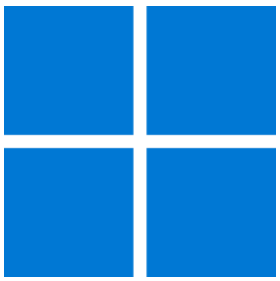
tutorial

Windows App SDK



Yatzy Game

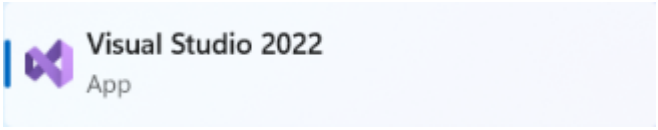
Yatzy Game

Yatzy Game shows how to create a dice game based on **Yacht** or **Yahtzee** using a toolkit from **NuGet** using the **Windows App SDK**.

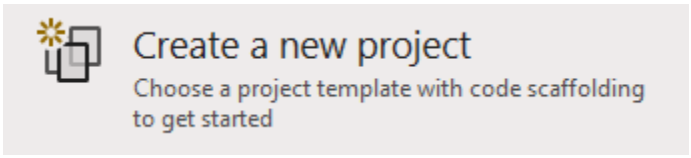
Step 1

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

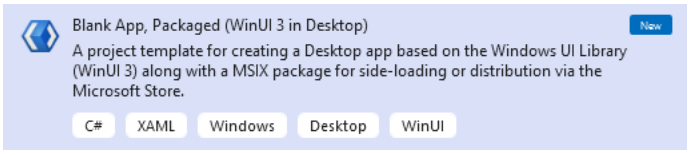
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



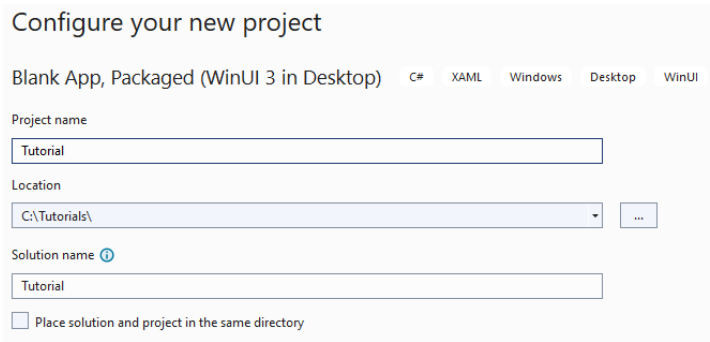
Once **Visual Studio 2022** has started select **Create a new project**.



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

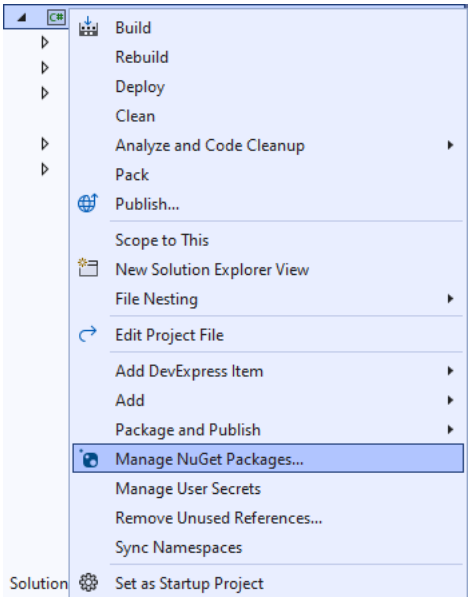


After that in **Configure your new project** type in the **Project name** as *YatzyGame*, then select a Location and then select **Create** to start a new **Solution**.



