = GetImageSource(inlineContainer.Child)
        If src IsNot Nothing Then
            Dim element = New C1HtmlElement("img")
            element.Attributes("src") = src
            e.Parent.Add(element)
            e.Handled = True
        End If
    End If
End Sub
```

C#

```
void HtmlFilter_ConvertingTextElement(object sender, ConvertingTextElementEventArgs
e)
{
    var inlineContainer = e.TextElement as C1InlineUIContainer;
    if (inlineContainer != null)
    {
        var src = GetImageSource(inlineContainer.Child);
        if (src != null)
        {
            var element = new C1HtmlElement("img");
            element.Attributes["src"] = src;
            e.Parent.Add(element);
            e.Handled = true;
        }
    }
}
```

This is pretty similar to the other handler, only it transforms a C1TextElement to a C1HtmlElement. Note that the SRC value is recovered from the attached property, and a **C1HtmlElement** is created with that attribute. As before, the new element is added to **e.Parent**, and the event is marked as Handled.

Overriding Styles

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There are two different ways you can apply changes to your **C1RichTextBox** document. You can modify parts of an underlying document using C1TextRange, or you can modify only the view and not the underlying document. A good example of modifying the view and not the document is highlighting a selection with different foreground and background colors. The style change doesn't belong to the document itself; it belongs to the current view. You can also see this in syntax coloring and as-you-type spell-checking.

You can see this behavior in action in the **SyntaxHighlight** sample, installed on your machine.

The **C1RichTextBox** control supports these scenarios with the StyleOverrides property. This property contains a collection of objects that specify ranges and style modifications to be applied to the view only. This approach has two advantages over applying style modifications to C1TextRange objects:

- The style overrides are not applied to the document, and therefore are not applied when you save a document as HTML (you would not normally want the current selection and spelling error indicators to be persisted to a file).
- Because the changes are not added to the document, and only affect the part that is currently visible, this approach is much more efficient than changing **C1TextRange** objects directly.

The limitation of this approach is that the style changes cannot involve style elements that affect the document flow. You can use style overrides to change the background, foreground, and to underline parts of the document. But you cannot change the font size or style, for example, since that would affect the document flow.

The code examples in the following text are taken from the **SyntaxHighlight** sample.

In demonstrating the use of style overrides, first, we need to declare a C1RangeStyleCollection object, a **C1RichTextBox** object, and a C1RichTextBoxMenu object. We'll also initialize the styles used to color the document, and create a **Page_Loaded** event. Within that event, we will add the C1RangeStyleCollection to the control's **StyleOverrides** collection.

C#

```
public sealed partial class SyntaxHighlight : UserControl
                {
                    C1RichTextBox _rtb;
                    C1RichTextBoxMenu _menu;
                    C1RangeStyleCollection _rangeStyles = new
C1RangeStyleCollection();
        // initialize regular expression used to parse HTML
                    string tagPattern =
                        @"</?(?<tagName>[a-zA-Z0-9_:\-]+)" +
                        @"(\s+(?<attName>[a-zA-Z0-9_:\-]+)(?<attValue>(=""
[^""]+"")?))*\s*/?>";
        // initialize styles used to color the document
                    C1TextElementStyle brDarkBlue = new C1TextElementStyle
                    {
                        { C1TextElement.ForegroundProperty, new
SolidColorBrush(Color.FromArgb(255, 0, 0, 180)) }
                    };
                    C1TextElementStyle brDarkRed = new C1TextElementStyle
                    {
                        { C1TextElement.ForegroundProperty, new
SolidColorBrush(Color.FromArgb(255, 180, 0, 0)) }
                    };
                    C1TextElementStyle brLightRed = new C1TextElementStyle
                    {
```

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```
                        { C1TextElement.ForegroundProperty, new
SolidColorBrush(Colors.Red) }
                    };
        public SyntaxHighlight()
                    {
                        InitializeComponent();
            Loaded += SyntaxHighlight_Loaded;
                    }
        void SyntaxHighlight_Loaded(object sender, RoutedEventArgs e)
                    {
                        if (_rtb == null)
                        {
                            _rtb = new C1RichTextBox
                            {
                                ReturnMode = ReturnMode.SoftLineBreak,
                                TextWrapping = TextWrapping.NoWrap,
                                IsReadOnly = false,
                                Document = new C1Document
                                {
                                    Background = new SolidColorBrush(Colors.White),
                                    FontFamily = new FontFamily("Courier New"),
                                    FontSize = 16,
                                    Blocks =
                                {
                                    new C1Paragraph
                                    {
                                        Children =
                                        {
                                            new C1Run
                                            {
                                                Text = GetStringResource("w3c.htm")
                                            },
                                        },
                                    }
                                }
                                },
                                StyleOverrides = { _rangeStyles }
                            };
                            if (_menu == null)
                            {
                                _menu = new C1RichTextBoxMenu();
                            }
                LayoutRoot.Children.Add(_rtb);
                            _menu.RichTextBox = _rtb;
                            LayoutRoot.Children.Add(_menu);
                _rtb.TextChanged += tb_TextChanged;
                            UpdateSyntaxColoring(_rtb.Document.ContentRange);
                        }
                    }
```

Next, we'll set the TextChanged event. In this event, you will detect any changes in the document and trigger the

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UpdateSyntaxColoring method.

C#

```
void tb_TextChanged(object sender, C1TextChangedEventArgs e)
        {
            var start = e.Range.Start.Enumerate(LogicalDirection.Backward)
                                         .FirstOrDefault(p => p.Symbol.Equals('\n'));
            if (start != null)
            {
                start = start.GetPositionAtOffset(1);
            }
            var end = e.Range.End.Enumerate().FirstOrDefault(p =>
p.Symbol.Equals('\n'));
            var doc = e.Range.Start.Element.Root;
            UpdateSyntaxColoring(new C1TextRange(start ?? doc.ContentStart, end ??
doc.ContentEnd));
        }
```

The **UpdateSyntaxColoring** method applies formatting to the view by selecting an entire tag and coloring it.

C#

```
 // perform syntax coloring
            void UpdateSyntaxColoring(C1TextRange range)
            {
                // remove old coloring
                _rangeStyles.RemoveRange(range);

                var input = range.Text;

                // highlight the matches
                foreach (Match m in Regex.Matches(input, tagPattern))
                {
                    // select whole tag, make it dark blue
                    _rangeStyles.Add(new
C1RangeStyle(GetRangeAtTextOffset(range.Start, m), brDarkBlue));

                    // select tag name, make it dark red
                    var tagName = m.Groups["tagName"];
                    _rangeStyles.Add(new
C1RangeStyle(GetRangeAtTextOffset(range.Start, tagName), brDarkRed));

                    // select attribute names, make them light red
                    var attGroup = m.Groups["attName"];
                    if (attGroup != null)
                    {
                        var atts = attGroup.Captures;
                        for (int i = 0; i < atts.Count; i++)
                        {
                            var att = atts[i];
                            _rangeStyles.Add(new
C1RangeStyle(GetRangeAtTextOffset(range.Start, att), brLightRed));
```

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```
                        }
                    }
                }
        }
```

The last two methods get the start and end of the C1TextRange with an offset, and then get the resource file attached to the sample:

C#

```
C1TextRange GetRangeAtTextOffset(C1TextPointer pos, Capture capture)
             {
                 var start = pos.GetPositionAtOffset(capture.Index,
C1TextRange.TextTagFilter);
                 var end = start.GetPositionAtOffset(capture.Length,
C1TextRange.TextTagFilter);
                 return new C1TextRange(start, end);
             }

             // utility
             static string GetStringResource(string resourceName)
             {
                 Assembly asm = typeof(SyntaxHighlight).GetTypeInfo().Assembly;
                 Stream stream =
asm.GetManifestResourceStream(String.Format("RichTextBoxSamples.Resources.{0}",
resourceName));
                 using (var sr = new StreamReader(stream))
                 {
                     return sr.ReadToEnd();
                 }
             }
         }
 }
```

In general, the method outlined in this topic will provide excellent performance, thousands of times faster than applying changes directly to the underlying document.

Saving and Loading HTML

To preserve the formatting of your **C1RichTextBox** control while persisting the contents of the control, use the C1RichTextBox.Html property.

The C1RichTextBox.Html property gets or sets the formatted content of a **C1RichTextBox** as an HTML string. The HTML filter built into the **C1RichTextBox** is fairly rich. It supports CSS styles, images, hyperlinks, lists, and so on. But the filter does not support all HTML; it is limited to features supported by the **C1RichTextBox** control itself. For example, the current version of **C1RichTextBox** does not support tables. Still, you can use the **C1RichTextBox.Html** property to display simple HTML documents.

If you type "Hello world." into a **C1RichTextBox**, the **C1RichTextBox.Html** property will return the following markup:

XAML Markup

```
<html>
<head>
```

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```
  <style type="text/css">
    .c0 { font-family:Portable User Interface;font-size:9pt; }
    .c1 { margin-bottom:7.5pt; }
  </style>
</head>
<body class="c0">
<p class="c1">Hello world.</p>
</body>
</html>
```

Note that the **C1RichTextBox.Html** property is just a filter between HTML and the internal **C1Document** class. Any information in the HTML stream that is not supported by the C1RichTextBox (for example, comments and meta information) is discarded, and will not be preserved when you save the HTML document later.

Working with C1RichTextBoxMenu

The C1RichTextBoxMenu acts as a complete radial context menu, allowing you to edit and format text containing multiple fonts, decorations, sizes, colors, and other basic HTML and RTF style attributes supported by CSS and inline markup.

Adding a C1RichTextBoxMenu to your application is simple. Once you've added a C1RichTextBox control to your application and given it a name, you can add a **C1RichTextBoxMenu** and bind it to the C1RichTextBox control using the RichTextBox property:

XAML

```
<c1RTB:C1RichTextBoxMenu x:Name="rtbMenu" RichTextBox="{Binding ElementName=rtb}"/>
<c1RTB:C1RichTextBox x:Name="rtb"  BorderThickness="2" BorderBrush="DarkGray"
RequestNavigate="rtb_RequestNavigate" />
```

For more information on using the C1RichTextBoxMenu assembly, you can see the **DemoRichTextBox** sample installed in the **ComponentOne** samples folder.

C1RichTextBox Menus and Commands

RichTextBox for UWP allows you to customize both the AppBar and the Menu. These flexible tools allow you to give users complete text-editing capabilities on-demand, freeing up valuable RichTextBox real estate.

Creating Custom Command Bars

You can create your own custom toolbar, context menu, or pop-up controls that apply formatting and functionality to the C1RichTextBox control. The following section describes the code necessary to perform the most basic formatting commands. It does not include code for setting up an **AppBar** application.

For a complete sample that covers more functions like inserting tables, hyperlinks, and images.

The following code snippets assume the name of the **C1RichTextBox** control on your page is **rtb**.

Clipboard Functions

The following code snippets demonstrate the code used for clipboard functions:

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Copy

C#

```
rtb.ClipboardCopy();
```

Paste

C#

```
if (!rtb.IsReadOnly)
{
    rtb.ClipboardPaste();
}
```

Cut

C#

```
if (rtb.IsReadOnly)
    rtb.ClipboardCopy();
else
{
    rtb.ClipboardCut();
}
```

Alignment Functions

The following code snippets demonstrate the code used for aligning text:

Align Left

C#

```
rtb.Selection.TextAlignment = C1TextAlignment.Left;
```

Align Center

C#

```
rtb.Selection.TextAlignment = C1TextAlignment.Center;
```

Align Right

C#

```
rtb.Selection.TextAlignment = C1TextAlignment.Right;
```

Justify

C#

```
rtb.Selection.TextAlignment = C1TextAlignment.Justify;
```

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Font Functions

The following code snippets demonstrate the code used for font functions:

Font Family

C#

```
rtb.Selection.FontFamily = new FontFamily("Arial");
```

Font Size

C#

```
rtb.Selection.TrimRuns();
foreach (var run in rtb.Selection.Runs)
{
    run.FontSize = size;
}
```

Formatting Functions

The following code snippets demonstrate the code used for formatting functions:

Foreground Color

C#

```
rtb.Selection.Foreground = new SolidColorBrush(Colors.Red);
```

Highlight (background) color

C#

```
rtb.Selection.InlineBackground = new SolidColorBrush(Colors.Yellow);
```

Toggle Bold

C#

```
if (rtb.Selection.FontWeight != null && rtb.Selection.FontWeight.Value.Weight ==
FontWeights.Bold.Weight)
{
    rtb.Selection.FontWeight = FontWeights.Normal;
}
else
{
    rtb.Selection.FontWeight = FontWeights.Bold;
}
```

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Toggle Italic

C#

```
if (rtb.Selection.FontStyle != null && rtb.Selection.FontStyle == FontStyle.Italic)
{
    rtb.Selection.FontStyle = FontStyle.Normal;
}
else
{
    rtb.Selection.FontStyle = FontStyle.Italic;
}
```

Toggle Underline

C#

```
var range = rtb.Selection;
var collection = new C1TextDecorationCollection();
if (range.TextDecorations == null)
{
    collection.Add(C1TextDecorations.Underline[0]);
}
else if (!range.TextDecorations.Contains(C1TextDecorations.Underline[0]))
{
    foreach (var decoration in range.TextDecorations)
        collection.Add(decoration);
    collection.Add(C1TextDecorations.Underline[0]);
}
else
{
    foreach (var decoration in range.TextDecorations)
        collection.Add(decoration);
    collection.Remove(C1TextDecorations.Underline[0]);
    if (collection.Count == 0)
        collection = null;
}
range.TextDecorations = collection;
```

Clear Formatting

C#

```
rtb.Selection.InlineBackground = null;
rtb.Selection.Foreground = rtb.Foreground;
rtb.Selection.FontWeight = FontWeights.Normal;
rtb.Selection.FontStyle = FontStyle.Normal;
rtb.Selection.TextDecorations = null;
```

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Select Text Function

The following code snippet demonstrates the code used to select text:

Select All

C#
```
rtb.SelectAll();
```

Document History Functions

The following snippets demonstrates the code used to create document history functions:

Undo

C#
```
if (rtb.DocumentHistory.CanUndo)
{
    rtb.DocumentHistory.Undo();
}
```

Redo

C#
```
if (rtb.DocumentHistory.CanRedo)
{
    rtb.DocumentHistory.Redo();
}
```

Using the AppBar

The C1.Xaml.RichTextBox.AppBar library includes built-in tools that you can use to create a simple command bar. The built-in tools support the following commands: Bold, Italic, Underline, Undo, Redo, Increase Font Size, Decrease Font Size, Center Align, Right Align, Left Align, and Justify. There is no visible application bar control; however, you can add the **C1 Tools** included in the assembly to the application bar.

