tutorial

Windows App SDK

Custom ComboBox

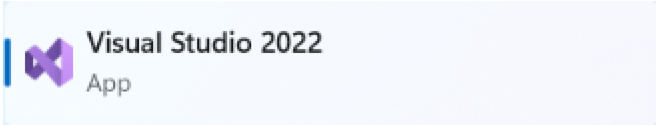
Custom ComboBox

Custom ComboBox shows how to create a **Style** for a **ComboBox** using **Windows App SDK**

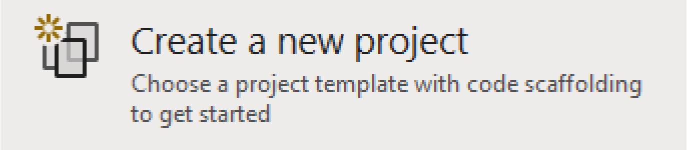
Step 1

Follow **Setup and Start** on how to get **Setup** and **Install** what you need for **Visual Studio 2022** and **Windows App SDK**.

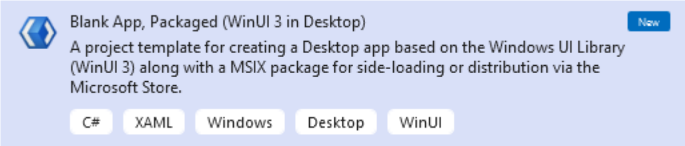
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.


Visual Studio 2022
App

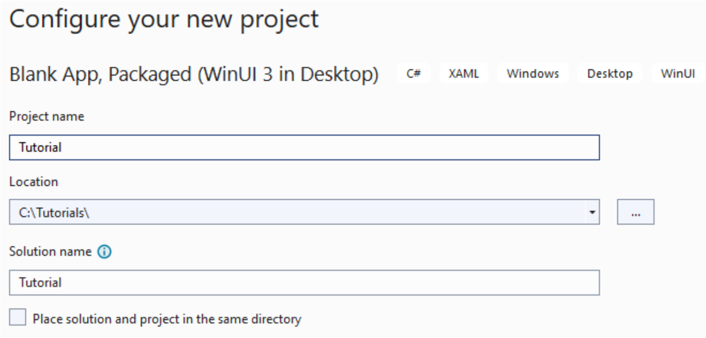
Once **Visual Studio 2022** has started select **Create a new project**.


Create a new project
Choose a project template with code scaffolding to get started

Then choose the **Blank App, Packages (WinUI in Desktop)** and then select **Next**.


Blank App, Packaged (WinUI 3 in Desktop) New
A project template for creating a Desktop app based on the Windows UI Library (WinUI 3) along with a MSIX package for side-loading or distribution via the Microsoft Store.
C# XAML Windows Desktop WinUI

After that in **Configure your new project** type in the **Project name** as *CustomComboBox*, then select a Location and then select **Create** to start a new **Solution**.


Configure your new project

Blank App, Packaged (WinUI 3 in Desktop) C# XAML Windows Desktop WinUI

Project name
Tutorial

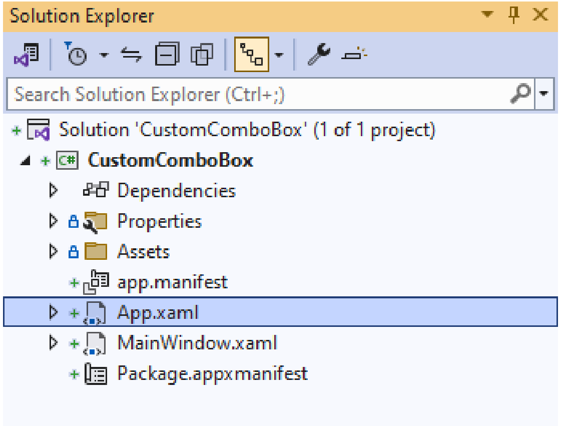
Location
C:\Tutorials\

Solution name
Tutorial

□ Place solution and project in the same directory

Step 2

Then in **Visual Studio** within **Solution Explorer** for the **Solution** double-click on **App.xaml** to see the **XAML** for the **Project**.


