Chapter 25

Page varieties

If you think of a Xamarin.Forms application as a building, then you construct this building from bricks that take the form of views and elements. You arrange them into walls using layout classes, and then form them into rooms with `ContentPage`, with passages from room to room made possible with navigational functions structured around `NavigationPage`.

This visual architecture can be enhanced a bit more with other instantiable classes that derive from `Page`. Here's the complete hierarchy:

```
Page
    TemplatedPage
        ContentPage
    NavigationPage
    MasterDetailPage
    MultiPage<T>
        TabbedPage
        CarouselPage
```

This chapter is devoted to these additional `Page` derivatives, which are similar in that they serve as parents to manage the visual presentation of two or more other pages:

- `MasterDetailPage` manages two pages: The *master* is generally a collection of data or a list of items, and the *detail* generally displays a particular item from the collection.
- `TabbedPage` consists of multiple child pages identified by tabs. You can populate `TabbedPage` with a collection of discrete pages or automatically generate tabs and pages based on a collection of data in much the same way that a `ListView` generates items based on a data collection. With this second option, each tab is associated with a member of the collection, formatted with a template, but this option is not suitable for iOS platforms.

The `CarouselPage` is slated for deprecation in favor of a forthcoming `CarouselView`, so it will not be discussed in this chapter. `MultiPage<T>` is abstract and cannot be instantiated itself, but it defines most of the properties and events for `TabbedPage`.

Master and Detail

The `MasterDetailPage` defines two properties, named `Master` and `Detail` of type `Page`. Generally, you'll set these two properties to objects of type `ContentPage`, but currently, to get `MasterDetail-Page` to work on the Universal Windows Platform, the detail page must be a `NavigationPage`.

How the MasterDetailPage displays and switches between these two pages depends on several factors: the underlying operating system, whether you're running the program on a phone or tablet, the portrait or landscape orientation of the device, and the setting of a property of MasterDetail-Page named MasterBehavior. Several behaviors are possible:

- *split*: The master and detail pages are displayed side by side, the master on the left and the detail on the right.
- *popover*: The detail page is animated to cover, or partially cover, the master page. There are three possibilities:
    - *slide*: The detail and master page slide back and forth.
    - *overlap*: The detail page partially covers the master page.
    - *swap*: The detail page entirely obscures the master page.

In theory, the MasterBehavior property of MasterDetailPage allows you to choose between the *split* and *popover* behaviors. You set this property to one of the five members of the MasterBehavior enumeration:

- Default
- Split
- SplitOnLandscape
- SplitOnPortrait
- Popover

As you'll see, however, the setting of the MasterBehavior property has *no effect* for applications running on phones. It only affects applications running on a tablet or the desktop. Phones always exhibit a *popover* behavior. Whether this behavior results in a *slide*, *overlap*, or *swap* depends on the platform.

Exploring the behaviors

Let's explore these behaviors with a program named **MasterDetailBehaviors**. The program defines three pages, named DemoPage (which derives from MasterDetailPage), and two ContentPage derivatives that are children of the MasterDetailPage. These are named MasterPage and Detail-Page.

MasterPage and DetailPage are very similar. Here's MasterPage:

```
<ContentPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             x:Class="MasterDetailBehaviors.MasterPage"
             Title="Master Page"
             Padding="10"
             x:Name="masterPage">
```

```
    <ContentPage.Padding>
        <OnPlatform x:TypeArguments="Thickness"
                    iOS="0, 20, 0, 0" />
    </ContentPage.Padding>

    <Frame OutlineColor="Accent">
        <StackLayout Orientation="Horizontal"
                     Spacing="0"
                     HorizontalOptions="Center"
                     VerticalOptions="Center">

            <Label Text="{Binding Source={x:Reference masterPage},
                                  Path=Width,
                                  StringFormat='Master: {0:F0}'}"
                   FontSize="Large" />

            <Label Text="{Binding Source={x:Reference masterPage},
                                  Path=Height,
                                  StringFormat=' &#x00D7; {0:F0}'}"
                   FontSize="Large" />
        </StackLayout>
    </Frame>
</ContentPage>
```

It contains a `Frame` with a pair of `Label` elements to display the width and height of the page. Notice that a `Title` property is set and the page contains the standard `Padding` to avoid overlapping the status bar on the iPhone.

The `DetailPage` does not contain that `Padding`. You'll see that it's unnecessary. But like `MasterPage`, this page also sets the `Title` property and contains a `Frame` with a pair of `Label` elements to display the width and height:

```
<ContentPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             x:Class="MasterDetailBehaviors.DetailPage"
             Title="Detail Page"
             Padding="10"
             x:Name="detailPage">

    <Frame OutlineColor="Accent">
        <StackLayout Orientation="Horizontal"
                     Spacing="0"
                     VerticalOptions="CenterAndExpand"
                     HorizontalOptions="Center">
            <Label Text="{Binding Source={x:Reference detailPage},
                                  Path=Width,
                                  StringFormat='Detail: {0:F0}'}"
                   FontSize="Large"/>

            <Label Text="{Binding Source={x:Reference detailPage},
                                  Path=Height,
                                  StringFormat=' &#x00D7; {0:F0}'}"
                   FontSize="Large" />
        </StackLayout>
    </Frame>
</ContentPage>
```

You'll also need a page that derives from `MasterDetailPage`. To add such a page in Visual Studio, add a new item to the project by using the **Forms Xaml Page** template; in Xamarin Studio, add a new file to the project by using the **Forms ContentPage Xaml** template. This creates a page that derives from `ContentPage`, but you can then simply change `ContentPage` to `MasterDetailPage` in both the XAML file and C# code-behind file.

Here's the XAML file for `DemoPage` with `MasterDetailPage` as the root element:

```
<MasterDetailPage xmlns="http://xamarin.com/schemas/2014/forms"
                  xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
                  xmlns:local="clr-namespace:MasterDetailBehaviors"
                  x:Class="MasterDetailBehaviors.DemoPage"
                  Title="Demo Page"
                  MasterBehavior="Default">

    <MasterDetailPage.Master>
        <local:MasterPage />
    </MasterDetailPage.Master>

    <MasterDetailPage.Detail>
        <NavigationPage>
            <x:Arguments>
                <local:DetailPage />
            </x:Arguments>
        </NavigationPage>
    </MasterDetailPage.Detail>
</MasterDetailPage>
```

The `MasterDetailPage.Master` and `MasterDetailPage.Detail` property elements are set to instances of `MasterPage` and `DetailPage`, respectively, but with a little difference: The `Detail` property is set to a `NavigationPage`, and the `x:Arguments` tags specify the `DetailPage` as the constructor argument. This is necessary to enable the user interface that lets the user switch between the master and detail pages on the Universal Windows Platform.

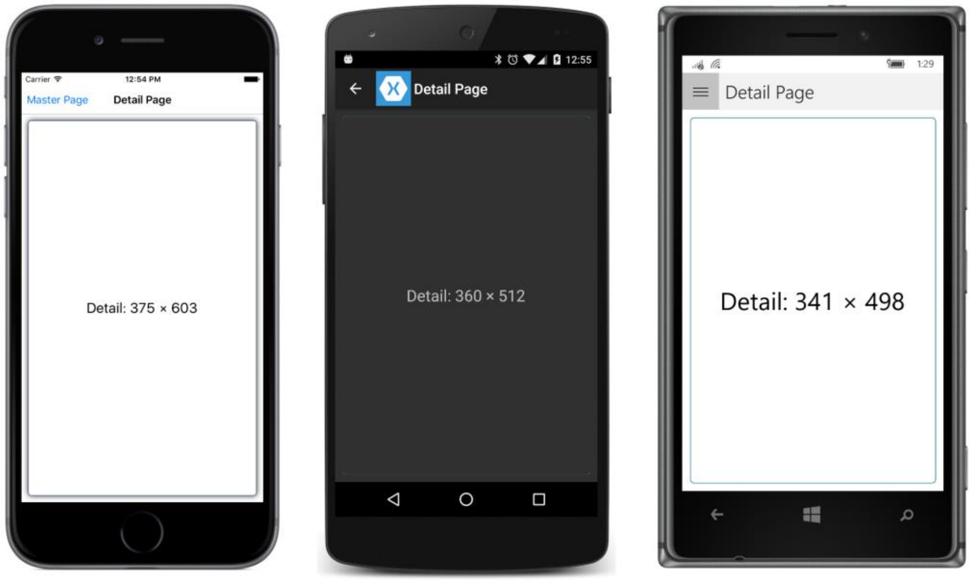
Also notice that the `MasterBehavior` property is set to `Default` in the root tag. You can experiment with different settings.

The `App` constructor sets the `MainPage` property to `DemoPage`. A Xamarin.Forms program should not navigate to a `MasterDetailPage`:

```
namespace MasterDetailBehaviors
{
    public class App : Application
    {
        public App()
        {
            MainPage = new DemoPage();
        }
```

```
            …
        }
    }
```

When you first run the program, by default the detail page is initially displayed:

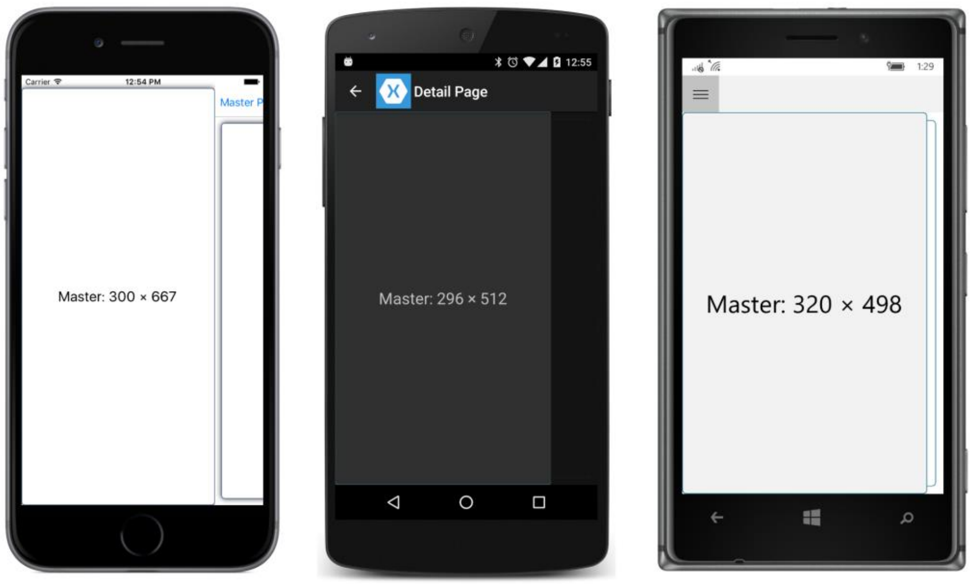


On all three platforms, the heading identifies this as the detail page by displaying the `Title` property of `DetailPage`. The iPhone also displays the `Title` of the `MasterPage`.