For a full example of implementing the **AppBar** assembly in your application, please see the Creating an AppBar Application tutorial. You can also see the **AppBarDemo** sample that was installed in the ComponentOne samples folder:

C:\Users\YourUserName\Documents\ComponentOne Samples\WinRT XAML Phone\C1.Xaml.RichTextBox\CS\RichTextBoxSamples

To use the **C1 Tools** in the **AppBar** assembly, your markup should resemble the following. Place it after the closing `</Grid>` tag:

XAML
```
<Page.BottomAppBar>
 <AppBar x:Name="topAppBar" Padding="10,0,10,0" >
```

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```
  </AppBar>
</Page.TopAppBar>
```

Note that the **AppBar** can be set to appear at the top of the page as well, using the following markup:

XAML

```
<Page.TopAppBar>
  <AppBar x:Name="bottomAppBar" Padding="10,0,10,0" >
  </AppBar>
</Page.BottomAppBar>
```

The **C1 Tools** you wish to use will be placed within a StackPanel control between the `<AppBar> </AppBar>` tags:

XAML

```
<StackPanel Orientation="Horizontal" HorizontalAlignment="Left">
   <RichTextBox:C1BoldTool x:Name="btnBold" Style="{StaticResource
BoldAppBarButtonStyle}" />
   <RichTextBox:C1ItalicTool x:Name="btnItalic" Style="{StaticResource
ItalicAppBarButtonStyle}" />
   <RichTextBox:C1UnderlineTool x:Name="btnUnderline" Style="{StaticResource
UnderlineAppBarButtonStyle}" />
</StackPanel>
```

If you wish to use a set of general Button controls, you can do that as well:

XAML

```
<StackPanel Orientation="Horizontal" HorizontalAlignment="Left">
   <Button x:Name="btnCopy" Style="{StaticResource CopyAppBarButtonStyle}"
Click="btnCopy_Click"/>
   <Button x:Name="btnPaste" Style="{StaticResource PasteAppBarButtonStyle}"
Click="btnPaste_Click"/>
   <Button x:Name="btnCut" Style="{StaticResource CutAppBarButtonStyle}"
Click="btnCut_Click"/>
</StackPanel>
```

Since the general Button controls have click events, you'll have to add the following code to handle the click events:

C#

```
#region Clipboard
        private void btnCopy_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
        {
            rtb.ClipboardCopy();
        }
        private void btnCut_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
        {
            if (rtb.IsReadOnly)
                rtb.ClipboardCopy();
            else
                rtb.ClipboardCut();
        }
```

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```
        private void btnPaste_Click(object sender, Windows.UI.Xaml.RoutedEventArgs e)
        {
            if (!rtb.IsReadOnly)
            {
                rtb.ClipboardPaste();
            }
        }
#endregion
```

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Working with C1Document Object

The C1Document object exposes a rich object model for creating and editing the underlying document. So far, we have focused on the object model of the C1RichTextBox control, which is the editable view of a C1Document object. The architecture of the **C1Document** object is similar to the one used by the Microsoft WPF RichTextBox control, which provides a view of a FlowDocument object.

The **C1Document** exposes the structure of the document, where the C1RichTextBox deals mainly with text as a flat, linear view of the control. The document model in **C1Document** makes it easy to enumerate runs within each paragraph, items within each list, and so on. This will be shown in a later section.

Programming directly against the **C1Document** object is the best way to perform many tasks, including report generation and the implementation of import and export filters. For example, the Html property exposes an HTML filter with methods that convert **C1Document** objects to and from HTML strings. You could implement a similar filter class to import and export other popular formats such as RTF or PDF.

Defining C1RichTextBox.Document Elements

The C1TextElement Class

The base class for all elements in a C1Document is the C1TextElement class. The C1TextElement class is comprised of three further classes: the C1Block class, the C1Document class, and the C1Inline class.

- **C1Block Class**

  The C1Block element is an abstract class that provides a base for all block-level flow content elements. Block-level flow content elements are classes that inherit from **C1Block**, such as the C1Paragraph class

  The following elements inherit from the **C1Block** Class:

Element	**Description**
C1BlockUIContainer	A block-level flow content element which enables UIElement elements to be embedded in flow content.
C1List	A block-level flow element that provides facilities for presenting content in an ordered or unordered list.
C1ListItem	A flow content element that represents a particular content item in a C1List.
C1Paragraph	A block-level flow content element used to group content into a paragraph.
C1Section	A block-level flow content element used for grouping other C1Block elements.
C1Table	A block-level flow content element that provides a grid-based presentation organized by rows and columns.
C1TableCell	A flow content element that defines a cell of content within a C1Table.
C1TableRow	A flow content element that defines a row within a C1Table
C1TableRowGroup	A flow content element that is used to group C1TableRow elements within a C1Table.

- **C1Document Class**

  The C1Document class represents a flow element.

- **C1Inline Class**

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The C1Inline abstract class provides a base for all inline flow elements. The C1Inline class is comprised of the following elements:

C1Inline Elements	Description
C1InlineUIContainer	An inline-level flow content element which enables UIElement elements to be embedded in flow content.
C1Run	An inline-level flow element intended to contain a run of formatted or unformatted text.
C1Span	The C1Span class groups other C1Inline flow content elements, such as C1Hyperlink elements.

Other C1RichTextBox.Documents Elements

There are other elements in the Documents namespace that are not contained in the C1TextElement class.

- C1HtmlDocument

  This element represents an Html document.

- C1TextRange

  This element represents a text range in a C1Document.

- C1TextPointer

  This element represents a position in a C1Document.

Creating Documents and Reports

To illustrate the process of creating a C1Document, we will walk through the steps required to implement a simple assembly documentation utility.

To start, create a new project and add a reference to the **C1.UWP** and **C1.UWP.RichTextBox** assemblies. Then edit the page constructor as follows:

C#

```
using C1.Xaml;
using C1.Xaml.RichTextBox;
using C1.Xaml.RichTextBox.Documents;
using System.Reflection;
using System.Text;
using Windows.UI;
using Windows.UI.Text;


// The Blank Page item template is documented at http://go.microsoft.com/fwlink/?
LinkId=234238

namespace RTBTestsDoc
{
```

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```
    /// <summary>
    /// An empty page that can be used on its own or navigated to within a Frame.
    /// </summary>
    public sealed partial class MainPage : Page
    {
        // C1RichTextBox that will display the C1Document
        C1RichTextBox _rtb;

        public MainPage()
        {
            this.InitializeComponent();
            // Create the C1RichTextBox and add it to the page
            _rtb = new C1RichTextBox();
            LayoutRoot.Children.Add(_rtb);

         // Create document and show it in the C1RichTextBox
            _rtb.Document =
DocumentAssembly(typeof(C1RichTextBox).GetTypeInfo().Assembly);
         _rtb.IsReadOnly = true;

        }
```

The code creates the **C1RichTextBox** and assigns its C1RichTextBox.Document property to the result of a call to the DocumentAssembly method. It then makes the control read-only so users can't change the report.

The DocumentAssembly method takes an Assembly as argument and builds a **C1Document** containing the assembly documentation. Here is the implementation:

C#

```
C1Document DocumentAssembly(Assembly asm)
        {
            // Create document
            C1Document doc = new C1Document();
            doc.FontFamily = new FontFamily("Tahoma");
            //Heading1 H = new Heading1("Assembly\r\n" + asm.FullName.Split(',')[0]);
            // Assembly
            Heading1 p = new Heading1();
            p.Inlines.Add(new C1Run() { Text = "Assembly\r\n" +
asm.FullName.Split(',')[0] });
            doc.Blocks.Add(p);

            // Types
            foreach (Type t in asm.ExportedTypes)
                DocumentType(doc, t);

            // Done
            return doc;
        }
```

The method starts by creating a new C1Document object and setting its C1TextElement.FontFamily property. This will be the default value for all text elements added to the document.

Next, the method adds a Heading1 paragraph containing the assembly name to the new document's Blocks

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collection. Blocks are elements such as paragraphs and list items that flow down the document. They are similar to "div" elements in HTML. Some document elements contain an Inlines collection instead. These collections contain elements that flow horizontally, similar to "span" elements in HTML.

The Heading1 class inherits from C1Paragraph and adds some formatting. We will add several such classes to the project, for normal paragraphs and headings 1 through 4.

The Normal paragraph is a C1Paragraph that takes a content string in its constructor:

C#

```
class Normal : C1Paragraph
        {
            public Normal()
            {
               // this.Inlines.Add(new C1Run() { Text = text });
                this.Padding = new Thickness(30, 0, 0, 0);
                this.Margin = new Thickness(0);
            }
        }
```

The Heading paragraph extends Normal and makes the text bold:

C#

```
class Heading : Normal
        {
            public Heading()
            {
                this.FontWeight = FontWeights.Bold;
            }
        }
```

Heading1 through Heading4 extend Heading to specify font sizes, padding, borders, and colors:

C#

```
class Heading1 : Heading
        {
            public Heading1()
            {
                this.Background = new SolidColorBrush(Colors.Yellow);
                this.FontSize = 24;
                this.Padding = new Thickness(0, 10, 0, 10);
                this.BorderBrush = new SolidColorBrush(Colors.Black);
                this.BorderThickness = new Thickness(3, 1, 1, 0);
            }
        }
        class Heading2 : Heading
        {
            public Heading2()
            {
                this.FontSize = 18;
                this.FontStyle = FontStyle.Italic ;
                this.Background = new SolidColorBrush(Colors.Yellow);
```

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```
            this.Padding = new Thickness(10, 5, 0, 5);
            this.BorderBrush = new SolidColorBrush(Colors.Black);
            this.BorderThickness = new Thickness(3, 1, 1, 1);
        }
    }
    class Heading3 : Heading
    {
        public Heading3()
        {
            this.FontSize = 14;
            this.Background = new SolidColorBrush(Colors.LightGray);
            this.Padding = new Thickness(20, 3, 0, 0);
        }
    }
    class Heading4 : Heading
    {
        public Heading4()
        {
            this.FontSize = 14;
            this.Padding = new Thickness(30, 0, 0, 0);
        }
    }
```

Now that we have classes for all paragraph types in the document, it's time to add the content. Recall that we used a DocumentType method in the first code block. Here is the implementation for that method:

C#

```
void DocumentType(C1Document doc, Type t)
        {

            // Type
            Heading2 h2 = new Heading2();
            h2.Inlines.Add(new C1Run() { Text = "Class " + t.Name });
            doc.Blocks.Add(h2);

            // Properties
            Heading3 h3 = new Heading3();
            h3.Inlines.Add(new C1Run() { Text = "Properties" });
            doc.Blocks.Add(h3);
            foreach (PropertyInfo pi in t.GetRuntimeProperties())
            {
                if (pi.DeclaringType == t)
                    DocumentProperty(doc, pi);
            }

            // Methods
            h3 = new Heading3();
            h3.Inlines.Add(new C1Run() { Text = "Methods" });
            doc.Blocks.Add(h3);
            foreach (MethodInfo mi in t.GetRuntimeMethods())
            {
```


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```
            if (mi.DeclaringType == t)
                DocumentMethod(doc, mi);
        }

        // Events
        h3 = new Heading3();
        h3.Inlines.Add(new C1Run() { Text = "Events" });
        doc.Blocks.Add(h3);
        foreach (EventInfo ei in t.GetRuntimeEvents())
        {
            if (ei.DeclaringType == t)
                DocumentEvent(doc, ei);
        }
    }
```

The method adds a Heading2 paragraph with the class name and then uses reflection to enumerate all the public properties, events, and methods in the type. The code for these methods is simple:

C#

```
void DocumentProperty(C1Document doc, PropertyInfo pi)
        {
            if (pi.PropertyType.IsGenericParameter)
                return;

            Heading4 h4 = new Heading4();
            h4.Inlines.Add(new C1Run() { Text = pi.Name });
            doc.Blocks.Add(h4);

            var text = string.Format("public {0} {1} {{ {2}{3} }}",
              pi.PropertyType.Name,
              pi.Name,
              pi.CanRead ? "get; " : string.Empty,
              pi.CanWrite ? "set; " : string.Empty);
            Normal n = new Normal();
            n.Inlines.Add(new C1Run() { Text = text });
            doc.Blocks.Add(n);
        }
```

The method adds a Heading4 paragraph containing the property name, then some Normal text containing the property type, name, and accessors.

The methods used for documenting events and properties are analogous:

C#

```
void DocumentMethod(C1Document doc, MethodInfo mi)
        {
            if (mi.IsSpecialName)
                return;

            Heading4 h4 = new Heading4();
            h4.Inlines.Add(new C1Run() { Text = mi.Name });
```

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```
            doc.Blocks.Add(h4);
            var parms = new StringBuilder();
            foreach (var parm in mi.GetParameters())
            {
                if (parms.Length > 0)
                    parms.Append(", ");
                parms.AppendFormat("{0} {1}", parm.ParameterType.Name, parm.Name);
            }
            var text = string.Format("public {0} {1}({2})",
              mi.ReturnType.Name,
              mi.Name,
              parms.ToString());

            Normal n = new Normal();
            n.Inlines.Add(new C1Run() { Text = text });
            doc.Blocks.Add(n);
        }

        void DocumentEvent(C1Document doc, EventInfo ei)
        {
            Heading4 h4 = new Heading4();
            h4.Inlines.Add(new C1Run() { Text = ei.Name });
            doc.Blocks.Add(h4);

            var text = string.Format("public {0} {1}",
              ei.EventHandlerType.Name,
              ei.Name);

            Normal n = new Normal();
            n.Inlines.Add(new C1Run() { Text = text });
            doc.Blocks.Add(n);
        }
    }
}
```

If you run the project now, it will resemble the image below:

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Assembly
C1.Xaml.RichTextBox

Class C1RichTextBox

Properties

LastFlowDirection
public FlowDirection LastFlowDirection { get; set; }
ContextMenu
public Object ContextMenu { get; set; }
TranslateY
public Double TranslateY { get; }
ViewManager
public C1RichTextViewManager ViewManager { get; }
DocumentHistory
public DocumentHistory DocumentHistory { get; }
Text
public String Text { get; set; }
Selection
public C1TextRange Selection { get; set; }

The resulting document can be viewed and edited in the C1RichTextBox like any other. It can also be exported to HTML using the C1RichTextBox.Html property in the **C1RichTextBox**, or copied through the clipboard to applications such as Microsoft Word or Excel.