Solution Explorer

Search Solution Explorer (Ctrl+;)

Solution 'CustomComboBox' (1 of 1 project)
CustomComboBox
Dependencies
Properties
Assets
app.manifest
App.xaml
MainWindow.xaml
Package.appxmanifest

Step 3

In the **XAML** for **App.xaml** below the **Comment** of **`<!-- Other app resources here -->`** type in the following **XAML** for the **`Style`** of **`CustomComboBox`** that will be used to target a **`ComboBox`**:

```
<Style x:Key="CustomComboBox" TargetType="ComboBox">
    <!-- Setters -->
    <Setter Property="Template">
        <Setter.Value>
            <ControlTemplate TargetType="ComboBox">
                <Grid x:Name="LayoutRoot">
                    <Grid.Resources>
                        <!-- Resources -->

                    </Grid.Resources>
                    <Grid.ColumnDefinitions>
                        <ColumnDefinition Width="*"/>
                        <ColumnDefinition Width="32"/>
                    </Grid.ColumnDefinitions>
                    <Grid.RowDefinitions>
                        <RowDefinition Height="Auto"/>
                        <RowDefinition Height="*"/>
                    </Grid.RowDefinitions>
                    <VisualStateManager.VisualStateGroups>
                        <VisualStateGroup x:Name="CommonStates">
                            <!-- Visual State Normal, Pointer Over & Pressed -->

                            <!-- Visual State Disabled -->

                        </VisualStateGroup>
                        <VisualStateGroup x:Name="FocusStates">
                            <!-- Visual State Focused -->

                            <!-- Visual State Focused Pressed-->

                            <!-- Unfocused, Pointer Focused & Focused Drop Down -->

                        </VisualStateGroup>
                        <!-- Visual State Group Drop Down States -->

                    </VisualStateManager.VisualStateGroups>
                    <!-- Content -->

                    <!-- Popup -->

                </Grid>
            </ControlTemplate>
        </Setter.Value>
    </Setter>
</Style>
```

Step 4

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Setters -->`** type the following **XAML**:

```
<Setter Property="Padding" Value="12,5,0,7"/>
<Setter Property="MinWidth" Value="{ThemeResource ComboBoxThemeMinWidth}"/>
<Setter Property="Foreground" Value="Gold"/>
<Setter Property="Background" Value="{ThemeResource ComboBoxBackground}"/>
<Setter Property="BorderBrush" Value="{ThemeResource ComboBoxBorderBrush}"/>
<Setter Property="BorderThickness"
Value="{ThemeResource ComboBoxBorderThemeThickness}"/>
<Setter Property="TabNavigation" Value="Once"/>
<Setter Property="ScrollViewer.HorizontalScrollBarVisibility" Value="Disabled"/>
<Setter Property="ScrollViewer.VerticalScrollBarVisibility" Value="Auto"/>
<Setter Property="ScrollViewer.HorizontalScrollMode" Value="Disabled"/>
<Setter Property="ScrollViewer.VerticalScrollMode" Value="Auto"/>
<Setter Property="ScrollViewer.IsVerticalRailEnabled" Value="True"/>
<Setter Property="ScrollViewer.IsDeferredScrollingEnabled" Value="False"/>
<Setter Property="ScrollViewer.BringIntoViewOnFocusChange" Value="True"/>
<Setter Property="HorizontalContentAlignment" Value="Stretch"/>
<Setter Property="HorizontalAlignment" Value="Left"/>
<Setter Property="VerticalAlignment" Value="Top"/>
<Setter Property="FontFamily"
Value="{ThemeResource ContentControlThemeFontFamily}"/>
<Setter Property="FontSize"
Value="{ThemeResource ControlContentThemeFontSize}"/>
<Setter Property="ItemsPanel">
    <Setter.Value>
        <ItemsPanelTemplate>
            <CarouselPanel/>
        </ItemsPanelTemplate>
    </Setter.Value>
</Setter>
```

This **XAML** is for the **Setters** for the **Properties** of the **`ComboBox`** used in the **Custom ComboBox**.

