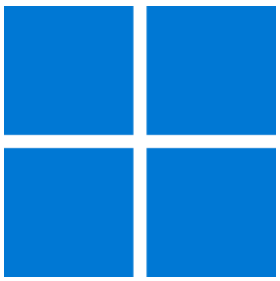
tutorial

Windows App SDK



Dial Control

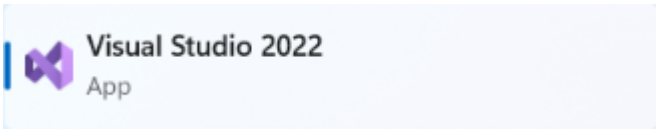
Dial Control

Dial Control shows how to create a **Control** that can be used as a **Dial** using **Windows App SDK**

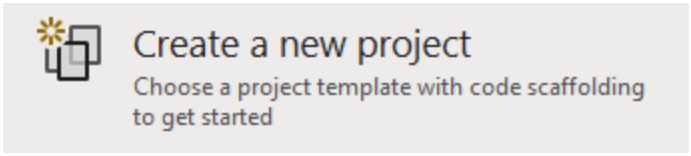
Step 1

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

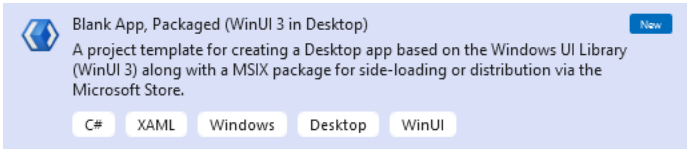
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



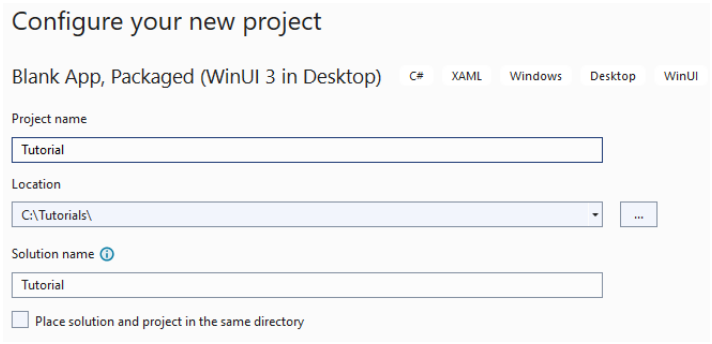
Once **Visual Studio 2022** has started select **Create a new project**.



