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tutorial

Windows App SDK

Hit or Miss

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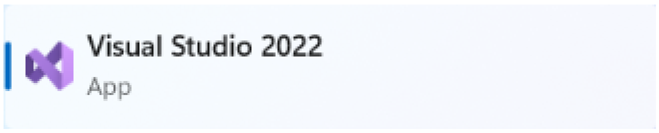
Hit or Miss

Hit or Miss shows how you can create a simple random game where you can either score a **Hit** or a **Miss** displayed with emoji and with a toolkit from **NuGet** using the **Windows App SDK**.

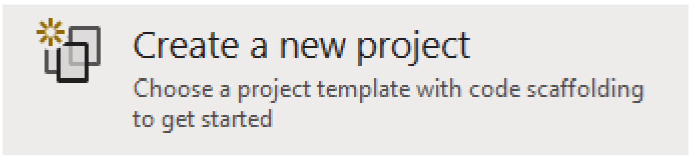
Step 1

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

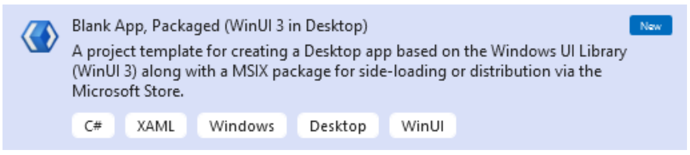
In **Windows 11** choose **Start** and then find or search for **Visual Studio 2022** and then select it.



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**.

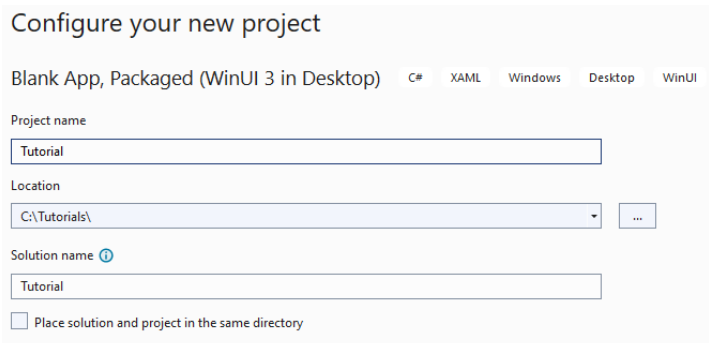

Blank App, Packaged (WinUI 3 in Desktop)

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 *HitOrMiss*, 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