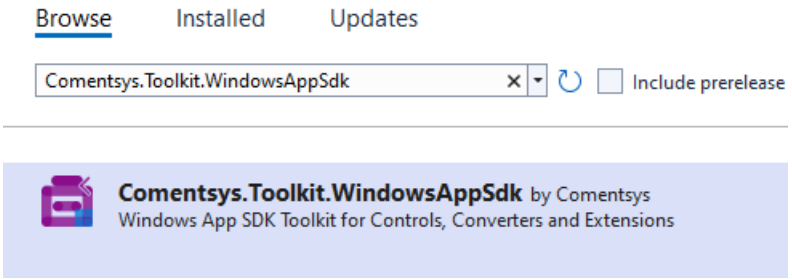
Step 2

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

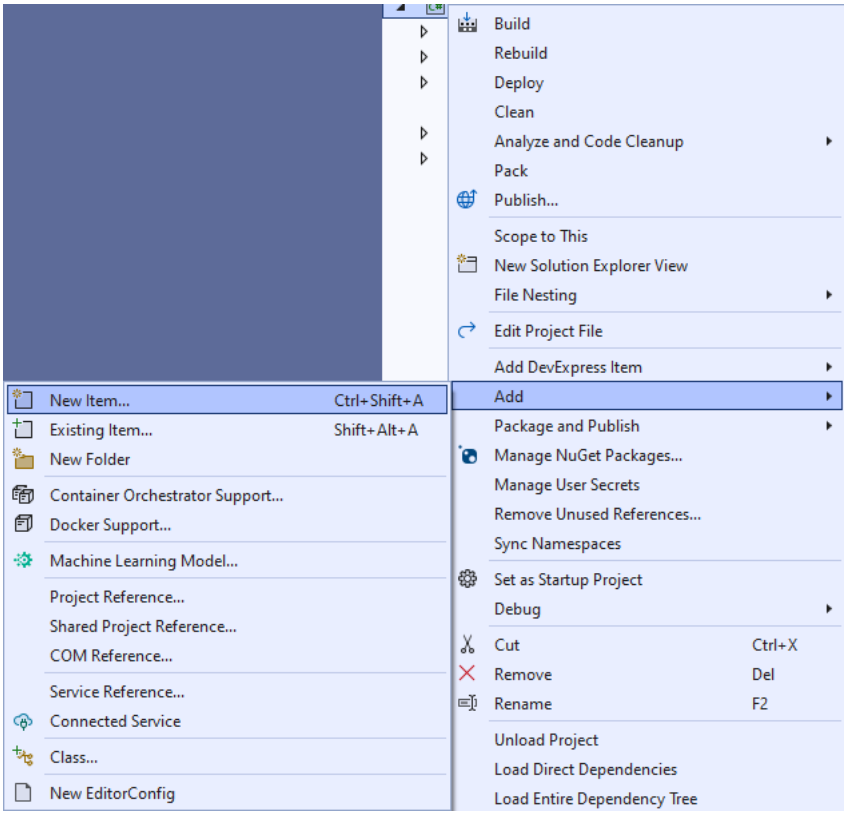
Then in the **NuGet Package Manager** from the **Browse** tab search for **Comentsys.Toolkit.WindowsAppSdk** and then select **Comentsys.Toolkit.WindowsAppSdk by Comentsys** as indicated and select **Install**



