tutorial

Windows App SDK

Carousel Control

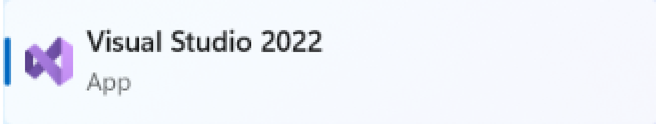
Carousel Control

Carousel Control shows how to create a **Control** that can be used to display **Images** in a moving **Carousel** using **Windows App SDK**

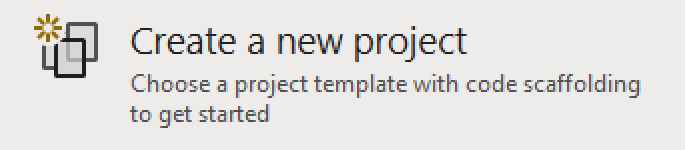
Step 1

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

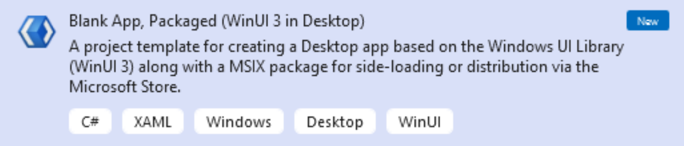
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



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

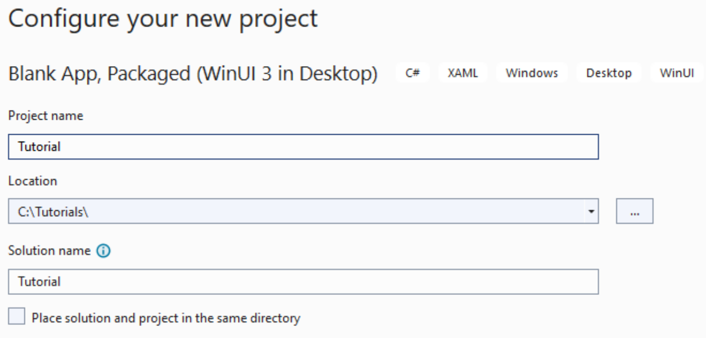

Create a new project
Choose a project template with code scaffolding to get started

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


Blank App, Packaged (WinUI 3 in Desktop)

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.

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


Configure your new project

Blank App, Packaged (WinUI 3 in Desktop)

