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tutorial

Windows App SDK

Uniform Layout

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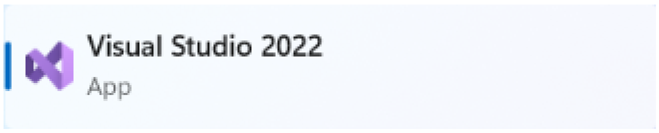
Uniform Layout

Uniform Layout shows how to create a **Uniform Panel** using **Windows App SDK**

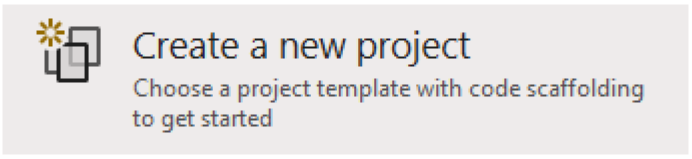
Step 1

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

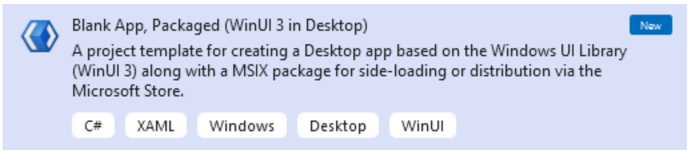
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



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

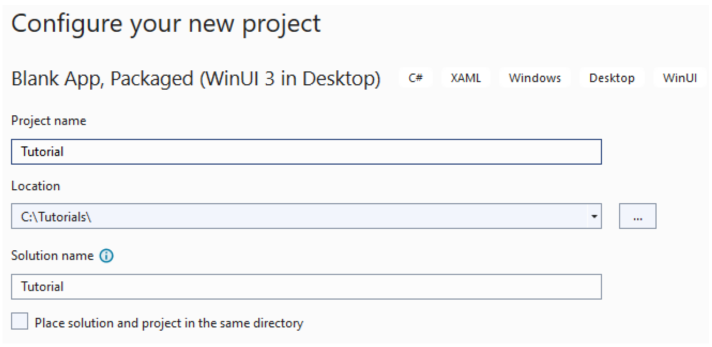

Create a new project
Choose a project template with code scaffolding to get started

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



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 *UniformLayout*, 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

