(T17)比較 Indexer、Properties。比較 Dictionary、List
CourseGUID: 29f1196a-1950-41a4-b9c1-dd13a9e92d92
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(T17)比較 Indexer、Properties。比較 Dictionary、List
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0. Summary

1.
Indexers V.S. Properties
Reference:
http://www.c-sharpcorner.com/uploadfile/puranindia/indexers-in-C-Sharp/
https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/indexers/
https://social.msdn.microsoft.com/Forums/vstudio/en-US/c02abcfd-3e3e-484e-9a7c-d2dcb32123e5/how-to-invoke-multi-parameter-indexer-in-c-?forum=netfxbcl
Indexers are used on group of instances of a class or struct just like arrays.

1.1.
Indexer is Parameterized property
which is created by "this" keyword and
identified by signature.
However,
properties don't need "this" keyword and
are identified by their names.

1.2.
Indexers are accessed using indexes and
are instance member, so can't be static.
However,
Properties are accessed by their names and
can be static or instance members.

1.3.

1.3.1.
Indexer is similar to property and it has get and set accessor for the [ ] operator.
Indexer can not use ref and out parameter and
it must have at least one parameter in [ ] operator.
Mmulti-parameter indexers are considered poor design style.
A indexer "get" accessor use the parameter list in [ ] operator as the indexer,
and return value of this indexer.
A indexer "set" accessor use the parameter list in [ ] operator as the indexer,
set the value to the indexer.
Indexer can be overloaded by using different signatures.

E.g.

```
//public class F
//{
//    public object Indexer[string a, string b] { ... }
//}
//
//var f = new F();
//f["hello", "world"] = new object();
```

1.3.2.

Property has "get" and "set" accessor.

A property "get" accessor has no parameters and
return value of the property.

A "set" accessor of a property contains the implicit value parameter and
set the value to the property.

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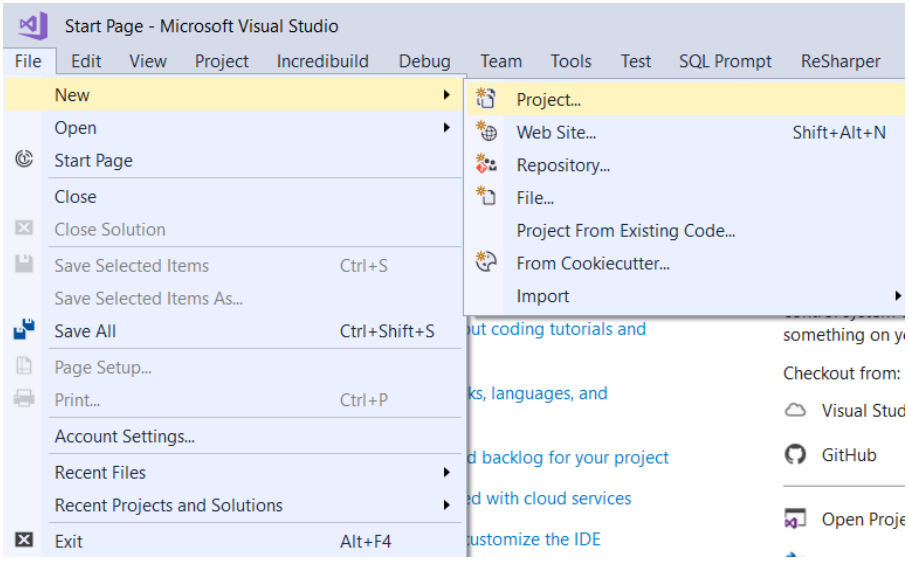
1. New Project