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

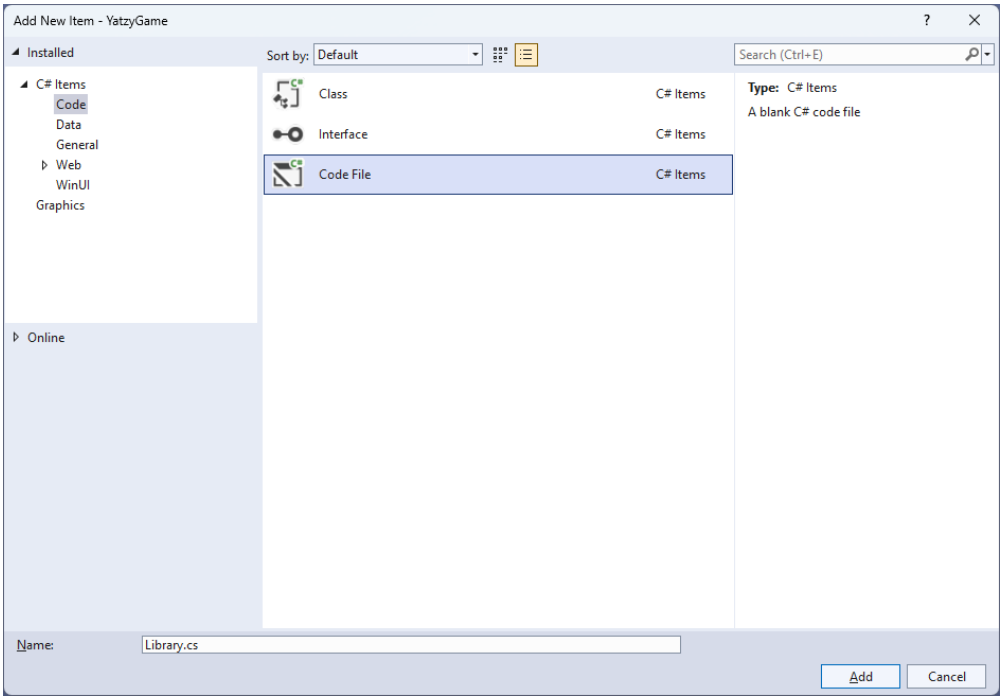
Step 4

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* and then you need to type the following **Code**:

```
// Usings & Namespace

public enum ScoreType
{
    AcesScore, TwosScore, ThreesScore, FoursScore, FivesScore,
    SixesScore, UpperTotalScore, UpperTotalBonusScore, ThreeOfAKindScore,
    FourOfAKindScore, FullHouseScore, SmallStraightScore, LargeStraightScore,
    YahtzeeScore, ChanceScore, YahtzeeBonusScore, LowerTotalScore, TotalScore
}

// Extensions Class

// Item Class

// Option Class

public class Calculate
{
    // Calculate GetAddUp, GetOfAKind & GetFullHouse Method

    // Calculate GetSmallStraight & GetLargeStraight Method

    // Calculate Get GetYahtzee & GetChance Method

}

public class Board // : ActionCommandObservableBase
{
    // Board Constants, Variables, Properties and Choose, SetScore & GetScore Method

    // Board Clear & Reset Method

    // Board SetTotal & AddUpDice Method

    // Board SetValueOfAKind Method

    // Board SetItemScore Method

    // Board SetYahtzee Method

    // Board SetChance, SetBonus & New Method

    // Board Roll Method

    // Board Constructor
}

// OptionTemplateSelector Class

// Library Class
```

Step 7

Still in *Library.cs* you will define a **namespace** which allows classes to be defined together, usually each is separate but will be defined in *Library.cs* along with adding **using** statements below the **Comment** of **// Usings & Namespace** by typing the following **Code**:

```
using Comentsys.Toolkit.Binding;
using Comentsys.Toolkit.WindowsAppSdk;
using Microsoft.UI.Xaml;
using Microsoft.UI.Xaml.Controls;
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text.RegularExpressions;
using System.Threading.Tasks;

namespace YatzyGame;
```

The **using** statements including ones for the package of **Comentsys.Toolkit.Binding** and **Comentsys.Toolkit.WindowsAppSdk** along with the **namespace** for **YatzyGame**.

Step 8

Still in *Library.cs* for the **namespace** of **YatzyGame** in *Library.cs* you will define a **class** for **Extensions** after the **Comment** of **// Extensions Class** by typing the following:

```
public static class Extensions
{
    private const string space = " ";
    private const string score = "Score";
    private static readonly Regex regex = new(@"\p{Lu}\p{Ll}*");

    public static string Name(this ScoreType type) =>
        string.Join(space, regex
            .Matches(Enum.GetName(typeof(ScoreType), type)
                .Replace(score, string.Empty))
                    .Select(s => s.Value));

    public static string Name(this ScoreType type, int take) =>
        string.Join(space, regex
            .Matches(Enum.GetName(typeof(ScoreType), type))
                .Select(s => s.Value)
                    .Take(take));
}
```

Extensions will provide formatting capabilities for outputting the values for elements in the game.

Step 9

Still in *Library.cs* for the **namespace** of **YatzyGame** in *Library.cs* you will define a **class** for **Item** after the **Comment** of **// Item Class** by typing the following:

```
public class Item : ActionCommandObservableBase
{
    private int _value;
    private bool _hold;

    public int Index { get; }
    public int Value { get => _value; set => SetProperty(ref _value, value); }
    public bool Hold { get => _hold; set => SetProperty(ref _hold, value); }

    public Item(int index, Action<int> action) :
        base(new ActionCommandHandler((param) =>
        action((param as Item).Index),
        (param) => (param as Item).IsEnabled)) =>
        (Index, Value) = (index, index + 1);
}
```

Item has **Properties** for **Index**, **Value** and **State** plus uses **ActionCommandObservableBase** from the package of **Comentsys.Toolkit.WindowsAppSdk.**

Step 10

Still in *Library.cs* for the **namespace** of **YatzyGame** in *Library.cs* you will define a **class** for **Option** after the **Comment** of **// Option Class** by typing the following:

```
public class Option : ActionCommandObservableBase
{
    private int _score;

    public int Score { get => _score; set => SetProperty(ref _score, value); }
    public ScoreType Type { get; }
    public string Content => Type.Name();

    public Option(ScoreType type) : base(null) =>
        Type = type;

    public Option(ScoreType type, Action<object> action) :
        base(new ActionCommandHandler((param) =>
        action(null),
        (param) => (param as Option).IsEnabled)) =>
        Type = type;
}
```

Option has **Properties** for **Score**, **Type** and **Content** and also uses **ActionCommandObservableBase** from the package of **Comentsys.Toolkit.WindowsAppSdk.**