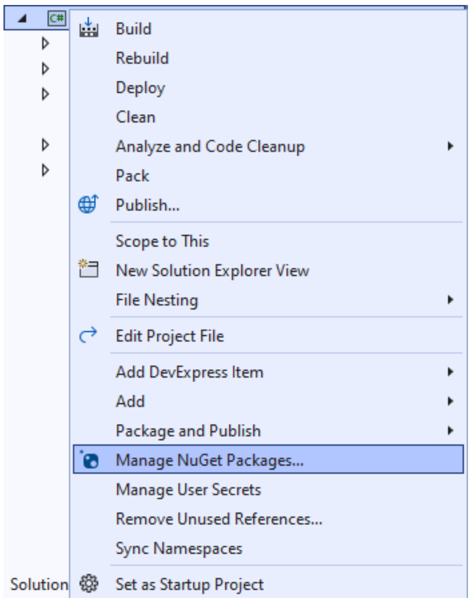
Location: C:\Tutorials\

Solution name: Tutorial

☐ Place solution and project in the same directory

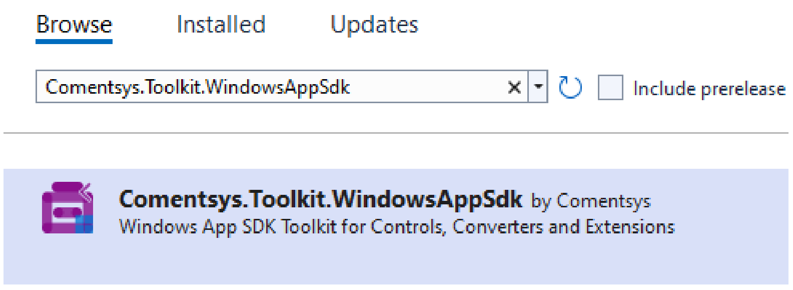
Step 2

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

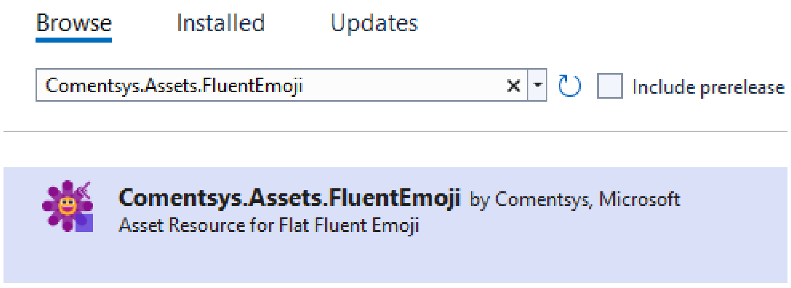
Then in the **NuGet Package Manager** from the **Browse** tab search for **Comentsys.Toolkit.WindowsAppSdk** and then select **Comentsys.Toolkit.WindowsAppSdk by Comentsys** as indicated and select **Install**


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.

Step 4

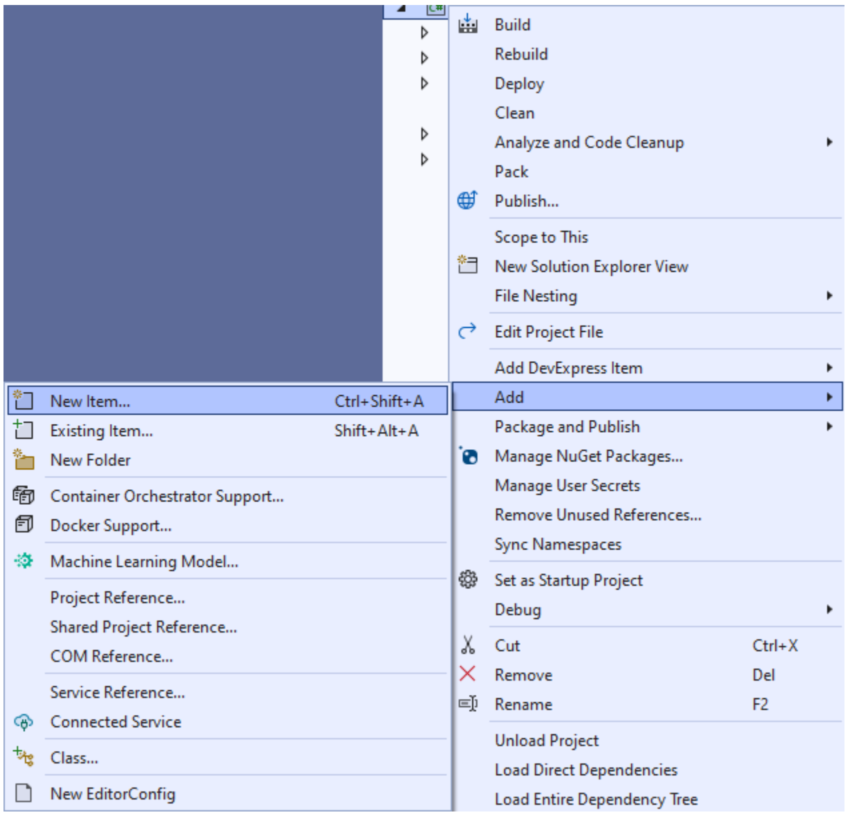
Then while still in the **NuGet Package Manager** from the **Browse** tab search for **Comentsys.Assets.FluentEmoji** and then select **Comentsys.Assets.FluentEmoji by Comentsys** as indicated and select **Install**


Browse
Installed
Updates
Comentsys.Assets.FluentEmoji
Include prerelease
Comentsys.Assets.FluentEmoji by Comentsys, Microsoft
Asset Resource for Flat Fluent Emoji

This will add the package for **Comentsys.Assets.FluentEmoji** 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: HitOrMiss** by selecting the **x** next to it.

