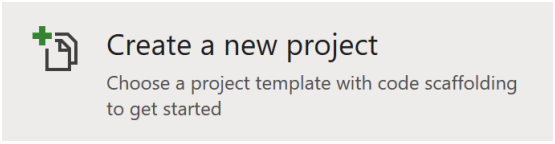
Universal Windows Platform – Touch Game

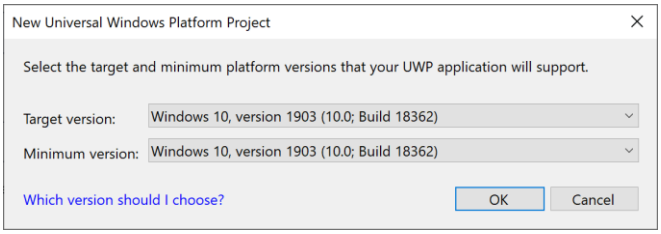
Touch Game shows how to use a **Grid** to implement a Touch-based pattern matching game

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**

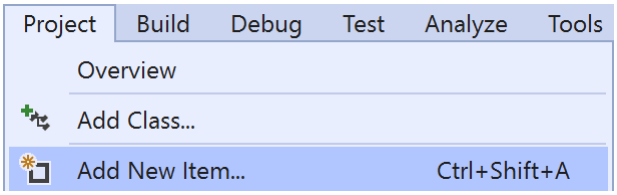
Then choose **Blank App (Universal Windows)** and select **Next** and then in **Configure your new project** enter the **Project name** as **TouchGame** and select **Create**



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.Popups;
using Windows.UI.Xaml;
using Windows.UI.Xaml.Controls;
using Windows.UI.Xaml.Media;

public class Library
{
    private const string title = "Touch Game";
    private const int size = 2;
    private const int speed = 800;
    private const int light = 400;
    private const int click = 200;
    private const int level = 100;
    private readonly Dictionary<int, string> _square =
        new Dictionary<int, string>()
    {
        { 0, "\U0001F7E5" }, // Red Square
        { 1, "\U0001F7E6" }, // Blue Square
        { 2, "\U0001F7E9" }, // Green Square
        { 3, "\U0001F7E8" }, // Yellow Square
    };

    private int _turn = 0;
    private int _count = 0;
    private bool _play = false;
    private bool _isTimer = false;
    private List<int> _items = new List<int>();
    private DispatcherTimer _timer = new DispatcherTimer();
    private Random _random = new Random((int)DateTime.Now.Ticks);


}
```

There are `using` statements to include necessary functionality. `_suits` is a `Dictionary<int, string>` represents the different coloured squares that will be shown and `Random` is used to create the numbers for the game

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

```
public void Show(string content, string title)
{
    _ = new MessageDialog(content, title).ShowAsync();
}

private List<int> Choose(int start, int finish, int total)
{
    int number;
    List<int> numbers = new List<int>();
    while (numbers.Count < total) // Select Numbers
    {
        // Random non-unique Number between Start and Finish
        number = _random.Next(start, finish + 1);
        numbers.Add(number); // Add Number
    }
    return numbers;
}
```

`Show` method is used to display a basic `MessageDialog` and `Choose` method is use to pick a set of randomised numbers

Next below the `private List<int> Choose(...) { ... }` **method** the following **method** should be entered:

```
private Viewbox Square(int value)
{
    TextBlock textblock = new TextBlock()
    {
        Text = _square[value],
        IsColorFontEnabled = true,
        TextLineBounds = TextLineBounds.Tight,
        FontFamily = new FontFamily("Segoe UI Emoji"),
        HorizontalTextAlignment = TextAlignment.Center
    };
    return new Viewbox()
    {
        Child = textblock
    };
}
```

`Square` method is used to create a `TextBlock` which be used for each of the squares of the game

After the **`private Viewbox Square(...) { ... }` method** the following **method** should be entered:

```
private void Score(int value)
{
    if (value == _items[_count])
    {
        if (_count < _turn)
        {
            _count++;
        }
        else
        {
            _isTimer = true;
            _play = false;
            _count = 0;
            _turn++;
        }
    }
    else
    {
        Show($"Game Over! You scored {_turn}!", title);
        _isTimer = false;
        _play = false;
        _count = 0;
        _turn = 0;
        _timer.Stop();
    }
}
```

`Score` method is used to work out the score for the game and also set other member values

Then after the **`private void Score(...) { ... }` method** the following **method** should be entered:

```
private void Set(Grid grid, int value, int period)
{
    Button button = (Button)grid.Children.Single(s =>
        (int)((Button)s).Tag == value);
    button.Opacity = 0.25;
    DispatcherTimer opacity = new DispatcherTimer()
    {
        Interval = TimeSpan.FromMilliseconds(period)
    };
    opacity.Tick += (object sender, object e) =>
    {
        button.Opacity = 1.0;
        opacity.Stop();
    };
    opacity.Start();
}
```

`Set` method is used to setup the indication of a square of the game being selected

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

```
private void Tick(Grid grid)
{
    if (_isTimer)
    {
        if (_count <= _turn)
        {
            Set(grid, _items[_count], light);
            _count++;
        }
        if (_count > _turn)
        {
            _isTimer = false;
            _play = true;
            _count = 0;
        }
    }
}
```

`Tick` method is used to call the `Set` method

Then after **`private void Tick(...) { ...}` method** the following **method** should be entered:

```
private void Add(Grid grid, int row, int column, int count)
{
    Button button = new Button()
    {
        Tag = count,
        Width = 100,
        Height = 100,
        Content = Square(count),
        Margin = new Thickness(5)
    };
    button.Click += (object sender, RoutedEventArgs e) =>
    {
        if (_play)
        {
            int value = (int)((Button)sender).Tag;
            Set(grid, value, click);
            Score(value);
        }
    };
    button.SetValue(Grid.ColumnProperty, column);
    button.SetValue(Grid.RowProperty, row);
    grid.Children.Add(button);
}
```

`Add` method will setup a `Button` and the `Click` event handler

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

```
private void Layout(ref Grid grid)
{
    grid.Children.Clear();
    grid.RowDefinitions.Clear();
    grid.ColumnDefinitions.Clear();
    // Setup Grid
    for (int index = 0; (index < size); index++)
    {
        grid.RowDefinitions.Add(new RowDefinition());
        grid.ColumnDefinitions.Add(new ColumnDefinition());
    }
    int count = 0;
    // Setup Board
    for (int column = 0; (column < size); column++)
    {
        for (int row = 0; (row < size); row++)
        {
            Add(grid, row, column, count);
            count++;
        }
    }
}
```

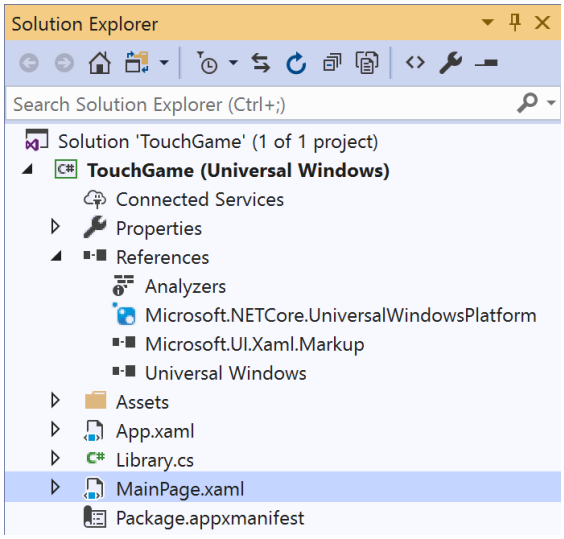
`Layout` method will setup the layout of the game and the board

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

```
public void New(Grid grid)
{
    Layout(ref grid);
    _items = Choose(0, 3, level);
    _play = false;
    _turn = 0;
    _count = 0;
    _isTimer = true;
    _timer = new DispatcherTimer
    {
        Interval = TimeSpan.FromMilliseconds(speed)
    };
    _timer.Tick += (object sender, object e) =>
    {
        Tick(grid);
    };
    _timer.Start();
}
```

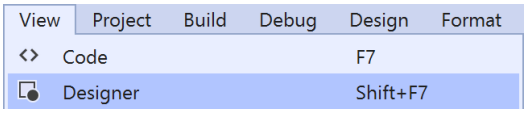
`New` method will setup and start playing the game by calling `Layout` and `Choose` methods

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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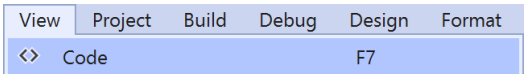
Step 7

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

The first block of XAML the main user interface features a Grid to represent the game and the second block of XAML is the CommandBar which contains New to setup and start the game

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);
}
```

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 in the **`Library`** class

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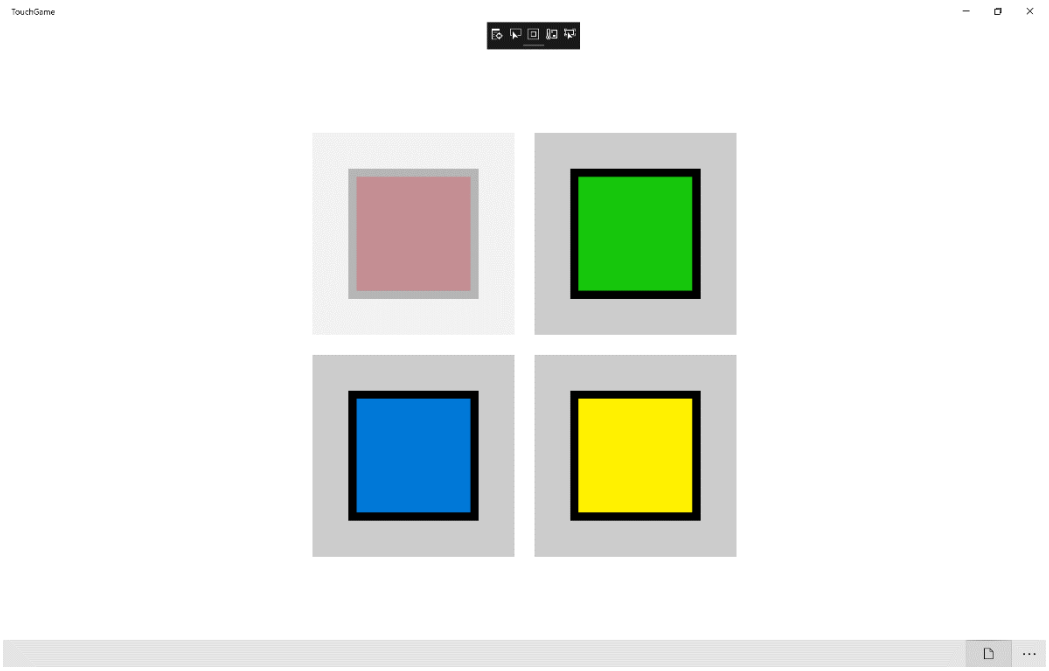
Step 10

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 click the **New** Button, then one of the squares will highlight, select the correct one, then each time one more square will highlight each turn, match the patterns to continue



Step 12

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