Step 11

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Calculate** after the **Comment** of **// Calculate GetAddUp, GetOfAKind & GetFullHouse Method** type the following **Methods**:

```
public static int GetAddUp(Item[] dice, int value)
{
    int sum = 0;
    foreach(var item in dice.Where(w => w.Value == value))
        sum += value;
    return sum;
}

public static int GetOfAKind(Item[] dice, int value)
{
    int sum = 0;
    bool result = false;
    for (int i = 1; i <= 6; i++)
    {
        int count = 0;
        for (int j = 0; j < 5; j++)
        {
            if (dice[j].Value == i)
                count++;
            if (count > value)
                result = true;
        }
    }
    if(result)
    {
        foreach (var item in dice)
            sum += item.Value;
    }
    return sum;
}

public static int GetFullHouse(Item[] dice)
{
    int sum = 0;
    int[] item = dice.Select(s => s.Value).ToArray();
    Array.Sort(item);
    if (((item[0] == item[1]) && (item[1] == item[2]) && // Three of a Kind
        (item[3] == item[4]) && // Two of a Kind
        (item[2] != item[3])) ||
        ((item[0] == item[1]) && // Two of a Kind
        (item[2] == item[3]) && (item[3] == item[4]) && // Three of a Kind
        (item[1] != item[2])))
        sum = 25;
    return sum;
}
```

GetAddUp will add up the values for the items, **GetOfAKind** will add up values for all the items of a given kind, passed in as value and **GetFullHouse** will see if the items make up a full house.

Step 12

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Calculate** after the **Comment** of **// Calculate GetSmallStraight & GetLargeStraight Method** type the following **Methods**:

```
public static int GetSmallStraight(Item[] dice)
{
    int sort = 0;
    int[] item = dice.Select(s => s.Value).ToArray();
    Array.Sort(item);
    for (int j = 0; j < 4; j++)
    {
        int value = 0;
        if (item[j] == item[j + 1])
        {
            value = item[j];
            for (int k = j; k < 4; k++)
                    item[k] = item[k + 1];
            item[4] = value;
        }
    }
    if (((item[0] == 1) && (item[1] == 2) && (item[2] == 3) && (item[3] == 4)) ||
        ((item[0] == 2) && (item[1] == 3) && (item[2] == 4) && (item[3] == 5)) ||
        ((item[0] == 3) && (item[1] == 4) && (item[2] == 5) && (item[3] == 6)) ||
        ((item[1] == 1) && (item[2] == 2) && (item[3] == 3) && (item[4] == 4)) ||
        ((item[1] == 2) && (item[2] == 3) && (item[3] == 4) && (item[4] == 5)) ||
        ((item[1] == 3) && (item[2] == 4) && (item[3] == 5) && (item[4] == 6)))
        sort = 30;
    return sort;
}

public static int GetLargeStraight(Item[] dice)
{
    int sum = 0;
    int[] i = dice.Select(s => s.Value).ToArray();
    Array.Sort(i);
    if (((i[0] == 1) && (i[1] == 2) && (i[2] == 3) && (i[3] == 4) && (i[4] == 5)) ||
        ((i[0] == 2) && (i[1] == 3) && (i[2] == 4) && (i[3] == 5) && (i[4] == 6)))
        sum = 40;
    return sum;
}
```

GetSmallStraight and **GetLargeStraight** will calculate those values for the game and return the score.

Step 13

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Calculate** after the **Comment** of **// Calculate Get GetYahtzee & GetChance Method** type the following **Methods**:

```
public static int GetYahtzee(Item[] dice)
{
    int sum = 0;
    for (int i = 1; i <= 6; i++)
    {
        int Count = 0;
        for (int j = 0; j < 5; j++)
        {
            if (dice[j].Value == i)
                Count++;
            if (Count > 4)
                sum = 50;
        }
    }
    return sum;
}

public static int GetChance(Item[] dice)
{
    int sum = 0;
    for (int i = 0; i < 5; i++)
        sum += dice[i].Value;
    return sum;
}
```

GetYahtzee will work out if the result is a **Yahtzee** and **GetChance** will work out the chance score.

Step 14

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** remove the **//** between **Board** and **: ActionCommandObservableBase** so that the top of the **class** of **Board** appears as follows:

```
public class Board : ActionCommandObservableBase
```

You will then provide what is needed for **ActionCommandObservableBase** to resolve the error of *There is no argument given that corresponds to the required parameter 'handler'* and define the rest of the **class** of **Board** in the following **Steps**.

Step 15

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** after the **Comment** of **// Constants, Variables, Properties and Choose, SetScore & GetScore Method** type the following **Constants**, **Variables**, **Properties** and **Methods**:

```
private const int dice = 5;
private const int count = 14;
private const string accept = "Accept?";

private readonly Random _random = new((int)DateTime.UtcNow.Ticks);
private readonly Func<string, Task<bool>> _confirm = null;

private List<Option> _options;
private Item[] _dice;
private int _rolls;
private int _count;
private int _total;
private int _upper;
private int _lower;
private int _bonus;

public List<Option> Options { get => _options; set => SetProperty(ref _options,
value); }
public Item[] Dice { get => _dice; set => SetProperty(ref _dice, value); }

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 void SetScore(ScoreType type, int value)
{
    var score = Options.FirstOrDefault(f => f.Type == type);
    if(score != null)
        score.Score = value;
}

private int GetScore(ScoreType type) =>
    Options.FirstOrDefault(f => f.Type == type)?.Score ?? 0;
```

Constants are values that are used in the game that will not change, **Variables** are values that will be changed in the game of which some are exposed as **Properties**. The **Method** of **Choose** is used to a list of randomised numbers and **SetScore** is used to update the score for an **Option** and **GetScore** will obtain a score for an **Option**. You will also have an error *There is no argument given that corresponds to the required parameter 'handler'* this will be resolved when you add the **Constructor** in a later **Step**.