You could use the same technique to create reports based on data from a database. In addition to formatted text, the C1Document object model supports the following features:

- **Lists**

  Lists are created by adding C1List objects to the document. The C1List object has a C1List.ListItems property that contains C1ListItem objects, which are also blocks.

- **Hyperlinks**

  Hyperlinks are created by adding C1Hyperlink objects to the document. The C1Hyperlink object has an C1Span.Inlines property that contains a collection of runs (typically C1Run elements that contain text), and a NavigateUri property that determines the action to be taken when the hyperlink is clicked.

- **Images**

  Images and other FrameworkElement objects are created by adding C1BlockUIContainer objects to the document. The C1BlockUIContainer object has a C1BlockUIContainer.Child property that can be set to any FrameworkElement object.

Note that not all objects can be exported to HTML. Images are a special case that the HTML filter knows how to handle.

Implementing Split Views

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Many editors offer split-views of a document, allowing you to keep a part of the document visible while you work on another part.

You can achieve this easily by connecting two or more **C1RichTextBox** controls to the same underlying C1Document. Each control acts as an independent view, allowing you to scroll, select, and edit the document as usual. Changes made to one view are reflected on all other views.

To show how this works, let's extend the previous example by adding a few lines of code to the page constructor:

C#

```
// Add a second C1RichTextBox to the page
         LayoutRoot.RowDefinitions.Add(new RowDefinition());
         LayoutRoot.RowDefinitions.Add(new RowDefinition());
         var rtb2 = new C1RichTextBox();
         rtb2.SetValue(Grid.RowProperty, 1);
         LayoutRoot.Children.Add(rtb2);

         // Bind the second C1RichTextBox to the same document
         rtb2.Document = _rtb.Document;
```

The new code adds a new C1RichTextBox to the page and then sets its C1RichTextBox.Document property to the document being shown by the original **C1RichTextBox**.

If you run the project again, you will see that the bottom control is editable (we did not set its C1RichTextBox.IsReadOnly property to False). If you type into it, you will see the changes on both controls simultaneously.

The mechanism is general; we could easily attach more views of the same document. Moreover, any changes you make to the underlying document are immediately reflected on all views.

Using the C1Document Class

As discussed earlier, the C1RichTextBox provides a linear, flat view of the control content, while C1Document exposes the document structure.

To illustrate the advantages of working directly with the document object, suppose you wanted to add some functionality to the previous sample: when the user presses the CTRL key, you want to capitalize the text in all paragraphs of type Heading2.

The object model exposed by the C1RichTextBox is not powerful enough to do this reliably. You would have to locate spans based on their formatting, which would be inefficient and unreliable (what if the user formatted some plain text with the same format used by Heading2?).

Using the **C1Document** object model, this task becomes trivial. You simply have to handle the **KeyDown** event within the **InitializeComponent()** method:

C#

```
public MainPage()
        {
            this.InitializeComponent();

                                //No changes here...

         // Bind the second C1RichTextBox to the same document
         rtb2.Document = _rtb.Document;
```

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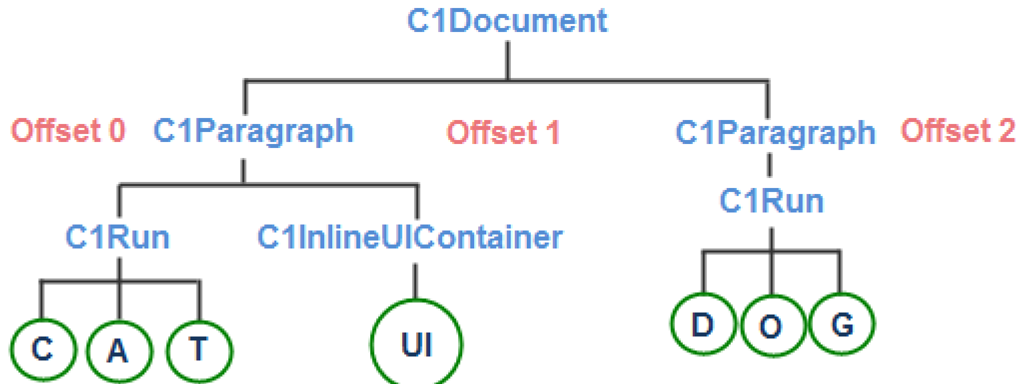
```
        rtb2.KeyDown += rtb2_KeyDown;
    }

    void rtb2_KeyDown(object sender, KeyRoutedEventArgs e)
    {
        if (e.Key == VirtualKey.Control)
        {
            var h2 = _rtb.Document.Blocks.OfType<Heading2>().FirstOrDefault();
            if (h2 != null)
                h2.ContentRange.ToUppercase();
        }
    }
```

The code monitors the keyboard. When the user presses the CTRL key, it enumerates all Heading2 elements in the document and replaces their content with capitals.

Understanding C1TextPointer

The C1TextPointer class represents a position inside a C1Document. It is intended to facilitate traversal and manipulation of C1Documents. The functionality is analogous to WPF's TextPointer class, although the object model has many differences.

A C1TextPointer is defined by a C1TextElement and an offset inside of it. Let's take this image as an example:



The nodes in blue text in the image above are C1TextElements. You can also see that there are three offset positions marked before, between, and after the two C1Paragraph elements. The offset positions that are marked indicate the C1TextPointer's position within the C1Document element.

In a C1Run element, each character in its text is considered a child of the element, so the offset indicates a position inside the text.

The C1InlineUIContainer is only considered to have a single child, the UIElement it displays, so it has two offset positions: one before and one after the child.

You can also visualize the document as a sequence of symbols, where a symbol can be either an element tag or some type of content. An element tag indicates the start or end of an element. So, if you wanted to recreate the above image in XML, it would look like this:

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C#

```
<C1Document>
    <C1Paragraph>
        <C1Run>CAT</C1Run>
        <C1InlineUIContainer><UI/></C1InlineUIContainer>
    </C1Paragraph>
    <C1Paragraph>
        <C1Run>DOG</C1Run>
    </C1Paragraph>
</C1Document>
```

Viewing a document like this, a **C1TextPointer** points to a position between tags or content. This view gives a clear order to C1TextPointer. In fact, C1TextPointer implements IComparable, and also overloads the comparison operators for convenience.

The symbol that is after a C1TextPointer can be obtained using the C1TextPointer.Symbol property. This property returns an object that can be of type **StartTag**, **EndTag**, **char**, or **UIElement**.

If you want to iterate through the positions in a document, there are two methods available: GetPositionAtOffset and Enumerate. GetPositionAtOffset is the low-level method; it just returns the position at a specified integer offset, as you can see in the following code from the **SyntaxHighlight** sample:

C#

```
C1TextRange GetRangeAtTextOffset(C1TextPointer pos, Capture capture)
        {
            var start = pos.GetPositionAtOffset(capture.Index,
C1TextRange.TextTagFilter);
            var end = start.GetPositionAtOffset(capture.Length,
C1TextRange.TextTagFilter);
            return new C1TextRange(start, end);
        }
```

Enumerate is the recommended way to iterate through positions. It returns an IEnumerable<C1TextPointer> that iterates through all the positions in a specified direction. For instance, this returns all the positions in a document:

C#

```
document.ContentStart.Enumerate()
```

Note that ContentStart returns the first **C1TextPointer** in a **C1TextElement**; there is also a ContentEnd property that returns the last position.

The interesting thing about Enumerate is that it returns a lazy enumeration. That is, **C1TextPointer** objects are only created when the IEnumerable is iterated. This allows for efficient use of LINQ extensions methods for filtering, finding, selecting, and so on. As an example, let's say you want to get the **C1TextRange** for the word contained under a **C1TextPointer** . You can do the following:

Visual Basic

```
Private Function ExpandToWord(pos As C1TextPointer) As C1TextRange
    ' Find word start
    Dim wordStart = If(pos.IsWordStart, pos,
pos.Enumerate(LogicalDirection.Backward).First(Function(p) p.IsWordStart))

    ' Find word end
```

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```
    Dim wordEnd = If(pos.IsWordEnd, pos,
pos.Enumerate(LogicalDirection.Forward).First(Function(p) p.IsWordEnd))

    ' Return new range from word start to word end
    Return New C1TextRange(wordStart, wordEnd)
End Function
```

C#

```
C1TextRange ExpandToWord(C1TextPointer pos)
{
    // Find word start
    var wordStart = pos.IsWordStart
        ? pos
        : pos.Enumerate(LogicalDirection.Backward).First(p => p.IsWordStart);

    // Find word end
    var wordEnd = pos.IsWordEnd
        ? pos
        : pos.Enumerate(LogicalDirection.Forward).First(p => p.IsWordEnd);

    // Return new range from word start to word end
    return new C1TextRange(wordStart, wordEnd);
}
```

The Enumerate method returns the positions in a specified direction, but it doesn't include the current position. So the code first checks if the parameter position is a word start, and if not, searches backward for a position that is a word start. Likewise for the word end, it checks the parameter position and then searches forward. We want to find the word that contains the parameter position, so we need the first word end moving forward and the first word start moving backward. **C1TextPointer** already contains the properties IsWordStart and IsWordEnd that tells you whether a position is a word start or end depending on the surrounding symbols. We use the First LINQ extension method to find the first position that satisfies our required predicate. And finally we create a **C1TextRange** from the two positions.

LINQ extension methods can be very useful when working with positions. As another example we can count the words in a document like this:

Visual Basic

```
document.ContentStart.Enumerate().Count(Function(p) p.IsWordStart AndAlso TypeOf
p.Symbol Is Char)
```

C#

```
document.ContentStart.Enumerate().Count(p => p.IsWordStart && p.Symbol is char)
```

Note that we need to check that the symbol following a word start is a char because IsWordStart returns True for positions that are not exactly at the start of a word. For instance the position just before a **C1Run** start tag is considered a word start if the first position of the C1Run is a word start.

Let's implement a Find method as another example:

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Visual Basic

```
Private Function FindWordFromPosition(position As C1TextPointer, word As String) As
C1TextRange
    ' Get all ranges whose text length is equal to word.Length
    Dim ranges = position.Enumerate().[Select](Function(pos)
    ' Get a position that is at word.Length offset
    ' but ignoring tags that do not change the text flow
    Dim [end] = pos.GetPositionAtOffset(word.Length, C1TextRange.TextTagFilter)
    Return New C1TextRange(pos, [end])

End Function)
    ' returned value will be null if word is not found.
    Return ranges.FirstOrDefault(Function(range) range.Text = word)
End Function
```

C#

```
C1TextRange FindWordFromPosition(C1TextPointer position, string word)
{
    // Get all ranges whose text length is equal to word.Length
    var ranges = position.Enumerate().Select(pos =>
    {
        // Get a position that is at word.Length offset
        // but ignoring tags that do not change the text flow
        var end = pos.GetPositionAtOffset(word.Length, C1TextRange.TextTagFilter);
        return new C1TextRange(pos, end);
    });
    // returned value will be null if word is not found.
    return ranges.FirstOrDefault(range => range.Text == word);
}
```

We want to find the word from a specified position, so we enumerate all positions forward, and select all ranges whose text length is word.Length. For each position we need to find the position that is at word.Length distance. For this we use the **GetPositionAtOffset** method. This method returns a position at a specified offset, but it also counts all inline tags as valid positions, we need to ignore this to account for the case when a word is split between two C1Run elements. That is why we use C1TextRange.TextTagFilter; this is the same filter method used by the internal logic that translates document trees into text. As a final step we search for the range whose text matches the searched word.

As a last example let's replace the first occurrence of a word:

Visual Basic

```
Dim wordRange = FindWordFromPosition(document.ContentStart, "cat")
If wordRange IsNot Nothing Then
    wordRange.Text = "dog"
End If
```

C#

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```
var wordRange = FindWordFromPosition(document.ContentStart, "cat");
if (wordRange != null)
{
    wordRange.Text = "dog";
}
```

We can use the previous example to first find the word, and then replace the text by just assigning to C1TextRange.Text property.

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Supported Elements

HTML Elements

RichTextBox for UWP supports many HTML elements. The following table lists HTML elements by names and notes whether they are supported by **RichTextBox for UWP**.