Project name: Tutorial

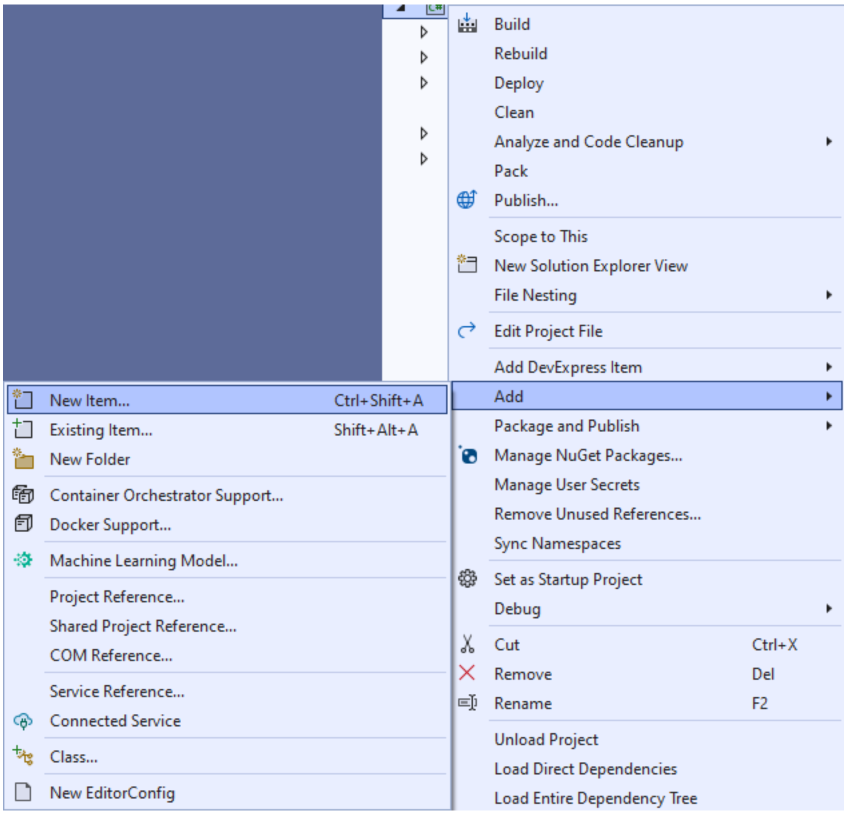
Location: C:\Tutorials\

Solution name: Tutorial

□ Place solution and project in the same directory

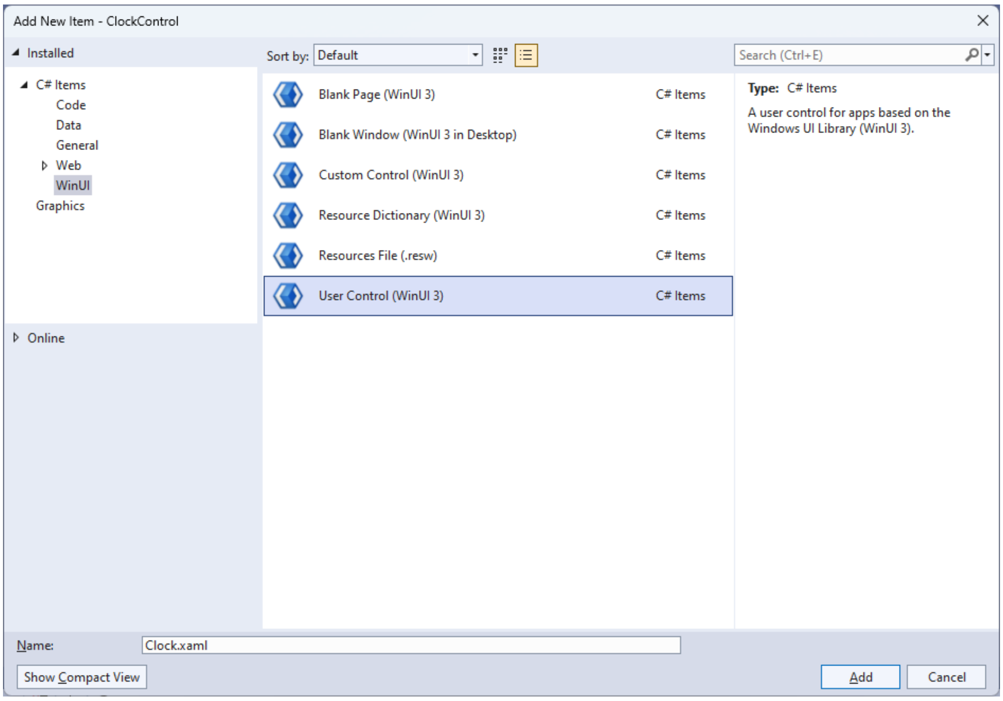
Step 2

Then in **Visual Studio** within **Solution Explorer** for the **Solution**, right click on the **Project** shown below the **Solution** and then select **Add** then **New Item…**



Step 3

Then in **Add New Item** from the **C# Items** list, select **WinUI** and then select **User Control (WinUI 3)** from the list next to this, then type in the name of *Carousel.xaml* and then **Click** on **Add**.



Blank Page (WinUI 3) C# Items
Blank Window (WinUI 3 in Desktop) C# Items
Custom Control (WinUI 3) C# Items
Resource Dictionary (WinUI 3) C# Items
Resources File (.resw) C# Items
User Control (WinUI 3) C# Items

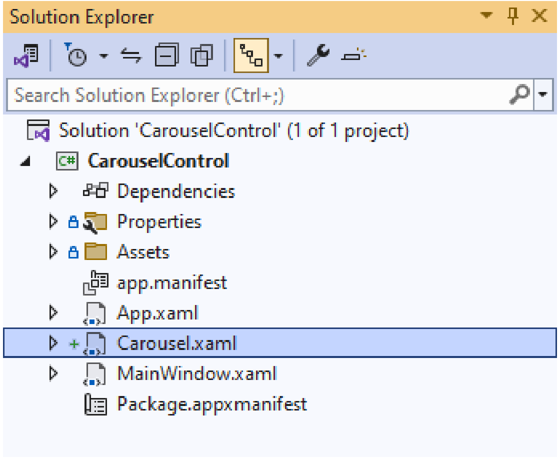
Type: C# Items

A user control for apps based on the Windows UI Library (WinUI 3).