Step 16

While still in the **`namespace`** of **`YatzyGame`** in *Library.cs* and in the **`class`** of **`Board`** after the **Comment** of **`// Board Clear & Reset Method`** type the following **Methods**:

```
private void Clear()
{
    _rolls = 0;
    _count = 0;
    _total = 0;
    _upper = 0;
    _lower = 0;
    _bonus = 0;
    foreach (ScoreType type in Enum.GetValues(typeof(ScoreType)))
        SetScore(type, 0);
    int value = 1;
    foreach(var dice in Dice)
    {
        dice.Hold = false;
        dice.Value = value++;
        dice.IsEnabled = false;
    }
    foreach (var option in Options)
        option.IsEnabled = false;
    IsEnabled = true;
}

private async Task Reset()
{
    _rolls = 0;
    _count++;
    foreach(var dice in _dice)
        dice.Hold = false;
    SetScore(ScoreType.UpperTotalScore, _upper);
    SetScore(ScoreType.UpperTotalBonusScore, _bonus);
    SetScore(ScoreType.LowerTotalScore, _lower);
    SetScore(ScoreType.TotalScore, _total);
    if(_count == count)
    {
        int total = GetScore(ScoreType.TotalScore);
        bool result = await _confirm($"Game Over, Score {total}. Play again?");
        if(result)
            Clear();
    }
}
```

`Clear` is used to reset all scores and uses **`SetScore`** and **`Reset`** resets all totals in the game.

Step 17

While still in the **`namespace`** of **`YatzyGame`** in *Library.cs* and in the **`class`** of **`Board`** after the **Comment** of **`// Board SetTotal & AddUpDice Method`** type the following **Methods**:

```
private void SetTotal(int score, bool isUpper)
{
    var isBonus = false;
    if (isUpper)
    {
        _upper += score;
        if (_upper >= 63)
            isBonus = true;
    }
    else
        _lower += score;
    _total = 0;
    _total += _upper;
    if (isBonus)
    {
        _bonus = 35;
        _total += _bonus;
    }
    _total += _lower;
}

private async void AddUpDice(ScoreType type, int value)
{
    int score = GetScore(type);
    if (_rolls > 0 && score == 0)
    {
        int total = Calculate.GetAddUp(_dice, value);
        bool result = await _confirm($"Total is {total}. {accept}");
        if (result)
        {
            SetScore(type, total);
            SetTotal(total, true);
            await Reset();
        }
    }
}
```

`SetTotal` is used to set the total score value and **`AddUpDice`** is used to get the scores from the **Dice**.

Step 18

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** after the **Comment** of **// Board SetValueOfAKind Method** type the following **Method**:

```
private async void SetValueOfAKind(ScoreType type, int value)
{
    string name = type.Name(1);
    int score = GetScore(type);
    if (_count > 0 && score == 0)
    {
        int total = Calculate.GetOfAKind(_dice, value - 1);
        if (total != 0)
        {
            bool result = await _confirm($"Total is {total}. {accept}");
            if (result)
            {
                SetScore(type, total);
                SetTotal(total, false);
                await Reset();
            }
        }
        else
        {
            bool result = await _confirm($"No {name} of a Kind. {accept}");
            if (result)
            {
                SetScore(type, 0);
                SetTotal(total, false);
                await Reset();
            }
        }
    }
}
```

SetValueOfAKind is used to set the values where the **Dice** are of the same kind.

Step 19

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** after the **Comment** of **// Board SetItemScore Method** type the following **Method**:

```
private async void SetItemScore(ScoreType type, int value)
{
    string name = type.Name();
    int score = GetScore(type);
    if ((_rolls > 0) && (score == 0))
    {
        int total = type switch
        {
            ScoreType.FullHouseScore => Calculate.GetFullHouse(_dice),
            ScoreType.SmallStraightScore => Calculate.GetSmallStraight(_dice),
            ScoreType.LargeStraightScore => Calculate.GetLargeStraight(_dice),
            _ => 0,
        };
        if (total == value)
        {
            SetScore(type, total);
            SetTotal(total, false);
            await Reset();
        }
        else
        {
            bool result = await _confirm($"No {name}. {accept}");
            if (result)
            {
                SetScore(type, 0);
                SetTotal(total, false);
                await Reset();
            }
        }
    }
}
```

SetItemScore will set the score using **GetFullHouse**, **GetSmallStraight** and **GetLargeStraight**.

