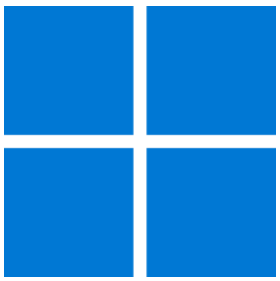
tutorial

Windows App SDK



Light Game

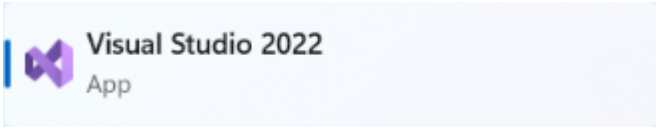
Light Game

Light Game how to create a simple game to toggle all the squares to **Yellow** from **Black** using a toolkit from **NuGet** using the **Windows App SDK**.

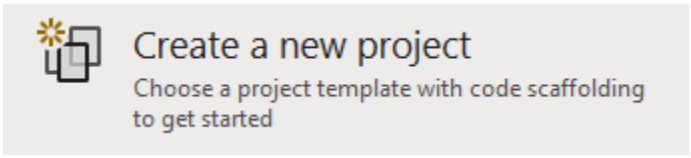
Step 1

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

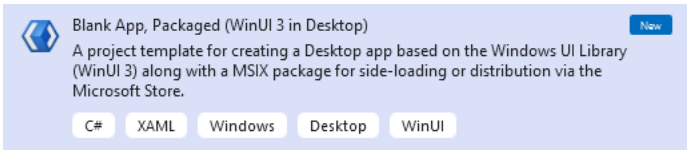
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



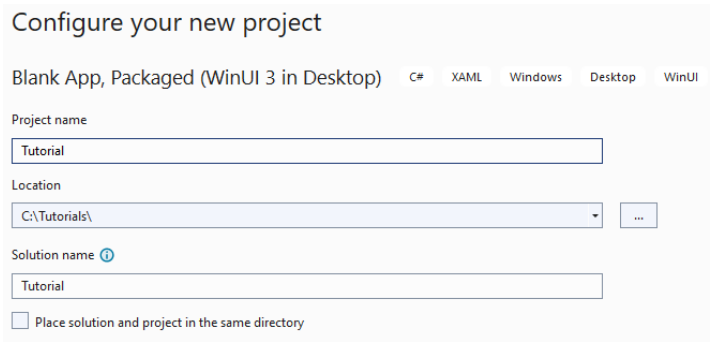
Once **Visual Studio 2022** has started select **Create a new project**.



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

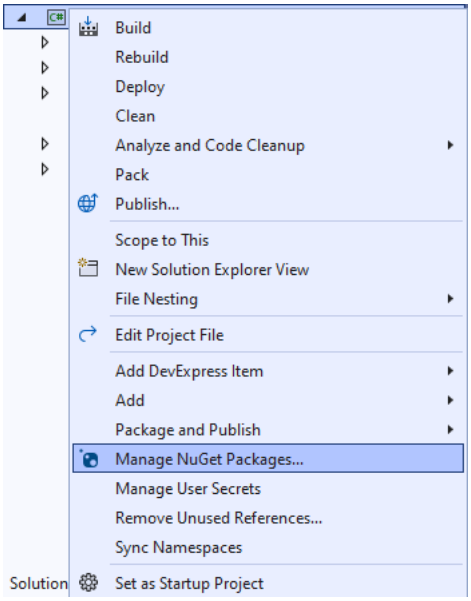


After that in **Configure your new project** type in the **Project name** as *LightGame*, then select a Location and then select **Create** to start a new **Solution**.