The operation to switch from the detail page to the master is different on the three platforms:

- On iOS, swipe the detail page to the right, or tap the Master Page text in the heading.
- On Android, swipe right from the left edge of the phone, or tap the arrow in the upper-left corner.
- On Windows 10 Mobile, tap the menu icon in the upper-left corner.

Here's the result after the switch:



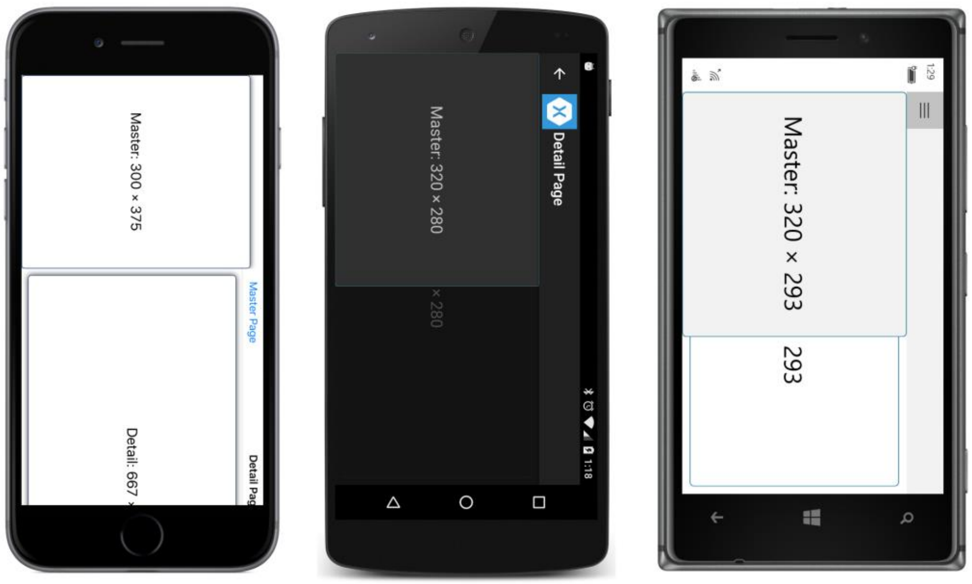
The master page is now visible. In terms of the `MasterBehavior` enumeration, the master page becomes visible with a `Popover` behavior, but the three screenshots illustrate differences between the platforms:

- The behavior on iOS is a *slide*. The detail page slides to the right as the master page slides in from the left; you can still see the left part of the detail page.
- The Android is an *overlay*. It's hard to tell because the detail page is faded out, but look closely, and you can see the `Frame` in the `DetailPage` at the far right of the screen.
- Windows 10 Mobile is also a *slide*. You can see the detail page behind the master page.

On both iOS and Android, the width of the master page is somewhat less than the width of the screen.

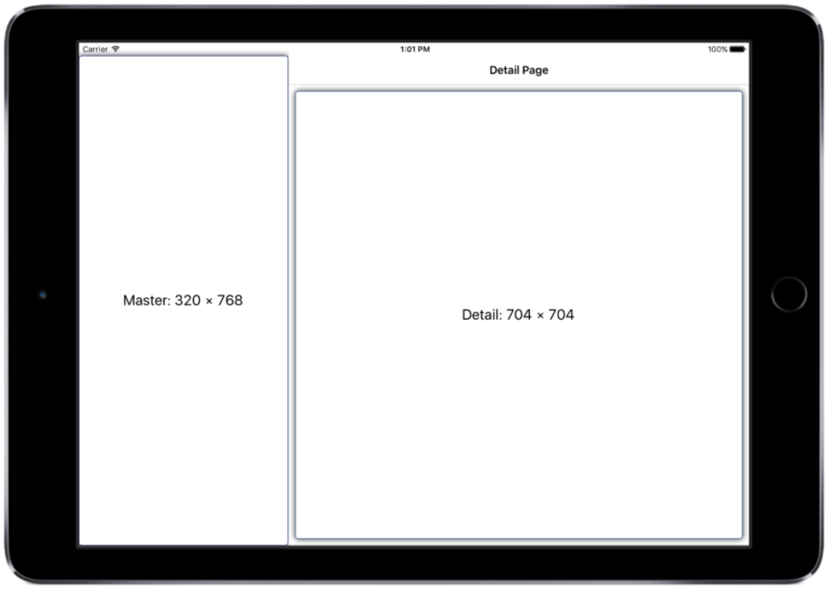
To return to the detail page on iOS, swipe to the left. On Android, swipe the master page to the left, tap the visible part of the detail page at the far right of the screen, or tap the **Back** triangle at the bottom of the screen. On Windows Phone, tap the menu icon again or the **Back** arrow.

You'll see similar behavior for these three platforms in landscape mode, except that master page has a similar width as the master page in portrait mode, which results in much more of the detail page being visible:



If you experiment with different settings of the `MasterBehavior` property of `MasterDetailPage`, you'll discover that this property has no effect on phones. Phones always have a *popover* behavior. Only on the iPad and on Windows tablets and the desktop will you see a *split* behavior.

On the iPad in landscape mode, the `MasterBehavior.Default` setting results in a *split* behavior:

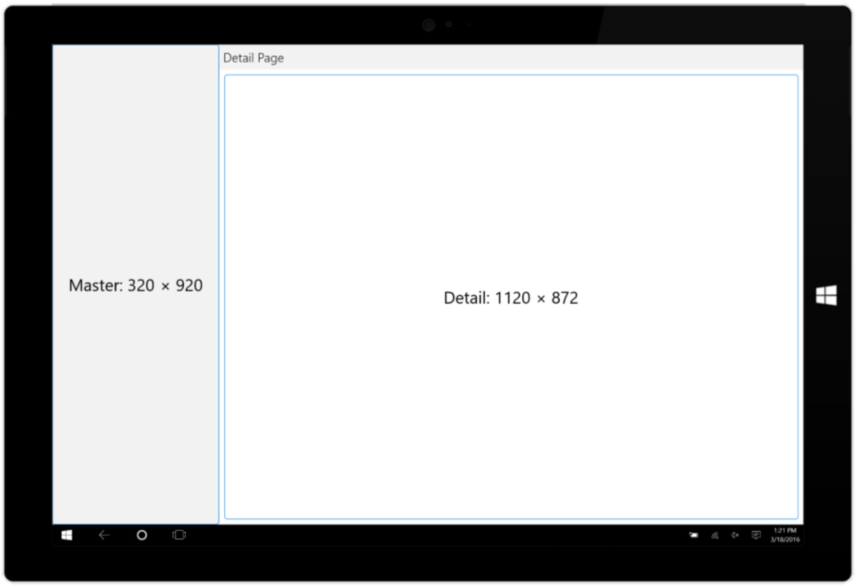


However, you can control the behavior. If you set the `MasterBehavior` property to `Popover`, you'll get a master page that overlays the detail page much like on the iPhone.

For an iPad in portrait mode, the default setting is the same as `Popover`, and you'll need to select `Split` or `SplitOnPortrait` to get a split screen in portrait mode.

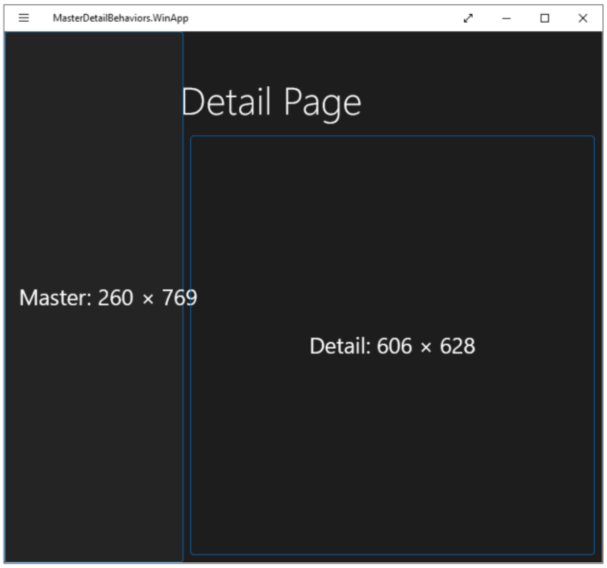
The `SplitOnLandscape` and `SplitOnPortrait` options allow you to have a different behavior for portrait and landscape modes. The `SplitOnLandscape` setting makes the most sense, and that is why it's the same as `Default` for tablets and the desktop: The master and detail views share the screen in landscape mode, but when the tablet is turned to portrait mode, the detail view occupies the full screen and the master page overlays it.

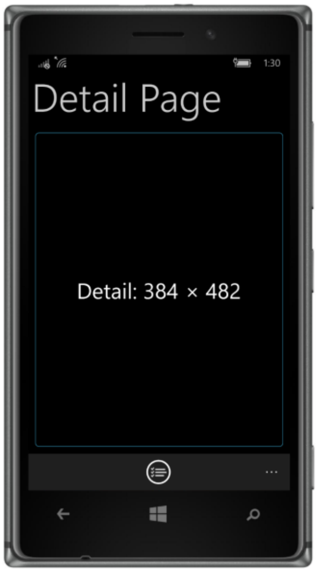
Here's the program running on the Surface Pro 3 in tablet mode:



This is a split behavior. You'll see a popover behavior if you start the program with the tablet in portrait mode, and you can control the behavior with different settings of the `MasterBehavior` property.