Step 20

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** after the **Comment** of **// Board SetYahtzee Method** type the following **Method**:

```
private async void SetYahtzee()
{
    int score = GetScore(ScoreType.YahtzeeScore);
    if ((_rolls > 0) && (score == 0))
    {
        int total = Calculate.GetYahtzee(_dice);
        if (total == 50)
        {
            SetScore(ScoreType.YahtzeeScore, total);
            SetTotal(total, false);
            await Reset();
        }
        else
        {
            bool result = await _confirm($"No Yahtzee. {accept}");
            if (result)
            {
                SetScore(ScoreType.YahtzeeScore, 0);
                SetScore(ScoreType.YahtzeeBonusScore, 0);
                _count++;
                SetTotal(total, true);
                await Reset();
            }
        }
    }
}
```

SetYahtzee will determine if the values of the **Dice** are a **Yatzee** and if so update the score accordingly.

Step 21

While still in the **namespace** of **YatzyGame** in *Library.cs* and in the **class** of **Board** after the **Comment** of **// Board SetChance, SetBonus & New Method** type the following **Methods**:

```
private async void SetChance()
{
    int score = GetScore(ScoreType.ChanceScore);
    if ((_rolls > 0) && (score == 0))
    {
        int total = Calculate.GetChance(_dice);
        bool result = await _confirm($"Total is {total}. {accept}");
        if (result)
        {
            SetScore(ScoreType.ChanceScore, total);
            SetTotal(total, false);
            await Reset();
        }
    }
}

private async void SetBonus()
{
    int score = GetScore(ScoreType.YahtzeeScore);
    int bonus = GetScore(ScoreType.YahtzeeBonusScore);
    if ((_rolls > 0) && (score == 0) && (bonus != 0))
    {
        int total = Calculate.GetYahtzee(_dice);
        if (total == 50)
        {
            SetScore(ScoreType.YahtzeeBonusScore, 100);
            SetTotal(100, false);
            await Reset();
        }
        else
        {
            SetScore(ScoreType.YahtzeeBonusScore, 0);
            SetTotal(0, true);
            await Reset();
        }
    }
}

public void New() =>
    Clear();
```

SetChance will be used for a chance score and **SetBonus** will be used for a bonus score with **New** using **Clear** to start a game.

Step 22

While still in the **`namespace`** of **`YatzyGame`** in *Library.cs* and in the **`class`** of **`Board`** after the **Comment** of **`// Board Roll Method`** type the following **Method**:

```
internal void Roll()
{
    if (_rolls < 3)
    {
        if (_rolls == 0)
        {
            foreach (var dice in Dice)
            {
                dice.IsEnabled = true;
                dice.Hold = false;
            }
            foreach (var option in Options)
                option.IsEnabled = true;
        }
        var values = Choose(1, 6, dice);
        for (int i = 0; i < Dice.Length; i++)
        {
            if (!Dice[i].Hold)
                Dice[i].Value = values[i];
        }
        _rolls++;
        if (_rolls == 3)
        {
            foreach (var dice in Dice)
            {
                dice.IsEnabled = false;
                dice.Hold = true;
            }
            IsEnabled = false;
        }
    }
}
```

`Roll` is used to roll the **Dice** used in the game and will also handle if they are held or not, this **Method** is also declared as **`internal`** as it will only be used within the **`class`** of **`Board`** in the next **Step** for the **Constructor**.

Step 23

While still in the **`namespace`** of **`YatzyGame`** in *Library.cs* and in the **`class`** of **`Board`** after the **Comment** of **`// Board Constructor`** type the following **Constructor**:

```
public Board(Func<string, Task<bool>> confirm) : base(
new ActionCommandHandler((param) => (param as Board).Roll(),
(param) => (param as Board).IsEnabled))
{
    IsEnabled = true;
    _confirm = confirm;
    _dice = new Item[dice];
    for (int i = 0; i < _dice.Length; i++)
        _dice[i] = new Item(i, (int i) =>
        _dice[i].Hold = !_dice[i].Hold);
    Options = new()
    {
        new Option(ScoreType.AcesScore,
            (p) => AddUpDice(ScoreType.AcesScore, 1)),
        new Option(ScoreType.TwosScore,
            (p) => AddUpDice(ScoreType.TwosScore, 2)),
        new Option(ScoreType.ThreesScore,
            (p) => AddUpDice(ScoreType.ThreesScore, 3)),
        new Option(ScoreType.FoursScore,
            (p) => AddUpDice(ScoreType.FoursScore, 4)),
        new Option(ScoreType.FivesScore,
            (p) => AddUpDice(ScoreType.FivesScore, 5)),
        new Option(ScoreType.SixesScore,
            (p) => AddUpDice(ScoreType.SixesScore, 6)),
        new Option(ScoreType.UpperTotalScore),
        new Option(ScoreType.UpperTotalBonusScore),
        new Option(ScoreType.ThreeOfAKindScore,
            (p) => SetValueOfAKind(ScoreType.ThreeOfAKindScore, 3)),
        new Option(ScoreType.FourOfAKindScore,
            (p) => SetValueOfAKind(ScoreType.FourOfAKindScore, 4)),
        new Option(ScoreType.FullHouseScore,
            (p) => SetItemScore(ScoreType.FullHouseScore, 25)),
        new Option(ScoreType.SmallStraightScore,
            (p) => SetItemScore(ScoreType.SmallStraightScore, 30)),
        new Option(ScoreType.LargeStraightScore,
            (p) => SetItemScore(ScoreType.FullHouseScore, 25)),
        new Option(ScoreType.YahtzeeScore,
            (p) => SetYahtzee()),
        new Option(ScoreType.ChanceScore,
            (p) => SetChance()),
        new Option(ScoreType.YahtzeeBonusScore,
            (p) => SetBonus()),
        new Option(ScoreType.LowerTotalScore),
        new Option(ScoreType.TotalScore)
    };
}
```