Step 5

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Resources -->`** type the following **XAML**:

```
<Storyboard x:Key="OverlayOpeningAnimation">
    <DoubleAnimationUsingKeyFrames
        Storyboard.TargetProperty="Opacity">
        <DiscreteDoubleKeyFrame
        KeyTime="0:0:0" Value="0.0"/>
        <SplineDoubleKeyFrame
        KeySpline="0.1,0.9 0.2,1.0"
        KeyTime="0:0:0.383" Value="1.0"/>
    </DoubleAnimationUsingKeyFrames>
</Storyboard>
<Storyboard x:Key="OverlayClosingAnimation">
    <DoubleAnimationUsingKeyFrames
        Storyboard.TargetProperty="Opacity">
        <DiscreteDoubleKeyFrame
        KeyTime="0:0:0" Value="1.0"/>
        <SplineDoubleKeyFrame
        KeySpline="0.1,0.9 0.2,1.0"
        KeyTime="0:0:0.216" Value="0.0"/>
    </DoubleAnimationUsingKeyFrames>
</Storyboard>
```

This **XAML** is for the **Resources** for two sets of **`Storyboard`** for **Animations** for the **`ComboBox`** used in the **Custom ComboBox**.

Step 6

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Visual State Normal, Pointer Over & Pressed -->`** type the following **XAML**:

```
<VisualState x:Name="Normal"/>
<VisualState x:Name="PointerOver">
    <Storyboard>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Background"
            Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxBackgroundPointerOver}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="BorderBrush"
            Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0" Value="GoldenRod"/>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
<VisualState x:Name="Pressed">
    <Storyboard>
        <ObjectAnimationUsingKeyFrames
        Storyboard.TargetProperty="Background"
        Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0"
        Value="{ThemeResource ComboBoxBackgroundPressed}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
        Storyboard.TargetProperty="BorderBrush"
        Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0"
        Value="{ThemeResource ComboBoxBorderBrushPressed}"/>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
```

This **XAML** is for the **Visual States** that will represent the **States** of **`Normal`**, **`PointerOver`** and **`Pressed`** for the **ComboBox** used in the **Custom ComboBox**.

Step 7

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Visual State Disabled -->`** type the following **XAML**:

```
<VisualState x:Name="Disabled">
    <Storyboard>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Background"
            Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxBackgroundDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="BorderBrush"
            Storyboard.TargetName="Background">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxBorderBrushDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="HeaderContentPresenter">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="ContentPresenter">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="PlaceholderTextBlock">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="DropDownGlyph">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxDropDownGlyphForegroundDisabled}"/>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
```

This **XAML** is for the **Visual State** that will represent the **State** of **`Disabled`** for the **ComboBox** used in the **Custom ComboBox**.

Step 8

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Visual State Focused -->`** type the following **XAML**:

```
<VisualState x:Name="Focused">
    <Storyboard>
        <DoubleAnimation Duration="0" To="1"
        Storyboard.TargetProperty="Opacity"
        Storyboard.TargetName="HighlightBackground"/>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="BorderBrush"
            Storyboard.TargetName="HighlightBackground">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxBackgroundBorderBrushFocused}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="ContentPresenter">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundFocused}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="PlaceholderTextBlock">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundFocused}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="DropDownGlyph">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxDropDownGlyphForegroundFocused}"/>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
```

This **XAML** is for the **Visual State** that will represent the **State** of **`Focused`** for the **`ComboBox`** used in the **Custom ComboBox**.

Step 9

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Visual State Focused Pressed -->`** type the following **XAML**:

```xml
<VisualState x:Name="FocusedPressed">
    <Storyboard>
        <DoubleAnimation Duration="0" To="1"
        Storyboard.TargetProperty="Opacity"
        Storyboard.TargetName="HighlightBackground"/>
        <ObjectAnimationUsingKeyFrames
        Storyboard.TargetProperty="Foreground"
        Storyboard.TargetName="ContentPresenter">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxForegroundFocusedPressed}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="PlaceholderTextBlock">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxPlaceHolderForegroundFocusedPressed}"/>
        </ObjectAnimationUsingKeyFrames>
        <ObjectAnimationUsingKeyFrames
            Storyboard.TargetProperty="Foreground"
            Storyboard.TargetName="DropDownGlyph">
            <DiscreteObjectKeyFrame KeyTime="0"
            Value="{ThemeResource ComboBoxDropDownGlyphForegroundFocusedPressed}"/>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
```

This **XAML** is for the **Visual State** that will represent the **State** of **`FocusedPressed`** for the **`ComboBox`** used in the **Custom ComboBox**.