The user interface to switch between master and detail is a bit different on Windows 8.1 and Windows Phone 8.1. A toolbar item is automatically provided to switch between master and detail:





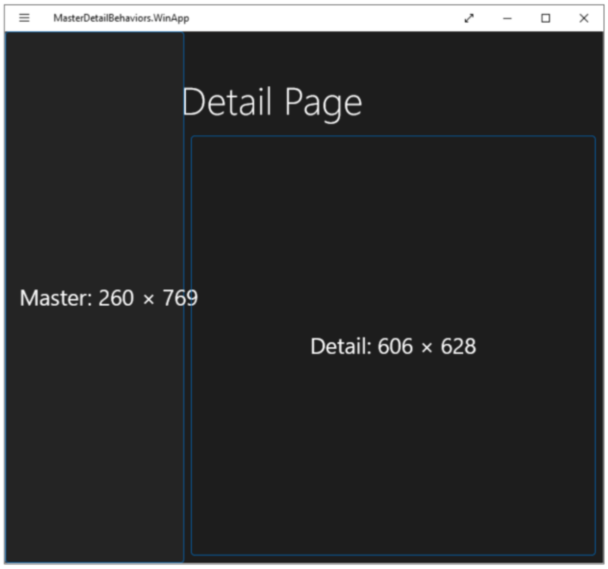
The Windows 8.1 screen shows the split behavior, but if you set it for popover, you'll need to right-click the screen to display the toolbar. The Windows Phone 8.1 screen displays the toolbar normally. You are responsible for setting the toolbar button image and the associated text. The image and text are the same regardless of whether the master or detail view is visible. The text is set from the `Title` property of the master page., which in this case is "Master Page".

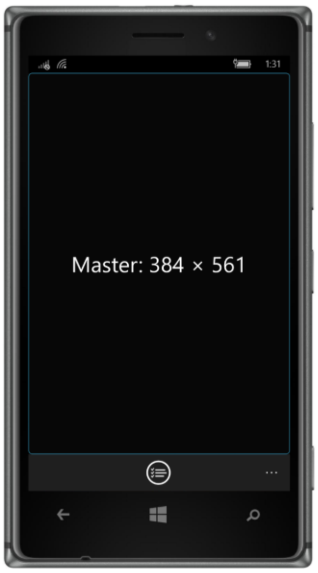
The bitmap for the button is set from the `Icon` property of the master page. (This `Icon` property is actually defined by `Page` and inherited by all the other page derivatives.) The Windows 8.1 and Windows Phone 8.1 projects were both given a folder named **Images**. The content of this folder is a PNG file. The constructor in the code-behind file for `MasterPage` sets that bitmap to the `Icon` property:

```
public partial class MasterPage : ContentPage
{
    public MasterPage()
    {
        InitializeComponent();

        if (Device.OS == TargetPlatform.WinPhone ||
            Device.OS == TargetPlatform.Windows)
        {
            Icon = new FileImageSource
            {
                File = "Images/ApplicationBar.Select.png"
            };
        }
    }
}
```

If you do not set that `Icon` property—either in the code-behind file or in the XAML file—the toolbar button will be displayed on the Windows 8.1 and Windows Phone 8.1 platforms without an image.

Tapping that toolbar icon switches between detail and master:





Back to school

So far in this book you've seen a couple of programs that use a `ListView` to display the students of the School of Fine Art. These programs all have different approaches for displaying a detailed look at one of the students. The **SelectedStudentDetail** program in Chapter 19, "Collection views," displayed the `ListView` in the top half of the screen and the detail in the bottom half. The **SchoolAndStudents** program in Chapter 24, "Page navigation," used page navigation to display the student from the `ListView`. Now let's use a `MasterDetailPage` for this job and call it **SchoolAndDetail**.

One major difference between the **SchoolAndDetail** program and **MasterDetailBehaviors** involves how the program is constructed. Rather than having separate classes for the master and detail page, everything is consolidated in one class that derives from `MasterDetailPage`.

This single class (shown below) is named `SchoolAndDetailPage`. The layout of the master and detail pages are defined within the `MasterDetailPage.Master` and `MasterDetailPage.Detail` property-element tags.

The root tag sets a property of `MasterDetailPage` named `IsPresented`. This property allows a program to switch between master and detail views programmatically or declaratively in XAML. The default value is `false`, which means to display the detail page, but the root element of this XAML file sets it to `True` to display the master page at startup:

```
<MasterDetailPage xmlns="http://xamarin.com/schemas/2014/forms"
```

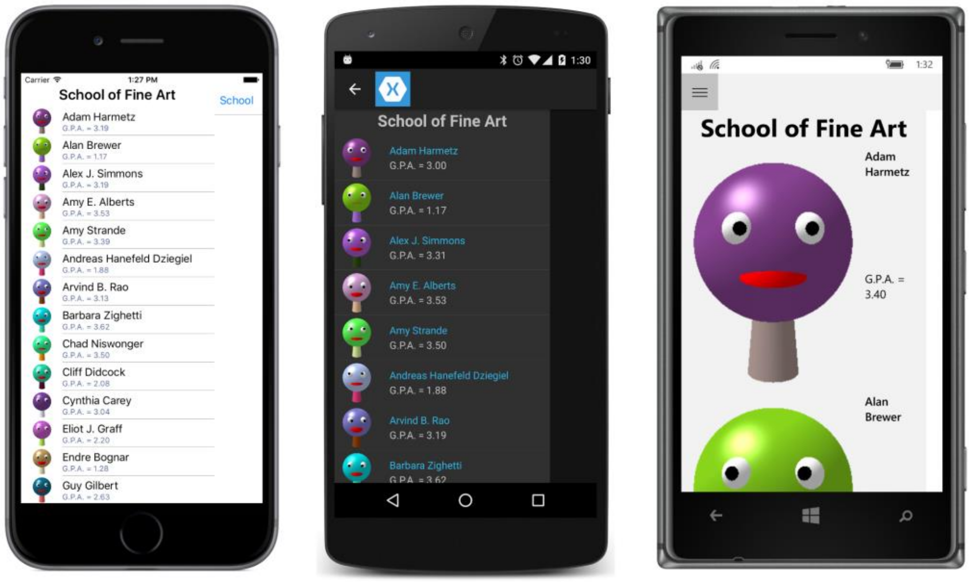
```
                  xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
                  xmlns:school="clr-namespace:SchoolOfFineArt;assembly=SchoolOfFineArt"
                  x:Class="SchoolAndDetail.SchoolAndDetailPage"
                  IsPresented="True">

    <MasterDetailPage.Master>
        <ContentPage Title="School">
            <ContentPage.Padding>
                <OnPlatform x:TypeArguments="Thickness"
                            iOS="0, 20, 0, 0" />
            </ContentPage.Padding>

            <ContentPage.Icon>
                <OnPlatform x:TypeArguments="FileImageSource"
                            WinPhone="Images/refresh.png" />
            </ContentPage.Icon>

            <ContentPage.BindingContext>
                <school:SchoolViewModel />
            </ContentPage.BindingContext>

            <StackLayout BindingContext="{Binding StudentBody}">
                <Label Text="{Binding School}"
                       FontSize="Large"
                       FontAttributes="Bold"
                       HorizontalTextAlignment="Center" />

                <ListView x:Name="listView"
                          ItemsSource="{Binding Students}"
                          ItemTapped="OnListViewItemTapped">
                    <ListView.ItemTemplate>
                        <DataTemplate>
                            <ImageCell ImageSource="{Binding PhotoFilename}"
                                       Text="{Binding FullName}"
                                       Detail="{Binding GradePointAverage,
                                                 StringFormat='G.P.A. = {0:F2}'}" />
                        </DataTemplate>
                    </ListView.ItemTemplate>
                </ListView>
            </StackLayout>
         </ContentPage>
    </MasterDetailPage.Master>

    <!-- Detail Page -->
    <MasterDetailPage.Detail>
        <NavigationPage>
            <x:Arguments>
                <ContentPage Title="{Binding FirstName}"
                             BindingContext="{Binding Source={x:Reference listView},
                                                       Path=SelectedItem}">
                    <StackLayout>
                        <!-- Name -->
                        <StackLayout Orientation="Horizontal"
                                     HorizontalOptions="Center"
                                     Spacing="0">
                            <StackLayout.Resources>
                                <ResourceDictionary>
                                    <Style TargetType="Label">
                                        <Setter Property="FontSize" Value="Large" />
                                        <Setter Property="FontAttributes" Value="Bold" />
                                    </Style>
                                </ResourceDictionary>
                            </StackLayout.Resources>

                            <Label Text="{Binding LastName}" />
                            <Label Text="{Binding FirstName, StringFormat=', {0}'}" />
                            <Label Text="{Binding MiddleName, StringFormat=' {0}'}" />
                        </StackLayout>

                        <!-- Photo -->
                        <Image Source="{Binding PhotoFilename}"
                               VerticalOptions="FillAndExpand" />

                        <!-- Sex -->
                        <Label Text="{Binding Sex, StringFormat='Sex = {0}'}"
                               HorizontalOptions="Center" />

                        <!-- GPA -->
                        <Label Text="{Binding GradePointAverage, StringFormat='G.P.A. =
                                         {0:F2}'}"
                               HorizontalOptions="Center" />
                    </StackLayout>
                </ContentPage>
            </x:Arguments>
        </NavigationPage>
    </MasterDetailPage.Detail>
</MasterDetailPage>
```

Notice also that the `Title` and `Icon` properties are set on the master page. The Windows 8.1 and Windows Phone 8.1 projects contain an **Images** directory with a **Refresh** icon that might also suggest a toggle operation. The master page also instantiates `SchoolViewModel` as an object in the `Master-PageBase.BindingContext` property-element tags.