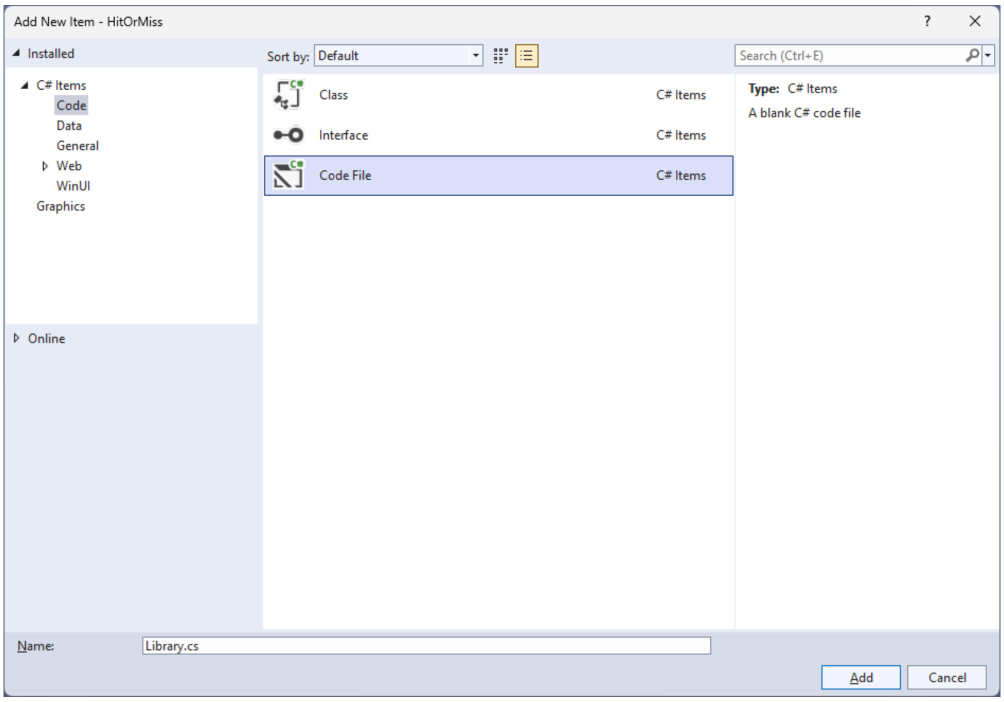
Step 5

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 6

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**.


Add New Item - HitOrMiss

Sort by: Default

Search (Ctrl+E)

Installed
- C# Items
  - Code
  - Data
  - General
  - Web
  - WinUI
- Graphics

Online

Class	C# Items
Interface	C# Items
Code File	C# Items

Type: C# Items

A blank C# code file

Name: Library.cs

Step 7

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

```
using Comentsys.Assets.FluentEmoji;
using Comentsys.Toolkit.WindowsAppSdk;
using Microsoft.UI.Xaml;
using Microsoft.UI.Xaml.Controls;
using System;
using System.Collections.Generic;
using System.Linq;

public class Library
{
    private const string title = "Hit or Miss";
    private const int score = 18;
    private const int size = 6;
    private const string hit = "X";
    private const string miss = "O";
    private readonly string[,] _board = new string[size, size];
    private readonly Random _random = new((int)DateTime.UtcNow.Ticks);

    private int _go = 0;
    private int _hits = 0;
    private int _misses = 0;
    private bool _won = false;
    private Dialog _dialog;

    private List<int> Choose(int minimum, int maximum, int total) =>
        Enumerable.Range(minimum, maximum)
            .OrderBy(r => _random.Next(minimum, maximum))
                .Take(total).ToList();

    private Viewbox Asset(string value) => new()
    {
        Child = new Asset()
        {
            AssetResource = FlatFluentEmoji.Get(
            value == hit ? FluentEmojiType.Collision :
            FluentEmojiType.Hole)
        }
    };

    // Add

    // Layout & New

}
```

The **`Class`** that has been defined in so far *Library.cs* has **`using`** for the packages that were added of **`Comentsys.Assets.FluentEmoji`** and **`Comentsys.Toolkit.WindowsAppSdk`** amongst others needed. There are also some **`const`** and **`readonly`** values for parts of the game and to represent the board then there are **Methods** of **`Choose`** which is used to select a random list of numbers and **`Asset`** which will represent **Emoji** that will be used for the hits and misses.