Once the **Constructor** has been added the error *There is no argument given that corresponds to the required parameter 'handler'* will have been resolved, as you have now provided what was needed.

Step 24

Still in *Library.cs* for the **namespace** of **YatzyGame** in *Library.cs* you will define a **class** for **OptionTemplateSelector** after the **Comment** of **// OptionTemplateSelector Class** by typing the following:

```
public class OptionTemplateSelector : DataTemplateSelector
{
    public DataTemplate ScoreItem { get; set; }
    public DataTemplate TotalItem { get; set; }

    protected override DataTemplate SelectTemplateCore(
        object value, DependencyObject container) =>
        value is Option item ? item.Command != null ?
            ScoreItem : TotalItem : null;
}
```

OptionTemplateSelector will be used to provide a different **DataTemplate** depending on whether the **Command** has been set on an **Item**, this will be useful when displaying the output for the game as needed.

Step 25

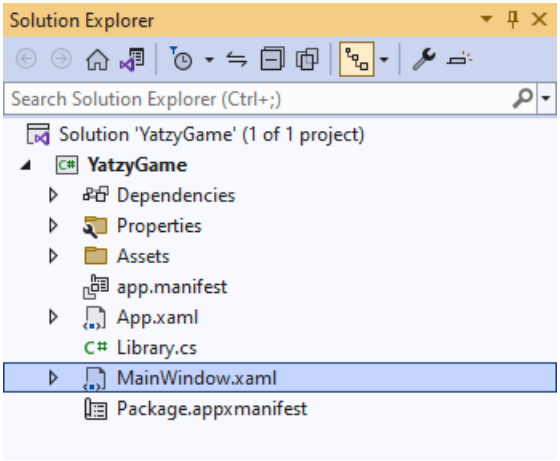
Still in *Library.cs* for the **namespace** of **YatzyGame** in *Library.cs* you will define a **class** for **Library** after the **Comment** of **// Library Class** by typing the following:

```
public class Library
{
    private const string title = "Yatzy Game";
    private Board _board;
    private Dialog _dialog;

    public void Load(StackPanel display)
    {
        _dialog = new Dialog(display.XamlRoot, title);
        display.DataContext = _board = new Board(
            (content) => _dialog.ConfirmAsync(content, "Yes", "No"));
    }

    public async void New()
    {
        var result = await _dialog.ConfirmAsync("Start a New Game?", "Yes", "No");
        if(result)
            _board.New();
    }
}
```

Library will set the **DataContext** of the **StackPanel** to the **Board** in **Load** and **New** will begin a game.

Step 26

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



Step 27

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 28

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

```
xmlns:ui="using:Comentsys.Toolkit.WindowsAppSdk"
```

The **XAML** for **`<Window>`** should then look as follows:

```
<Window
    xmlns:ui="using:Comentsys.Toolkit.WindowsAppSdk"
    x:Class="YatzyGame.MainWindow"
    xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
    xmlns:local="using:YatzyGame"
    xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
    xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
    mc:Ignorable="d">
```

Step 29

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

```
<Grid>
    <Grid.Resources>
        <!-- Resources -->

    </Grid.Resources>
    <Viewbox>
        <!-- StackPanel -->

    </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 **`StackPanel`** to be added in a later **Step** along with using **Resources** which will be added in the next **Step** and has an **`AppBarButton`** set to **`New`**.

Step 30

While still in the **XAML** for **MainWindow.xaml** below the **Comment** of **`<!-- Resources -->`** type in the following **XAML** for **Data Templates** for look-and-feel of the game along with **`OptionTemplateSelector`**.