One advantage of putting everything within a single XAML file is that you can establish a data binding between the master and detail pages. The `BindingContext` of the `ContentPage` that serves as the detail page is bound to the `SelectedItem` property of the `ListView`.

Other than those differences, the page definitions themselves are quite similar to the **SchoolAnd-Students** program in the previous chapter.

The program starts up displaying the master page, which includes the `ListView` with the students:



School of Fine Art

Adam Harmetz
G.P.A. = 3.19
Alan Brewer
G.P.A. = 1.17
Alex J. Simmons
G.P.A. = 3.19
Amy E. Alberts
G.P.A. = 3.53
Amy Strande
G.P.A. = 3.39
Andreas Hanefeld Dziegiel
G.P.A. = 1.88
Arvind B. Rao
G.P.A. = 3.13
Barbara Zighetti
G.P.A. = 3.62
Chad Niswonger
G.P.A. = 3.50
Cliff Didcock
G.P.A. = 2.08
Cynthia Carey
G.P.A. = 3.04
Eliot J. Graff
G.P.A. = 2.20
Endre Bognar
G.P.A. = 1.28
Guy Gilbert
G.P.A. = 2.63

School of Fine Art

Adam Harmetz
G.P.A. = 3.00
Alan Brewer
G.P.A. = 1.17
Alex J. Simmons
G.P.A. = 3.31
Amy E. Alberts
G.P.A. = 3.53
Amy Strande
G.P.A. = 3.50
Andreas Hanefeld Dziegiel
G.P.A. = 1.88
Arvind B. Rao
G.P.A. = 3.19
Barbara Zighetti
G.P.A. = 3.62

School of Fine Art

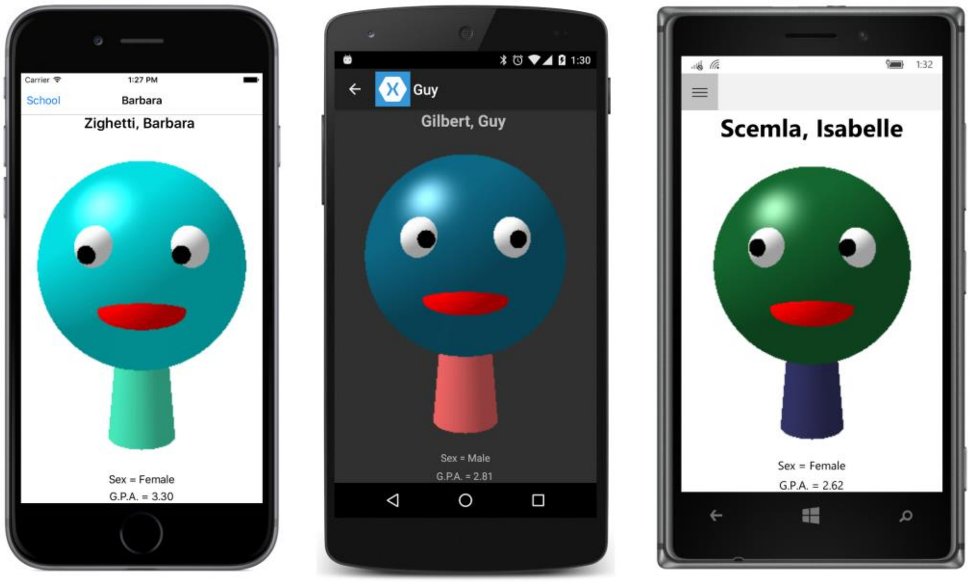
Adam
Harmetz
G.P.A. =
3.40
Alan
Brewer

This program has another way to switch from the master page to the detail page. The code-behind file contains a simple handler for the `ItemTapped` event of the `ListView`:

```
public partial class SchoolAndDetailPage : MasterDetailPage
{
    public SchoolAndDetailPage()
    {
        InitializeComponent();
    }

    void OnListViewItemTapped(object sender, ItemTappedEventArgs args)
    {
        // Show the detail page.
        IsPresented = false;
    }
}
```

The difference between `ItemTapped` and `ItemSelected` is that `ItemTapped` works even if the item is already selected. The `ItemTapped` handler doesn't deselect the item. This maintains a consistency between the selected item in the `ListView` and the contents of the detail page.

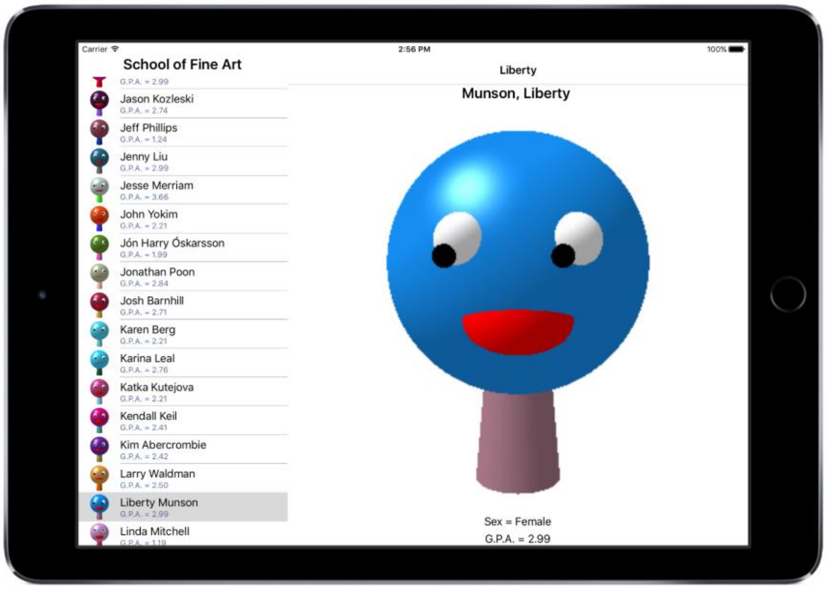
Here's the detail page that you'll see after a tap:



To return to the master page on iOS, swipe right. On Android, swipe right from the left edge or tap the arrow at the top. On Windows 10 Mobile, tap the menu icon in the upper-left corner.

On both Android and Windows Phone, tapping the **Back** arrow at the bottom of the screen will exit the program. That **Back** arrow will switch from master to detail, but not from detail to master.

Here's the program running on the iPad Air 2 simulator showing the side-by-side display of the master and detail:



G.P.A. = 2.99
Jason Kozleski
G.P.A. = 2.74
Jeff Phillips
G.P.A. = 1.24
Jenny Liu
G.P.A. = 2.99
Jesse Merriam
G.P.A. = 3.66
John Yokim
G.P.A. = 2.21
Jón Harry Óskarsson
G.P.A. = 1.99
Jonathan Poon
G.P.A. = 2.84
Josh Barnhill
G.P.A. = 2.71
Karen Berg
G.P.A. = 2.21
Karina Leal
G.P.A. = 2.76
Katka Kutejova
G.P.A. = 2.21
Kendall Keil
G.P.A. = 2.41
Kim Abercrombie
G.P.A. = 2.42
Larry Waldman
G.P.A. = 2.50
Liberty Munson
G.P.A. = 2.99
Linda Mitchell
G.P.A. = 1.19

Your own user interface

If you'd like to supply your own user interface for switching between the master and detail views, you'll probably also want to disable the interface automatically provided by the `MasterDetailPage`. You can do this in two ways:

- Set the `IsGestureEnabled` property to `false` to disable the swipe gesture support on iOS and Android.
- Override the protected `ShouldShowToolbarButton` method and return `false` to hide the toolbar buttons on Windows 8.1 and Windows Phone 8.1.

However, you won't be able to disable the interface entirely. Setting the `IsGestureEnabled` property to `false` means you can no longer use swipes to switch between master and detail on iOS and Android. The property does not affect taps, however. For both iOS and Android, when the display has a *popover* behavior and the master page is overlaying the detail page, you can dismiss the master page with a tap on the detail page at the right. `IsGestureEnabled` does not disable those taps.

If you set the `IsGestureEnabled` property to `false`, you'll need to supply your own user interface for displaying the master view from the detail page on iOS and Android.

The toolbar button that accompanies the `MasterDetailPage` on Windows 8.1 and Windows Phone 8.1 platforms is attached to the underlying native page. It cannot be accessed from the `ToolbarItems` collections of the `MasterDetailPage` or of the two pages set to the `Master` and `Detail` properties. Overriding the `ShouldShowToolbarButton` and returning `false` suppresses that toolbar button. Again, if you do that, you must supply you own user interface for switching between master and detail views.

Another problem is that you don't need an interface at all to switch between the views when the `MasterDetailPage` is using a *split* mode. You know that you only get a split mode on iPad and Windows Runtime tablets, but if you specify a `MasterBehavior` as `Default` or `SplitOnLandscape`, how can you tell when the screen is in a *split* mode or *overlay* mode?

On the Windows Runtime tablets, a call to the base implementation of `ShouldShowToolbarButton` will tell you. This method returns `true` for phones and for tablets in an *overlay* mode, but it returns `false` for tablets in a *split* mode. However, this method is only implemented on Windows 8.1 and Windows Phone 8.1.

For iOS, you can determine whether the iPad is in an *overlay* or *split* mode by checking the dimensions of the page. If the page is in portrait mode, it's `overlay`; for landscape mode, it's `split`.