Name	Supported
A	YES
ABBR	YES
ACRONYM	YES
ADDRESS	YES
APPLET	NO
AREA	NO
B	YES
BASE	NO
BASEFONT	YES
BDO	NO
BIG	YES
BLOCKQUOTE	YES
BODY	YES
BR	YES
BUTTON	NO
CAPTION	NO
CENTER	YES
CITE	YES
CODE	YES
COL	YES
COLGROUP	YES
DD	YES
DEL	YES
DFN	YES
DIV	YES
DL	YES
DT	YES
EM	YES
FIELDSET	NO
FONT	YES
FORM	NO
FRAME	NO

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FRAMESET	NO
H1	YES
H2	YES
H3	YES
H4	YES
H5	YES
H6	YES
HEAD	YES
HR	YES
HTML	YES
I	YES
IFRAME	NO
IMG	YES
INPUT	NO
INS	YES
ISINDEX	NO
KBD	YES
LABEL	YES
LEGEND	NO
LI	YES
LINK	NO
MAP	NO
MENU	YES
META	NO
NOFRAMES	NO
NOSCRIPT	NO
OBJECT	NO
OL	YES
OPTGROUP	NO
OPTION	NO
P	YES
PARAM	NO
PRE	YES
Q	NO
S	YES
SAMP	YES
SCRIPT	NO
SELECT	NO

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SMALL	YES
SPAN	YES
STRIKE	YES
STRONG	YES
STYLE	YES
SUB	YES
SUP	YES
TABLE	YES
TBODY	YES
TD	YES
TEXTAREA	NO
TFOOT	YES
TH	YES
THEAD	YES
TITLE	NO
TR	YES
TT	YES
U	YES
UL	YES
VAR	YES

HTML Attributes

RichTextBox for UWP supports many HTML attribute. The following table lists HTML attributes by name and element and notes whether they are supported by **RichTextBox for UWP.**

Name	Elements	Supported
abbr	TD, TH	NO
accept-charset	FORM	NO
accept	FORM, INPUT	NO
accesskey	A, AREA, BUTTON, INPUT, LABEL, LEGEND, TEXTAREA	NO
action	FORM	NO
align	CAPTION	NO
align	APPLET, IFRAME, IMG, INPUT, OBJECT	NO
align	LEGEND	NO
align	TABLE	NO
align	HR	NO
align	DIV, H1, H2, H3, H4, H5, H6, P	YES

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align	COL, COLGROUP, TBODY, TD, TFOOT, TH, THEAD, TR	NO
alink	BODY	NO
alt	APPLET	NO
alt	AREA, IMG	NO
alt	INPUT	NO
archive	APPLET	NO
archive	OBJECT	NO
axis	TD, TH	NO
background	BODY	NO
bgcolor	TABLE	YES
bgcolor	TR	YES
bgcolor	TD, TH	YES
bgcolor	BODY	YES
border	TABLE	YES
border	IMG, OBJECT	YES
cellpadding	TABLE	NO
cellspacing	TABLE	YES
char	COL, COLGROUP, TBODY, TD, TFOOT, TH, THEAD, TR	NO
charoff	COL, COLGROUP, TBODY, TD, TFOOT, TH, THEAD, TR	NO
charset	A, LINK, SCRIPT	NO
checked	INPUT	NO
cite	BLOCKQUOTE, Q	NO
cite	DEL, INS	NO
class	All elements but BASE, BASEFONT, HEAD, HTML, META, PARAM, SCRIPT, STYLE, TITLE	YES
classid	OBJECT	NO
clear	BR	NO
code	APPLET	NO
codebase	OBJECT	NO
codebase	APPLET	NO
codetype	OBJECT	NO
color	BASEFONT, FONT	NO
cols	FRAMESET	NO
cols	TEXTAREA	NO
colspan	TD, TH	YES
compact	DIR, DL, MENU, OL, UL	NO
content	META	NO
coords	AREA	NO
coords	A	NO
data	OBJECT	NO

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datetime	DEL, INS	NO
declare	OBJECT	NO
defer	SCRIPT	NO
dir	All elements but APPLET, BASE, BASEFONT, BDO, BR, FRAME, FRAMESET, IFRAME, PARAM, SCRIPT	NO
dir	BDO	NO
disabled	BUTTON, INPUT, OPTGROUP, OPTION, SELECT, TEXTAREA	NO
enctype	FORM	NO
face	BASEFONT, FONT	YES
for	LABEL	NO
frame	TABLE	YES
frameborder	FRAME, IFRAME	NO
headers	TD, TH	NO
height	IFRAME	NO
height	TD, TH	NO
height	IMG, OBJECT	YES
height	APPLET	NO
href	A, AREA, LINK	YES
href	BASE	NO
hreflang	A, LINK	NO
hspace	APPLET, IMG, OBJECT	YES
http-equiv	META	NO
id	All elements but BASE, HEAD, HTML, META, SCRIPT, STYLE, TITLE	YES
ismap	IMG, INPUT	NO
label	OPTION	NO
label	OPTGROUP	NO
lang	All elements but APPLET, BASE, BASEFONT, BR, FRAME, FRAMESET, IFRAME, PARAM, SCRIPT	NO
language	SCRIPT	NO
link	BODY	NO
longdesc	IMG	NO
longdesc	FRAME, IFRAME	NO
marginheight	FRAME, IFRAME	NO
marginwidth	FRAME, IFRAME	NO
maxlength	INPUT	NO
media	STYLE	NO
media	LINK	NO
method	FORM	NO
multiple	SELECT	NO

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name	BUTTON, TEXTAREA	NO
name	APPLET	NO
name	SELECT	NO
name	FORM	NO
name	FRAME, IFRAME	NO
name	IMG	YES
name	A	YES
name	INPUT, OBJECT	NO
name	MAP	NO
name	PARAM	NO
name	META	NO
nohref	AREA	NO
noresize	FRAME	NO
noshade	HR	NO
nowrap	TD, TH	NO
object	APPLET	NO
onblur	A, AREA, BUTTON, INPUT, LABEL, SELECT, TEXTAREA	NO
onchange	INPUT, SELECT, TEXTAREA	NO
onclick	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
ondblclick	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onfocus	A, AREA, BUTTON, INPUT, LABEL, SELECT, TEXTAREA	NO
onkeydown	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onkeypress	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onkeyup	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onload	FRAMESET	NO
onload	BODY	NO
onmousedown	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onmousemove	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onmouseout	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO

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onmouseover	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onmouseup	All elements but APPLET, BASE, BASEFONT, BDO, BR, FONT, FRAME, FRAMESET, HEAD, HTML, IFRAME, ISINDEX, META, PARAM, SCRIPT, STYLE, TITLE	NO
onreset	FORM	NO
onselect	INPUT, TEXTAREA	NO
onsubmit	FORM	NO
onunload	FRAMESET	NO
onunload	BODY	NO
profile	HEAD	NO
prompt	ISINDEX	NO
readonly	TEXTAREA	NO
readonly	INPUT	NO
rel	A, LINK	NO
rev	A, LINK	NO
rows	FRAMESET	NO
rows	TEXTAREA	NO
rowspan	TD, TH	YES
rules	TABLE	YES
scheme	META	NO
scope	TD, TH	NO
scrolling	FRAME, IFRAME	NO
selected	OPTION	NO
shape	AREA	NO
shape	A	NO
size	HR	NO
size	FONT	NO
size	INPUT	NO
size	BASEFONT	NO
size	SELECT	NO
span	COL	NO
span	COLGROUP	NO
src	SCRIPT	NO
src	INPUT	NO
src	FRAME, IFRAME	NO
src	IMG	NO
standby	OBJECT	NO
start	OL	YES

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style	All elements but BASE, BASEFONT, HEAD, HTML, META, PARAM, SCRIPT, STYLE, TITLE	YES
summary	TABLE	NO
tabindex	A, AREA, BUTTON, INPUT, OBJECT, SELECT, TEXTAREA	NO
target	A, AREA, BASE, FORM, LINK	NO
text	BODY	NO
title	All elements but BASE, BASEFONT, HEAD, HTML, META, PARAM, SCRIPT, TITLE	YES
type	A, LINK	NO
type	OBJECT	NO
type	PARAM	NO
type	SCRIPT	NO
type	STYLE	NO
type	INPUT	NO
type	LI	NO
type	OL	NO
type	UI	NO
type	BUTTON	NO
usemap	IMG, INPUT, OBJECT	NO
valign	COL, COLGROUP, TBODY, TD, TFOOT, TH, THEAD, TR	YES
value	INPUT	NO
value	OPTION	NO
value	PARAM	NO
value	BUTTON	NO
value	LI	NO
valuetype	PARAM	NO
version	HTML	NO
vlink	BODY	NO
vspace	APPLET, IMG, OBJECT	YES
width	HR	NO
width	IFRAME	NO
width	IMG, OBJECT	YES
width	TABLE	NO
width	TD, TH	NO
width	APPLET	NO
width	COL	YES
width	COLGROUP	NO
width	PRE	NO

CSS Properties

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RichTextBox for UWP supports many CSS properties. The following table lists CSS properties by name and media group and notes whether they are supported by **RichTextBox for UWP**.

Name	Media Groups	Supported	Comments
azimuth	aural	NO	
background-attachment	visual	NO	
background-color	visual	YES	
background-image	visual	YES	The image is not repeated.
background-position	visual	NO	
background-repeat	visual	NO	
background	visual	YES	Only supports color and image.
borer-collapse	visual	YES	
border-color	visual	YES	
border-spacing	visual	YES	
border-style	visual	YES	Supports 'none', 'hidden', and solid. Other values are treated as solid.
border-top border-right border-bottom border-left	visual	YES	
border-top-color border-right-color border-bottom-color border-left-color	visual	YES	
border-top-style border-right-style border-bottom-style border-left-style	visual	YES	
border-top-width border-right-width border-bottom-width border-left-width	visual	YES	
borer-width	visual	YES	
border	visual	YES	
bottom	visual	YES	
caption-side	visual	NO	
clear	visual	NO	
clip	visual	NO	
color	visual	YES	
content	all	NO	
counter-increment	all	NO	
counter-reset	all	NO	
cue-after	aural	NO	
cue-before	aural	NO	

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cue	aural	NO	
cursor	visual, interactive	YES	All values except crosshair, move, progress, help, and <uri>.
direction	visual	NO	
display all	all	YES	All values except run-in, inline-block, inline-table, and table-caption.
elevation	aural	NO	
empty-cells	visual	NO	
float	visual	NO	
font-family	visual	YES	
font-size	visual	YES	
font-style	visual	YES	
font-variant	visual	NO	
font-weight	visual	YES	
font	visual	YES	
height	visual	YES	Only in img elements.
left	visual	YES	
letter-spacing	visual	NO	
line-height	visual	NO	
list-style-image	visual	YES	
list-style-position	visual	YES	
list-style-type	visual	NO	All values except Georgian, Armenian, and lower-Greek.
list-style	visual	YES	
margin-right margin-left	visual	YES	
margin-top margin-bottom	visual	YES	
margin	visual	YES	
max-height	visual	NO	
max-width	visual	NO	
min-height	visual	NO	
min-width	visual	NO	

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orphans	visual, paged	NO	
outline-color	visual, interactive	NO	
outline-style	visual, interactive	NO	
outline-width	visual, interactive	NO	
outline	visual, interactive	NO	
overflow	visual	NO	
padding-top padding-right padding-bottom padding-left	visual	YES	
padding	visual	YES	
page-break-after	visual, paged	NO	
page-break-before	visual, paged	NO	
page-break-inside	visual, paged	NO	
pause-after	aural	NO	
pause-before	aural	NO	
pause	aural	NO	
pitch-range	aural	NO	
pitch	aural	NO	
play-during	aural	NO	
position	visual	NO	
quotes	visual	NO	
richness	aural	NO	
right	visual	NO	
speak-header	aural	NO	
speak-numeral	aural	NO	
speak-punctuation	aural	NO	
speak	aural	NO	
speech-rate	aural	NO	
stress	aural	NO	
table-layout	visual	NO	
text-align	visual	YES	
text-decoration	visual	YES	
text-indent	visual	YES	
text-transform	visual	NO	
top	visual	NO	
unicode-bidi	visual	NO	
vertical-align	visual	YES	All values except <percentage> and <length>.
visibility	visual	YES	

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voice-family	aural	NO	
volume	aural	NO	
white-space	visual	YES	Nowrap and pre are treated like normal and pre-wrap.
windows	visual, paged	NO	
width	visual	YES	Only in img elements.
word-spacing	visual	NO	
z-index	visual	NO	

CSS Selectors

RichTextBox for UWP supports several CSS selectors. The following table lists CSS selectors by pattern and CSS level and notes whether they are supported by **RichTextBox for UWP**.

Pattern	CSS Level	Supported
*	2	YES
E	1	YES
E[foo]	2	YES
E[foo="bar"]	2	YES
E[foo~="bar"]	2	YES
E[foo^="bar"]	3	YES
E[foo$="bar"]	3	YES
E[foo*="bar"]	3	YES
E[foo|="en"]	2	YES
E:root	3	NO
E:nth-child(n)	3	NO
E:nth-last-child(n)	3	NO
E:nth-of-type(n)	3	NO
E:nth-last-of-type(n)	3	NO
E:first-child	2	NO
E:last-child	3	NO
E:first-of-type	3	NO
E:last-of-type	3	NO
E:only-child	3	NO
E:only-of-type	3	NO
E:empty	3	NO
E:link	1	NO

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E:visited	1	NO
E:active	2	NO
E:hover	2	NO
E:focus	2	NO
E:target	3	NO
E:lang(fr)	2	NO
E:enabled	3	NO
E:disabled	3	NO
E:checked	3	NO
E::first-line	1	NO
E::first-letter	1	NO
E::before	2	NO
E::after	2	NO
E.warning	1	NO
E#myid	1	YES
E:not(s)	3	NO
E F	1	YES
E > F	2	YES
E + F	2	YES
E ~ F	3	YES

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Tutorials

Creating an AppBar Application

In this tutorial, you'll create an application using the C1.RichTextBox.AppBar.dll assembly. You'll add markup and code to create custom top and bottom app bars. You'll also add content through code. There are two files that you'll use in this application: **StandardStyles.xaml** and **simple.htm**.

StandardStyles.xaml can be found in the **Common** folder, and **simple.htm** can be found in the **Resources** folder.

Step 1 of 5: Creating the Application

In this step, you'll create a new Universal Windows application, add a **C1RichTextBox** control, and add the markup to create the top and bottom app bars.

1. Select **File | New | Project** to open the **New Project** dialog box.
    1. Select Templates | Visual C# | Windows | Universal.
    2. From the templates list, select **Blank App (Universal Windows)**.
    3. Enter a name for your application and click **OK**. A new, blank application will open.
2. In the Solution Explorer, right-click the **References** file and select **Add Reference** from the list. Browse to locate the following assembly references:
    - C1.UWP
    - C1.UWP.RichTextBox
    - C1.UWP.RichTextBox.AppBar
    - C1.UWP.RichTextBox.Menu
3. Double-click the **MainPage.xaml** file to open it.
4. Add the following namespace declarations to the `<Page>` tag at the top of the page:

XAML

```
xmlns:RichTextBox="using:C1.Xaml.RichTextBox"
xmlns:Xaml="using:C1.Xaml"
```

Your `<Page>` tag should resemble the following:

XAML

```
<Page xmlns:RichTextBox="using:C1.Xaml.RichTextBox"
xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
    xmlns:local="using:AppBarTest3"
    xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
    xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
    xmlns:Xaml="using:C1.Xaml"
    x:Class="AppBarTest3.MainPage"
    mc:Ignorable="d">
```

5. Directly above the `<Grid> </Grid>` tags on your page, add `<Page.Resources>`:

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XAML
```
<Page.Resources>
        <ResourceDictionary Source="Common/StandardStyles.xaml"/>
    </Page.Resources>
```

You'll add the **StandardStyles.xaml** file in **Step 2**.

6. Add the following markup between the `<Grid> </Grid>` tags to add some row definitions:

XAML
```
<Grid.RowDefinitions>
   <RowDefinition Height="140"/>
   <RowDefinition Height="*"/>
</Grid.RowDefinitions>
```

7. Place your cursor below the closing `</Grid.RowDefinition>` tag. Open the Visual Studio ToolBox and locate the **C1RichTextBox** control. Double-click the control to add it to your page.

