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tutorial

Windows App SDK

Touch Game

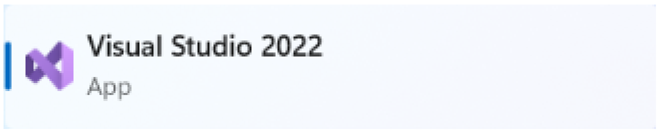
Touch Game

Touch Game shows how you can create a pattern matching game using a toolkit from **NuGet** using the **Windows App SDK**.

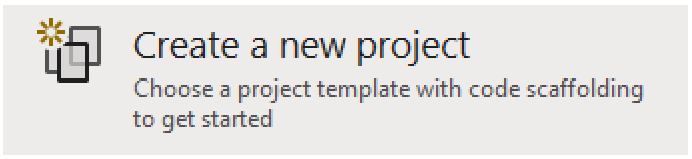
Step 1

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

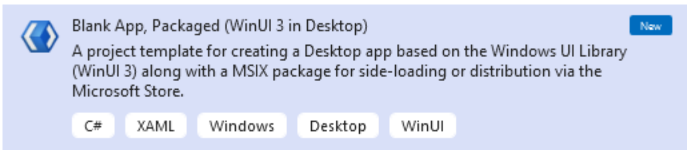
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



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**.

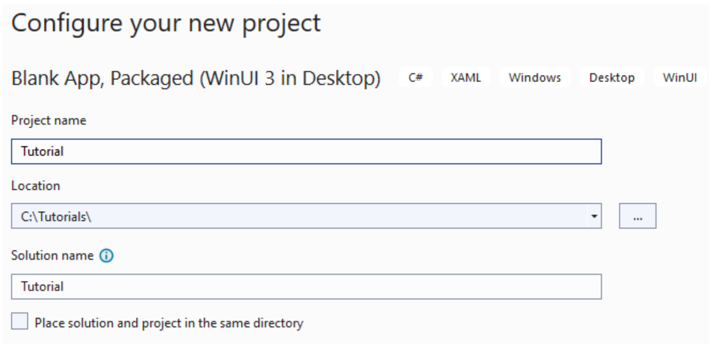

Blank App, Packaged (WinUI 3 in Desktop)

New

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.

C# XAML Windows Desktop WinUI

After that in **Configure your new project** type in the **Project name** as *TouchGame*, 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

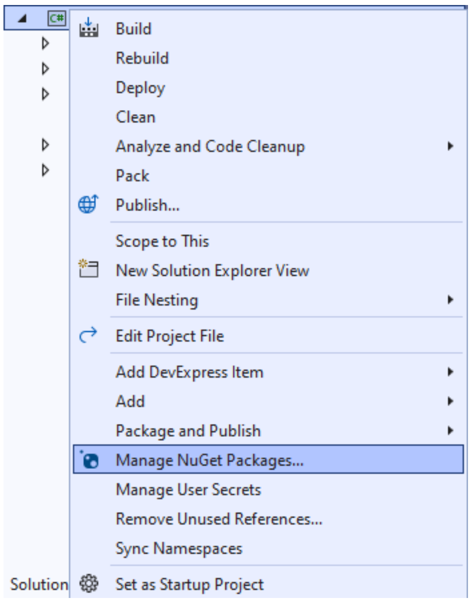
Location: C:\Tutorials\

Solution name: Tutorial

☐ Place solution and project in the same directory

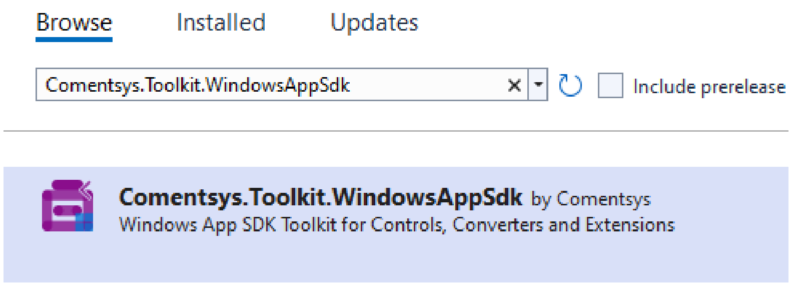
Step 2

Then in **Visual Studio** within **Solution Explorer** for the **Solution**, right click on the **Project** shown below the **Solution** and then select **Manage NuGet Packages...**