Name: Clock.xaml

Step 4

Then from **Solution Explorer** for the **Solution** double-click on **Carousel.xaml** to see the **XAML** for the **User Control**.



Step 5

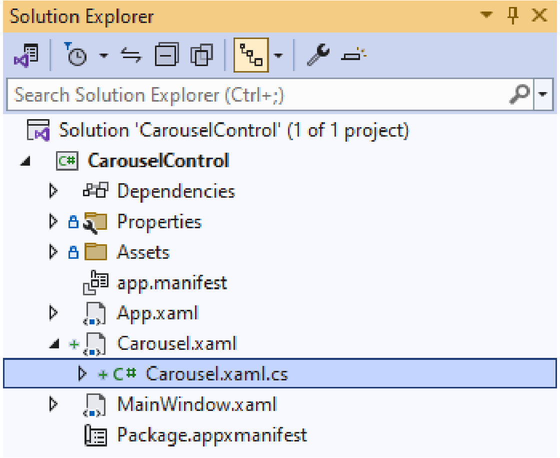
In the **XAML** for *Carousel.xaml* there be some **XAML** for a **`Grid`**, above **`</Grid>`**, type in the following **XAML**:

```
<Canvas Name="Display" HorizontalAlignment="Center"
VerticalAlignment="Center" Loaded="Load"/>
```

This **XAML** contains a **Canvas** with a **Loaded** event handler of **Load**.

Step 6

Then, within **Solution Explorer** for the **Solution** select the arrow next to **Carousel.xaml** then double-click on **Carousel.xaml.cs** to see the **Code** for the **User Control**.



Step 7

You will now be in the **View** for the **Code** of *Carousel.xaml.cs*, near the top of the **Code**, below the final **`using`** statement you will need to type the following **`using`** statements:

```
using Microsoft.UI.Xaml.Media.Animation;
using Microsoft.UI.Xaml.Media.Imaging;
```

Step 8

Then, while still in the **View** for the **Code** of *Carousel.xaml.cs*, type in the following **Code** below the end of the **Constructor** of **`public Carousel() { ... }`**:

```
private const double speed = 0.0125;
private const double perspective = 55;

private readonly Storyboard _animation = new();
private readonly List<BitmapImage> _list = new();
private readonly Point _radius = new() { X = -20, Y = 200 };

private Point _position;
private double _distance;

// Rotate Method

// Layout Method

// Add, Remove, New & Load Methods
```

The **`class`** for **`Carousel`** represents the **User Control** for the **Carousel** and includes a **`Storyboard`** that will be used for rotating the images represented by the **`List`** of **`BitmapImage`** for the **Carousel.**

Step 9

While still in the **`class`** of **`Carousel`** after the **Comment** of **`// Rotate Method`** type the following **Method**:

```
private void Rotate()
{
    foreach (var item in Display.Children.Cast<Image>())
    {
        double angle = (double)item.Tag;
        angle -= speed;
        item.Tag = angle;
        _position.X = Math.Cos(angle) * _radius.X;
        _position.Y = Math.Sin(angle) * _radius.Y;
        Canvas.SetLeft(item, _position.X - (item.Width - perspective));
        Canvas.SetTop(item, _position.Y);
        if (_radius.X >= 0)
        {
            _distance = 1 * (1 - (_position.X / perspective));
            Canvas.SetZIndex(item, -(int)_position.X);
        }
        else
        {
            _distance = 1 / (1 - (_position.X / perspective));
            Canvas.SetZIndex(item, (int)_position.X);
        }
        item.Opacity = ((ScaleTransform)item.RenderTransform).ScaleX =
            ((ScaleTransform)item.RenderTransform).ScaleY = _distance;
    }
    _animation.Begin();
}
```

This **Method** will be used for rotating the items in the **Carousel** by looping through all the **`Image`** controls and then adjusting the position of them along with triggering the **`Storyboard`**.

Step 10

While still in the **class** of **Carousel** after the **Comment** of **// Layout Method** type the following **Method**:

```
private void Layout(Canvas display)
{
    display.Children.Clear();
    for (int index = 0; index < _list.Count; index++)
    {
        _distance = 1 / (1 - (_position.X / perspective));
        var item = new Image
        {
            Width = 150,
            Source = _list[index],
            Tag = index * (Math.PI * 2 / _list.Count),
            RenderTransform = new ScaleTransform()
        };
        _position.X = Math.Cos((double)item.Tag) * _radius.X;
        _position.Y = Math.Sin((double)item.Tag) * _radius.Y;
        Canvas.SetLeft(item, _position.X - (item.Width - perspective));
        Canvas.SetTop(item, _position.Y);
        item.Opacity = ((ScaleTransform)item.RenderTransform).ScaleX =
            ((ScaleTransform)item.RenderTransform).ScaleY = _distance;
        display.Children.Add(item);
    }
}
```

This **Method** will be used to create the look-and-feel of the **Carousel** by positioning each item as an **Image** onto the **Carousel** where needed.