8. Edit the `<RichTextBox:C1RichTextBox/>` tag to that is resembles the following. You'll add a name for your control and two events:

```
<RichTextBox:C1RichTextBox x:Name="rtb" Grid.Row="1"  Margin="116,0,100,100"
RequestNavigate="rtb_RequestNavigate" PointerPressed="rtb_PointerPressed" />
```

9. Locate the closing `</Grid>` tag on your page and place your cursor beneath it. Add the following markup to create the framework for the top and bottom AppBars:

XAML
```
<Page.TopAppBar>
   <AppBar x:Name="topAppBar" IsSticky="True" Padding="10,0,10,0">
     <Grid>
       <StackPanel Orientation="Horizontal" HorizontalAlignment="Right">

       </StackPanel>
     </Grid>
   </AppBar>
</Page.TopAppBar>
<Page.BottomAppBar>
  <AppBar x:Name="bottomAppBar" IsSticky="True" Padding="10,0,10,0">
    <Grid>
      <StackPanel Orientation="Horizontal" HorizontalAlignment="Left">

      </StackPanel>
      <StackPanel Orientation="Horizontal" HorizontalAlignment="Right">

      </StackPanel>
    </Grid>
  </AppBar>
</Page.BottomAppBar>
```

10. Place your cursor between the TopAppBar's `<StackPanel> </StackPanel>` tags. Add the following markup to add three **C1RichTextBox** Tools:

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XAML
```
<RichTextBox:C1LeftAlignTool x:Name="btnLeftAlign" Style="{StaticResource
AlignLeftAppBarButtonStyle}" />
<RichTextBox:C1CenterAlignTool x:Name="btnCenterAlign" Style="{StaticResource
AlignCenterAppBarButtonStyle}" />
<RichTextBox:C1RightAlignTool x:Name="btnRightAlign" Style="{StaticResource
AlignRightAppBarButtonStyle}" />
```

13. Next, locate the first set of `<StackPanel> </StackPanel>` tags in the BottomAppBar. Add the following markup to add three general Button controls:

XAML
```
<Button x:Name="btnCopy" Style="{StaticResource CopyAppBarButtonStyle}"
Click="btnCopy_Click"/>
<Button x:Name="btnPaste" Style="{StaticResource PasteAppBarButtonStyle}"
Click="btnPaste_Click"/>
<Button x:Name="btnCut" Style="{StaticResource CutAppBarButtonStyle}"
Click="btnCut_Click"/>
```

14. Locate the second set of `<StackPanel> </StackPanel>` tags. Add the following markup to add five **C1RichTextBox Tools** and one general Button control:

XAML
```
<RichTextBox:C1IncreaseFontSizeTool x:Name="btnIncreaseFontSize" Style="
{StaticResource FontIncreaseAppBarButtonStyle}"/>
<RichTextBox:C1DecreaseFontSizeTool x:Name="btnDecreaseFontSize" Style="
{StaticResource FontDecreaseAppBarButtonStyle}"/>
<RichTextBox:C1BoldTool x:Name="btnBold" Style="{StaticResource
BoldAppBarButtonStyle}" />
<RichTextBox:C1ItalicTool x:Name="btnItalic" Style="{StaticResource
ItalicAppBarButtonStyle}" />
<RichTextBox:C1UnderlineTool x:Name="btnUnderline" Style="{StaticResource
UnderlineAppBarButtonStyle}" />
<Button x:Name="btnMore" Style="{StaticResource MoreAppBarButtonStyle}"
Click="btnMore_Click"/>
```

In this step, you created a new Universal Windows application, added the **C1RichTextBox** control, added the markup for the two **App Bars**, and added both **C1 Tools** and general controls to the **App Bar** markup. In the next step, you'll add your resource files and some general application code.

Step 2 of 5: Adding Resource Files and General Application Code

In this step, you'll add the resource files that contain the styles and the content which your application will use. Right-click your application name and select **Add | New Folder**. Name the new folder **Common**.

1. Right-click the **Common** folder and select **Add | New Item**.
2. Select **Blank Page** from the available templates in the **Add New Item** dialog window, name it **StandardStyles.xaml**, and click **OK**.

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3. When the file opens, add the following XAML markup:

XAML

```
<ResourceDictionary
    xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml">
    <!-- Non-brush values that vary across themes -->
    <ResourceDictionary.ThemeDictionaries>
        <ResourceDictionary x:Key="Default">
            <x:String x:Key="BackButtonGlyph">&#xE071;</x:String>
            <x:String x:Key="BackButtonSnappedGlyph">&#xE0BA;</x:String>
        </ResourceDictionary>
        <ResourceDictionary x:Key="HighContrast">
            <x:String x:Key="BackButtonGlyph">&#xE071;</x:String>
            <x:String x:Key="BackButtonSnappedGlyph">&#xE0C4;</x:String>
        </ResourceDictionary>
    </ResourceDictionary.ThemeDictionaries>
    <x:String x:Key="ChevronGlyph">&#xE26B;</x:String>
    <!-- RichTextBlock styles -->
    <Style x:Key="BasicRichTextStyle" TargetType="RichTextBlock">
        <Setter Property="Foreground" Value="{ThemeResource
ApplicationForegroundThemeBrush}"/>
        <Setter Property="FontSize" Value="{ThemeResource
ControlContentThemeFontSize}"/>
        <Setter Property="FontFamily" Value="{ThemeResource
ContentControlThemeFontFamily}"/>
        <Setter Property="TextTrimming" Value="WordEllipsis"/>
        <Setter Property="TextWrapping" Value="Wrap"/>
        <Setter Property="Typography.StylisticSet20" Value="True"/>
        <Setter Property="Typography.DiscretionaryLigatures" Value="True"/>
        <Setter Property="Typography.CaseSensitiveForms" Value="True"/>
    </Style>
    <Style x:Key="BaselineRichTextStyle" TargetType="RichTextBlock"
BasedOn="{StaticResource BasicRichTextStyle}">
        <Setter Property="LineHeight" Value="20"/>
        <Setter Property="LineStackingStrategy" Value="BlockLineHeight"/>
        <!-- Properly align text along its baseline -->
        <Setter Property="RenderTransform">
            <Setter.Value>
                <TranslateTransform X="-1" Y="4"/>
            </Setter.Value>
        </Setter>
    </Style>
    <Style x:Key="ItemRichTextStyle" TargetType="RichTextBlock"
BasedOn="{StaticResource BaselineRichTextStyle}"/>
    <Style x:Key="BodyRichTextStyle" TargetType="RichTextBlock"
BasedOn="{StaticResource BaselineRichTextStyle}">
        <Setter Property="FontWeight" Value="SemiLight"/>
    </Style>
    <!-- TextBlock styles -->
    <Style x:Key="BasicTextStyle" TargetType="TextBlock">
        <Setter Property="Foreground" Value="{ThemeResource
```

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```
ApplicationForegroundThemeBrush}"/>
        <Setter Property="FontSize" Value="{ThemeResource
ControlContentThemeFontSize}"/>
        <Setter Property="FontFamily" Value="{ThemeResource
ContentControlThemeFontFamily}"/>
        <Setter Property="TextTrimming" Value="WordEllipsis"/>
        <Setter Property="TextWrapping" Value="Wrap"/>
        <Setter Property="Typography.StylisticSet20" Value="True"/>
        <Setter Property="Typography.DiscretionaryLigatures" Value="True"/>
        <Setter Property="Typography.CaseSensitiveForms" Value="True"/>
    </Style>
    <Style x:Key="BaselineTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BasicTextStyle}">
        <Setter Property="LineHeight" Value="20"/>
        <Setter Property="LineStackingStrategy" Value="BlockLineHeight"/>
        <!-- Properly align text along its baseline -->
        <Setter Property="RenderTransform">
            <Setter.Value>
                <TranslateTransform X="-1" Y="4"/>
            </Setter.Value>
        </Setter>
    </Style>
    <Style x:Key="HeaderTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BaselineTextStyle}">
        <Setter Property="FontSize" Value="56"/>
        <Setter Property="FontWeight" Value="Light"/>
        <Setter Property="LineHeight" Value="40"/>
        <Setter Property="RenderTransform">
            <Setter.Value>
                <TranslateTransform X="-2" Y="8"/>
            </Setter.Value>
        </Setter>
    </Style>
    <Style x:Key="SubheaderTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BaselineTextStyle}">
        <Setter Property="FontSize" Value="26.667"/>
        <Setter Property="FontWeight" Value="Light"/>
        <Setter Property="LineHeight" Value="30"/>
        <Setter Property="RenderTransform">
            <Setter.Value>
                <TranslateTransform X="-1" Y="6"/>
            </Setter.Value>
        </Setter>
    </Style>
    <Style x:Key="TitleTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BaselineTextStyle}">
        <Setter Property="FontWeight" Value="SemiBold"/>
    </Style>
    <Style x:Key="SubtitleTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BaselineTextStyle}">
        <Setter Property="FontWeight" Value="Normal"/>
```

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```
    </Style>
    <Style x:Key="ItemTextStyle" TargetType="TextBlock" BasedOn="{StaticResource
BaselineTextStyle}"/>
    <Style x:Key="BodyTextStyle" TargetType="TextBlock" BasedOn="{StaticResource
BaselineTextStyle}">
        <Setter Property="FontWeight" Value="SemiLight"/>
    </Style>
    <Style x:Key="CaptionTextStyle" TargetType="TextBlock"
BasedOn="{StaticResource BaselineTextStyle}">
        <Setter Property="FontSize" Value="12"/>
        <Setter Property="Foreground" Value="{ThemeResource
ApplicationSecondaryForegroundThemeBrush}"/>
    </Style>
    <Style x:Key="GroupHeaderTextStyle" TargetType="TextBlock">
        <Setter Property="FontFamily" Value="{ThemeResource
ContentControlThemeFontFamily}"/>
        <Setter Property="TextTrimming" Value="WordEllipsis"/>
        <Setter Property="TextWrapping" Value="NoWrap"/>
        <Setter Property="Typography.StylisticSet20" Value="True"/>
        <Setter Property="Typography.DiscretionaryLigatures" Value="True"/>
        <Setter Property="Typography.CaseSensitiveForms" Value="True"/>
        <Setter Property="FontSize" Value="26.667"/>
        <Setter Property="LineStackingStrategy" Value="BlockLineHeight"/>
        <Setter Property="FontWeight" Value="Light"/>
        <Setter Property="LineHeight" Value="30"/>
        <Setter Property="RenderTransform">
            <Setter.Value>
                <TranslateTransform X="-1" Y="6"/>
            </Setter.Value>
        </Setter>
    </Style>
    <!-- Button styles -->
    <!--
        TextButtonStyle is used to style a Button using subheader-styled text
with no other adornment.  There
        are two styles that are based on TextButtonStyle (TextPrimaryButtonStyle
and TextSecondaryButtonStyle)
        which are used in the GroupedItemsPage as a group header and in the
FileOpenPickerPage for triggering
        commands.
    -->
    <Style x:Key="TextButtonStyle" TargetType="ButtonBase">
        <Setter Property="MinWidth" Value="0"/>
        <Setter Property="MinHeight" Value="0"/>
        <Setter Property="Template">
            <Setter.Value>
                <ControlTemplate TargetType="ButtonBase">
                    <Grid Background="Transparent">
                        <ContentPresenter x:Name="Text"
Content="{TemplateBinding Content}" />
                        <Rectangle
```

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```
                            x:Name="FocusVisualWhite"
                            IsHitTestVisible="False"
                            Stroke="{ThemeResource 
FocusVisualWhiteStrokeThemeBrush}"
                            StrokeEndLineCap="Square"
                            StrokeDashArray="1,1"
                            Opacity="0"
                            StrokeDashOffset="1.5"/>
                        <Rectangle
                            x:Name="FocusVisualBlack"
                            IsHitTestVisible="False"
                            Stroke="{ThemeResource 
FocusVisualBlackStrokeThemeBrush}"
                            StrokeEndLineCap="Square"
                            StrokeDashArray="1,1"
                            Opacity="0"
                            StrokeDashOffset="0.5"/>
                        <VisualStateManager.VisualStateGroups>
                            <VisualStateGroup x:Name="CommonStates">
                                <VisualState x:Name="Normal"/>
                                <VisualState x:Name="PointerOver">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames 
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0" 
Value="{ThemeResource ApplicationPointerOverForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Pressed">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames 
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0" 
Value="{ThemeResource ApplicationPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Disabled">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames 
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0" 
Value="{ThemeResource ApplicationPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="FocusStates">
                                <VisualState x:Name="Focused">
                                    <Storyboard>
```

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```
                                        <DoubleAnimation Duration="0" To="1"
Storyboard.TargetName="FocusVisualWhite" Storyboard.TargetProperty="Opacity"/>
                                        <DoubleAnimation Duration="0" To="1"
Storyboard.TargetName="FocusVisualBlack" Storyboard.TargetProperty="Opacity"/>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Unfocused"/>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="CheckStates">
                                <VisualState x:Name="Checked"/>
                                <VisualState x:Name="Unchecked">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource ApplicationSecondaryForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Indeterminate"/>
                            </VisualStateGroup>
                        </VisualStateManager.VisualStateGroups>
                    </Grid>
                </ControlTemplate>
            </Setter.Value>
        </Setter>
    </Style>
    <Style x:Key="MenuTextButtonStyle" TargetType="ButtonBase">
        <Setter Property="MinWidth" Value="0"/>
        <Setter Property="MinHeight" Value="0"/>
        <Setter Property="Template">
            <Setter.Value>
                <ControlTemplate TargetType="ButtonBase">
                    <Grid Background="Transparent">
                        <ContentPresenter x:Name="Text"
Content="{TemplateBinding Content}" />
                        <Rectangle
                            x:Name="FocusVisualWhite"
                            IsHitTestVisible="False"
                            Stroke="{ThemeResource
FocusVisualWhiteStrokeThemeBrush}"
                            StrokeEndLineCap="Square"
                            StrokeDashArray="1,1"
                            Opacity="0"
                            StrokeDashOffset="1.5"/>
                        <Rectangle
                            x:Name="FocusVisualBlack"
                            IsHitTestVisible="False"
                            Stroke="{ThemeResource
FocusVisualBlackStrokeThemeBrush}"
                            StrokeEndLineCap="Square"
```