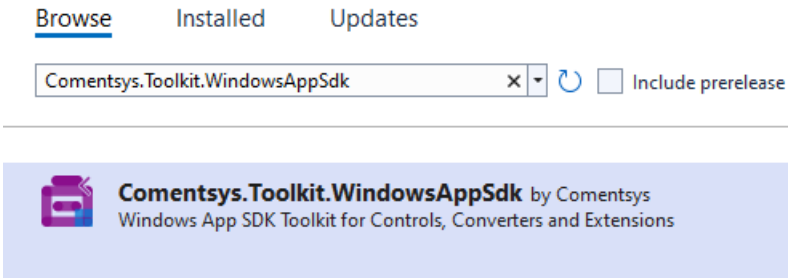
Step 2

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



Step 3

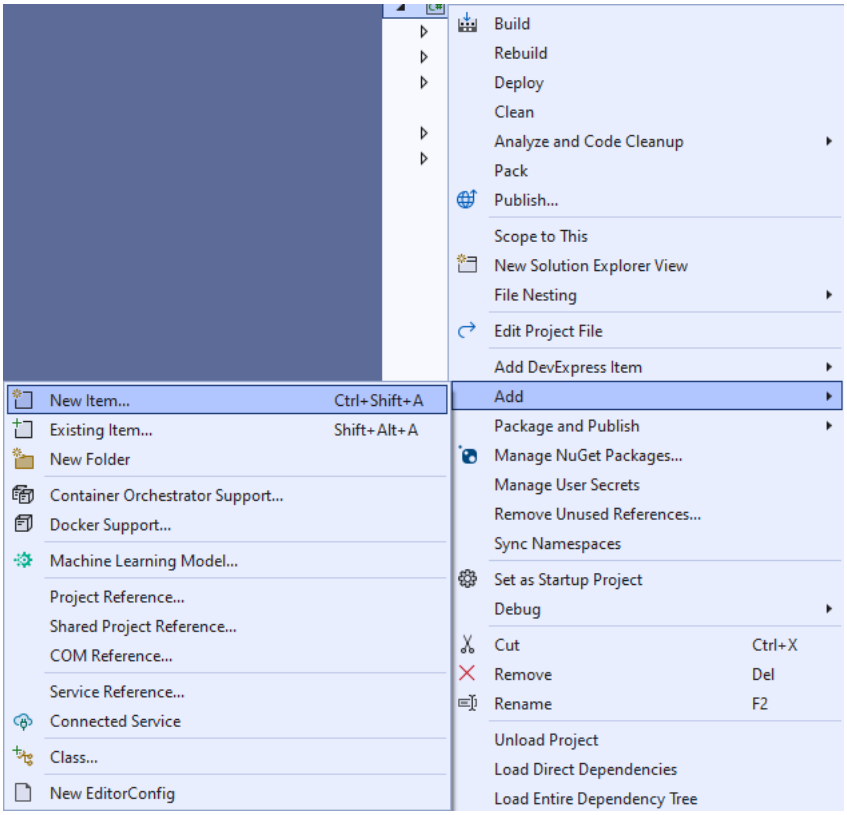
Then in the **NuGet Package Manager** from the **Browse** tab search for **Comentsys.Toolkit.WindowsAppSdk** and then select **Comentsys.Toolkit.WindowsAppSdk by Comentsys** as indicated and select **Install**



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: LightGame** by selecting the **x** next to it.

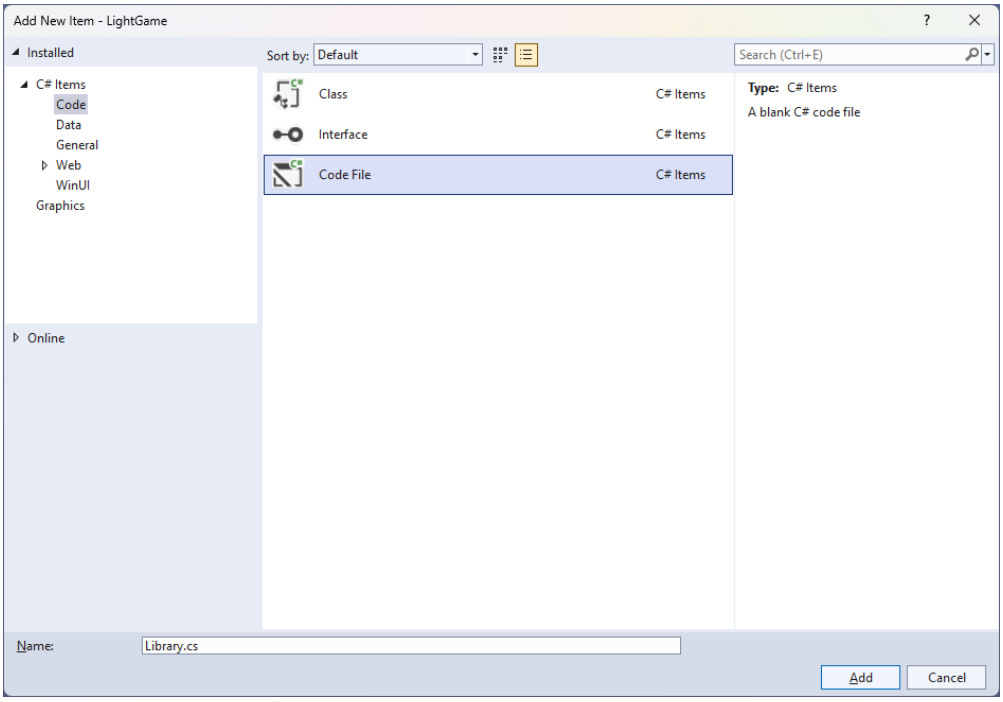
Step 4

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.Controls;
using Microsoft.UI.Xaml.Input;
using Microsoft.UI.Xaml.Media;
using Windows.UI;

public class Library
{
    private const string title = "Light Game";
    private const int on = 1;
    private const int off = 0;
    private const int size = 7;
    private readonly Color lightOn = Colors.Gold;
    private readonly Color lightOff = Colors.Black;
    private readonly int[,] _board = new int[size, size];

    private Grid _grid;
    private Dialog _dialog;
    private int _moves = 0;
    private bool _over = false;