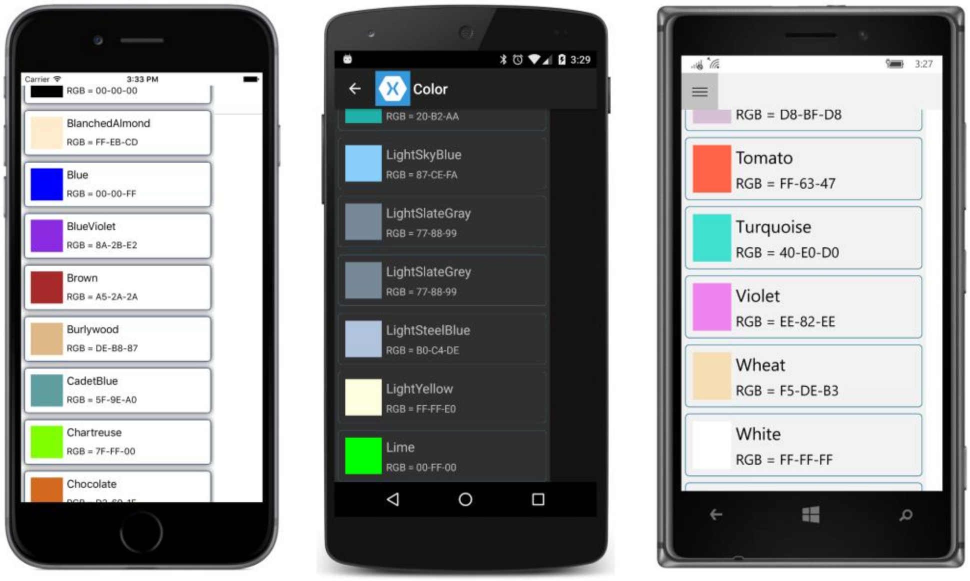
Let's put all this knowledge to use. The **ColorsDetails** program displays all the colors in the `NamedColor` collection in a `ListView` in the master page and provides detailed information about the selected color in its detail page. Here's the master page definition first:

```
<MasterDetailPage xmlns="http://xamarin.com/schemas/2014/forms"
                  xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
                  xmlns:toolkit=
                  "clr-namespace:Xamarin.FormsBook.Toolkit;assembly=Xamarin.FormsBook.Toolkit"
                  x:Class="ColorsDetails.ColorDetailsPage"
                  IsPresented="True"
                  x:Name="page">

    <MasterDetailPage.Master>
        <ContentPage Title="Colors">
            <ContentPage.Padding>
                <OnPlatform x:TypeArguments="Thickness"
                            iOS="0, 20, 0, 0" />
            </ContentPage.Padding>

            <ListView x:Name="listView"
                      SeparatorVisibility="None"
                      ItemsSource="{x:Static toolkit:NamedColor.All}"
                      ItemTapped="OnListViewItemTapped">
                <ListView.RowHeight>
                    <OnPlatform x:TypeArguments="x:Int32"
                                iOS="80"
                                Android="80"
                                WinPhone="90" />
                </ListView.RowHeight>

                <ListView.ItemTemplate>
                    <DataTemplate>
                        <ViewCell>
                            <ContentView Padding="5">
                                <Frame OutlineColor="Accent"
                                       Padding="10">
                                    <StackLayout Orientation="Horizontal">
                                        <BoxView x:Name="boxView"
                                                 Color="{Binding Color}"
                                                 WidthRequest="50"
                                                 HeightRequest="50" />
                                        <StackLayout>
                                            <Label Text="{Binding Name}"
                                                   FontSize="Medium"
                                                   VerticalOptions="StartAndExpand" />
                                            <Label Text="{Binding RgbDisplay,
                                                                  StringFormat='RGB = {0}'}"
                                                   FontSize="Small"
                                                   VerticalOptions="CenterAndExpand" />
                                        </StackLayout>
                                    </StackLayout>
                                </Frame>
                            </ContentView>
                        </ViewCell>
                    </DataTemplate>
                </ListView.ItemTemplate>
            </ListView>
        </ContentPage>
    </MasterDetailPage.Master>
    …
```

```
</MasterDetailPage>
```

The markup for this `ListView` is quite similar to that in the **CustomNamedColorList** program in Chapter 19. In this new version, however, the `ItemTapped` event of the `ListView` is handled in the code-behind file. (You'll see that code shortly.)

Here's the list of colors on the three platforms:



The `ContentPage` that serves as the detail view has its `BindingContext` set to the `SelectedItem` property of the `ListView`. Most of the contents—which include a `BoxView` of the color; the red, green, and blue values; and the hue, saturation, and luminosity values—are in a `ScrollView`. This is for the benefit of phones in landscape mode. The only elements not in this `ScrollView` are a `Label` with the color name at the top of the page and a `Button` on the bottom:

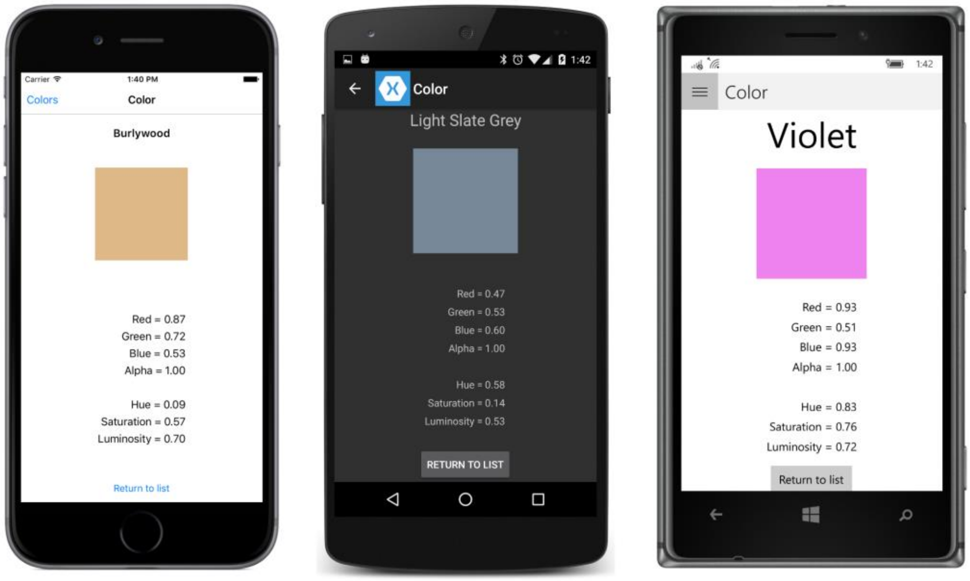
```
<MasterDetailPage … >
    …
    <MasterDetailPage.Detail>
        <NavigationPage>
            <x:Arguments>
                <ContentPage Title="Color"
                             BindingContext="{Binding Source={x:Reference listView},
                                                      Path=SelectedItem}">
                    <ContentPage.Padding>
                        <OnPlatform x:TypeArguments="Thickness"
                                    iOS="0, 20, 0, 0" />
                    </ContentPage.Padding>

                    <StackLayout>
                        <Label Text="{Binding FriendlyName}"
                               Style="{DynamicResource TitleStyle}"
```

```
               HorizontalTextAlignment="Center" />

        <ScrollView VerticalOptions="FillAndExpand">
            <StackLayout>
                <BoxView Color="{Binding Color}"
                         WidthRequest="144"
                         HeightRequest="144"
                         VerticalOptions="CenterAndExpand"
                         HorizontalOptions="Center" />

                <StackLayout VerticalOptions="CenterAndExpand"
                             HorizontalOptions="Center">
                    <StackLayout.Resources>
                        <ResourceDictionary>
                            <Style TargetType="Label">
                                <Setter Property="HorizontalTextAlignment"
                                        Value="End" />
                            </Style>
                        </ResourceDictionary>
                    </StackLayout.Resources>

                    <Label Text="{Binding Color.R,
                                          StringFormat='Red = {0:F2}'}" />
                    <Label Text="{Binding Color.G,
                                          StringFormat='Green = {0:F2}'}" />
                    <Label Text="{Binding Color.B,
                                          StringFormat='Blue = {0:F2}'}" />
                    <Label Text="{Binding Color.A,
                                          StringFormat='Alpha = {0:F2}'}" />
                    <Label Text=" " />
                    <Label Text="{Binding Color.Hue,
                                          StringFormat='Hue = {0:F2}'}" />
                    <Label Text="{Binding Color.Saturation,
                                          StringFormat='Saturation = {0:F2}'}" />
                    <Label Text="{Binding Color.Luminosity,
                                          StringFormat='Luminosity = {0:F2}'}" />
                </StackLayout>
            </StackLayout>
        </ScrollView>

        <Button x:Name="returnButton"
                Text="Return to list"
                HorizontalOptions="Center"
                Clicked="OnReturnButtonClicked">
            <Button.IsEnabled>
                <Binding Source="{x:Reference page}"
                         Path="IsPresented">
                    <Binding.Converter>
                        <toolkit:BooleanNegationConverter />
                    </Binding.Converter>
                </Binding>
            </Button.IsEnabled>
        </Button>
    </StackLayout>
```

```
                </ContentPage>
            </x:Arguments>
        </NavigationPage>
    </MasterDetailPage.Detail>
</MasterDetailPage>
```

The `Button` on the bottom has a `Clicked` event handler in the code-behind file, of course, but also notice the data binding to its `IsEnabled` property. The source of the data binding is the `IsPresented` property of the `MasterDetailPage`. If `IsPresented` is `true`—which means that master view is displayed—then the `Button` is disabled. (If you'd like to do something similar in code, `MasterDetailPage` defines an `IsPresentedChanged` event.)