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```
                            StrokeDashArray="1,1"
                            Opacity="0"
                            StrokeDashOffset="0.5"/>
                        <VisualStateManager.VisualStateGroups>
                            <VisualStateGroup x:Name="CommonStates">
                                <VisualState x:Name="Normal"/>
                                <VisualState x:Name="PointerOver">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource ApplicationPointerOverForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Pressed">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource ApplicationPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Disabled">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource ApplicationPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="FocusStates">
                                <VisualState x:Name="Focused">
                                    <Storyboard>
                                        <DoubleAnimation Duration="0" To="1"
Storyboard.TargetName="FocusVisualWhite" Storyboard.TargetProperty="Opacity"/>
                                        <DoubleAnimation Duration="0" To="1"
Storyboard.TargetName="FocusVisualBlack" Storyboard.TargetProperty="Opacity"/>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Unfocused"/>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="CheckStates">
                                <VisualState x:Name="Checked"/>
                                <VisualState x:Name="Unchecked">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Text" Storyboard.TargetProperty="Foreground">
```

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```
                                                <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource ApplicationSecondaryForegroundThemeBrush}"/>
                                            </ObjectAnimationUsingKeyFrames>
                                        </Storyboard>
                                    </VisualState>
                                    <VisualState x:Name="Indeterminate"/>
                                </VisualStateGroup>
                            </VisualStateManager.VisualStateGroups>
                        </Grid>
                    </ControlTemplate>
                </Setter.Value>
            </Setter>
        </Style>
        <Style x:Key="TextPrimaryButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource TextButtonStyle}">
            <Setter Property="Foreground" Value="{ThemeResource
ApplicationHeaderForegroundThemeBrush}"/>
        </Style>
        <Style x:Key="TextSecondaryButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource TextButtonStyle}">
            <Setter Property="Foreground" Value="{ThemeResource
ApplicationSecondaryForegroundThemeBrush}"/>
        </Style>
        <!--
            TextRadioButtonStyle is used to style a RadioButton using subheader-
styled text with no other adornment.
            This style is used in the SearchResultsPage to allow selection among
filters.
        -->
        <Style x:Key="TextRadioButtonStyle" TargetType="RadioButton"
BasedOn="{StaticResource TextButtonStyle}">
            <Setter Property="Margin" Value="0,0,30,0"/>
        </Style>
        <!--
            AppBarButtonStyle is used to style a Button (or ToggleButton) for use in
an App Bar.  Content will be centered
            and should fit within the 40 pixel radius glyph provided.  16-point
Segoe UI Symbol is used for content text
            to simplify the use of glyphs from that font.  AutomationProperties.Name
is used for the text below the glyph.
        -->
        <Style x:Key="AppBarButtonStyle" TargetType="ButtonBase">
            <Setter Property="Foreground" Value="{ThemeResource
AppBarItemForegroundThemeBrush}"/>
            <Setter Property="VerticalAlignment" Value="Stretch"/>
            <Setter Property="FontFamily" Value="Segoe UI Symbol"/>
            <Setter Property="FontWeight" Value="Normal"/>
            <Setter Property="FontSize" Value="20"/>
            <Setter Property="AutomationProperties.ItemType" Value="App Bar
Button"/>
            <Setter Property="Template">
```

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```
            <Setter.Value>
                <ControlTemplate TargetType="ButtonBase">
                    <Grid x:Name="RootGrid" Width="100"
Background="Transparent">
                        <StackPanel VerticalAlignment="Top" Margin="0,12,0,11">
                            <Grid Width="40" Height="40" Margin="0,0,0,5"
HorizontalAlignment="Center">
                                <TextBlock x:Name="BackgroundGlyph"
Text="&#xE0A8;" FontFamily="Segoe UI Symbol" FontSize="53.333" Margin="-4,-
19,0,0" Foreground="{ThemeResource AppBarItemBackgroundThemeBrush}"/>
                                <TextBlock x:Name="OutlineGlyph" Text="&#xE0A7;"
FontFamily="Segoe UI Symbol" FontSize="53.333" Margin="-4,-19,0,0"/>
                                <ContentPresenter x:Name="Content"
HorizontalAlignment="Center" Margin="-1,-1,0,0" VerticalAlignment="Center"/>
                            </Grid>
                            <TextBlock
                                x:Name="TextLabel"
                                Text="{TemplateBinding
AutomationProperties.Name}"
                                Foreground="{ThemeResource
AppBarItemForegroundThemeBrush}"
                                Margin="0,0,2,0"
                                FontSize="12"
                                TextAlignment="Center"
                                Width="88"
                                MaxHeight="32"
                                TextTrimming="WordEllipsis"
                                Style="{StaticResource BasicTextStyle}"/>
                        </StackPanel>
                        <Rectangle
                                x:Name="FocusVisualWhite"
                                IsHitTestVisible="False"
                                Stroke="{ThemeResource
FocusVisualWhiteStrokeThemeBrush}"
                                StrokeEndLineCap="Square"
                                StrokeDashArray="1,1"
                                Opacity="0"
                                StrokeDashOffset="1.5"/>
                        <Rectangle
                                x:Name="FocusVisualBlack"
                                IsHitTestVisible="False"
                                Stroke="{ThemeResource
FocusVisualBlackStrokeThemeBrush}"
                                StrokeEndLineCap="Square"
                                StrokeDashArray="1,1"
                                Opacity="0"
                                StrokeDashOffset="0.5"/>
                        <VisualStateManager.VisualStateGroups>
                            <VisualStateGroup x:Name="ApplicationViewStates">
                                <VisualState x:Name="FullScreenLandscape"/>
                                <VisualState x:Name="Filled"/>
```

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```
                                <VisualState x:Name="FullScreenPortrait">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="TextLabel" Storyboard.TargetProperty="Visibility">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="Collapsed"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="RootGrid" Storyboard.TargetProperty="Width">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="60"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Snapped">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="TextLabel" Storyboard.TargetProperty="Visibility">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="Collapsed"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="RootGrid" Storyboard.TargetProperty="Width">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="60"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="CommonStates">
                                <VisualState x:Name="Normal"/>
                                <VisualState x:Name="PointerOver">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="BackgroundGlyph" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemPointerOverBackgroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Content" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemPointerOverForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Pressed">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="OutlineGlyph" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemForegroundThemeBrush}"/>
```

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```
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="BackgroundGlyph" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Content" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Disabled">
                                    <Storyboard>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="OutlineGlyph" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemDisabledForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Content" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemDisabledForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="TextLabel" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemDisabledForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="FocusStates">
                                <VisualState x:Name="Focused">
                                    <Storyboard>
                                        <DoubleAnimation

Storyboard.TargetName="FocusVisualWhite"

Storyboard.TargetProperty="Opacity"
                                                To="1"
                                                Duration="0"/>
                                        <DoubleAnimation

Storyboard.TargetName="FocusVisualBlack"

Storyboard.TargetProperty="Opacity"
                                                To="1"
                                                Duration="0"/>
                                    </Storyboard>
```

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```
                                </VisualState>
                                <VisualState x:Name="Unfocused" />
                                <VisualState x:Name="PointerFocused" />
                            </VisualStateGroup>
                            <VisualStateGroup x:Name="CheckStates">
                                <VisualState x:Name="Checked">
                                    <Storyboard>
                                        <DoubleAnimation Duration="0" To="0"
Storyboard.TargetName="OutlineGlyph" Storyboard.TargetProperty="Opacity"/>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="BackgroundGlyph" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="BackgroundCheckedGlyph"
Storyboard.TargetProperty="Visibility">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="Visible"/>
                                        </ObjectAnimationUsingKeyFrames>
                                        <ObjectAnimationUsingKeyFrames
Storyboard.TargetName="Content" Storyboard.TargetProperty="Foreground">
                                            <DiscreteObjectKeyFrame KeyTime="0"
Value="{ThemeResource AppBarItemPressedForegroundThemeBrush}"/>
                                        </ObjectAnimationUsingKeyFrames>
                                    </Storyboard>
                                </VisualState>
                                <VisualState x:Name="Unchecked"/>
                                <VisualState x:Name="Indeterminate"/>
                            </VisualStateGroup>
                        </VisualStateManager.VisualStateGroups>
                    </Grid>
                </ControlTemplate>
            </Setter.Value>
        </Setter>
    </Style>
    <!--
        Standard AppBarButton Styles for use with Button and ToggleButton

        An AppBarButton Style is provided for each of the glyphs in the Segoe UI
Symbol font.
        Uncomment any style you reference (as not all may be required).
    -->
    <Style x:Key="CopyAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="CopyAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Copy"/>
        <Setter Property="Content" Value="&#xE16F;"/>
    </Style>
    <Style x:Key="PasteAppBarButtonStyle" TargetType="ButtonBase"
```

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```
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="PasteAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Paste"/>
        <Setter Property="Content" Value="&#xE16D;"/>
    </Style>
    <Style x:Key="CutAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="CutAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Cut"/>
        <Setter Property="Content" Value="&#xE16B;"/>
    </Style>
    <Style x:Key="UnderlineAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="UnderlineAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Underline"/>
        <Setter Property="Content" Value="&#xE19A;"/>
    </Style>
    <Style x:Key="BoldAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="BoldAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Bold"/>
        <Setter Property="Content" Value="&#xE19B;"/>
    </Style>
    <Style x:Key="ItalicAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="ItalicAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="Italic"/>
        <Setter Property="Content" Value="&#xE199;"/>
    </Style>
    <Style x:Key="MoreAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <Setter Property="AutomationProperties.AutomationId"
Value="MoreAppBarButton"/>
        <Setter Property="AutomationProperties.Name" Value="More"/>
        <Setter Property="Content" Value="&#xE10C;"/>
    </Style>
    <Style x:Key="RedoAppBarButtonStyle" TargetType="ButtonBase"
BasedOn="{StaticResource AppBarButtonStyle}">
        <!-- <Setter Property="AutomationProperties.AutomationId;"/> -->
<Setter Property="AutomationProperties.Name" Value="Align Right"/>
        <Setter Property="Content" Value="&#xE1A0;"/>
    </Style>
</ResourceDictionary>
```

- Right-click your application name again and select **Add | New Folder**. Name the new folder **Resources**.

1. Right-click the **Resources** folder and select **Add | New Item**.

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2. Select **HTML Page** from the available templates in the **Add New Item** dialog window. Name the new file **simple.htm**.
3. When the blank page opens, add the following markup:

Example Title

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<body style="font-size:medium">

    <p>
        Display and edit formatted text as HTML documents with <strong>
RichTextBox<span style="font-size:x-small"><sup>TM</sup></span> for
WinRT</strong>. Use the control to display HTML content from the Web or use it
as a rich text editor. The <strong>C1RichTextBox</strong> control supports:
    </p>
    <ul style="line-height:1.5em">
        <li>
           Most text <span style="background-color: yellow">
<strong>decorations</strong></span>, <span style="color: red">
<em>alignments</em></span> and <u>styles</u>
        </li>
        <li>
           Bulleted and numbered lists
        </li>
        <li>
           Clipboard and document history (undo and redo)
        </li>
        <li>
           Hyperlinks: <a href="http://www.componentone.com">ComponentOne
website</a>
        </li>
        <li>
           Insert tables and pictures
        </li>
    </ul>

</body>
</html>
```

4. Select **simple.htm** in the Solution Explorer. In the Properties window, set the **Build Action** to **Embedded Resource**.
5. Rebuild your application.

5. Double-click the **App.xaml** file in the Solution Explorer and add the following markup:

XAML

```
<Application.Resources>
  <ResourceDictionary>
    <ResourceDictionary.MergedDictionaries>
     <!-- Styles that define common aspects of the platform look and feel
required by Visual Studio project and item templates -->
           <ResourceDictionary Source="Common/StandardStyles.xaml"/>
         </ResourceDictionary.MergedDictionaries>
```

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```
    </ResourceDictionary>
</Application.Resources>
```

In this step, you added and set the content for your application resources, and added the markup to apply those resources to your entire application. In the next step, you'll add general code for some of the **AppBar** items and to handle the **C1RichTextBox** events you added in the first step.

Step 3 of 5: Adding General Application Code

In this step, you'll add code to create some of the AppBar items and to handle the C1RichTextBox control's events.

1. Open MainPage.xaml again, and right-click the page. Select View Code from the context menu.
2. Add the following using statements to the top of the page:

C#

```
using C1.Xaml;
using C1.Xaml.RichTextBox;
using C1.Xaml.RichTextBox.Documents;
using System.Reflection;
using Windows.UI.Text;
using Windows.UI;
using Windows.UI.Popups;
```

3. Directly below the **InitializeComponent()** method, add the **InitMorePopup()** method:

C#

```
this.InitMorePopup();
```

4. Next, you'll add the code that will update the C1RichTextBox control with eight C1 Tools:

C#

```
btnBold.RichTextBox = rtb;
btnItalic.RichTextBox = rtb;
btnUnderline.RichTextBox = rtb;
btnIncreaseFontSize.RichTextBox = rtb;
btnDecreaseFontSize.RichTextBox = rtb;
btnLeftAlign.RichTextBox = rtb;
btnCenterAlign.RichTextBox = rtb;
btnRightAlign.RichTextBox = rtb;
```

5. Now, add the code that will load your content resource. Remember to insert your application name where the code says **"YourApplicationName.Resources.simple.htm":**

C#

```
Assembly asm = typeof(MainPage).GetTypeInfo().Assembly;
Stream stream =
asm.GetManifestResourceStream("YourApplicationName.Resources.simple.htm");
var html = new StreamReader(stream).ReadToEnd();
rtb.Html = html;
```

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6. Last, add the event handler for the RequestNavigate event:

C#

```
private async void rtb_RequestNavigate(object sender, RequestNavigateEventArgs
e)
        {
            var md = new MessageDialog("The document is requesting to navigate
to " + e.Hyperlink.NavigateUri, "Navigate");

            md.Commands.Add(new UICommand("OK", (UICommandInvokedHandler) =>
            {
                Windows.System.Launcher.LaunchUriAsync(e.Hyperlink.NavigateUri);
            }));

            md.Commands.Add(new UICommand("Cancel", (UICommandInvokedHandler) =>
            {
                rtb.Select(e.Hyperlink.ContentStart.TextOffset,
e.Hyperlink.ContentRange.Text.Length);
            }));

            await md.ShowAsync();
```

In this step, you added code to handle C1RichTextBox events and to create some of the **C1 Tools** used in the AppBar. In the next step, you'll add the code for the bottom AppBar.

Step 4 of 5: Adding Code for the BottomAppBar

In this step, you'll add the code that handles the flyout and click events for the **BottomAppBar** items.

1. The first section of code to add to your page contains five regions: Clipboard, Undo/Redo, Lists, clear formatting, and sub/superscript:

C#