    // Toggle, Set & Winner

    // Select & Add

    // Layout & 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 **`// Toggle, Set & Winner`** type the following **Methods**:

```
private void Toggle(int row, int column)
{
    _board[row, column] = _board[row, column] == on ? off : on;
    var piece = _grid.FindName($"{row}:{column}") as Piece;
    piece.Fill = _board[row, column] == on ?
    new SolidColorBrush(lightOn) :
    new SolidColorBrush(lightOff);
}

private void Set(int row, int column)
{
    Toggle(row, column);
    if (row > 0)
        Toggle(row - 1, column); // Toggle Left
    if (row < (size - 1))
        Toggle(row + 1, column); // Toggle Right
    if (column > 0)
        Toggle(row, column - 1); // Toggle Above
    if (column < (size - 1))
        Toggle(row, column + 1); // Toggle Below
}

private bool Winner()
{
    for (int row = 0; row < size; row++)
    {
        for (int column = 0; column < size; column++)
        {
            if (_board[column, row] == on)
            {
                return false;
            }
        }
    }
    return true;
}
```

`Toggle` is used to set the elements of the game between being **On** or **Yellow** or **Off** or **Black** then **`Set`** is used to toggle the elements of the game to the **Left**, **Right**, **Top** and **Bottom** of the element that has been toggled and **`Winner`** checks to see if the game is over.

Step 8

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

```
private void Select(Piece piece)
{
    if (!_over)
    {
        int row = (int)piece.GetValue(Grid.RowProperty);
        int column = (int)piece.GetValue(Grid.ColumnProperty);
        Set(row, column);
        _moves++;
        if (Winner())
        {
            _dialog.Show($"Well Done! You won in {_moves} moves!");
            _over = true;
        }
    }
    else
        _dialog.Show($"Game Over!");
}

private void Add(Grid grid, int row, int column)
{
    Piece piece = new()
    {
        Width = 50,
        Height = 50,
        IsSquare= true,
        Name = $"{row}:{column}",
        Fill = new SolidColorBrush(lightOn)
    };
    piece.Tapped += (object sender, TappedRoutedEventArgs e) =>
        Select(piece);
    piece.SetValue(Grid.ColumnProperty, column);
    piece.SetValue(Grid.RowProperty, row);
    grid.Children.Add(piece);
}
```

`Select` is used to check if the game is over and if not then will use **`Set`** to toggle elements of the game, then uses **`Winner`** to check if the game has been won.

Step 9

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

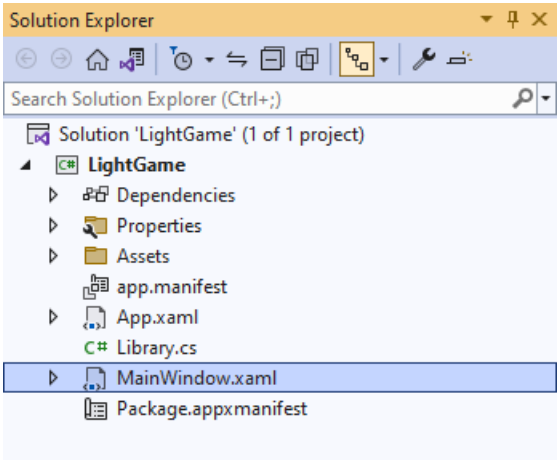
```
private void Layout(Grid grid)
{
    grid.Children.Clear();
    grid.RowDefinitions.Clear();
    grid.ColumnDefinitions.Clear();
    for (int index = 0; index < size; index++)
    {
        grid.RowDefinitions.Add(new RowDefinition());
        grid.ColumnDefinitions.Add(new ColumnDefinition());
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

public void New(Grid grid)
{
    _grid = grid;
    _moves = 0;
    _over = false;
    Layout(grid);
    _dialog = new Dialog(grid.XamlRoot, title);
    for (int column = 0; column < size; column++)
    {
        for (int row = 0; row < size; row++)
        {
            _board[column, row] = on;
        }
    }
}
```

`Layout` will create the look-and-feel for the game and **`New`** will start a game.