You can see the `Button` at the bottom of the detail view for returning to the master view:



Burlywood

Red = 0.87
Green = 0.72
Blue = 0.53
Alpha = 1.00

Hue = 0.09
Saturation = 0.57
Luminosity = 0.70

Return to list

Light Slate Grey

Red = 0.47
Green = 0.53
Blue = 0.60
Alpha = 1.00

Hue = 0.58
Saturation = 0.14
Luminosity = 0.53

RETURN TO LIST

Violet

Red = 0.93
Green = 0.51
Blue = 0.93
Alpha = 1.00

Hue = 0.83
Saturation = 0.76
Luminosity = 0.72

Return to list

The code-behind file handles the event handlers for the `ListView` and `Button` (toward the bottom of the file). These merely set the `IsPresented` property to `false` and `true`, respectively, and have no effect when the `MasterDetailPage` is in *split* mode:

```
public partial class ColorDetailsPage : MasterDetailPage
{
    public ColorDetailsPage()
    {
        InitializeComponent();

        IsGestureEnabled = false;

        // Special processing for iPads.
        if (Device.OS == TargetPlatform.iOS &&
            Device.Idiom == TargetIdiom.Tablet)
        {
            SizeChanged += (sender, args) =>
            {
                // Enable button for portrait mode.
                returnButton.IsVisible = Height > Width;
            };
        }
    }

    public override bool ShouldShowToolbarButton()
    {
        // Only works for Windows and Windows Phone platforms.
        returnButton.IsVisible = base.ShouldShowToolbarButton();

        return false;
    }

    void OnListViewItemTapped(object sender, ItemTappedEventArgs args)
    {
        IsPresented = false;
    }

    void OnReturnButtonClicked(object sender, EventArgs args)
    {
        IsPresented = true;
    }
}
```

The more interesting parts of the code-behind file are in the constructor and the override of the ShouldShowToolbarButton. These sections of code attempt two jobs:

First, they disable the existing user interface for switching between master and detail views by setting IsGestureEnabled to false and returning false from ShouldShowToolbarButton. This means that no toolbar item is displayed on the Windows 8.1 and Windows Phone 8.1 platforms. The MasterDetailPage still requires that a Title be set on the ContentPage that serves as the master view, but that Title is not used anywhere on these platforms.

The second job is to hide that Button entirely when the MasterDetailPage is in split view. The SizeChanged handler for the page is set in the constructor when the program is running on an iPad, and it sets the IsVisible property to true only if the page dimensions indicate portrait mode. The ShouldShowToolbarButton override handles Windows tablets by showing the Button if the base implementation of ShouldShowToolbarButton returns true.

That's one way to implement your own user interface for switching between master and detail views. The **MasterDetailTaps** program shows another approach. This program is similar to the **MasterDetailBehavior** program that began this chapter, but with the definitions of the master and detail views consolidated in one XAML file. This new program disables the existing UI for transitioning between master and detail views and replaces it with simple taps.

MasterDetailTapsPage derives from MasterDetailPage and includes similar Frame and Label elements as the earlier program:

```
<MasterDetailPage xmlns="http://xamarin.com/schemas/2014/forms"
                  xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
                  x:Class="MasterDetailTaps.MasterDetailTapsPage"
                  Title="Demo Page">

    <MasterDetailPage.Master>
        <ContentPage Title="Master"
                     Padding="10"
                     x:Name="masterPage">

            <Frame OutlineColor="Accent"
                   BackgroundColor="Transparent">
                <Frame.GestureRecognizers>
                    <TapGestureRecognizer Tapped="OnMasterTapped" />
                </Frame.GestureRecognizers>

                <StackLayout Orientation="Horizontal"
                             Spacing="0"
                             HorizontalOptions="Center"
                             VerticalOptions="Center">

                    <Label Text="{Binding Source={x:Reference masterPage},
                                          Path=Width,
                                          StringFormat='Master: {0:F0}'}"
                           FontSize="Large" />

                    <Label Text="{Binding Source={x:Reference masterPage},
                                          Path=Height,
                                          StringFormat=' &#x00D7; {0:F0}'}"
                           FontSize="Large" />
                </StackLayout>
            </Frame>
        </ContentPage>
    </MasterDetailPage.Master>

    <MasterDetailPage.Detail>
        <NavigationPage>
            <x:Arguments>
                <ContentPage Title="Detail"
                             Padding="10"
                             x:Name="detailPage">
                    <ContentPage.Padding>
                        <OnPlatform x:TypeArguments="Thickness"
                                    iOS="0, 20, 0, 0" />
                    </ContentPage.Padding>

                    <Frame OutlineColor="Accent"
                           BackgroundColor="Transparent">
                        <Frame.GestureRecognizers>
                            <TapGestureRecognizer Tapped="OnDetailTapped" />
                        </Frame.GestureRecognizers>

                        <StackLayout Orientation="Horizontal"
                                     Spacing="0"
                                     VerticalOptions="CenterAndExpand"
                                     HorizontalOptions="Center">
                            <Label Text="{Binding Source={x:Reference detailPage},
                                                  Path=Width,
                                                  StringFormat='Detail: {0:F0}'}"
                                   FontSize="Large"/>

                            <Label Text="{Binding Source={x:Reference detailPage},
                                                  Path=Height,
                                                  StringFormat=' &#x00D7; {0:F0}'}"
                                   FontSize="Large" />
                        </StackLayout>
                    </Frame>
                </ContentPage>
            </x:Arguments>
        </NavigationPage>
    </MasterDetailPage.Detail>
</MasterDetailPage>
```

Notice the `TapGestureRecognizer` attached to the `Frame` element on both the master and detail pages.

Notice also that the `BackgroundColor` of each `Frame` is set to `Transparent`. This is for the benefit of the Windows platforms. The default background of a `Frame` in these platforms is `null`, which lets taps fall through to the underlying element. Setting the background to `Transparent` doesn't change the appearance but captures the taps.

The `Tapped` handlers simply set `IsPresented`:

```
public partial class MasterDetailTapsPage : MasterDetailPage
{
    public MasterDetailTapsPage()
    {
        InitializeComponent();

        // Disable swipe interface.
        IsGestureEnabled = false;
    }

    public override bool ShouldShowToolbarButton()
    {
        // Hide toolbar button on Windows platforms.
        return false;
    }

    void OnMasterTapped(object sender, EventArgs args)
    {
        // Catch exceptions when setting IsPresented in split mode.
        try
        {
            IsPresented = false;
        }
        catch
```

```
            {
            }
        }

        void OnDetailTapped(object sender, EventArgs args)
        {
            IsPresented = true;
        }
    }
```

The normal user interface is disabled as in the previous program but no logic is required to hide the new user interface in *split* mode.

The `try` and `catch` block in the `OnMasterTapped` method is used to avoid an `InvalidOperationException` that occurs on both Windows and iPads in split mode. The error message that accompanies the exception states "Can't change IsPresented when setting Split."

TabbedPage

`TabbedPage` derives from the abstract class `MultiPage<Page>`. It maintains a collection of children of type `Page`, only one of which is fully visible at a time. `TabbedPage` identifies each child by a series of tabs across the top or bottom of the page. An iOS application that uses a `TabbedPage` must include an icon for each tab; otherwise, Apple will not accept the program for the App Store. This icon is set via each page's `Icon` property.

`MultiPage<T>` defines all the important properties and events for `TabbedPage`, the most important of which is:

- `Children` property of type `IList<T>`.

Normally, you fill this `Children` collection with page objects.

However, you can use `TabbedPage` in a somewhat different way by observing that `MultiPage<T>` is quite similar to `ItemsView<T>`, the base class of `ListView`, in that it defines:

- the `ItemsSource` property of type `IEnumerable`, and
- the `ItemTemplate` property of type `DataTemplate`.

If you supply an `IEnumerable` collection of objects with public properties suitable for data bindings, and a template with a page type as the root element, then the children are generated dynamically. The `BindingContext` of each generated page is set equal to the particular object from `ItemsSource`.

`MultiPage<T>` defines two properties that can help your application keep track of which page in the `Children` collection the user is currently viewing:

- `CurrentPage` of type `T` (`Page` for `TabbedPage`).

- SelectedItem of type object, referring to an object in the ItemsSource collection.

Both properties are gettable and settable.

MultiPage<T> also defines two events:

- PagesChanged is fired when the ItemsSource collection changes
- CurrentPageChanged is fired when the viewed page changes.

Most commonly, you'll add ContentPage derivatives directly to the Children collection. If you want to use TabbedPage for displaying a collection of similar pages based on a collection of data, you can alternatively set the ItemsSource property to that collection and define a page by using ItemTemplate, but this approach should be avoided on iOS.

Discrete tab pages

The most common use of TabbedPage is to navigate between different functions within an app, which typically means each tab presents a different type of page. It is common for these pages to be related in some way—perhaps multiple pages for application settings—even if they don't look the same.

The **DiscreteTabbedColors** program has three tabs: the first displaying a list of the built-in Xamarin.Forms colors, the second displaying a list of colors from the NamedColor class in the **Xamarin.FormsBook.Toolkit** (introduced in earlier chapters), and the third containing a color-tester (with which you can select arbitrary RGB values to preview).

The **DiscreteTabbedColors** program begins with three ContentPage derivatives. The first is code-only and consists of a simple list of the standard Xamarin.Forms colors.

```
class BuiltInColorsPage : ContentPage
{
    public BuiltInColorsPage()
    {
        Title = "Built-in";
        Icon = Device.OnPlatform("ic_action_computer.png", null, null);
        Padding = new Thickness(5, Device.OnPlatform(20, 5, 5), 5, 5);
        double fontSize = Device.GetNamedSize(NamedSize.Large, typeof(Label));
        Content = new ScrollView
        {
            Content = new StackLayout
            {
                Spacing = 0,
                Children =
                {
                    new Label
                    {
                        Text = "White",
                        TextColor = Color.White,
                        FontSize = fontSize
                    },
                    …

                    new Label
                    {
                        Text = "Purple",
                        TextColor = Color.Purple,
                        FontSize = fontSize
                    }
                }
            }
        };
    }
}
```

Notice that the `Title` property is set. This is essential for the tab text on all the platforms. The code also sets the `Icon` property for iOS. The particular icon is part of the Android set of icons described in Chapter 13, "Bitmaps," and is 32-pixels square.