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

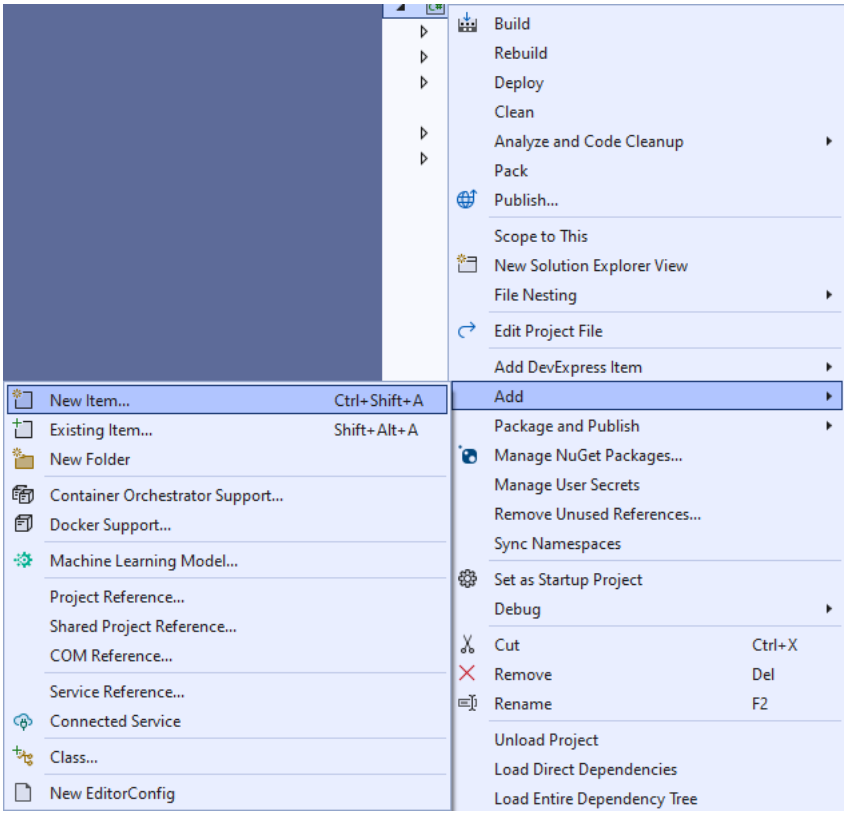


After that in **Configure your new project** type in the **Project name** as *DialControl*, then select a Location and then select **Create** to start a new **Solution**.



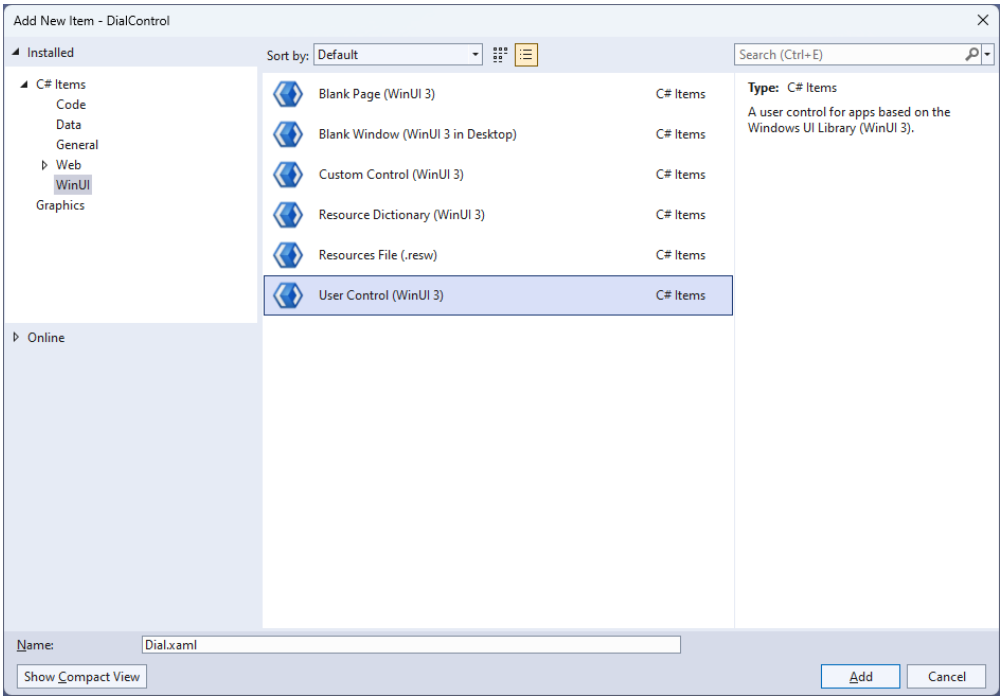
Step 2

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...**



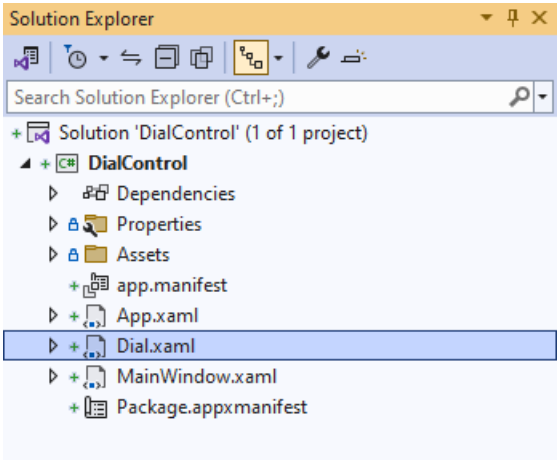
Step 3

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 *Dial.xaml* and then **Click** on **Add**.