Step 10

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Unfocused, Pointer Focused & Focused Drop Down -->`** type the following **XAML**:

```
<VisualState x:Name="Unfocused"/>
<VisualState x:Name="PointerFocused"/>
<VisualState x:Name="FocusedDropDown">
    <Storyboard>
        <ObjectAnimationUsingKeyFrames Duration="0"
            Storyboard.TargetProperty="Visibility"
            Storyboard.TargetName="PopupBorder">
            <DiscreteObjectKeyFrame KeyTime="0">
                <DiscreteObjectKeyFrame.Value>
                    <Visibility>Visible</Visibility>
                </DiscreteObjectKeyFrame.Value>
            </DiscreteObjectKeyFrame>
        </ObjectAnimationUsingKeyFrames>
    </Storyboard>
</VisualState>
```

This **XAML** is for the **Visual States** that will represent the **States** of **`Unfocused`**, **`PointerFocused`** and **`FocusedDropDown`** for the **`ComboBox`** used in the **Custom ComboBox**.

Step 11

While still in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Visual State Group Drop Down States -->`** type the following **XAML**:

```
<VisualStateGroup x:Name="DropDownStates">
    <VisualState x:Name="Opened">
        <Storyboard>
            <SplitOpenThemeAnimation ClosedTargetName="ContentPresenter"
            OffsetFromCenter="{Binding TemplateSettings.DropDownOffset,
            RelativeSource={RelativeSource Mode=TemplatedParent}}"
            OpenedTargetName="PopupBorder"
            OpenedLength="{Binding TemplateSettings.DropDownOpenedHeight,
            RelativeSource={RelativeSource Mode=TemplatedParent}}"/>
        </Storyboard>
    </VisualState>
    <VisualState x:Name="Closed">
        <Storyboard>
            <SplitCloseThemeAnimation
            ClosedTargetName="ContentPresenter"
            OffsetFromCenter="{Binding TemplateSettings.DropDownOffset,
            RelativeSource={RelativeSource Mode=TemplatedParent}}"
            OpenedTargetName="PopupBorder"
            OpenedLength="{Binding TemplateSettings.DropDownOpenedHeight,
            RelativeSource={RelativeSource Mode=TemplatedParent}}"/>
        </Storyboard>
    </VisualState>
</VisualStateGroup>
```

This **XAML** is for the **Visual State Group** that will represent the **Drop Down States** of **`Opened`** and **`Closed`** for the **`ComboBox`** used in the **Custom ComboBox**.

Step 12

Then in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Content -->`** type the following **XAML:**

```
<Border x:Name="Background" Grid.ColumnSpan="2"
Grid.Row="1" BorderBrush="Salmon" Background="LightSalmon"
BorderThickness="{TemplateBinding BorderThickness}" CornerRadius="15"/>
<Border x:Name="HighlightBackground"  Grid.ColumnSpan="2" Grid.Row="1"
BorderBrush="Gold" BorderThickness="{TemplateBinding BorderThickness}"
Background="{ThemeResource ComboBoxBackgroundUnfocused}"
Opacity="0" CornerRadius="15"/>
<ContentPresenter x:Name="ContentPresenter" Grid.Row="1"
HorizontalAlignment="{TemplateBinding HorizontalContentAlignment}"
Margin="{TemplateBinding Padding}" CornerRadius="15"
VerticalAlignment="{TemplateBinding VerticalContentAlignment}">
    <TextBlock x:Name="PlaceholderTextBlock"
    Foreground="{ThemeResource ComboBoxPlaceHolderForeground}"
    Text="{TemplateBinding PlaceholderText}"/>
</ContentPresenter>
<FontIcon x:Name="DropDownGlyph" Grid.Column="1" Grid.Row="1"
AutomationProperties.AccessibilityView="Raw" Foreground="Gold"
FontSize="12" FontFamily="{ThemeResource SymbolThemeFontFamily}"
Glyph="&#xE0E5;" HorizontalAlignment="Right" IsHitTestVisible="False"
Margin="0,10,10,10" VerticalAlignment="Center"/>
```

This **XAML** is the **Content** for the layout of a **`ComboBox`** when the **`Style`** is applied for the **Custom ComboBox**.