```
#region Clipboard
        private void btnCopy_Click(object sender,
Windows.UI.Xaml.RoutedEventArgs e)
        {
            rtb.ClipboardCopy();
        }

        private void btnCut_Click(object sender, Windows.UI.Xaml.RoutedEventArgs
e)
        {
            if (rtb.IsReadOnly)
                rtb.ClipboardCopy();
            else
                rtb.ClipboardCut();
        }

        private void btnPaste_Click(object sender,
```

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```
Windows.UI.Xaml.RoutedEventArgs e)
        {
            if (!rtb.IsReadOnly)
            {
                rtb.ClipboardPaste();
            }
        }
        #endregion

        #region Undo/Redo
        void btnRedo_Click(object sender, RoutedEventArgs e)
        {
            if (rtb.DocumentHistory.CanRedo)
            {
                rtb.DocumentHistory.Redo();
            }
            morePopUp.Hide();
        }

        void btnUndo_Click(object sender, RoutedEventArgs e)
        {
            if (rtb.DocumentHistory.CanUndo)
            {
                rtb.DocumentHistory.Undo();
            }
            morePopUp.Hide();
        }
        #endregion

        #region Lists
        void btnBulletedList_Click(object sender, RoutedEventArgs e)
        {
            // check if selection is already a list
            if (rtb.Selection.Lists.Count<C1.Xaml.RichTextBox.Documents.C1List>
() > 0)
            {
                // undo list
                rtb.Selection.UndoList();
            }
            else
            {
                // make bullet list

rtb.Selection.MakeList(C1.Xaml.RichTextBox.Documents.TextMarkerStyle.Disc);
            }
            morePopUp.Hide();
        }

        void btnNumberedList_Click(object sender, RoutedEventArgs e)
        {
            // check if selection is already a list
```

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```
            if (rtb.Selection.Lists.Count<C1.Xaml.RichTextBox.Documents.C1List>
() > 0)
            {
                // undo list
                rtb.Selection.UndoList();
            }
            else
            {
                // make number list

rtb.Selection.MakeList(C1.Xaml.RichTextBox.Documents.TextMarkerStyle.Decimal);
            }
            morePopUp.Hide();
        }
        #endregion

        #region clear formatting
        void btnClear_Click(object sender, RoutedEventArgs e)
        {
            // clear foreground and background colors
            rtb.Selection.InlineBackground = null;
            rtb.Selection.Foreground = rtb.Foreground;

            // clear font
            rtb.Selection.FontWeight = FontWeights.Normal;
            rtb.Selection.FontStyle = FontStyle.Normal;
            rtb.Selection.TextDecorations = null;
        }
        #endregion

        #region sub/super script
        void btnSubscript_Click(object sender, RoutedEventArgs e)
        {
            // subscript
            if (rtb.Selection.InlineAlignment != C1VerticalAlignment.Sub &&
rtb.Selection.InlineAlignment != null)
            {
                rtb.Selection.InlineAlignment = C1VerticalAlignment.Sub;
                ShrinkFont(4);
            }
            else
            {
                rtb.Selection.InlineAlignment = C1VerticalAlignment.Baseline;
                GrowFont(4);
            }
            morePopUp.Hide();
        }

        void btnSuperscript_Click(object sender, RoutedEventArgs e)
        {
            // superscript
```

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```
            if (rtb.Selection.InlineAlignment != C1VerticalAlignment.Super &&
rtb.Selection.InlineAlignment != null)
            {
                rtb.Selection.InlineAlignment = C1VerticalAlignment.Super;
                ShrinkFont(4);
            }
            else
            {
                rtb.Selection.InlineAlignment = C1VerticalAlignment.Baseline;
                GrowFont(4);
            }
            morePopUp.Hide();
        }

        private void GrowFont(int size)
        {
            // grow font
            rtb.Selection.TrimRuns();
            foreach (var run in rtb.Selection.Runs)
            {
                run.FontSize += size;
            }
        }

        private void ShrinkFont(int size)
        {
            // shrink font
            rtb.Selection.TrimRuns();
            foreach (var run in rtb.Selection.Runs)
            {
                run.FontSize -= size;
            }
        }
        #endregion
```

2. The next region of code to be added contains the events for the More button and menu:

C#

```
#region More
        Flyout morePopUp = new Flyout();
        private void btnMore_Click(object sender, RoutedEventArgs e)
        {
            morePopUp.Placement = FlyoutPlacementMode.Top;
            morePopUp.ShowAt(sender as FrameworkElement);
        }

        void InitMorePopup()
        {
            Border menuBorder = new Border();
            menuBorder.Height = 260;
            menuBorder.Width = 150;
```

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```
            StackPanel panel = new StackPanel();
            panel.VerticalAlignment = Windows.UI.Xaml.VerticalAlignment.Center;

            // bulleted list
            Button btnBulletedList = new Button();
            btnBulletedList.Content = "Bulleted List";
            btnBulletedList.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnBulletedList.Margin = new Thickness(20, 5, 20, 5);
            btnBulletedList.Click += btnBulletedList_Click;

            // numbered list
            Button btnNumberedList = new Button();
            btnNumberedList.Content = "Numbered List";
            btnNumberedList.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnNumberedList.Margin = new Thickness(20, 5, 20, 5);
            btnNumberedList.Click += btnNumberedList_Click;

            // undo
            Button btnUndo = new Button();
            btnUndo.Content = "Undo";
            btnUndo.Style = Application.Current.Resources["MenuTextButtonStyle"]
as Style;
            btnUndo.Margin = new Thickness(20, 5, 20, 5);
            btnUndo.Click += btnUndo_Click;

            // undo
            Button btnRedo = new Button();
            btnRedo.Content = "Redo";
            btnRedo.Style = Application.Current.Resources["MenuTextButtonStyle"]
as Style;
            btnRedo.Margin = new Thickness(20, 5, 20, 5);
            btnRedo.Click += btnRedo_Click;

            // clear formatting
            Button btnClear = new Button();
            btnClear.Content = "Clear Formatting";
            btnClear.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnClear.Margin = new Thickness(20, 5, 20, 5);
            btnClear.Click += btnClear_Click;

            // superscript
            Button btnSuperscript = new Button();
            btnSuperscript.Content = "Superscript";
            btnSuperscript.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnSuperscript.Margin = new Thickness(20, 5, 20, 5);
            btnSuperscript.Click += btnSuperscript_Click;
```

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```
            // subscript
            Button btnSubscript = new Button();
            btnSubscript.Content = "Subscript";
            btnSubscript.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnSubscript.Margin = new Thickness(20, 5, 20, 5);
            btnSubscript.Click += btnSubscript_Click;

            // strikethrough
            Button btnStrikethrough = new Button();
            btnStrikethrough.Content = "Strikethrough";
            btnStrikethrough.Style =
Application.Current.Resources["MenuTextButtonStyle"] as Style;
            btnStrikethrough.Margin = new Thickness(20, 5, 20, 5);
            btnStrikethrough.Click += btnStrikethrough_Click;

            panel.Children.Add(btnBulletedList);
            panel.Children.Add(btnNumberedList);
            panel.Children.Add(btnSubscript);
            panel.Children.Add(btnSuperscript);
            panel.Children.Add(btnStrikethrough);
            panel.Children.Add(btnUndo);
            panel.Children.Add(btnRedo);
            panel.Children.Add(btnClear);
            menuBorder.Child = panel;
            morePopUp.Content = menuBorder;

        }

        void btnStrikethrough_Click(object sender, RoutedEventArgs e)
        {
            // strikethrough
            var range = rtb.Selection;
            var collection = new C1TextDecorationCollection();
            if (range.TextDecorations == null)
            {
                collection.Add(C1TextDecorations.Strikethrough[0]);
            }
            else if
(!range.TextDecorations.Contains(C1TextDecorations.Strikethrough[0]))
            {
                foreach (var decoration in range.TextDecorations)
                    collection.Add(decoration);

                collection.Add(C1TextDecorations.Strikethrough[0]);
            }
            else
            {
                foreach (var decoration in range.TextDecorations)
                    collection.Add(decoration);
```

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```
                collection.Remove(C1TextDecorations.Strikethrough[0]);
                if (collection.Count == 0)
                    collection = null;
            }
            range.TextDecorations = collection;
            morePopUp.Hide();
        }
        #endregion
```

3. The last section of code handles the PointerPressed event:

C#

```
private void rtb_PointerPressed(object sender, PointerRoutedEventArgs e)
        {
            bottomAppBar.IsOpen = true;
            topAppBar.IsOpen = true;
        }
    }
}
```

In this step, you added the code for the **Bottom AppBar** events. In the next step, you'll run your application.

Step 5 of 5: Running the Application

In this step, you'll run the application.

1. Press **F5** or start debugging to run your application:

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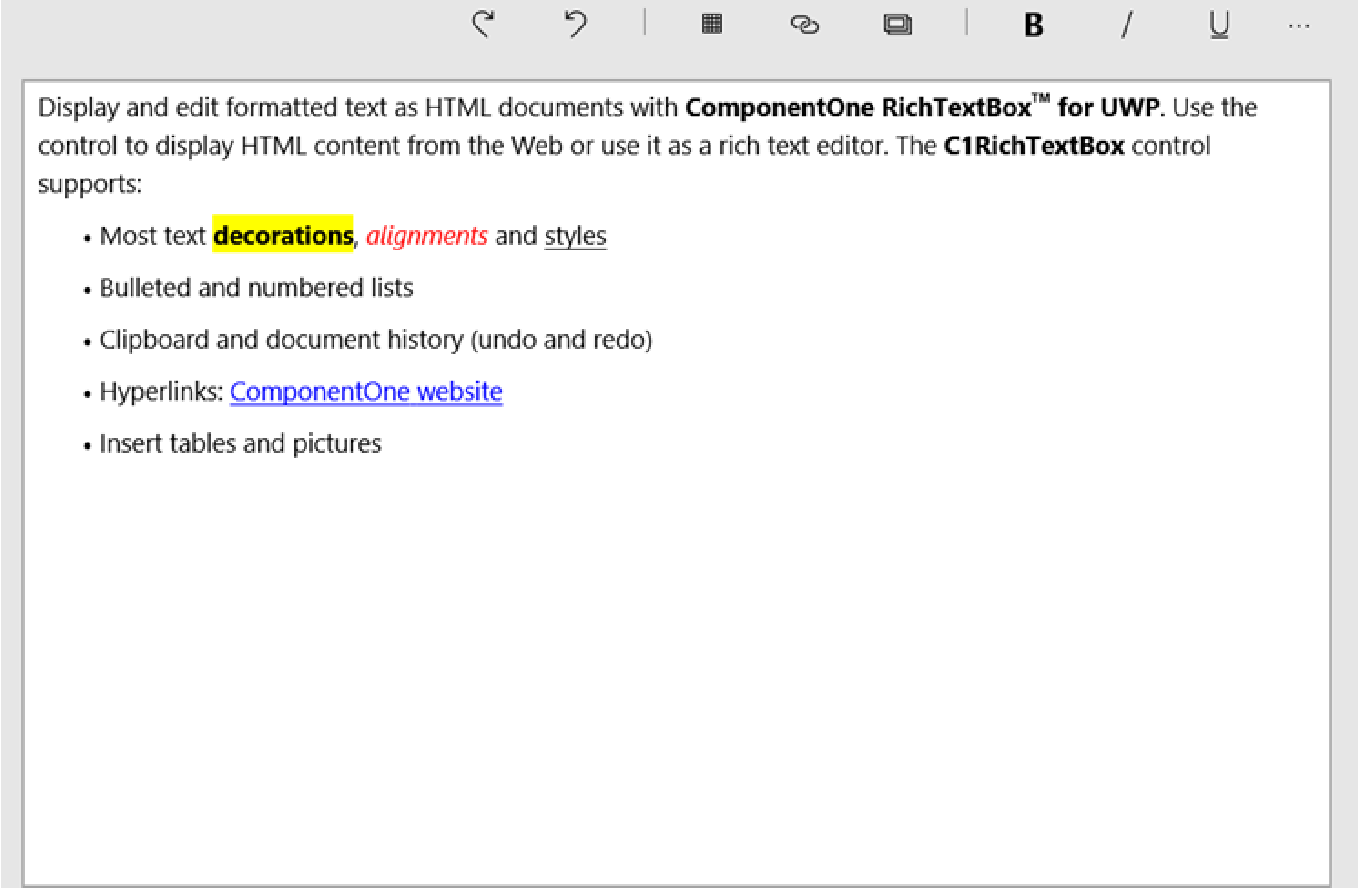

Congratulations! You have completed the **Creating an AppBar Application** Tutorial! In this tutorial, you created a new application, added markup and code, and added resource files.

Printing C1RichTextBox Contents

In this tutorial, you'll create a new Universal Windows application that will allow you to add printing capabilities to your **C1RichTextBox** control. The sample on which this tutorial is based can be found in the **C1RichTextBox Samples** folder.

You will also need the **dickens.htm** file located in the **Resources** folder of the Printing sample.

Step 1 of 4: Setting up the Application

In this step, you'll create a new Universal Windows application, add a C1RichTextBox control, and add the markup to create the C1RichTextBox control and a C1RichTextBoxMenu control.

1. Select **File | New | Project** to open the **New Project** dialog box.
    1. Select Templates | Visual C# | Windows | Universal. From the templates list, select Blank App (Universal Windows).
    3. Enter a name for your application and click **OK**. A new application will open.
2. In the Solution Explorer, right-click the **References** file and select **Add Reference** from the list. Browse to locate the following assembly references:

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- C1.UWP
- C1.UWP.RichTextBox
- C1.UWP.RichTextBox.Menu

3. Double-click the **MainPage.xaml** file to open it.

4. Add the following namespace declaration to the <Page> tag at the top of the page:

XAML

```
xmlns:c1RTB="using:C1.Xaml.RichTextBox"
```

5. Next, you'll add some **Grid.Resources** and **RowDefinitions**. The following markup should be placed between the <Grid> </Grid> tags:

XAML

```
<Grid.Resources>
            <DataTemplate x:Name="printTemplate">
                <Grid Height="{Binding ViewManager.PresenterInfo.Height}"
Width="{Binding ViewManager.PresenterInfo.Width}">
                    <c1RTB:C1RichTextPresenter Source="{Binding}" Margin="
{Binding ViewManager.PresenterInfo.Padding}" />
                </Grid>
            </DataTemplate>
        </Grid.Resources>
        <Grid.RowDefinitions>
            <RowDefinition Height="Auto"/>
            <RowDefinition/>
        </Grid.RowDefinitions>
```

6. Right below the closing </Grid.RowDefinitions> tag, add a general Button control. Edit the markup so that it resembles the following. You'll add a Name, the Content, and a Click event:

XAML