Step 4

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



Step 5

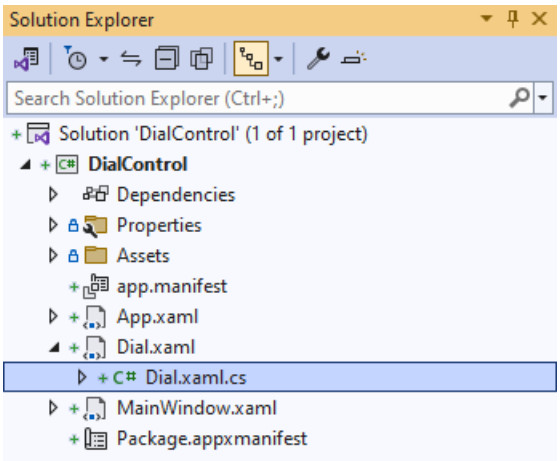
In the **XAML** for *Dial.xaml* there be some **XAML** for a **`Grid`**, above **`</Grid>`**, type in the following **XAML**:

```
<Grid Name="DialGrid" Loaded="Load">
    <ContentPresenter Content="{x:Bind Face}"/>
    <ContentPresenter Content="{x:Bind Knob}"
        RenderTransformOrigin="0.5,0.5">
        <ContentPresenter.RenderTransform>
            <TransformGroup>
                <RotateTransform x:Name="DialValue" />
            </TransformGroup>
        </ContentPresenter.RenderTransform>
    </ContentPresenter>
</Grid>
```

This **XAML** contains a **`Grid`** with a **`Loaded`** event handler of **`Load`** along with a **`ContentPresenter`** for the **`Face`** and **`Knob`** of the **Dial** which also has a **`RotateTransform`** to show the correct indicator for the **Dial**.

Step 6

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



Step 7

You will now be in the **View** for the **Code** of *Dial.xaml.cs*, type in the following **Code** below the end of the **Constructor** of **`public Dial() { ... }`**:

```
private bool _hasCapture = false;

// Dependancy Properties

// Properties

// GetRotation, GetAngle & SetPosition Methods

// Load Method
```

The **`class`** for **`Dial`** represents the **User Control** for the **Dial** and includes a **`bool`** that will be used to know when the **Dial** is being interacted with.

Step 8

While still in the **`class`** of **`Dial`** after the **Comment** of **`// Dependency Properties`** type the following **Dependency Properties**:

```
public static readonly DependencyProperty ValueProperty =
DependencyProperty.Register(nameof(Value), typeof(double),
typeof(Dial), null);

public static readonly DependencyProperty MinimumProperty =
DependencyProperty.Register(nameof(Minimum), typeof(double),
typeof(Dial), null);

public static readonly DependencyProperty MaximumProperty =
DependencyProperty.Register(nameof(Maximum), typeof(double),
typeof(Dial), null);

public static readonly DependencyProperty KnobProperty =
DependencyProperty.Register(nameof(Knob), typeof(UIElement),
typeof(Dial), null);

public static readonly DependencyProperty FaceProperty =
DependencyProperty.Register(nameof(Face), typeof(UIElement),
typeof(Dial), null);
```

There will also be some **Errors** as these refer to **Properties** that will be added in the next step.

These **Dependency Properties** refer to various **Properties** of the **Dial** that can be customised for the **User Control**.

Step 9

While still in the **`class`** of **`Dial`** after the **Comment** of **`// Properties`** type the following **Properties**:

```
public double Value
{
    get { return (double)GetValue(ValueProperty); }
    set { SetValue(ValueProperty, value); }
}

public double Minimum
{
    get { return (double)GetValue(MinimumProperty); }
    set { SetValue(MinimumProperty, value); }
}

public double Maximum
{
    get { return (double)GetValue(MaximumProperty); }
    set { SetValue(MaximumProperty, value); }
}

public UIElement Knob
{
    get { return (UIElement)GetValue(KnobProperty); }
    set { SetValue(KnobProperty, value); }
}

public UIElement Face
{
    get { return (UIElement)GetValue(FaceProperty); }
    set { SetValue(FaceProperty, value); }
}
```

Any **Errors** should now be resolved, if you continue to get them check any previous steps to see if you have missed anything.

