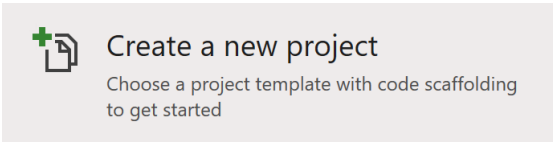
Universal Windows Platform – Lucky Dominoes

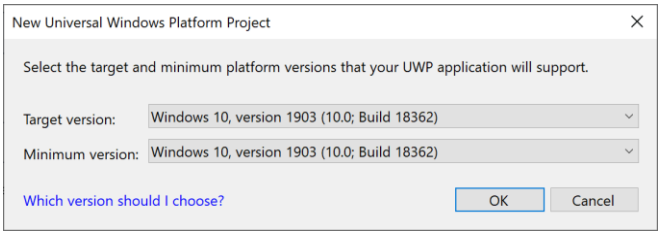
Lucky Dominoes shows how to create the look-and-feel of a **Domino** as well as obeying the rules of one and could for the basis of any **Domino** based game

Step 1



Follow **Setup and Start** on how to Install and/or Get Started with **Visual Studio 2019** if not already or in **Windows 10** choose **Start**, find and select **Visual Studio 2019** then from the **Get started** screen select **Create a new project**

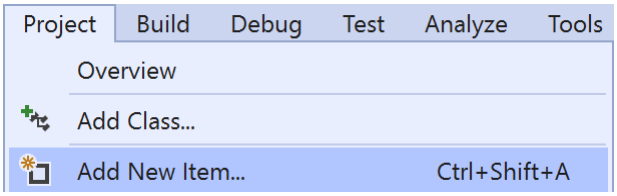
Then choose **Blank App (Universal Windows)** and select **Next** and then in **Configure your new project** enter the **Project name** as **LuckyDominoes** and select **Create**



Finally, in **New Universal Windows Platform Project** pick the **Target version** and **Minimum version** to be at least **Windows 10, version 1903 (10.0; Build 18362)** and then select **OK**

Target Version will control the most recent features of Windows 10 your application can use. To make sure you always have the most recent version, check for any Notifications or Updates in Visual Studio 2019

Step 2



Choose **Project** then **Add New Item...** from the **Menu** in **Visual Studio 2019**

Step 3

Then choose **Code File** from **Add New Item** in **Visual Studio 2019**, enter the **Name** as **Library.cs** and select **Add**

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Step 4

In the **Code** View of **Library.cs** will be displayed and in this the following should be entered:

```
using System;
using System.Collections.Generic;
using System.Linq;
using Windows.UI;
using Windows.UI.Xaml;
using Windows.UI.Xaml.Controls;
using Windows.UI.Xaml.Media;
using Windows.UI.Xaml.Shapes;

public class Library
{
    private const int size = 3;
    private const string set_one = "one";
    private const string set_two = "two";
    private const string name_upper = "upper";
    private const string name_lower = "lower";

    private readonly string[] tiles =
    {
        "0,0",
        "0,1", "1,1",
        "0,2", "1,2", "2,2",
        "0,3", "1,3", "2,3", "3,3",
        "0,4", "1,4", "2,4", "3,4", "4,4",
        "0,5", "1,5", "2,5", "3,5", "4,5", "5,5",
        "0,6", "1,6", "2,6", "3,6", "4,6", "5,6", "6,6"
    };
    private readonly byte[][] layout =
    {
                  // a, b, c, d, e, f, g, h, i
        new byte[] { 0, 0, 0, 0, 0, 0, 0, 0, 0 }, // 0
        new byte[] { 0, 0, 0, 0, 1, 0, 0, 0, 0 }, // 1
        new byte[] { 1, 0, 0, 0, 0, 0, 0, 0, 1 }, // 2
        new byte[] { 1, 0, 0, 0, 1, 0, 0, 0, 1 }, // 3
        new byte[] { 1, 0, 1, 0, 0, 0, 1, 0, 1 }, // 4
        new byte[] { 1, 0, 1, 0, 1, 0, 1, 0, 1 }, // 5
        new byte[] { 1, 0, 1, 1, 0, 1, 1, 0, 1 }, // 6
    };
    private readonly string[] tags =
    {
        "a", "b", "c", "d", "e", "f", "g", "h", "i"
    };

    private int _turns = 0;
    private List<int> _one = new List<int>();
    private List<int> _two = new List<int>();
    private Random _random = new Random((int)DateTime.Now.Ticks);

}
```

There are `using` statements to include necessary functionality. `layout` is a `byte[][]` is a two-dimensional array of values that will represent which row and column of pips will be displayed on the upper or lower portion of a domino and `Random` is used to create the numbers for the domino

Then below the **`private Random _random = new Random((int)DateTime.UtcNow.Ticks);`** line the following **methods** should be entered:

```
private Color Colour(string resource)
{
    return (Color)Application.Current.Resources[resource];
}

private Brush Background()
{
    return new LinearGradientBrush(new GradientStopCollection()
    {
        new GradientStop()
        {
            Color = Colour("SystemAccentColorLight3"),
            Offset = 0.0
        },
        new GradientStop()
        {
            Color = Colour("SystemAccentColorDark3"),
            Offset = 1.0
        }
    }, 90);
}
```