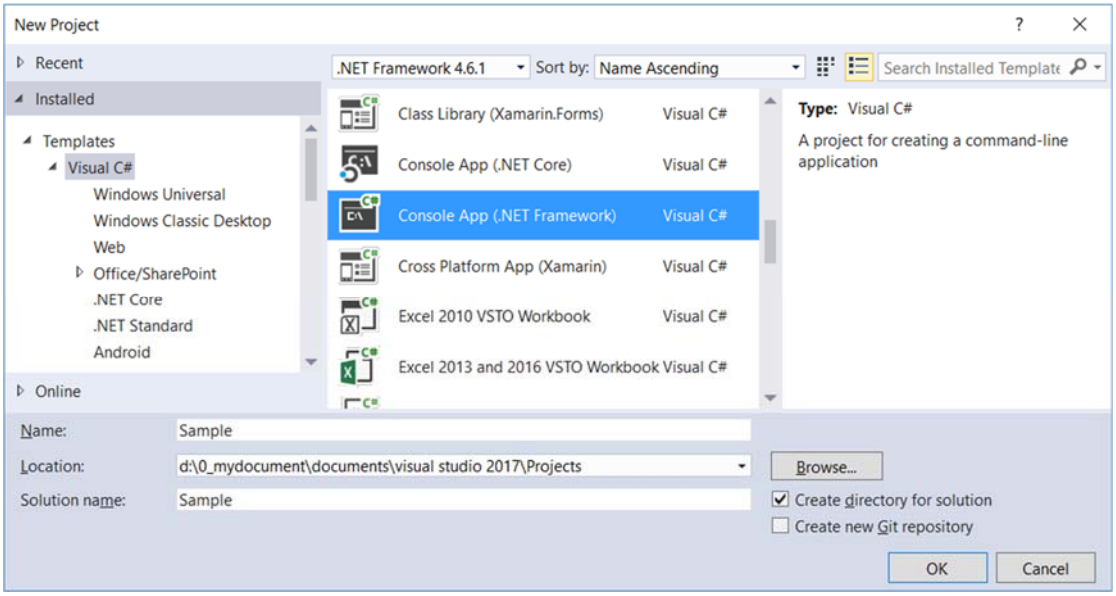
1.1. Create New Project : Sample

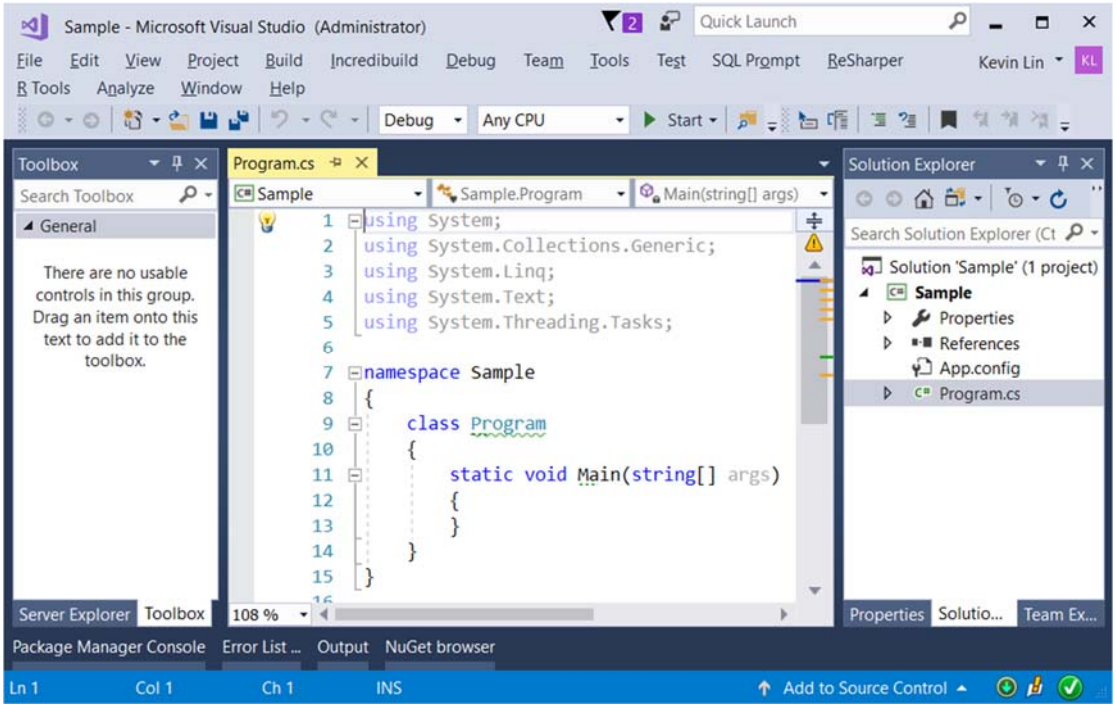
File --> New --> Project... -->

Visual C# --> **Console App (.Net Framework)** -->

Name: **Sample**







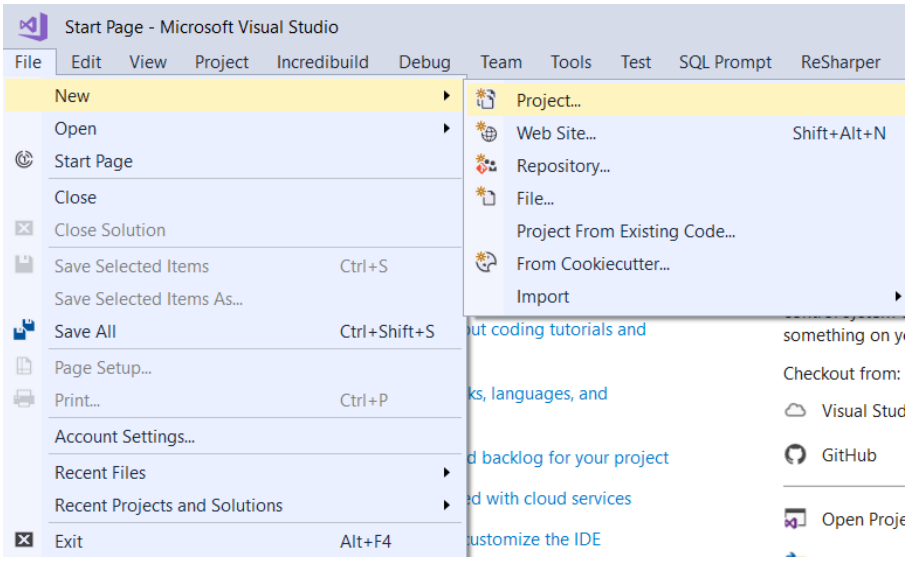
1.2. Create New Project : SampleWebForm

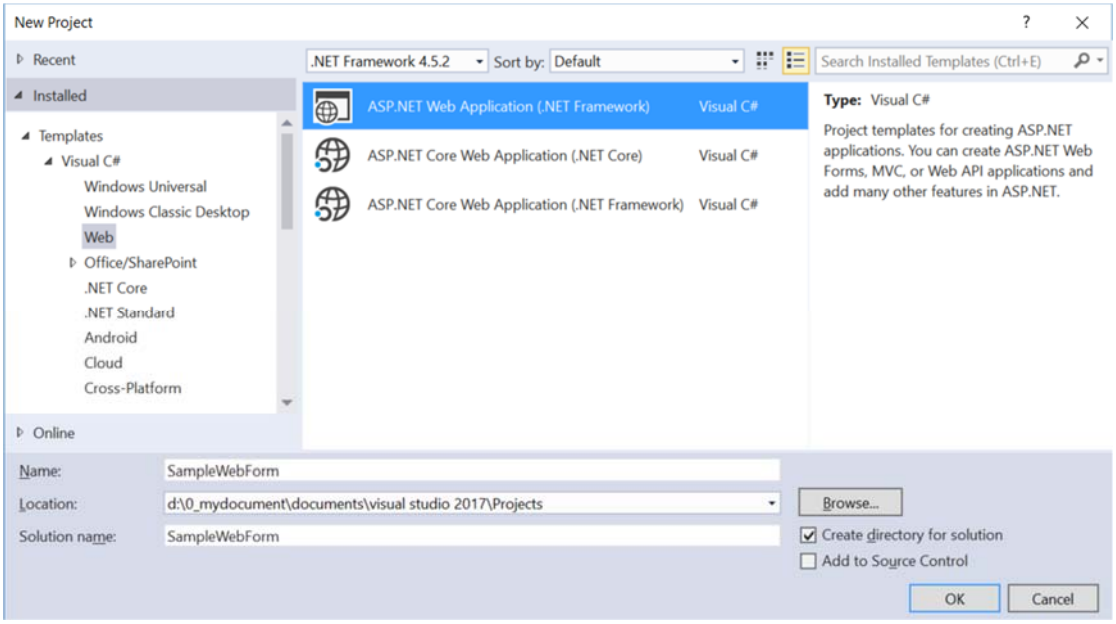