These **Properties** are for values for the **User Control** such as the **`Minimum`** or **`Maximum`** values for the **Dial**.

Step 10

While still in the **`class`** of **`Dial`** after the **Comment** of **`// GetRotation, GetAngle & SetPosition Methods`** type the following **Methods**:

```
private double GetRotation(double width, double height, Point point)
{
    double radius = width / 2;
    Point centre = new(radius, height / 2);
    double triangleTop = Math.Sqrt(Math.Pow(point.X - centre.X, 2)
        + Math.Pow(centre.Y - point.Y, 2));
    double triangleHeight = (point.Y > centre.Y) ?
        point.Y - centre.Y : centre.Y - point.Y;
    return triangleHeight * Math.Sin(90) / triangleTop * 100;
}

private double GetAngle(Point point)
{
    double diameter = DialGrid.ActualWidth;
    double height = DialGrid.ActualHeight;
    double radius = diameter / 2;
    double rotation = GetRotation(diameter, height, point);
    if ((point.X > radius) && (point.Y <= radius))
    {
        rotation = 90.0 + (90.0 - rotation);
    }
    else if ((point.X > radius) && (point.Y > radius))
    {
        rotation = 180.0 + rotation;
    }
    else if ((point.X < radius) && (point.Y > radius))
    {
        rotation = 270.0 + (90.0 - rotation);
    }
    return rotation;
}

private void SetPosition(double rotation)
{
    if (Minimum >= 0 && Maximum > 0 && Minimum < 360 && Maximum <= 360)
    {
        if (rotation < Minimum) { rotation = Minimum; }
        if (rotation > Maximum) { rotation = Maximum; }
    }
    DialValue.Angle = rotation;
    Value = rotation;
}
```

These **Methods** will be used to determine the rotation for the **Dial** with **`GetRotation`** which will be used to set the angle with **`GetAngle`** and **`SetPosition`** will be used to constrain the angle as needed for the **Dial**.

Step 11

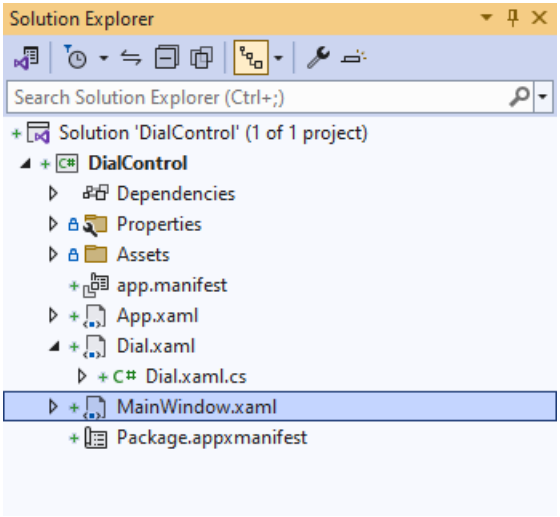
While still in the **`class`** of **`Dial`** after the **Comment** of **`// Load Method`** type the following **Method**:

```
private void Load(object sender, RoutedEventArgs e)
{
    if (Minimum > 0 && Minimum < 360)
        SetPosition(Minimum);
    DialGrid.PointerReleased += (object sender, PointerRoutedEventArgs e) =>
        _hasCapture = false;
    DialGrid.PointerPressed += (object sender, PointerRoutedEventArgs e) =>
    {
        _hasCapture = true;
        SetPosition(GetAngle(e.GetCurrentPoint(DialGrid).Position));
    };
    DialGrid.PointerMoved += (object sender, PointerRoutedEventArgs e) =>
    {
        if (_hasCapture)
            SetPosition(GetAngle(e.GetCurrentPoint(DialGrid).Position));
    };
    DialGrid.PointerExited += (object sender, PointerRoutedEventArgs e) =>
        _hasCapture = false;
}
```

Load will be used to set up the **Event Handlers** for the **Dial** for when the mouse is released or pressed and when the mouse is moved or leaves the **Dial**.