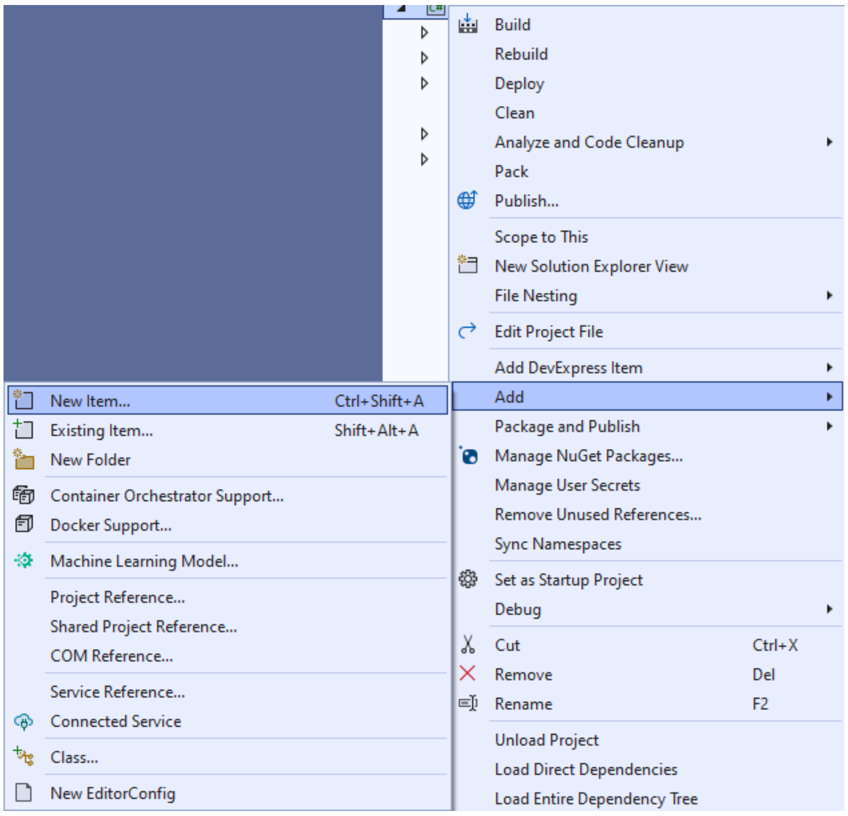
Location: C:\Tutorials\

Solution name: Tutorial

☐ Place solution and project in the same directory

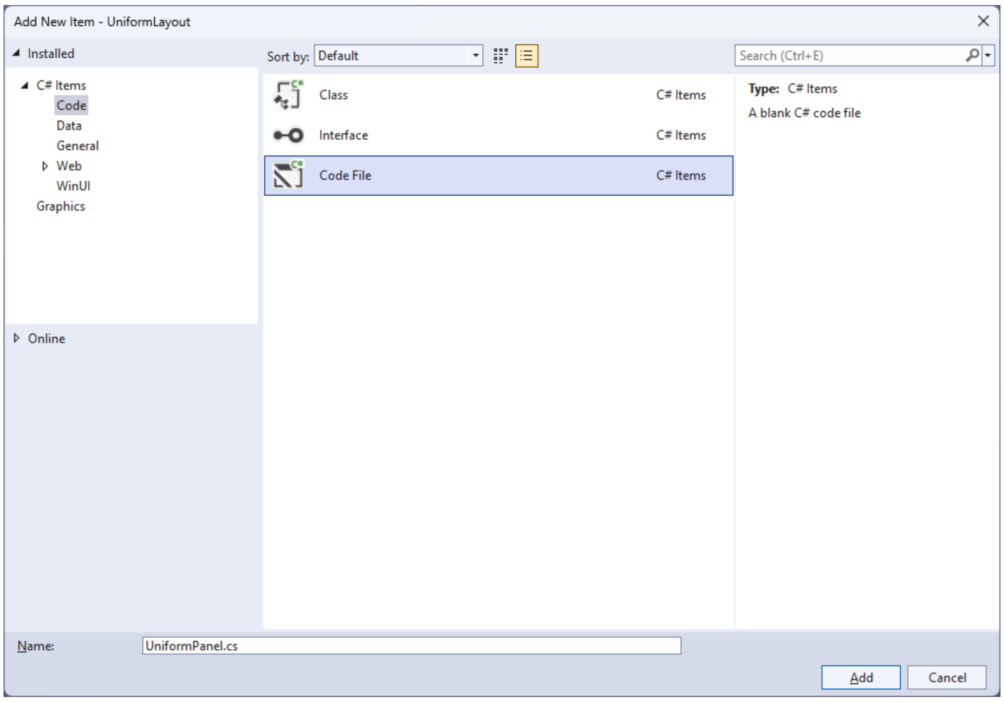
Step 2

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



Step 3

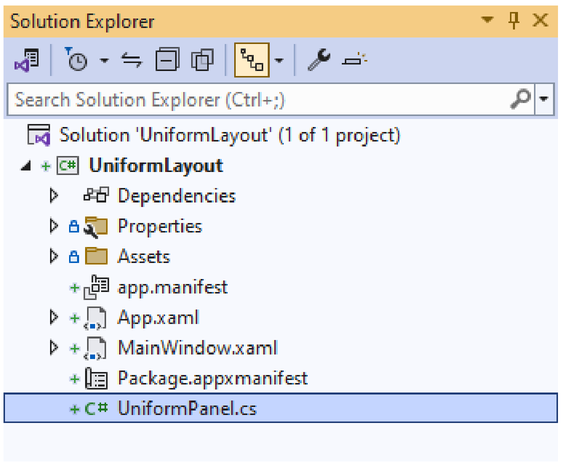
Then in **Add New Item** from the **C# Items** list, select **Code** and then select **Code File** from the list next to this, then type in the name of *UniformPanel.cs* and then **Click** on **Add**.



Name: UniformPanel.cs

Step 4

Then from **Solution Explorer** for the **Solution** double-click on **UniformPanel.cs** to see the **Code** for the **User Control**.



Step 5

You will now be in the **View** for the **Code** of *UniformPanel.cs*, within this type in the following **Code**:

```
using Microsoft.UI.Xaml;
using Microsoft.UI.Xaml.Controls;
using System;
using Windows.Foundation;

namespace UniformLayout;

public class UniformPanel : Panel
{
    // Members, Dependency Properties & Properties

    // Update Computed Values Method

    // Measure Override Method

    // Arrange Override Method

}
```

There are **`using`** statements for the **User Control**, a **`namespace`** for **`UniformLayout`** along with a **`class`** of **`UniformPanel`** that will represent the **User Control** and **Inherits** the **`class`** of **`Panel`**.