Step 3

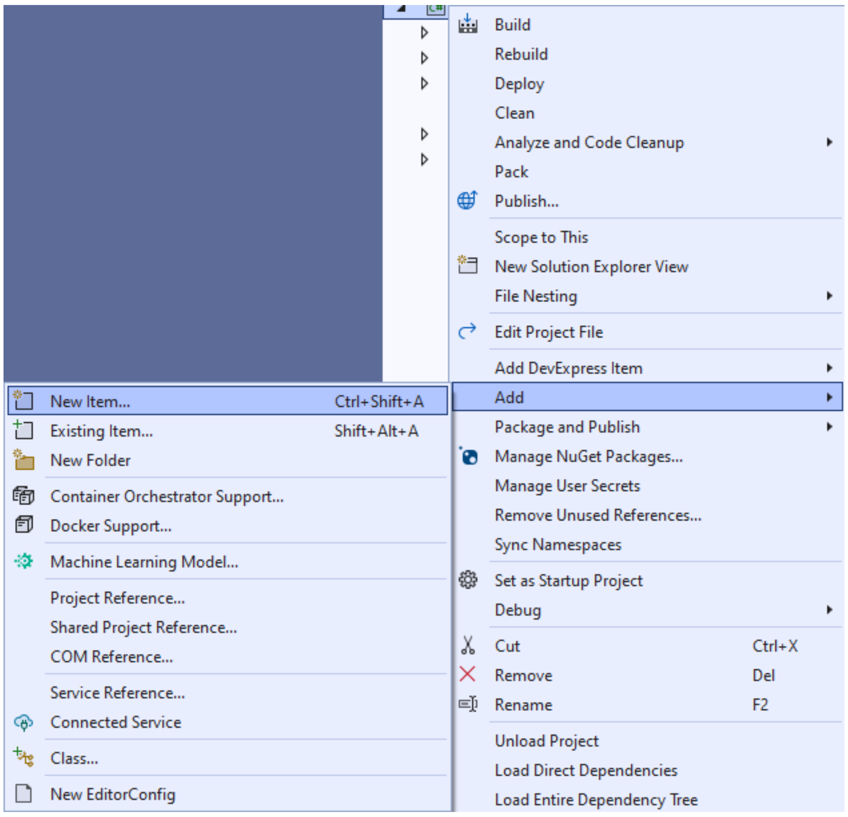
Then in the **NuGet Package Manager** from the **Browse** tab search for **Comentsys.Toolkit.WindowsAppSdk** and then select **Comentsys.Toolkit.WindowsAppSdk by Comentsys** as indicated and select **Install**


Browse
Installed
Updates
Comentsys.Toolkit.WindowsAppSdk
Include prerelease
Comentsys.Toolkit.WindowsAppSdk by Comentsys
Windows App SDK Toolkit for Controls, Converters and Extensions

This will add the package for **Comentsys.Toolkit.WindowsAppSdk** to your **Project**. If you get the **Preview Changes** screen saying **Visual Studio is about to make changes to this solution. Click OK to proceed with the changes listed below.** You can read the message and then select **OK** to **Install** the package, then you can close the **tab** for **Nuget: TouchGame** by selecting the **x** next to it.