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

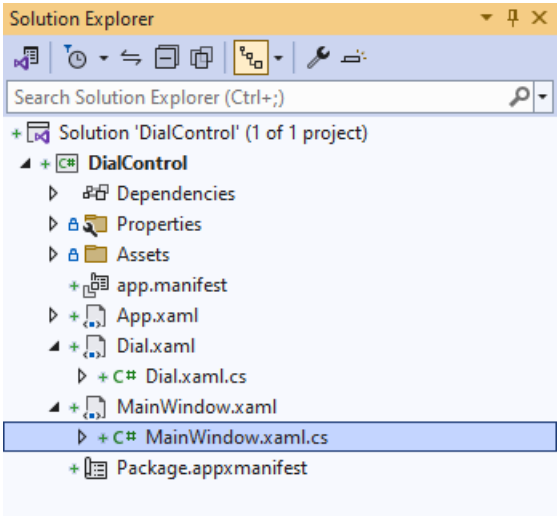
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<local:Dial x:Name="Dial" Height="300" Width="300" Minimum="90.0" Maximum="275.0">
    <local:Dial.Face>
        <Ellipse Fill="{ThemeResource SystemControlHighlightAccentBrush}"/>
    </local:Dial.Face>
    <local:Dial.Knob>
        <Rectangle Height="40" Width="150" Margin="5,0,145,0"
            RadiusX="20" RadiusY="20"
            Fill="{ThemeResource SystemControlBackgroundAltHighBrush}"/>
    </local:Dial.Knob>
</local:Dial>
```

This **XAML** contains the **User Control** of **`Dial`** with the **`Face`** and **`Knob`** set along with other **Properties** such as the **`Minimum`** and **`Maximum`** values.

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:

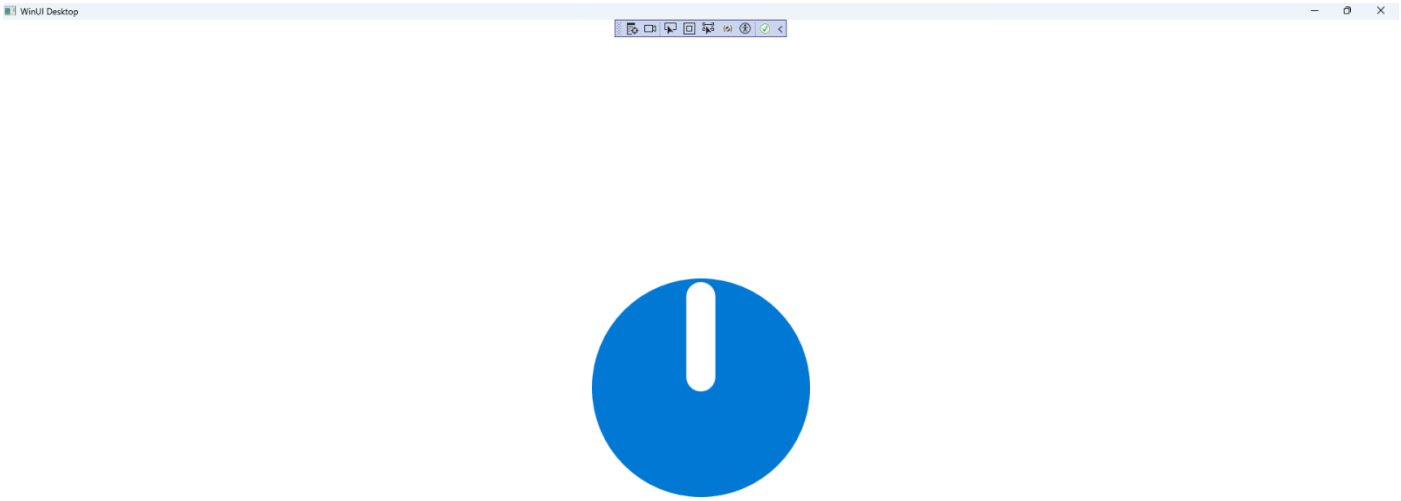
```
private void myButton_Click(object sender, RoutedEventArgs e)
{
    myButton.Content = "Clicked";
}
```

Step 17

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

Step 18

Once running you will see the **Dial Control** displayed, then you can rotate it to set the **Value** for the **Dial**.



Step 19

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!