`Colour` method is used to return `Color` resource and `Background` method is used to create a `LinearGradientBrush` using that method

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Next below the **`private void Background() { ... }` method** the following **methods** should be entered:

```
private List<int> Choose(int total)
{
    return Enumerable.Range(0, total)
    .OrderBy(r => _random.Next(0, total)).ToList();
}

private void Add(Grid grid, int row, int column, string name)
{
    Ellipse element = new Ellipse()
    {
        Name = name,
        Opacity = 0,
        Margin = new Thickness(5),
        Fill = new SolidColorBrush(Colors.WhiteSmoke)
    };
    element.SetValue(Grid.ColumnProperty, column);
    element.SetValue(Grid.RowProperty, row);
    grid.Children.Add(element);
}
```

`Choose` method is used to get a randomised `List` of `int` using `Enumerable` and `Add` method is used to create the `Ellipse` to represent the pips of the domino

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After the `private void Add(...) { ... }` **method** the following **methods** should be entered:

```
private Grid Portion(string name)
{
    Grid grid = new Grid()
    {
        Name = name,
        Width = 100,
        Height = 100,
        Background = Background(),
        Padding = new Thickness(5),
    };
    // Setup Grid
    for (int index = 0; (index < size); index++)
    {
        grid.RowDefinitions.Add(new RowDefinition());
        grid.ColumnDefinitions.Add(new ColumnDefinition());
    }
    int count = 0;
    // Setup Layout
    for (int row = 0; (row < size); row++)
    {
        for (int column = 0; (column < size); column++)
        {
            Add(grid, row, column, $"{name}.{tags[count]}");
            count++;
        }
    }
    return grid;
}
```

`Portion` method is used to create the layout of part of a domino by using the `Add` method

Then after the **`private Grid Portion(...) { ... }` method** the following **methods** should be entered:

```
private StackPanel Domino(string name)
{
    StackPanel panel = new StackPanel()
    {
        Margin = new Thickness(25),
        Orientation = Orientation.Vertical
    };
    panel.Children.Add(Portion($"{name}.{name_upper}"));
    panel.Children.Add(Portion($"{name}.{name_lower}"));
    return panel;
}

private void Layout(Grid grid)
{
    StackPanel panel = new StackPanel()
    {
        Orientation = Orientation.Horizontal
    };
    panel.Children.Add(Domino(set_one));
    panel.Children.Add(Domino(set_two));
    grid.Children.Add(panel);
}
```

`Domino` method uses the `Portion` method to create the layout of a domino using a `StackPanel` and then is used by `Layout` method to create a pair of dominoes on another `StackPanel`

Next after the `private void Layout(...) { ... }` **method** the following **methods** should be entered:

```
private void SetPortion(Grid grid, string name, int value)
{
    for (int i = 0; i < tags.Length; i++)
    {
        ((UIElement)grid.FindName($"{name}.{tags[i]}"))
        .Opacity = layout[value][i];
    }
}

private void Set(Grid grid, string name, string tile)
{
    string[] pair = tile.Split(',');
    SetPortion(grid, $"{name}.{name_upper}", int.Parse(pair[0]));
    SetPortion(grid, $"{name}.{name_lower}", int.Parse(pair[1]));
}
```

`SetPortion` method is used to set the `Opacity` of an element and `Set` method is used to update the value of a domino using the `SetPortion` method

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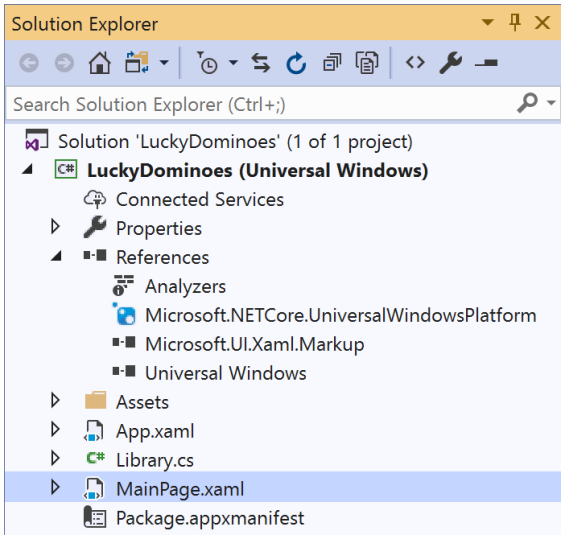
Finally after **`private void Set(...) { ...}` method** the following `public` **methods** should be entered:

```
public void New(Grid grid)
{
    Layout(grid);
    _turns = tiles.Count() - 1;
    _one = Choose(tiles.Count());
    _two = Choose(tiles.Count());
}

public void Play(Grid grid)
{
    if (!grid.Children.Any()) New(grid);
    if (_turns > 0)
    {
        Set(grid, set_one, tiles[_one[_turns]]);
        Set(grid, set_two, tiles[_two[_turns]]);
        _turns--;
    }
    else
    {
        New(grid);
    }
}
```