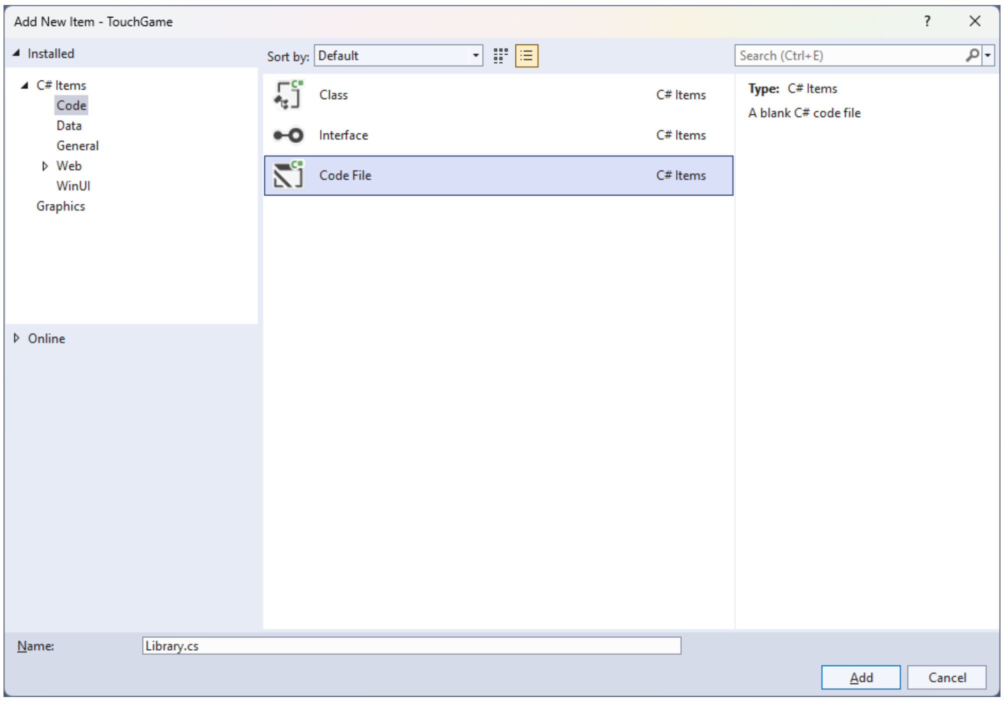
Step 4

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 5

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 *Library.cs* and then **Click** on **Add**.



Step 6

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

```
using Comentsys.Toolkit.WindowsAppSdk;
using Microsoft.UI;
using Microsoft.UI.Xaml;
using Microsoft.UI.Xaml.Controls;
using Microsoft.UI.Xaml.Media;
using System;
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
using Windows.UI;

public class Library
{
    private const string title = "Touch Game";
    private const int size = 2;
    private const int level = 10;
    private const int delay_duration = 250;
    private const int timer_duration = 500;
    private static readonly Dictionary<int, Color> _options = new()
    {
        { 0, Colors.Red },
        { 1, Colors.Blue },
        { 2, Colors.Green },
        { 3, Colors.Gold }
    };
    private readonly Random _random = new((int)DateTime.UtcNow.Ticks);

    private Grid _grid;
    private int _score;
    private bool _over;
    private int _index;
    private bool _playing = false;

    private Dialog _dialog;
    private DispatcherTimer _timer;
    private List<int> _values = new();

    // Choose, Option & Set

    // Play

    // Add & Layout

    // Tick & New

}
```

`Class` defined so far *Library.cs* has **`using`** for package of **`Comentsys.Toolkit.WindowsAppSdk`** and others. It also has **Constants** to represent things needed in the game and there are **Variables** to keep track of values used in the game and elements for the look-and-feel of the game.

Step 7

Still in the **Class** for *Library.cs* after the **Comment** of **// Choose, Option & Set** type the following **Methods**:

```
private List<int> Choose(int minimum, int maximum, int total)
{
    var choose = new List<int>();
    var values = Enumerable.Range(minimum, maximum).ToList();
    for(int index = 0; index < total; index++)
    {
        var value = _random.Next(0, values.Count);
        choose.Add(values[value]);
    }
    return choose;
}

private Viewbox Option(int option) => new()
{
    Child = new Piece()
    {
        IsSquare = true,
        Name = $"{option}",
        Stroke = new SolidColorBrush(_options[option])
    }
};

private async void Set(int option)
{
    var piece = _grid.FindName($"{option}") as Piece;
    piece.Fill = piece.Stroke;
    await Task.Delay(delay_duration);
    piece.Fill = null;
}
```

Choose is used to select a set of random numbers that are not unique. **Option** is used to get the **Piece** needed to show the pattern and **Set** is used to update the **Piece** to indicate a part of the pattern.