```
<Button x:Name="btnPrint" Content="Print" HorizontalAlignment="Left"
Click="btnPrint_Click" />
```

6. Finally, add a C1RichTextBoxMenu control and a C1RichTextBox control by locating the controls in the Visual Studio ToolBox and double-clicking them. Edit the markup to resemble the following:

XAML

```
<c1RTB:C1RichTextBoxMenu x:Name="rtbMenu" RichTextBox="{Binding
ElementName=rtb}" Grid.Row="1" />
<c1RTB:C1RichTextBox x:Name="rtb"  Grid.Row="1"
                             FontFamily="Times New Roman"
                             FontSize="20"
                             ViewMode="Print"
                             HorizontalContentAlignment="Center"
                             Background="#EEEEEE"/>
```

In this step, you set up a new Universal Windows application, added the appropriate references for the application, and added **C1RichTextBox** controls to the application. In the next step, you'll add the appropriate

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resource files and some application code.

Step 2 of 4: Adding Resource Files and Code

In the previous step, you set up your application and added controls. In this step, you'll add the necessary resource files and add some of the code that controls printing. In this step, you'll add a resource file that was installed with your **ComponentOne Studio UWP Edition Samples**. You can find the samples in the **Documents** folder of your system.

1. Right-click your application name in the Solution Explorer and select **Add | New Folder** from the context menu. Name the new folder **Resources** and click **OK**.
2. Right-click the **Resources** folder and select **Add | Existing Item** from the context menu. Browse to the location of your Samples, and select **dickens.htm** from the **RichTextBoxSamples\Resources** folder. Click **OK** to add the file to your **Resources** folder.
3. Select the **dickens.htm** file in the Solution Explorer and set the **Build Action** property to **Embedded Resource** in the Properties window. Rebuild your application.
4. Right-click your application page; select **View Code** from the context menu. The **MainPage.xaml.cs** page will open.
5. Import the following namespaces:

C#

```
using Windows.UI.Xaml.Printing;
using C1.Xaml.RichTextBox;
using Windows.UI.ViewManagement;
using Windows.Graphics.Printing;
using System.Reflection;
using Windows.UI.Popups;
```

6. Edit the MainPage class so that it resembles the following code:

C#

```
public sealed partial class MainPage : Page
    {
        /// <summary>
        /// PrintDocument is used to prepare the pages for printing.
        /// Prepare the pages to print in the handlers for the Paginate,
GetPreviewPage, and AddPages events.
        /// </summary>
        protected PrintDocument printDocument = null;
        /// <summary>
        /// Marker interface for document source
        /// </summary>
        protected IPrintDocumentSource printDocumentSource = null;
        /// <summary>
        /// A list of UIElements used to store the rtb pages.
        /// </summary>
        internal List<FrameworkElement> pages = null;
        /// <summary>
        /// Used for printing the document of C1RichTextBox.
        /// </summary>
        C1RichTextViewManager viewManager;
```

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7. Edit the **MainPage()** constructor so that it resembles the following code. Please remember to replace "YourApplicationName" in the **GetManifestResourceStream()** with your application name:

C#

```
public MainPage()
        {
            this.InitializeComponent();
            Assembly asm = typeof(MainPage).GetTypeInfo().Assembly;
            Stream stream =
asm.GetManifestResourceStream("YourApplicationName.Resources.dickens.htm");
            var html = new StreamReader(stream).ReadToEnd();
            rtb.Html = html;
            pages = new List<FrameworkElement>();
            this.Loaded += Printing_Loaded;
            this.Unloaded += Printing_Unloaded;
        }
```

In this step, you added a **Resources** file, and the appropriate existing **dickens.htm** file. You also added code to the **MainPage.xaml.cs** file. In the next step, you'll add the rest of the code to handle the **Button_Click** event for the general **Button** control, and the **Printing** events that you added in the **MainPage()** constructor.

Step 3 of 4: Adding Application Code

In the previous step, you added a resource file and started adding code to your application. In this step, you'll add the rest of your application code.

1. First, you'll add the event handlers for the **Printing_Loaded**, **Printing_Unloaded**, and **btnPrint_Click** events within and event handler region:

C#

```
#region event handlers
        void Printing_Unloaded(object sender, RoutedEventArgs e)
        {
            UnregisterForPrinting();
        }
        void Printing_Loaded(object sender, RoutedEventArgs e)
        {
            // init printing
            RegisterForPrinting();
        }
        private async void btnPrint_Click(object sender, RoutedEventArgs e)
        {
            await Windows.Graphics.Printing.PrintManager.ShowPrintUIAsync();
        }
        #endregion
```

2. Create another region for the printing implementation:

C#

```
 #region implemention
```

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```
#endregion
```

3. Within the implementation region, add the **PrintTaskRequested** event handler:

C#

```
/// <summary>
        /// This is the event handler for PrintManager.PrintTaskRequested.
        /// </summary>
        /// <param name="sender">PrintManager</param>
        /// <param name="e">PrintTaskRequestedEventArgs </param>
        protected void PrintTaskRequested(PrintManager sender,
PrintTaskRequestedEventArgs e)
        {
            PrintTask printTask = null;
            printTask = e.Request.CreatePrintTask("SamplePDF", sourceRequested
=>
            {
                // Print Task event handler is invoked when the print job is
completed.
                printTask.Completed += async (s, args) =>
                {
                    // Notify the user when the print operation fails.
                    if (args.Completion == PrintTaskCompletion.Failed)
                    {
                        await
Dispatcher.RunAsync(Windows.UI.Core.CoreDispatcherPriority.Normal, () =>
                        {
                            MessageDialog dialog = new MessageDialog("Failed to
print.");
                            dialog.ShowAsync();
                        });
                    }
                };
```

4. Directly below the **PrintTaskRequested** event handler, set some options like the paper size and orientation:

C#

```
// set print options like paper size and orientation

Dispatcher.RunAsync(Windows.UI.Core.CoreDispatcherPriority.Normal, () =>
                {
                    var layout = rtb.ViewManager.PresenterInfo as C1PageLayout;
                    if (layout != null && layout.Width > layout.Height)
                    {
                        printTask.Options.Orientation =
PrintOrientation.Landscape;
                    }
                });
                sourceRequested.SetSource(printDocumentSource);
            });
        }
```

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5. The method you'll add next registers the app for printing with Windows and sets up the event handlers for the print process:

C#

```
 /// <summary>
        /// This method registers the app for printing with Windows and sets up
the necessary event handlers for the print process.
        /// </summary>
        protected void RegisterForPrinting()
        {
            // Create the PrintDocument.
            printDocument = new PrintDocument();
            // Save the DocumentSource.
            printDocumentSource = printDocument.DocumentSource;
            // Add an event handler which sets up print preview.
            printDocument.Paginate += Paginate;
            // Add an event handler which provides a specified preview page.
            printDocument.GetPreviewPage += GetPrintPreviewPage;
            // Add an event handler which provides all final print pages.
            printDocument.AddPages += AddPrintPages;
            // Create a PrintManager and add a handler for printing
initialization.
            PrintManager printMan = PrintManager.GetForCurrentView();
            printMan.PrintTaskRequested += PrintTaskRequested;
        }
```

6. Add the method that un-registers the app for printing:

C#

```
 /// <summary>
        /// This method unregisters the app for printing with Windows.
        /// </summary>
        protected void UnregisterForPrinting()
        {
            if (printDocument == null)
                return;
            printDocument.Paginate -= Paginate;
            printDocument.GetPreviewPage -= GetPrintPreviewPage;
            printDocument.AddPages -= AddPrintPages;
            // Remove the handler for printing initialization.
            PrintManager printMan = PrintManager.GetForCurrentView();
            printMan.PrintTaskRequested -= PrintTaskRequested;
        }
```

6. The last code you'll add within the implementation region contains three event handlers:

C#

```
  /// <summary>
        /// This is the event handler for PrintDocument.Paginate.
```

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```
        /// It fires when the PrintManager requests print preview
        /// </summary>
        /// <param name="sender">PrintDocument</param>
        /// <param name="e">Paginate Event Arguments</param>
        protected void Paginate(object sender, PaginateEventArgs e)
        {
            pages.Clear();
            viewManager = new C1RichTextViewManager
            {
                Document = rtb.Document,
                PresenterInfo = rtb.ViewManager.PresenterInfo
            };
            PrintDocument printDoc = (PrintDocument)sender;
            // Report the number of preview pages
            printDoc.SetPreviewPageCount(rtb.ViewManager.Presenters.Count,
PreviewPageCountType.Intermediate);
        }
        /// <summary>
        /// This is the event handler for PrintDocument.GetPrintPreviewPage. It
provides a specific print preview page,
        /// in the form of an UIElement, to an instance of PrintDocument.
PrintDocument subsequently converts the UIElement
        /// into a page that the Windows print system can deal with.
        /// </summary>
        /// <param name="sender">PrintDocument</param>
        /// <param name="e">Arguments containing the preview requested
page</param>
        protected void GetPrintPreviewPage(object sender,
GetPreviewPageEventArgs e)
        {
            // Add the first page
            if (e.PageNumber == 1)
                AddOnePrintPreviewPage(0);
            PrintDocument printDoc = (PrintDocument)sender;
            printDoc.SetPreviewPage(e.PageNumber, pages[e.PageNumber - 1]);
            // Add the other pages
            if (e.PageNumber == 1)
                for (int i = 1; i < viewManager.Presenters.Count; i++)
                    AddOnePrintPreviewPage(i);
        }
        /// <summary>
        /// This is the event handler for PrintDocument.AddPages. It provides
all pages to be printed, in the form of
        /// UIElements, to an instance of PrintDocument. PrintDocument
subsequently converts the UIElements
        /// into a pages that the Windows print system can deal with.
        /// </summary>
        /// <param name="sender">PrintDocument</param>
        /// <param name="e">Add page event arguments containing a print task
options reference</param>
        protected void AddPrintPages(object sender, AddPagesEventArgs e)
```

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```
        {
            // Loop over all of the pages and add each one to be printed
            foreach (FrameworkElement page in pages)
            {
                printDocument.AddPage(page);
            }
            PrintDocument printDoc = (PrintDocument)sender;
            // Indicate that all of the print pages have been provided
            printDoc.AddPagesComplete();
        }
        void AddOnePrintPreviewPage(int index)
        {
            var page = (FrameworkElement)printTemplate.LoadContent();
            page.DataContext = viewManager.Presenters[index];
            if (!pages.Contains(page))
                pages.Add(page);
        }
```

In this step, you added application code. In the next step, you'll run the application.

Step 4 of 4: Running the Application

In the previous step, you added application code. In this step, you'll run the application.

1. Press **F5** or start debugging to run your application. Your application should resemble the following image:

2. Tap or click the Print button. You can choose the printer you wish to use:

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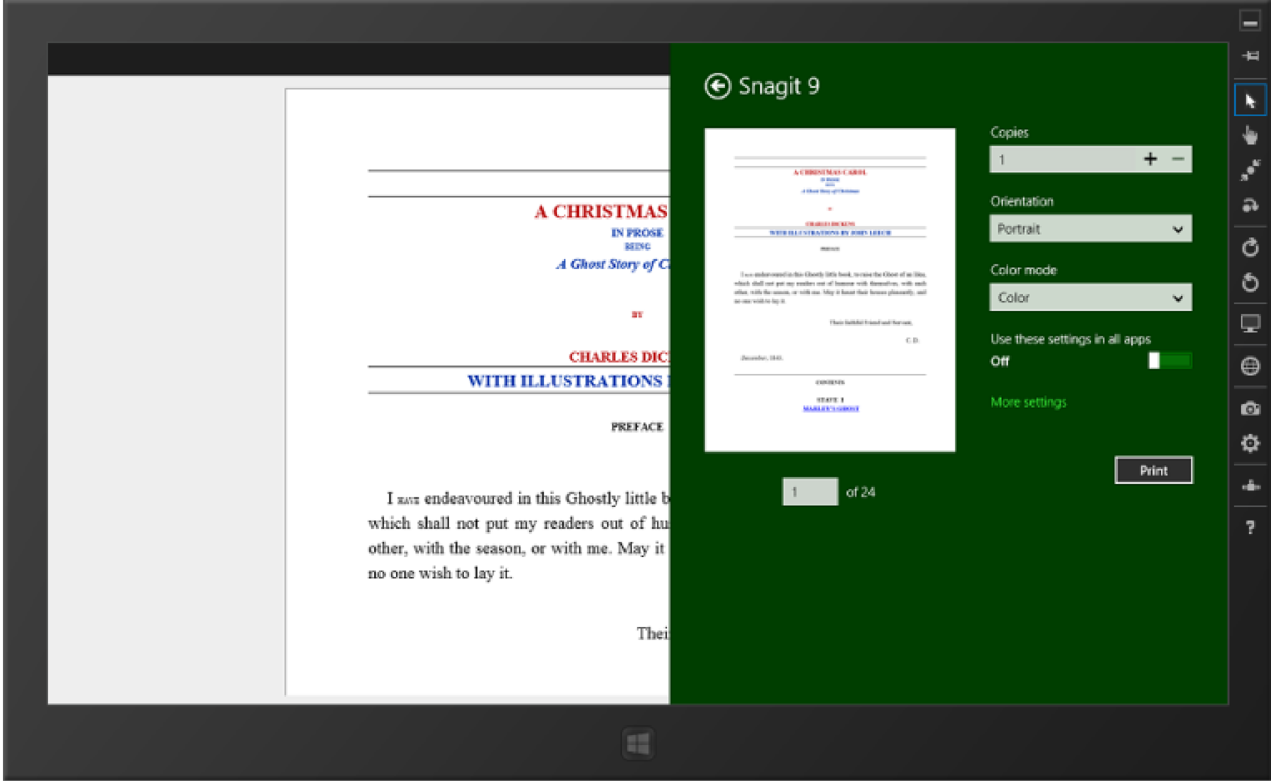
3. Choose a printer. The Print dialog will open, so you can preview the printed document, and set the print settings:



What You've Accomplished

In this tutorial, you added printing capabilities to your C1RichTextBox control using native Windows print

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events. You also loaded a document from your **Resources** folder, and created the **C1RichTextBox** control using XAML markup.

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