The `NamedColorsPage` consists of a `ListView` of all the `NamedColor` objects. Notice again the `Title` property and `Icon` property for iOS:

```
<ContentPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             xmlns:toolkit=
                "clr-namespace:Xamarin.FormsBook.Toolkit;assembly=Xamarin.FormsBook.Toolkit"
             x:Class="DiscreteTabbedColors.NamedColorsPage"
             Title="Toolkit">
    <ContentPage.Icon>
        <OnPlatform x:TypeArguments="FileImageSource"
                    iOS="ic_action_storage.png" />
    </ContentPage.Icon>

    <ListView ItemsSource="{x:Static toolkit:NamedColor.All}">
        <ListView.RowHeight>
            <OnPlatform x:TypeArguments="x:Int32"
                        iOS="80"
                        Android="80"
                        WinPhone="90" />
        </ListView.RowHeight>

        <ListView.ItemTemplate>
            <DataTemplate>
                <ViewCell>
                    <ContentView Padding="5">
                        <StackLayout Orientation="Horizontal">
                            <BoxView x:Name="boxView"
                                     Color="{Binding Color}"
                                     WidthRequest="50"
                                     HeightRequest="50" />
                            <StackLayout>
                                <Label Text="{Binding Name}"
                                       FontSize="Medium"
                                       VerticalOptions="StartAndExpand" />
                                <Label Text="{Binding RgbDisplay, StringFormat='RGB = {0}'}"
```

```
                                             FontSize="Small"
                                             VerticalOptions="CenterAndExpand" />
                                </StackLayout>
                            </StackLayout>
                        </ContentView>
                    </ViewCell>
                </DataTemplate>
            </ListView.ItemTemplate>
    </ListView>
</ContentPage>
```

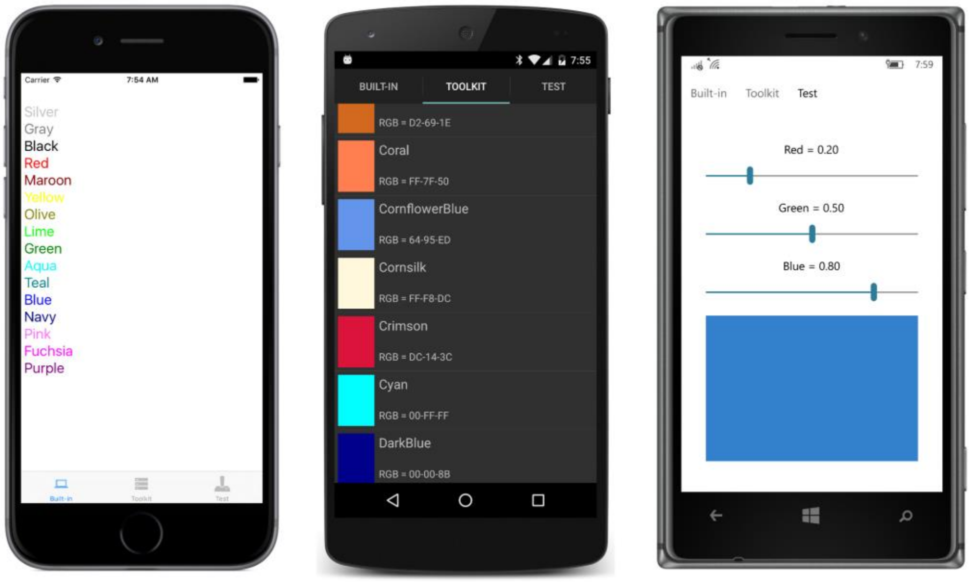
The third page contains a trio of `Slider` elements to select a color, such as you've seen before:

```
<ContentPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             xmlns:toolkit=
                "clr-namespace:Xamarin.FormsBook.Toolkit;assembly=Xamarin.FormsBook.Toolkit"
             x:Class="DiscreteTabbedColors.ColorTestPage"
            Title="Test">
    <ContentPage.Icon>
        <OnPlatform x:TypeArguments="FileImageSource"
                    iOS="ic_action_gamepad.png" />
    </ContentPage.Icon>

    <StackLayout Padding="20, 40">
        <StackLayout.BindingContext>
            <toolkit:ColorViewModel Color="Gray" />
        </StackLayout.BindingContext>

        <Label Text="{Binding Red, StringFormat='Red = {0:F2}'}"
               HorizontalOptions="Center" />

        <Slider Value="{Binding Red}" />

        <Label Text="{Binding Green, StringFormat='Green = {0:F2}'}"
               HorizontalOptions="Center" />

        <Slider Value="{Binding Green}" />

        <Label Text="{Binding Blue, StringFormat='Blue = {0:F2}'}"
               HorizontalOptions="Center" />

        <Slider Value="{Binding Blue}" />

        <BoxView Color="{Binding Color}"
                 VerticalOptions="FillAndExpand" />
  </StackLayout>
</ContentPage>
```

Here's the `DiscreteTabbedColorsPage`. Notice the root element of `TabbedPage`. This XAML file simply adds instances of these three page types to the `Children` collection of the `TabbedPage`:

```
<TabbedPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             xmlns:local="clr-namespace:DiscreteTabbedColors"
             x:Class="DiscreteTabbedColors.DiscreteTabbedColorsPage">

    <local:BuiltInColorsPage />
    <local:NamedColorsPage />
    <local:ColorTestPage />

</TabbedPage>
```

Here are the three tabs on the three platforms:



On iOS, the tabs are at the bottom, identified with text and icons, and the selected tab is highlighted. Both Android and Windows 10 Mobile display the tabs at the top of the screen but highlight the selected tab in different ways.

The **StudentNotes** program has a home page that lists all the students in a `ListView`, but selecting a student from this list causes the program to navigate to a `TabbedPage`. The page has three tabs: the first displays textual information about the student, the second displays the photograph of the student, and the third displays an `Editor` that allows a teacher or other school administrator to enter some notes about the student. (This feature makes use of the `Notes` property in the `Student` class in the **SchoolOfFineArt** library.)

The `App` class in the **StudentNotes** program passes the `Properties` dictionary defined by `Application` to the `SchoolViewModel` constructor, and also passes the `Properties` dictionary to the `SaveNotes` method of the ViewModel when the program goes to sleep, possibly in preparation for being terminated:

```
public class App : Application
{
    public App()
    {
        ViewModel = new SchoolViewModel(Properties);

        MainPage = new NavigationPage(new StudentNotesHomePage());
    }

    public SchoolViewModel ViewModel
    {
        private set; get;
    }

    protected override void OnStart()
    {
        // Handle when your app starts
    }

    protected override void OnSleep()
    {
        ViewModel.SaveNotes(Properties);
    }

    protected override void OnResume()
    {
        // Handle when your app resumes
    }
}
```

The home page should look familiar by now. It simply displays all the students in a `ListView`:

```
<ContentPage xmlns="http://xamarin.com/schemas/2014/forms"
             xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
             xmlns:local="clr-namespace:StudentNotes;assembly=StudentNotes"
             x:Class="StudentNotes.StudentNotesHomePage"
             Title="Students"
             BindingContext="{Binding Source={x:Static Application.Current},
                                      Path=ViewModel}">

    <StackLayout BindingContext="{Binding StudentBody}">
        <Label Text="{Binding School}"
               FontSize="Large"
               FontAttributes="Bold"
               HorizontalTextAlignment="Center" />

        <ListView x:Name="listView"
                  ItemsSource="{Binding Students}"
                  ItemSelected="OnListViewItemSelected">
            <ListView.ItemTemplate>
                <DataTemplate>
                    <ImageCell ImageSource="{Binding PhotoFilename}"
                               Text="{Binding FullName}"
                               Detail="{Binding GradePointAverage,
                                                StringFormat='G.P.A. = {0:F2}'}" />
                </DataTemplate>
            </ListView.ItemTemplate>
        </ListView>
    </StackLayout>
</ContentPage>
```

The code-behind file contains the `ItemSelected` handler for the `ListView` to navigate to `StudentNotesDataPage`, setting the page's `BindingContext` to the selected `Student` object:

```
public partial class StudentNotesHomePage : ContentPage
{
    public StudentNotesHomePage()
    {
        InitializeComponent();
    }

    async void OnListViewItemSelected(object sender, SelectedItemChangedEventArgs args)
    {
        if (args.SelectedItem != null)
        {
            listView.SelectedItem = null;

            await Navigation.PushAsync(new StudentNotesDataPage
            {
                BindingContext = args.SelectedItem
            });
        }
    }
}
```