Step 6

Then in the `namespace` of `UniformLayout` in the `class` of `UniformPanel` after the **Comment** of `// Members, Dependency Properties & Properties` type the following **Members**, **Dependency Properties** and **Properties**:

```
private int _columns;
private int _rows;

public static readonly DependencyProperty ColumnsProperty =
DependencyProperty.Register(nameof(Columns), typeof(int),
typeof(UniformPanel), new PropertyMetadata(0));

public static readonly DependencyProperty FirstColumnProperty =
DependencyProperty.Register(nameof(FirstColumn), typeof(int),
typeof(UniformPanel), new PropertyMetadata(0));

public static readonly DependencyProperty RowsProperty =
DependencyProperty.Register(nameof(Rows), typeof(int),
typeof(UniformPanel), new PropertyMetadata(0));

public int Columns
{
    get { return (int)GetValue(ColumnsProperty); }
    set { SetValue(ColumnsProperty, value); }
}

public int FirstColumn
{
    get { return (int)GetValue(FirstColumnProperty); }
    set { SetValue(FirstColumnProperty, value); }
}

public int Rows
{
    get { return (int)GetValue(RowsProperty); }
    set { SetValue(RowsProperty, value); }
}
```

The **Members** will be used to store values for the **User Control** and the **Dependency Properties** or **Properties** for the **User Control** can be customised for the **Uniform Panel**.

Step 7

While still in the **`namespace`** of **`UniformLayout`** in the **`class`** of **`UniformPanel`** after the **Comment** of **`// Update Computed Values Method`** type the following **Method**:

```
private void UpdateComputedValues()
{
    _columns = Columns;
    _rows = Rows;
    if (FirstColumn >= _columns) FirstColumn = 0;
    if ((_rows == 0) || (_columns == 0))
    {
        var row = 0;
        var column = 0;
        var count = Children.Count;
        while (column < count)
        {
            var element = Children[column];
            if (element.Visibility != Visibility.Collapsed)
            {
                row++;
            }
            column++;
        }
        if (row == 0) row = 1;
        if (_rows == 0)
        {
            if (_columns > 0)
            {
                _rows = (row + FirstColumn + (_columns - 1)) / _columns;
            }
            else
            {
                _rows = (int)Math.Sqrt(row);
                if ((_rows * _rows) < row)
                {
                    _rows++;
                }
                _columns = _rows;
            }
        }
        else if (_columns == 0)
        {
            _columns = (row + (_rows - 1)) / _rows;
        }
    }
}
```

The **Method** of **`UpdateComputedValues`** calculates the **Rows** and **Columns** and adjusts the layout accordingly based on the **`Visibility`** of the elements to produce the correct number of **Rows** and **Columns** needed by the **User Control**.

Step 8

While still in the **`namespace`** of **`UniformLayout`** in the **`class`** of **`UniformPanel`** after the **Comment** of **`// Measure Override Method`** type the following **Method**:

```
protected override Size MeasureOverride(Size availableSize)
{
    UpdateComputedValues();
    var available = new Size(
        availableSize.Width / _columns,
        availableSize.Height / _rows);
    double width = 0.0;
    double height = 0.0;
    int value = 0;
    int count = Children.Count;
    while (value < count)
    {
        var element = Children[value];
        element.Measure(available);
        var desiredSize = element.DesiredSize;
        if (width < desiredSize.Width)
            width = desiredSize.Width;
        if (height < desiredSize.Height)
            height = desiredSize.Height;
        value++;
    }
    return new Size(width * _columns, height * _rows);
}
```

The **Method** of **`MeasureOverride`** will **Measure** the **`Size`** required to layout the **`Children`** of the **`Panel`** using the **Method** of **`UpdateComputedValues`** to respond to changes that require the layout to be updated and arranged accordingly for the **User Control**.

Step 9

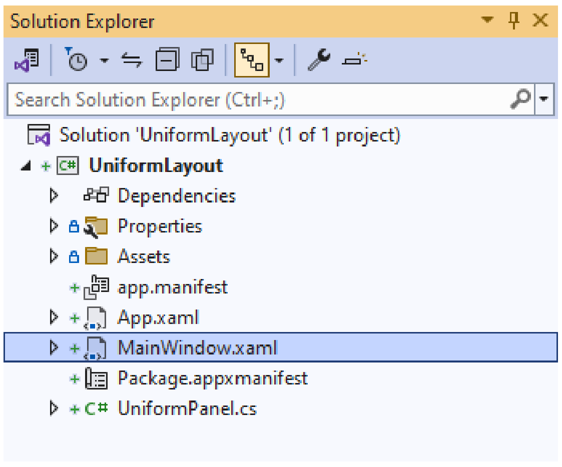
While still in the **`namespace`** of **`UniformLayout`** in the **`class`** of **`UniformPanel`** after the **Comment** of **`// Arrange Override Method`** type the following **Method**:

```
protected override Size ArrangeOverride(Size finalSize)
{
    var rect = new Rect(0.0, 0.0,
    finalSize.Width / _columns, finalSize.Height / _rows);
    double width = rect.Width;
    double value = finalSize.Width - 1.0;
    rect.X += rect.Width * FirstColumn;
    foreach (var element in Children)
    {
        element.Arrange(rect);
        if (element.Visibility != Visibility.Collapsed)
        {
            rect.X += width;
            if (rect.X >= value)
            {
                rect.Y += rect.Height;
                rect.X = 0.0;
            }
        }
    }
    return finalSize;
}
```

The **Method** of **`ArrangeOverride`** will position the **`Children`** of the **`Panel`** for the **User Control**.