```
<DataTemplate x:Name="DiceTemplate">
    <StackPanel>
        <ui:Dice Height="50" Width="50" Value="{Binding Value}"
        Foreground="Red" Background="WhiteSmoke" CornerRadius="5"/>
        <ToggleButton Margin="2" HorizontalAlignment="Center" Content="Hold"
        IsChecked="{Binding Hold}" Command="{Binding Command}"
        CommandParameter="{Binding}"/>
    </StackPanel>
</DataTemplate>
<DataTemplate x:Key="ScoreTemplate">
    <StackPanel>
        <Grid Margin="2">
            <Grid.ColumnDefinitions>
                <ColumnDefinition Width="*"/>
                <ColumnDefinition Width="Auto"/>
            </Grid.ColumnDefinitions>
            <Button Width="200" Grid.Column="0"
            HorizontalContentAlignment="Left"
            Content="{Binding Content}" Command="{Binding Command}"
            CommandParameter="{Binding}"/>
            <Grid Grid.Column="1" Background="Blue">
                <TextBlock Width="75" Text="{Binding Score}"
                TextAlignment="Center" VerticalAlignment="Center"
                Foreground="WhiteSmoke"/>
            </Grid>
        </Grid>
    </StackPanel>
</DataTemplate>
<DataTemplate x:Key="TotalTemplate">
    <StackPanel>
        <Grid Margin="2">
            <Grid.ColumnDefinitions>
                <ColumnDefinition Width="*"/>
                <ColumnDefinition Width="Auto"/>
            </Grid.ColumnDefinitions>
            <TextBlock Width="200" Grid.Column="0" TextAlignment="Right"
            Text="{Binding Content}" FontWeight="SemiBold"/>
            <Grid Grid.Column="1">
                <TextBlock Width="75" Text="{Binding Score}"
                TextAlignment="Center" VerticalAlignment="Center"
                Foreground="Blue"/>
            </Grid>
        </Grid>
    </StackPanel>
</DataTemplate>
<ItemsPanelTemplate x:Name="ItemsTemplate">
    <StackPanel Orientation="Horizontal"/>
</ItemsPanelTemplate>
<local:OptionTemplateSelector x:Key="OptionTemplateSelector"
ScoreItem="{StaticResource ScoreTemplate}"
TotalItem="{StaticResource TotalTemplate}" />
```

Step 31

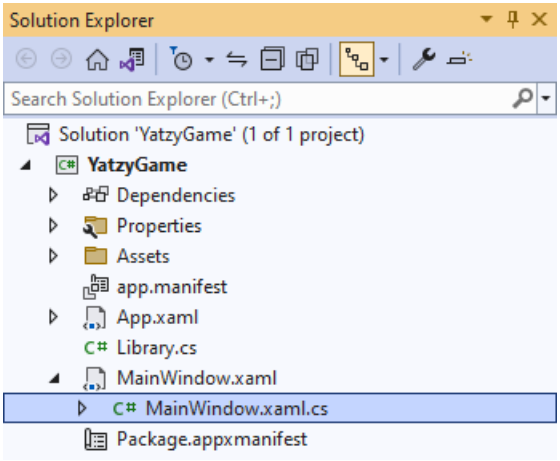
While still in the **XAML** for **MainWindow.xaml** below the **Comment** of **`<!-- StackPanel -->`** type in the following **XAML**:

```
<StackPanel Name="Display" Margin="50"
    HorizontalAlignment="Center"
    VerticalAlignment="Center"
    Loaded="Load">
    <Button Margin="2" HorizontalAlignment="Stretch" VerticalAlignment="Center"
    Command="{Binding Command}" CommandParameter="{Binding}" Content="Roll"/>
    <ItemsControl ItemsSource="{Binding Dice}"
    ItemTemplate="{StaticResource DiceTemplate}"
    ItemsPanel="{StaticResource ItemsTemplate}"/>
    <ItemsControl ItemsSource="{Binding Options}" HorizontalAlignment="Center">
        <ItemsControl.ItemTemplate>
            <DataTemplate>
                <ContentControl Content="{Binding}"
                ContentTemplateSelector="{StaticResource OptionTemplateSelector}"/>
            </DataTemplate>
        </ItemsControl.ItemTemplate>
    </ItemsControl>
</StackPanel>
```

This **XAML** contains a **`StackPanel`** with a **Loaded** event handler for **Load** it also contains a **`Button`** along with an **ItemsControl** for the **Dice** and the other **Buttons** and **Totals** for the game.

Step 32

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 33

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 34

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 Load(object sender, RoutedEventArgs e) =>
    _library.Load(Display);

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

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

Step 35

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

Step 36

Once running you can select *Roll* to randomly select the values for the **Dice** and you can use the other **Buttons** to total up your score based on the values of the **Dice**, or you can select *New* to start a new game.

Step 37

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!