Step 8

While still in the **`Class`** for *Library.cs* after the **Comment** of **`// Play`** type in the following **Method**:

```
private void Play(int option)
{
    if (!_playing)
    {
        if (!_over)
        {
            var correct = _values[_index] == option;
            if (correct)
            {
                if (_index < _score)
                    _index++;
                else
                {
                    _score++;
                    if (_score < level)
                    {
                        _index = 0;
                        _timer.Start();
                    }
                    else
                        _over = true;
                }
            }
            else
                _over = true;
        }
        if (_over)
            _dialog.Show($"Game Over! You scored {_score} out of {level}!");
    }
}
```

`Play` is used set the option for the pattern along with checking to see how many correct patterns have been performed and will display a **`Dialog`** the score if the pattern is not correct or the game is over.

Step 9

While still in the **`Class`** for *Library.cs* after the **Comment** of **`// Add & Layout`** type in the following **Methods**:

```
private void Add(Grid grid, int row, int column, int option)
{
    Button button = new()
    {
        Width = 100,
        Height = 100,
        Tag = option,
        Content = Option(option),
        Margin = new Thickness(5)
    };
    button.Click += (object sender, RoutedEventArgs e) =>
        Play((int)((Button)sender).Tag);
    button.SetValue(Grid.ColumnProperty, column);
    button.SetValue(Grid.RowProperty, row);
    grid.Children.Add(button);
}

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

Add is used to setup the **Buttons** to input the pattern and will use the **Method** for **`Play`** when the event handler for **`Click`** is triggered and **Layout** will use **Add** to create the look-and-feel for the game.

Step 10

While still in the **`Class`** for *Library.cs* after the **Comment** of **`// Tick & New`** type the following **Methods**:

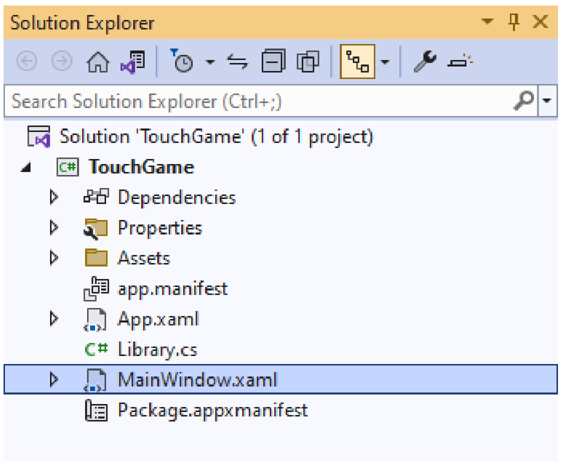
```
private void Tick()
{
    if (_index <= _score)
    {
        _playing = true;
        Set(_values[_index]);
        _index++;
    }
    else
    {
        _index = 0;
        _timer.Stop();
        _playing = false;
    }
}

public void New(Grid grid)
{
    _index = 0;
    _score = 0;
    _grid = grid;
    _over = false;
    Layout(grid);
    _dialog = new(grid.XamlRoot, title);
    _values = Choose(0, 3, level);
    _timer = new DispatcherTimer()
    {
        Interval = TimeSpan.FromMilliseconds(timer_duration)
    };
    _timer.Tick += (object sender, object e) =>
        Tick();
    _timer.Start();
}
```

`Tick` will display the pattern that needs to be duplicated using **`Set`** and **`New`** will setup and start a game.

Step 11

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



Step 12

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 13

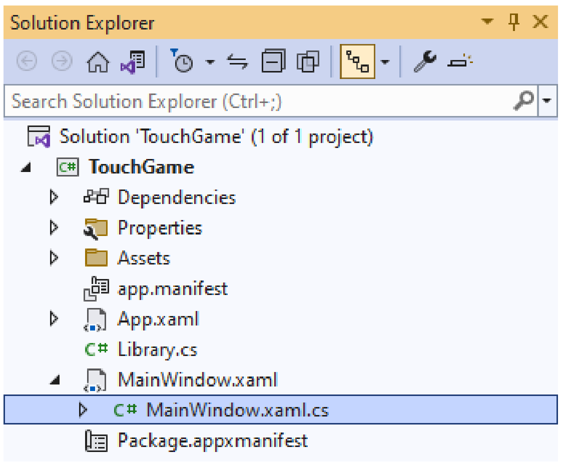
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

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

This **XAML** contains a **`Grid`** with a **`Viewbox`** which will scale a **`Grid`**. It has a **`Loaded`** event handler for **`New`** which is also shared by the **`AppBarButton`**.

Step 14

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 15

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 16

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

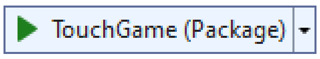
```
private readonly Library _library = new();

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

Here an **Instance** of the **Class** of **`Library`** is created then below this is the **Method** of **`New`** that will be used with **Event Handler** from the **XAML**, this **Method** uses Arrow Syntax with the **`=>`** for an Expression Body which is useful when a **Method** only has one line.