Step 10

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



Step 11

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 12

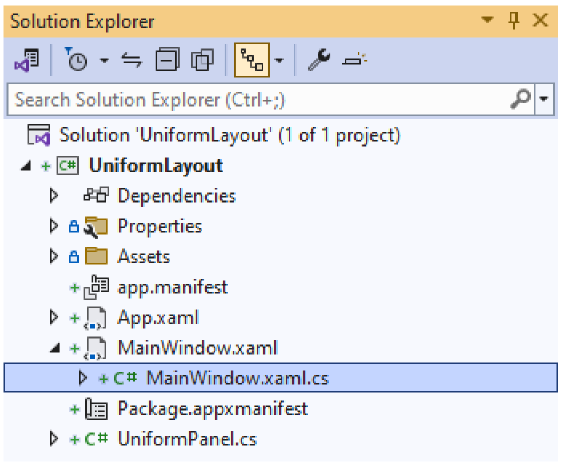
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<local:UniformPanel Columns="4"
    HorizontalAlignment="Center" VerticalAlignment="Center">
    <Rectangle Width="100" Height="100" Fill="Red" Margin="10"/>
    <Rectangle Width="100" Height="100" Fill="Orange"/>
    <Rectangle Width="100" Height="100" Fill="Yellow"/>
    <Rectangle Width="100" Height="100" Fill="Green"/>
    <Rectangle Width="100" Height="100" Fill="Cyan"/>
    <Rectangle Width="100" Height="100" Fill="Blue"/>
    <Rectangle Width="100" Height="100" Fill="Magenta"/>
    <Rectangle Width="100" Height="100" Fill="Purple"/>
</local:UniformPanel>
```

This **XAML** contains the **User Control** of **`UniformPanel`** with **`Columns`** set to **4** and the **`Children`** containing **Controls** for a **`Rectangle`** in various colours.

Step 13

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**.



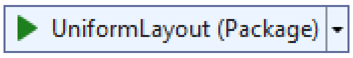
Step 14

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";
}
```

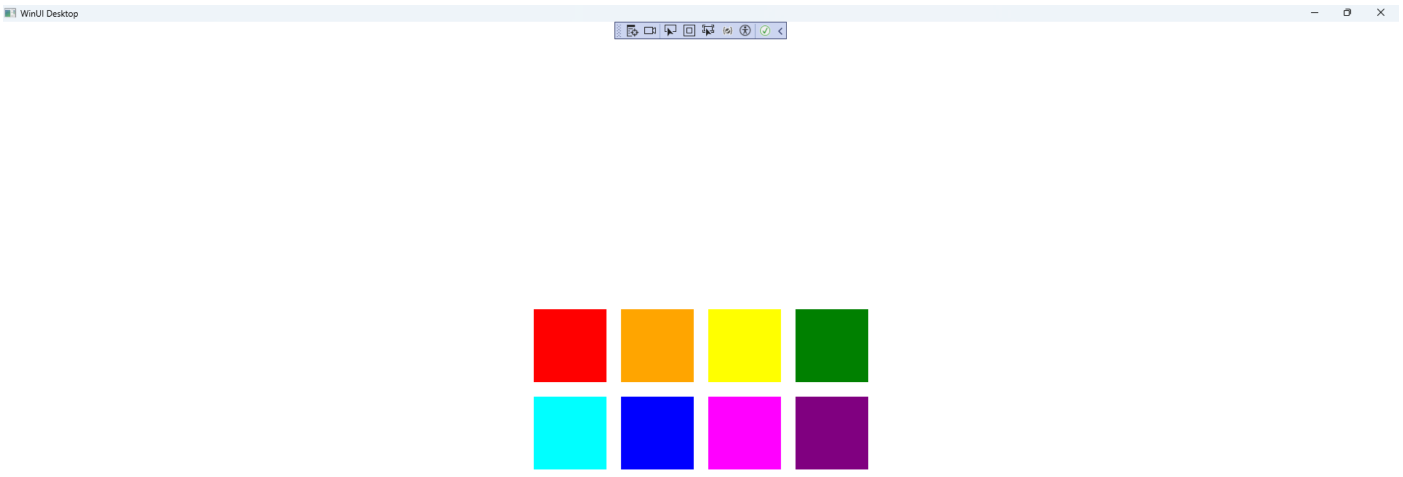
Step 15

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



Step 16

Once running you will see the **Uniform Panel** displayed.



Step 17

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!