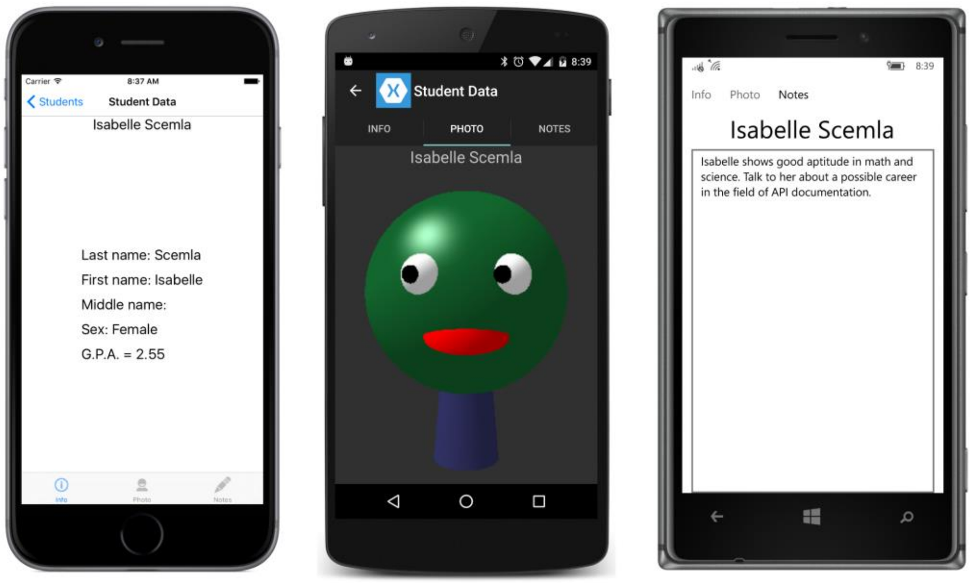
The `StudentNotesDataPage` derives from `TabbedPage`. Within the start and end tags of the `TabbedPage`, three `ContentPage` definitions are added to the `Children` property of `TabbedPage`. Each has its `Title` property set to the text to use in the tab, and `Icon` definitions are included for iOS:

```
<TabbedPage xmlns="http://xamarin.com/schemas/2014/forms"
            xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
            x:Class="StudentNotes.StudentNotesDataPage"
            Title="Student Data">

    <ContentPage Title="Info">
        <ContentPage.Icon>
            <OnPlatform x:TypeArguments="FileImageSource"
                        iOS="ic_action_about.png" />
        </ContentPage.Icon>

        <StackLayout>
            <Label Text="{Binding FullName}"
                   FontSize="Large"
                   HorizontalOptions="Center" />

            <StackLayout Spacing="12"
                         VerticalOptions="CenterAndExpand"
                         HorizontalOptions="Center">
                <StackLayout.Resources>
                    <ResourceDictionary>
                        <Style TargetType="Label">
                            <Setter Property="FontSize" Value="Large" />
                        </Style>
                    </ResourceDictionary>
                </StackLayout.Resources>

                <Label Text="{Binding LastName,
                                      StringFormat='Last name: {0}'}" />

                <Label Text="{Binding FirstName,
                                      StringFormat='First name: {0}'}" />

                <Label Text="{Binding MiddleName,
                                      StringFormat='Middle name: {0}'}" />

                <Label Text="{Binding Sex,
                                      StringFormat='Sex: {0}'}" />

                <Label Text="{Binding GradePointAverage,
                                      StringFormat='G.P.A. = {0:F2}'}" />
            </StackLayout>
        </StackLayout>
    </ContentPage>

    <ContentPage Title="Photo">
        <ContentPage.Icon>
            <OnPlatform x:TypeArguments="FileImageSource"
                        iOS="ic_action_person.png" />
        </ContentPage.Icon>

        <StackLayout>
            <Label Text="{Binding FullName}"
                   FontSize="Large"
                   HorizontalOptions="Center" />

            <Image Source="{Binding PhotoFilename}"
                   VerticalOptions="FillAndExpand" />
        </StackLayout>
    </ContentPage>

    <ContentPage Title="Notes">
        <ContentPage.Icon>
            <OnPlatform x:TypeArguments="FileImageSource"
                        iOS="ic_action_edit.png" />
        </ContentPage.Icon>

        <StackLayout>
            <Label Text="{Binding FullName}"
                   FontSize="Large"
                   HorizontalOptions="Center" />

            <Editor Text="{Binding Notes}"
                    Keyboard="Text"
                    VerticalOptions="FillAndExpand" />
        </StackLayout>
    </ContentPage>
```

```
</TabbedPage>
```

This is perhaps not enough information to spread over three pages, but you can easily imagine situations where this approach would be ideal.

Here's how the three tabs look on the three platforms:



Isabelle Scemla

Last name: Scemla
First name: Isabelle
Middle name:
Sex: Female
G.P.A. = 2.55

Isabelle Scemla

Isabelle Scemla

Isabelle shows good aptitude in math and science. Talk to her about a possible career in the field of API documentation.

You can navigate back to the list of students in the normal way: By tapping the left arrow at the top of the screen on iOS and Android, or by pressing the **Back** arrow at the bottom of the screen on Android and Windows 10 Mobile.

Using an ItemTemplate

The `TabbedPage` can also be used to present a small data set, each item of which is a separate page identified by a tab. You do this by setting the `ItemsSource` property of `TabbedPage` and specifying an `ItemTemplate` for rendering each page.

The **MultiTabbedColors** project contains a single page class that was added to the project as a `ContentPage`, but which was then modified to be a `TabbedPage`. The project also has a reference to the **Xamarin.FormsBook.Toolkit** library.

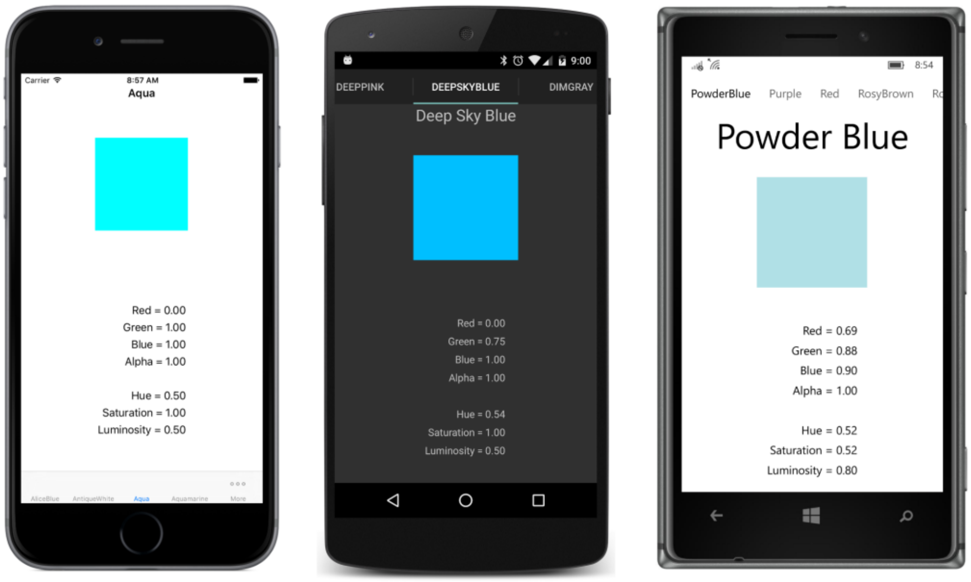
Notice that the root element of the XAML file sets the `ItemsSource` property of `TabbedPage` to the collection available from the `NamedColor.All` static property. The remainder of the file defines the `ItemTemplate` property. The `TabbedPage.ItemTemplate` property-element tags enclose a pair of `DataTemplate` tags, in which a page definition appears, beginning with `ContentPage`. The data bindings reference properties of the objects in the `ItemsSource` collection, in this case properties of `NamedColor`:

```
<TabbedPage xmlns="http://xamarin.com/schemas/2014/forms"
            xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
            xmlns:toolkit=
                "clr-namespace:Xamarin.FormsBook.Toolkit;assembly=Xamarin.FormsBook.Toolkit"
            x:Class="MultiTabbedColors.MultiTabbedColorsPage"
            ItemsSource="{x:Static toolkit:NamedColor.All}">

    <TabbedPage.ItemTemplate>
        <DataTemplate>
            <ContentPage Title="{Binding Name}">
                <ContentPage.Padding>
                    <OnPlatform x:TypeArguments="Thickness"
                                iOS="0, 20, 0, 0" />
                </ContentPage.Padding>

                <StackLayout>
                    <Label Text="{Binding FriendlyName}"
                           Style="{DynamicResource TitleStyle}"
                           HorizontalTextAlignment="Center" />

                    <ScrollView VerticalOptions="FillAndExpand">
                        <StackLayout>
                            <BoxView Color="{Binding Color}"
                                     WidthRequest="144"
                                     HeightRequest="144"
                                     VerticalOptions="CenterAndExpand"
                                     HorizontalOptions="Center" />

                            <StackLayout VerticalOptions="CenterAndExpand"
                                         HorizontalOptions="Center">
                                <StackLayout.Resources>
                                    <ResourceDictionary>
                                        <Style TargetType="Label">
                                            <Setter Property="HorizontalTextAlignment"
                                                    Value="End" />
                                        </Style>
                                    </ResourceDictionary>
                                </StackLayout.Resources>

                                <Label Text="{Binding Color.R,
                                                      StringFormat='Red = {0:F2}'}" />
                                <Label Text="{Binding Color.G,
                                                      StringFormat='Green = {0:F2}'}" />
                                <Label Text="{Binding Color.B,
                                                      StringFormat='Blue = {0:F2}'}" />
                                <Label Text="{Binding Color.A,
                                                      StringFormat='Alpha = {0:F2}'}" />
                                <Label Text=" " />
                                <Label Text="{Binding Color.Hue,
                                                      StringFormat='Hue = {0:F2}'}" />
                                <Label Text="{Binding Color.Saturation,
                                                      StringFormat='Saturation = {0:F2}'}" />
                                <Label Text="{Binding Color.Luminosity,
                                                      StringFormat='Luminosity = {0:F2}'}" />
                            </StackLayout>
                        </StackLayout>
                    </ScrollView>
                </StackLayout>
            </ContentPage>
        </DataTemplate>
    </TabbedPage.ItemTemplate>
</TabbedPage>
```

To avoid overwriting the status bar at the top of the iOS screen, set `Padding` on the `ContentPage` template rather than on the `TabbedPage` itself.

Set the `Title` property of this `ContentPage` template to the text you want to appear in the tabs to identify each page. Notice that the `Title` is bound to the `Name` property of `NamedColor`, but the contents of the page also include a `Label` with a `TitleStyle` to display the `FriendlyName` property, which is similar to the `Name` property but includes spaces if the color name consists of multiple words.

Here is **TabbedColors** running on the three standard platforms:



```
Red = 0.00
Green = 1.00
Blue = 1.00
Alpha = 1.00

Hue = 0.50
Saturation = 1.00
Luminosity = 0.50
```

Deep Sky Blue

```
Red = 0.00
Green = 0.75
Blue = 1.00
Alpha = 1.00

Hue = 0.54
Saturation = 1.00
Luminosity = 0.50
```

Powder Blue

```
Red = 0.69
Green = 0.88
Blue = 0.90
Alpha = 1.00

Hue = 0.52
Saturation = 0.52
Luminosity = 0.80
```

The tabs function like a menu that allow you to select a particular page.

The good news is that this works great on Android and Windows 10 Mobile. You can scroll quickly through the headers on the top of the Android screen, and swipe the actual pages on Windows 10 Mobile.

On iOS, however, only four items are displayed, and the **more** button and the ellipsis do not work. Moreover, there are no icons, and you need icons on a `TabbedPage` for Apple to approve the app for the App Store. While this facility of `TabbedPage` appears to be quite an interesting way to generate pages, it's not suitable for a cross-platform application. More suitable would be the `CarouselView`, which unfortunately was not quite ready by the time this book went to print.