Step 8

Still in the **`Class`** for *Library.cs* after the **Comment** of **`// Add`** type the following **Method**:

```
private void Add(ref Grid grid, int row, int column)
{
    Button button = new()
    {
        Width = 64,
        Height = 64
    };
    button.Click += (object sender, RoutedEventArgs e) =>
    {
        if (!_won)
        {
            button = (Button)sender;
            string selected = _board[
                (int)button.GetValue(Grid.RowProperty),
                (int)button.GetValue(Grid.ColumnProperty)
            ];
            if (button.Content == null)
            {
                button.Content = Asset(selected);
                if (selected == hit)
                    _hits++;
                else if (selected == miss)
                    _misses++;
                _go++;
            }
            if (_go < (size * size) && _misses < score)
            {
                if (_hits == score)
                {
                    _dialog.Show(
                    $"You Won! With {_hits} hits and {_misses} misses");
                    _won = true;
                }
            }
            else
            {
                _dialog.Show($"You Lost! With {_hits} hits and {_misses} misses");
                _won = true;
            }
        }
    };
    button.SetValue(Grid.ColumnProperty, column);
    button.SetValue(Grid.RowProperty, row);
    grid.Children.Add(button);
}
```

Add is used to add a **`Button`** which when clicked, set with the **Event Handler** of **`Click`** will indicate if the selection was a hit or a miss with a message to indicate whether the game was won or lost.

Step 9

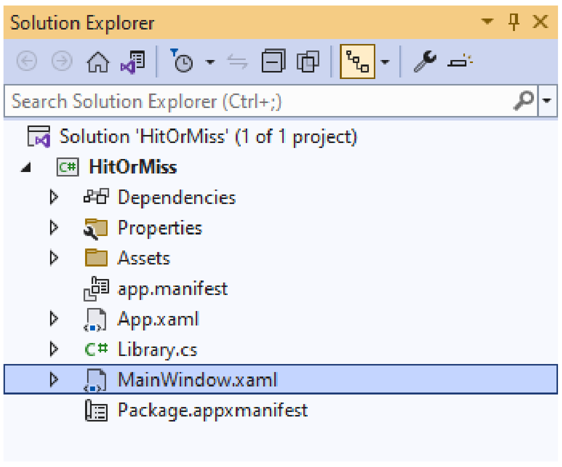
While still in the **`Class`** for *Library.cs* after the **Comment** of **`// Layout & New`** type in the following **Methods** of **`Layout`** which will layout the board for the game and **`New`** which will start a new game.

```
private void Layout(Grid grid)
{
    _go = 0;
    _hits = 0;
    _misses = 0;
    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());
    }
    for (int row = 0; row < size; row++)
    {
        for (int column = 0; column < size; column++)
        {
            Add(ref grid, row, column);
        }
    }
}

public void New(Grid grid)
{
    Layout(grid);
    _won = false;
    int index = 0;
    _dialog = new Dialog(grid.XamlRoot, title);
    // Setup Values
    List<string> values = new();
    while (values.Count < (size * size))
    {
        values.Add(hit);
        values.Add(miss);
    }
    List<int> indices = Choose(1, size * size, size * size);
    // Setup Board
    for (int column = 0; column < size; column++)
    {
        for (int row = 0; row < size; row++)
        {
            _board[column, row] = values[indices[index] - 1];
            index++;
        }
    }
}
```

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

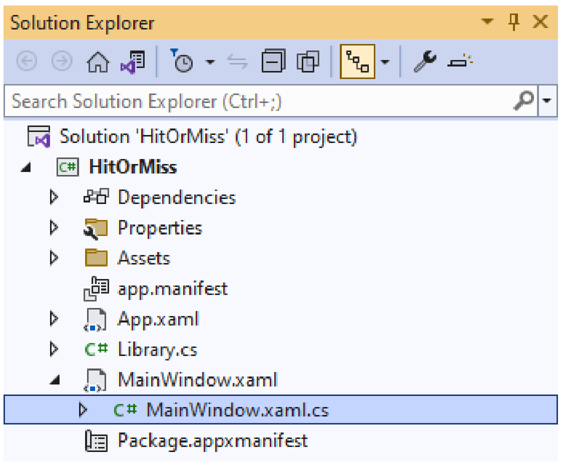
While still in the **XAML** for **MainWindow.xaml** above **`</Window>`**, type in the following **XAML**:

```
<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**.


Solution Explorer

Search Solution Explorer (Ctrl+;)

Solution 'HitOrMiss' (1 of 1 project)
HitOrMiss
Dependencies
Properties
Assets
app.manifest
App.xaml
Library.cs
MainWindow.xaml
MainWindow.xaml.cs
Package.appxmanifest

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() { ... }`**:

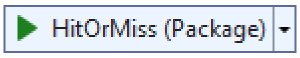
```
private readonly Library _library = new();

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.