Step 10

Then from **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

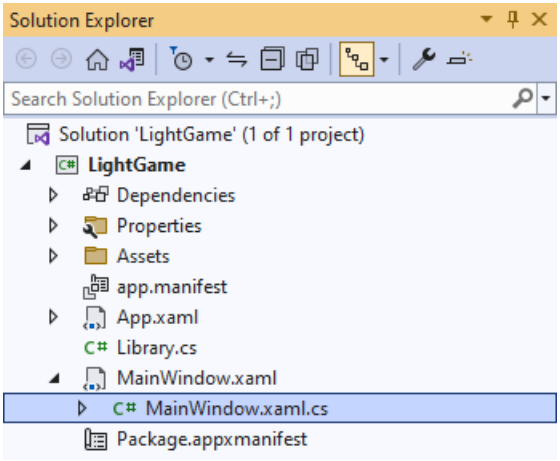
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<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 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

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);
```

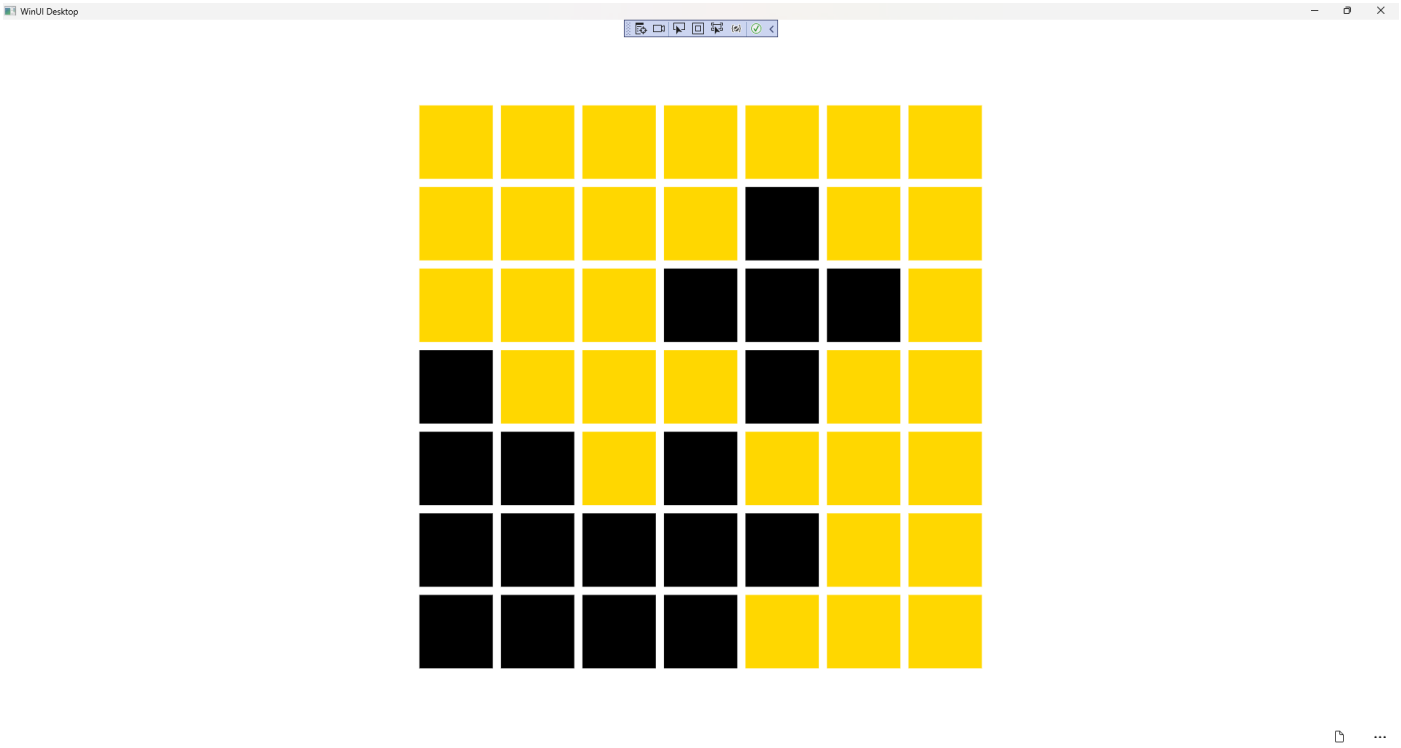
Here an **Instance** of the **Class** of **`Library`** is created then below this is the **Method** of **`New`** that will be used with **Event Handler** from the **XAML**, this **Method** uses Arrow Syntax with the **`=>`** for an Expression Body which is useful when a **Method** only has one line.

Step 16

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

Step 17

Once running you can then select any **Square** and you win by setting all the **Squares** that are **Yellow** to **Black** or you can select *New* to start a new game.



Step 18

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!