File --> New --> Project... -->

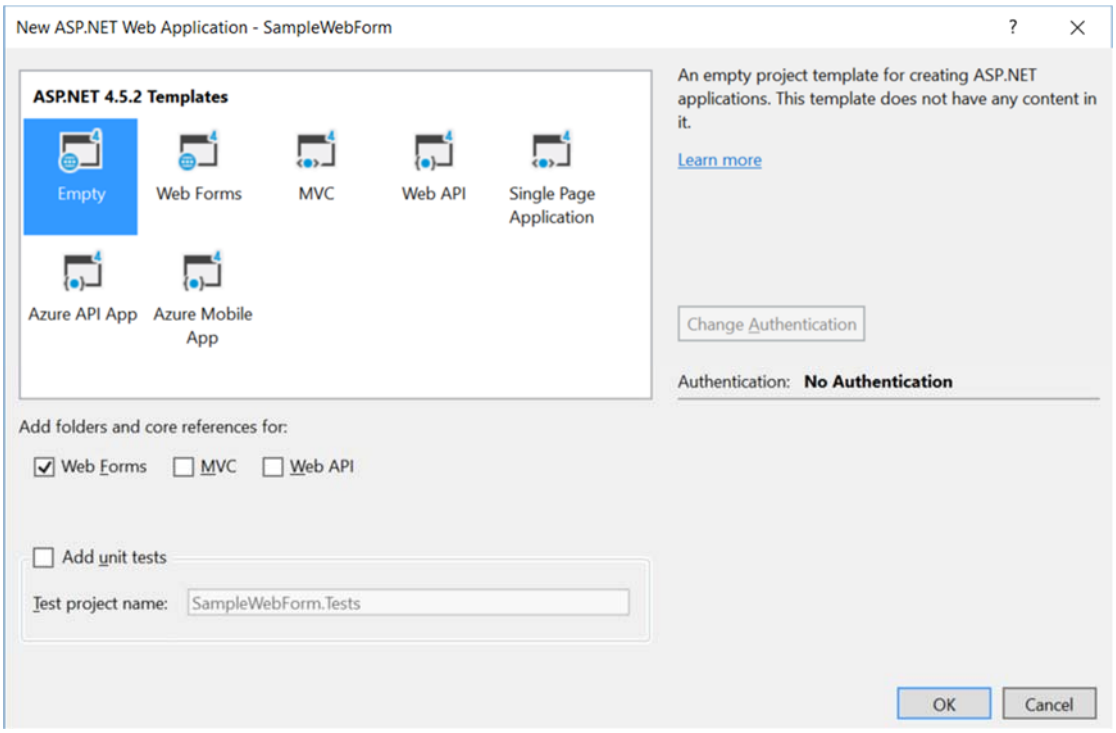
Visual C# --> Web --> **ASP.NET Web Application (.Net Framework)** -->

Name: **SampleWebForm**

--> Select "Empty" --> Select "Web Forms"


Start Page - Microsoft Visual Studio
File Edit View Project Incredibuild Debug Team Tools Test SQL Prompt ReSharper
New
Open
Start Page
Close
Close Solution
Save Selected Items Ctrl+S
Save Selected Items As...
Save All Ctrl+Shift+S
Page Setup...
Print... Ctrl+P
Account Settings...
Recent Files
Recent Projects and Solutions
Exit Alt+F4
Project...
Web Site... Shift+Alt+N
Repository...
File...
Project From Existing Code...
From Cookiecutter...
Import
Checkout from:
Visual Stud
GitHub
Open Proje