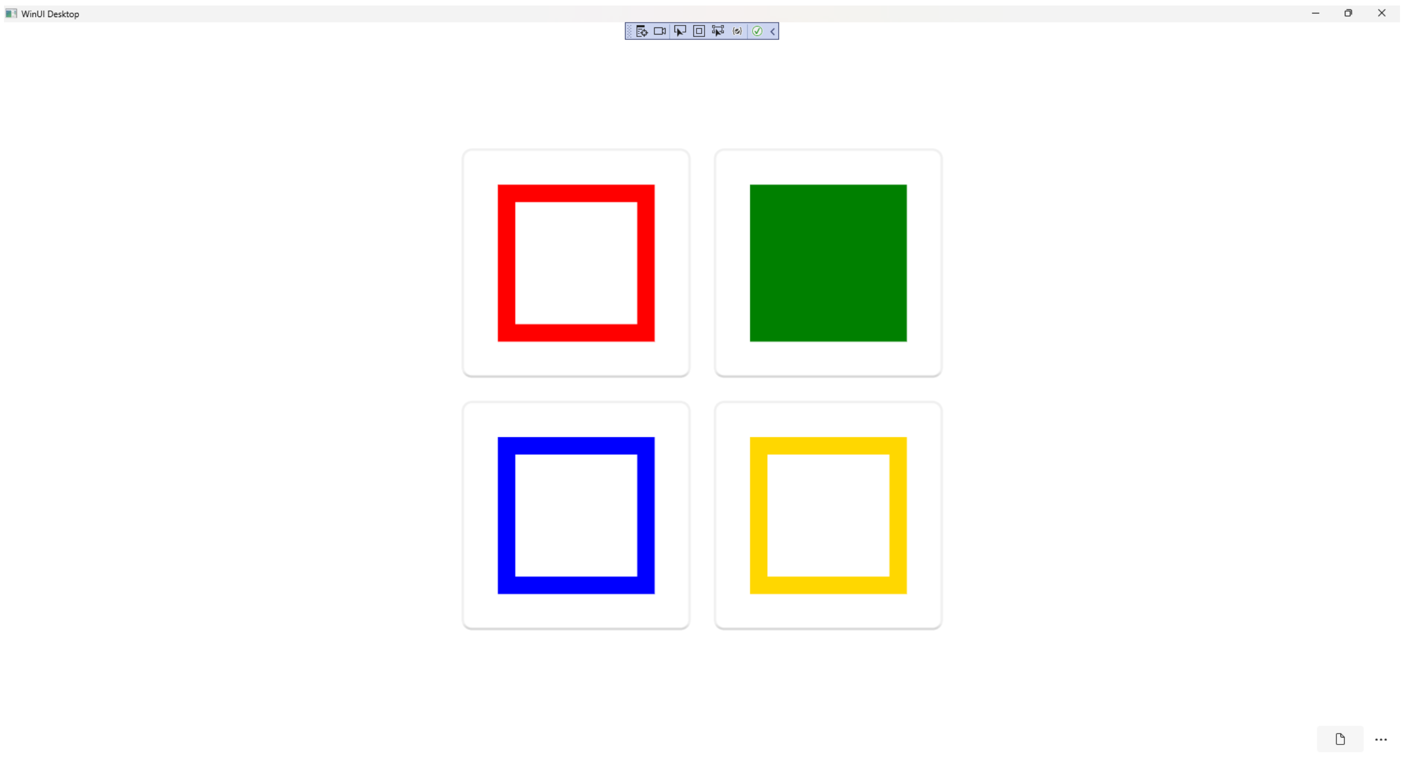
Step 17

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



Step 18

Once running you can then select any **`Button`** then one of the **Squares** will be highlighted, select the correct one, then each time one more **Square** will be highlighted each turn, match the pattern to continue but if you get it wrong you lose, or you can select *New* to start a new game.



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!