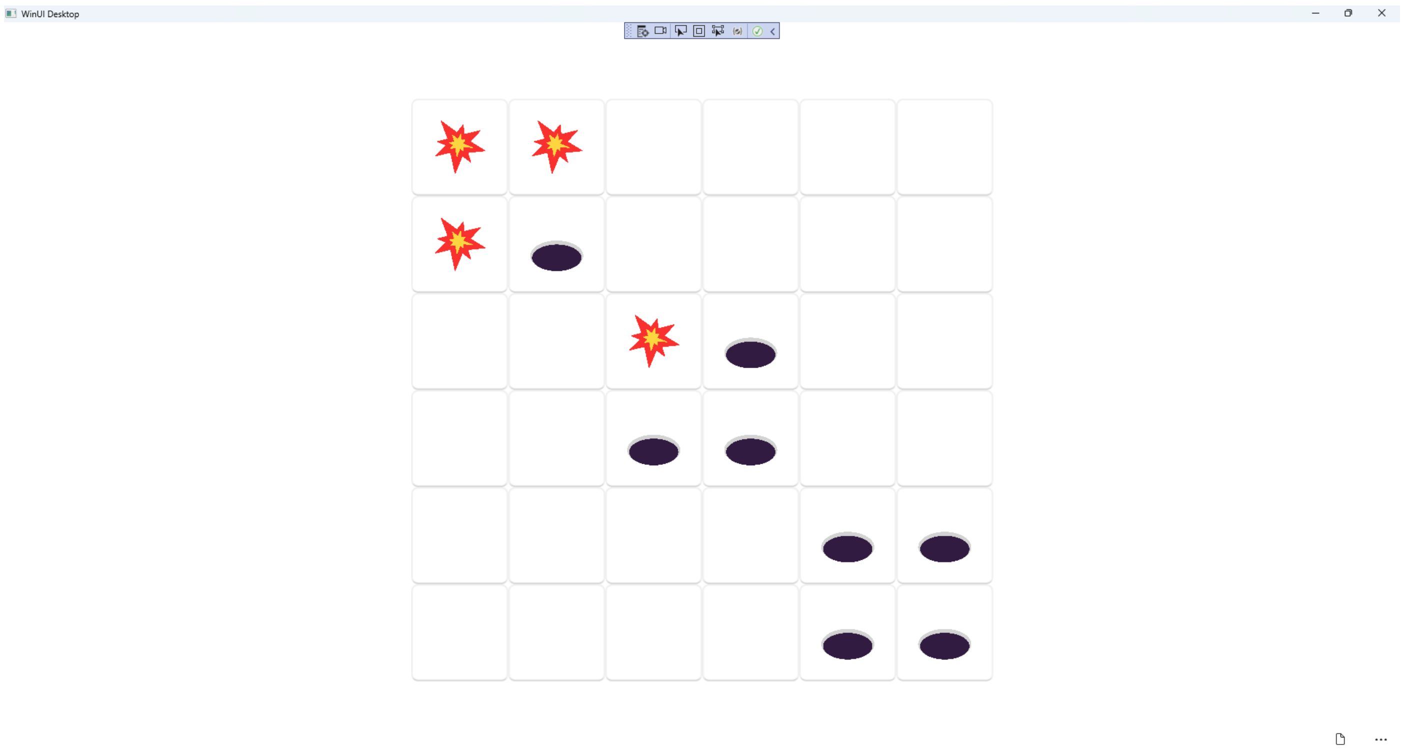
Step 16

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



Step 17

Once running you can start by clicking on any `Button`, to win you will need to get more hits (**Collisions**) than misses (**Holes**) up to a total of *18* to win! You can restart the game by selecting *New*.



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!