Step 13

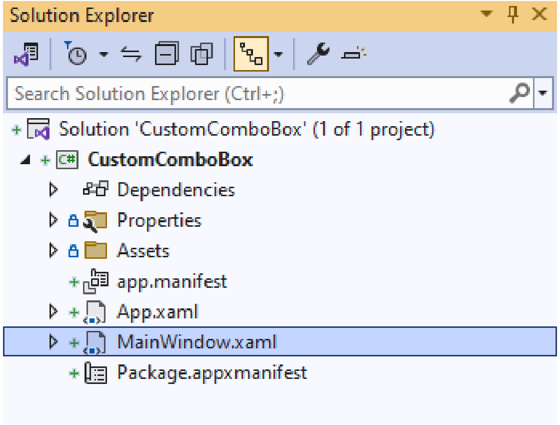
Then in the **XAML** for **App.xaml** below the **Comment** of **`<!-- Popup -->`** type the following **XAML:**

```
<Popup x:Name="Popup">
    <Border x:Name="PopupBorder" BorderBrush="Salmon"
    BorderThickness="{ThemeResource ComboBoxDropdownBorderThickness}"
    Background="LightSalmon" HorizontalAlignment="Stretch"
    Margin="0,-1,0,-1" CornerRadius="15">
        <ScrollViewer x:Name="ScrollViewer"
        AutomationProperties.AccessibilityView="Raw"
        BringIntoViewOnFocusChange="{TemplateBinding
        ScrollViewer.BringIntoViewOnFocusChange}"
        Foreground="{ThemeResource ComboBoxDropDownForeground}"
        HorizontalScrollMode="{TemplateBinding
        ScrollViewer.HorizontalScrollMode}"
        HorizontalScrollBarVisibility="{TemplateBinding
        ScrollViewer.HorizontalScrollBarVisibility}"
        IsHorizontalRailEnabled="{TemplateBinding
        ScrollViewer.IsHorizontalRailEnabled}"
        IsVerticalRailEnabled="{TemplateBinding
        ScrollViewer.IsVerticalRailEnabled}"
        IsDeferredScrollingEnabled="{TemplateBinding
        ScrollViewer.IsDeferredScrollingEnabled}"
        MinWidth="{Binding TemplateSettings.DropDownContentMinWidth,
        RelativeSource={RelativeSource Mode=TemplatedParent}}"
        VerticalSnapPointsType="OptionalSingle" ZoomMode="Disabled"
        VerticalScrollBarVisibility="{TemplateBinding
        ScrollViewer.VerticalScrollBarVisibility}"
        VerticalScrollMode="{TemplateBinding
        ScrollViewer.VerticalScrollMode}"
        VerticalSnapPointsAlignment="Near">
            <ItemsPresenter Margin="{ThemeResource ComboBoxDropdownContentMargin}"/>
        </ScrollViewer>
    </Border>
</Popup>
```

This **XAML** is the **Popup** used for the **`ComboBox`** when the **`Style`** is applied for the **Custom ComboBox**.

Step 14

Within **Solution Explorer** for the **Solution** double-click on **MainWindow.xaml** to see the **XAML** for the **Main Window**.



Step 15

In the **XAML** for **MainWindow.xaml** there be some **XAML** for a **`StackPanel`**, this should be **Removed** by removing the following:

```
<StackPanel Orientation="Horizontal"
HorizontalAlignment="Center" VerticalAlignment="Center">
    <Button x:Name="myButton" Click="myButton_Click">Click Me</Button>
</StackPanel>
```