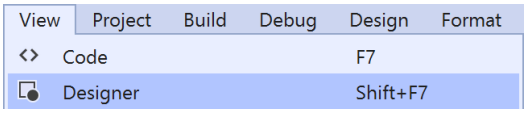
`New` method will setup the layout of the `Grid` using the `Layout` method and select the randomised values to display on a domino and `Play` method will use the `Set` method to display the value of a domino until there's no more to display

Step 5



In the **Solution Explorer** of **Visual Studio 2019** select **MainPage.xaml**

Step 6



Choose **View** then **Designer** from the **Menu** in **Visual Studio 2019**

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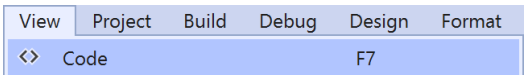
Step 7

In the **Design** View and **XAML** View of **Visual Studio 2019** will be displayed, and in this between the **`Grid`** and **`/Grid`** elements enter the following **XAML**:

```
<Viewbox>
    <Grid Margin="50" Name="Display"
    HorizontalAlignment="Center"
    VerticalAlignment="Center"/>
</Viewbox>
<CommandBar VerticalAlignment="Bottom">
    <AppBarButton Icon="Page2" Label="New" Click="New_Click"/>
    <AppBarButton Icon="Play" Label="Play" Click="Play_Click"/>
</CommandBar>
```

The first block of XAML the main user interface features a Grid with two Grid Controls within to represent the dominoes. The second block of XAML is the CommandBar which contains New to reset the game and Play to show the dominoes

Step 8



Choose **View** then **Code** from the **Menu** in **Visual Studio 2019**

Step 9

Once in the **Code** View, below the end of **`public MainPage() { ... }`** the following Code should be entered:

```
Library library = new Library();

private void New_Click(object sender, RoutedEventArgs e)
{
    library.New(Display);
}

private void Play_Click(object sender, RoutedEventArgs e)
{
    library.Play(Display);
}
```

Below the MainPage method an instance of the `Library` class is created. In the `New_Click(...)` Event handler will setup the game with the `New` method, and `Play_Click(...)` will call the `Play` method in the `Library` class

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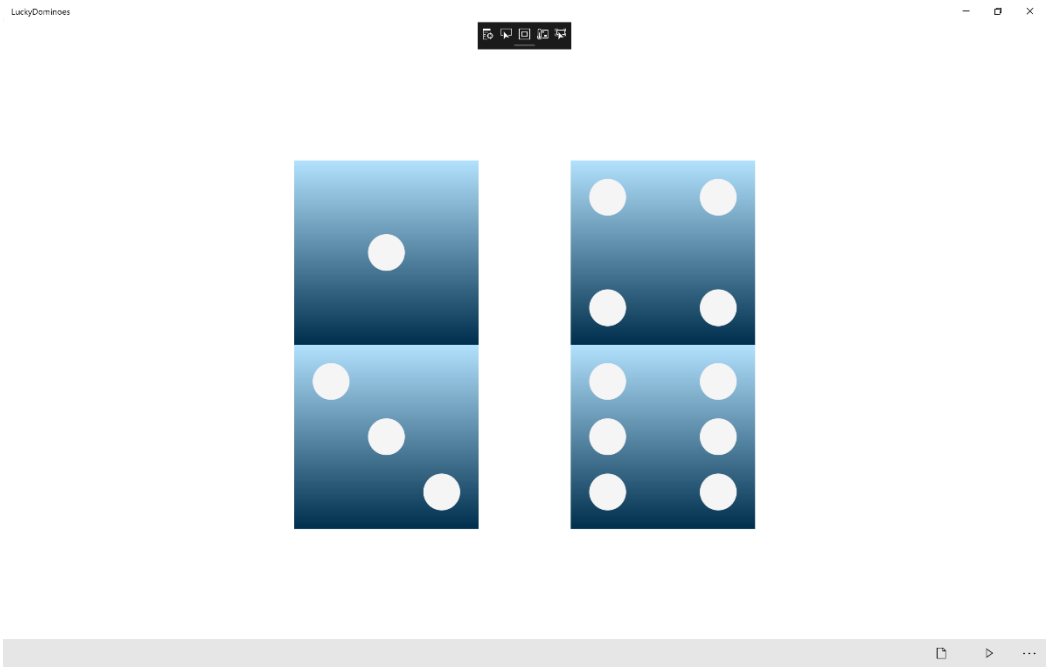
Step 10

That completes the **Universal Windows Platform** Application, in **Visual Studio 2019** select **Local Machine** to run the Application

Step 11

Once the Application is running you can then use **New** to start then **Play** to set each **Domino** to a random selection of all the possible values of a **Domino**



Step 12

To Exit the Application, select the **Close** button in the top right of the Application