Step 11

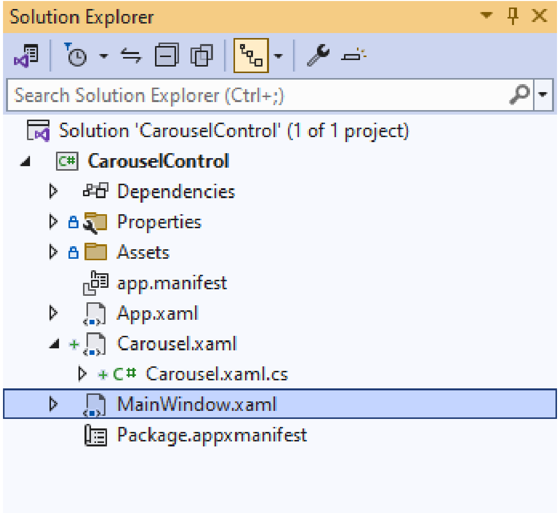
While still in the `class` of `Carousel` after the **Comment** of `// Add, Remove, New & Load Methods` type the following **Methods**:

```
public void Add(BitmapImage image)
{
    _list.Add(image);
    Layout(Display);
}

public void Remove()
{
    if (_list.Any())
    {
        _list.Remove(_list.Last());
        Layout(Display);
    }
}

public void New()
{
    _list.Clear();
    Layout(Display);
}

private void Load(object sender, RoutedEventArgs e)
{
    _animation.Completed += (object s, object obj) =>
        Rotate();
    _animation.Begin();
}
```

Add will be used to add items to the **Carousel** and **Remove** will be used to remove the last item from the **Carousel**, then **New** will be used to clear the **Carousel** of all items and **Load** will be used to setup the **Carousel**.

Step 12

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



Step 13

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 14

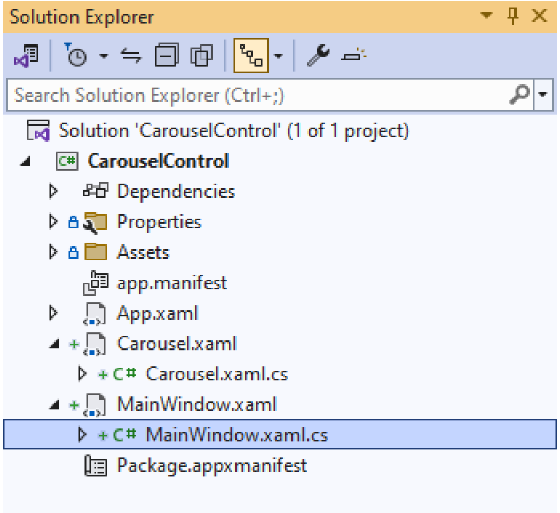
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<Grid>
    <Grid.RowDefinitions>
        <RowDefinition Height="Auto"/>
        <RowDefinition Height="*"/>
    </Grid.RowDefinitions>
    <TextBox Grid.Row="0" Name="Value" InputScope="Url" Margin="20,20,20,20"/>
    <local:Carousel  Grid.Row="1" x:Name="Display" Width="400"
        HorizontalAlignment="Center" VerticalAlignment="Center" />
    <CommandBar Grid.Row="1" VerticalAlignment="Bottom">
        <AppBarButton Icon="Add" Label="Add" Click="Add"/>
        <AppBarButton Icon="Remove" Label="Remove" Click="Remove"/>
        <AppBarButton Icon="Page2" Label="New" Click="New"/>
    </CommandBar>
</Grid>
```

This **XAML** contains a **`Grid`** including a **`TextBox`**, the **User Control** of **`Carousel`** and a **`CommandBar`** with an **`AppBarButton`** with **Events** of **`Click`** for **Add**, **Remove** and **New**.

Step 15

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 16

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 17

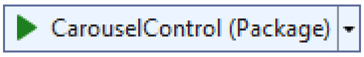
Once **`myButton_Click(...)`** has been removed, type in the following **Code** below the end of the **Constructor** of **`public MainWindow() { ... }`**:

```
private void Add(object sender, RoutedEventArgs e) =>
    Display.Add(new BitmapImage(new Uri(Value.Text)));

private void New(object sender, RoutedEventArgs e) =>
    Display.New();

private void Remove(object sender, RoutedEventArgs e) =>
    Display.Remove();
```

The **Methods** of **Add**, **New** and **Remove** will be used with **Event Handler** from the **XAML**, these **Methods** use Arrow Syntax with the **=>** for an Expression Body which is useful when a **Method** only has one line.

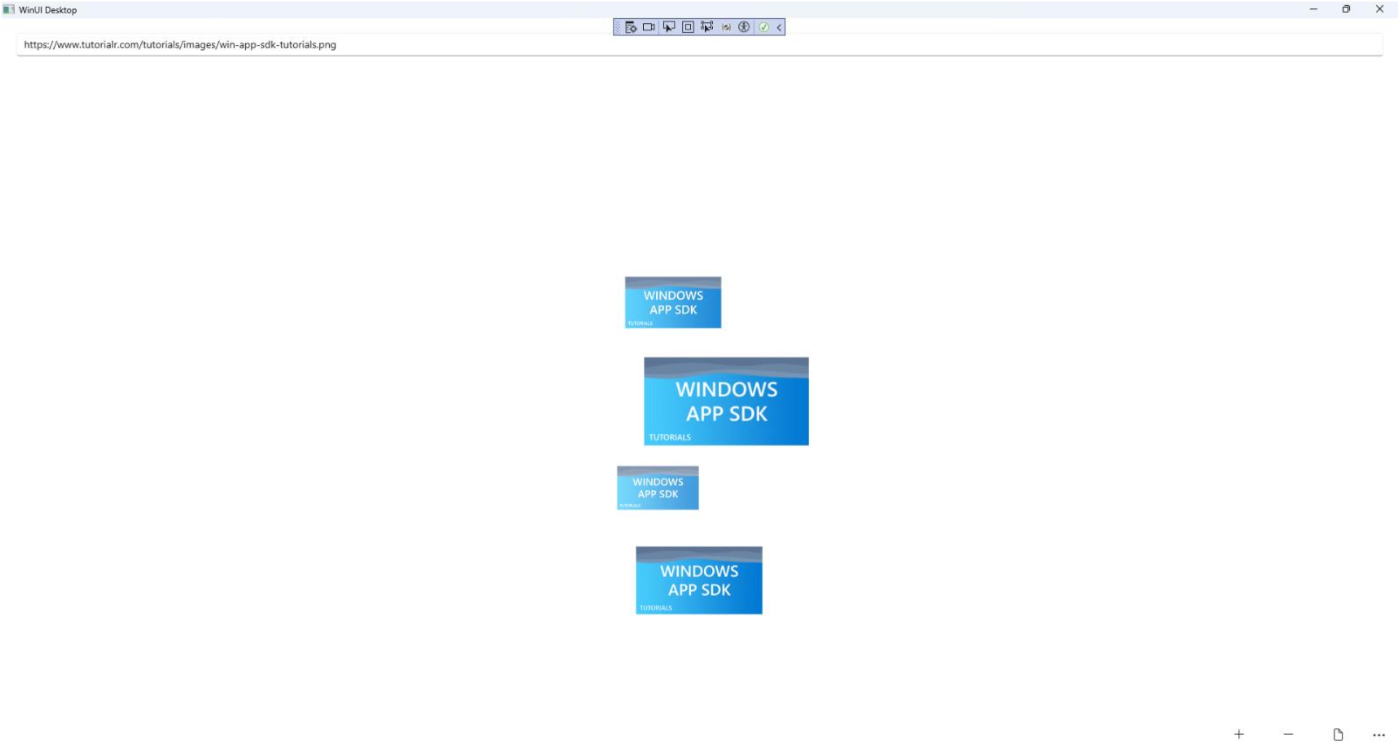
Step 18

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



Step 19

Once running you will see the **Carousel Control** displayed, then you can type in the *URL* of an image e.g. https://www.tutorialr.com/tutorials/images/win-app-sdk-tutorials.png then select *Add* to display this or multiple images on the **Carousel** or you can select *Remove* to remove the last image or *New* to clear the **Carousel**.


WinUI Desktop
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Step 20

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!