Step 16

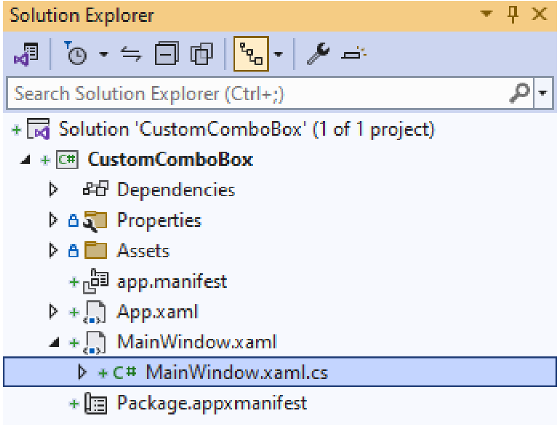
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<ComboBox Margin="50" SelectedIndex="0"
HorizontalAlignment="Stretch"
VerticalAlignment="Center"
Style="{StaticResource CustomComboBox}">
    <ComboBoxItem Content="ComboBox"/>
    <ComboBoxItem Content="One"/>
    <ComboBoxItem Content="Two"/>
    <ComboBoxItem Content="Three"/>
    <ComboBoxItem Content="Four"/>
</ComboBox>
```

This **XAML** contains a **`ComboBox`** with **`Style`** set to the **`StaticResource`** of **`ComboBox`** from **App.xaml**.

Step 17

Then, within **Solution Explorer** for the **Solution** select the arrow next to **MainWindow.xaml** then double-click on **MainWindow.xaml.cs** to see the **Code** for the **Main Window**.



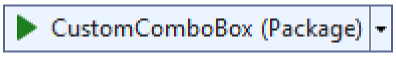
Step 18

In the **Code** for **MainWindow.xaml.cs** there be a **Method** of **`myButton_Click(...)`** this should be **Removed** by removing the following:

```
private void myButton_Click(object sender, RoutedEventArgs e)
{
    myButton.Content = "Clicked";
}
```

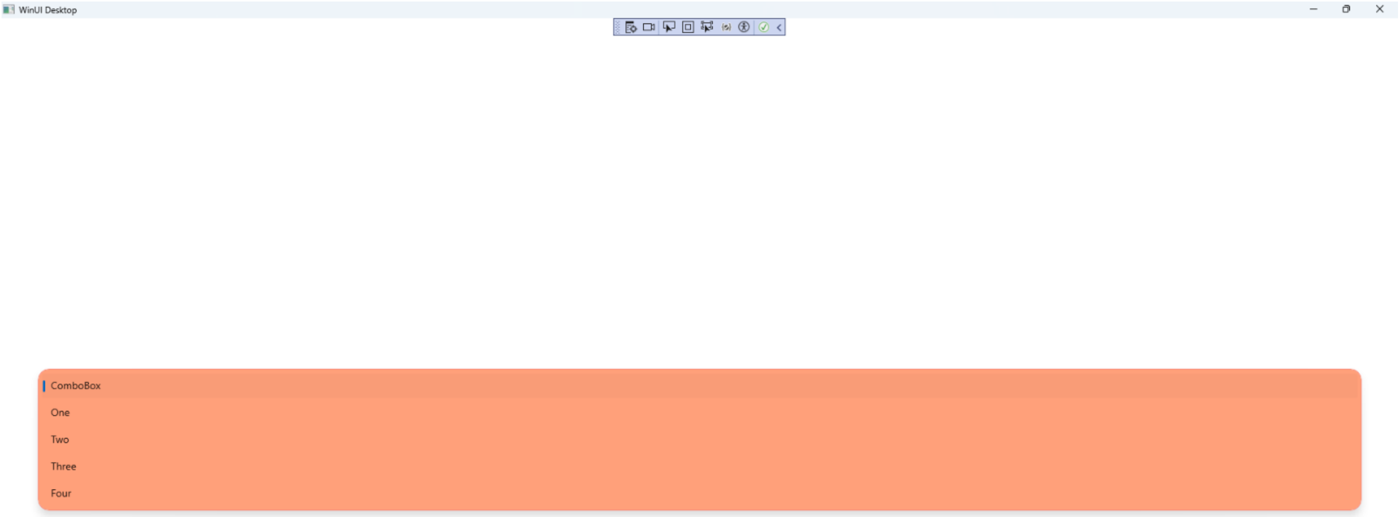
Step 19

That completes the **Windows App SDK** application. In **Visual Studio 2022** from the **Toolbar** select **CustomComboBox (Package)** to **Start** the application.



Step 20

Once running you will see the **Custom ComboBox** displayed which you can **Select** to see the **Options**.



Step 21

To **Exit** the **Windows App SDK** application, select the **Close** button from the top right of the application as that concludes this **Tutorial** for **Windows App SDK** from tutorialr.com!