New Project
Recent
Installed
Templates
Visual C#
Windows Universal
Windows Classic Desktop
Web
Office/SharePoint
.NET Core
.NET Standard
Android
Cloud
Cross-Platform
Online
.NET Framework 4.5.2
Sort by: Default
Search Installed Templates (Ctrl+E)
ASP.NET Web Application (.NET Framework) Visual C#
ASP.NET Core Web Application (.NET Core) Visual C#
ASP.NET Core Web Application (.NET Framework) Visual C#
Type: Visual C#
Project templates for creating ASP.NET applications. You can create ASP.NET Web Forms, MVC, or Web API applications and add many other features in ASP.NET.
Name: SampleWebForm
Location: d:\0_mydocument\documents\visual studio 2017\Projects
Solution name: SampleWebForm
Browse...
Create directory for solution
Add to Source Control
OK
Cancel


New ASP.NET Web Application - SampleWebForm
ASP.NET 4.5.2 Templates
Empty
Web Forms
MVC
Web API
Single Page Application
Azure API App
Azure Mobile App
An empty project template for creating ASP.NET applications. This template does not have any content in it.
Learn more
Change Authentication
Authentication: No Authentication
Add folders and core references for:
Web Forms
MVC
Web API
Add unit tests
Test project name: SampleWebForm.Tests
OK
Cancel

==========

2. Sample : Program.cs

```
using System;
using System.Collections.Generic;
using System.Linq;
using OnLineGame;
namespace Sample
{
    class Program
    {
        static void Main(string[] args)
        {
            // 0. ------------------------------------------------
            Console.WriteLine("0. DefaultValue() ==============================");
            DefaultValue();
            // 1. ------------------------------------------------
            Console.WriteLine("1. ListSample() ==============================");
            ListSample();
            // 2. ------------------------------------------------
            Console.WriteLine("2. DictionarySample() ==============================");
            DictionarySample();
            // 3. ------------------------------------------------
            Console.WriteLine("3. ListOfStringIndexerSample() ==============================");
            ListOfStringIndexerSample();
            Console.WriteLine("4. ListOfGamerIndexerSample() ==============================");
            ListOfGamerIndexerSample();
            Console.WriteLine("5. ListOfGamerIndexerSample2() ==============================");
            ListOfGamerIndexerSample2();
            Console.WriteLine("6. Dictionary_String_Gamer_IndexerSample() ==============================");
            Dictionary_String_Gamer_IndexerSample();
            Console.ReadLine();
        }

        // 0. ------------------------------------------
        static void DefaultValue()
        {
            int intDefault = default(int);
            Console.WriteLine($"default(int) == {intDefault}");
            string stringDefault = default(string) == null ?
                "NULL" : default(string);
            Console.WriteLine($"default(string) == {stringDefault}");
        }
        // 1. ------------------------------------------
        static void ListSample()
        {
            List<string> listMagicSpell = new List<string>
            {
                "Spell01", "Spell02", "Spell03", "Spell04"
```

```
};
Console.WriteLine("1.1. listMagicSpell ------------------ ");
Console.Write("listMagicSpell == {");
foreach (string magicSpell in listMagicSpell)
{
    if (magicSpell == listMagicSpell.Last())
    {
        Console.WriteLine($"\"{magicSpell}\"" + " }");
    }
    else
    {
        Console.Write($"\"{magicSpell}\", ");
    }
}
//1.1.listMagicSpell------------------
//listMagicSpell == { "Spell01", "Spell02", "Spell03", "Spell04" }
Console.WriteLine("1.2. ListObject.FindIndex() ---------------------- ");
int indexOfSpell03 = listMagicSpell.FindIndex(a => a == "Spell03");
Console.WriteLine($"listMagicSpell.FindIndex(a => a == \"Spell03\")  :  " +
                  $"{indexOfSpell03}");
//1.2.ListObject.FindIndex()----------------------
//listMagicSpell.FindIndex(a => a == "Spell03")  :  2
int indexOfSpell0 = listMagicSpell.FindIndex(a => a == "Spell0");
Console.WriteLine($"listMagicSpell.FindIndex(a => a == \"Spell0\")  :  " +
                  $"{indexOfSpell0}");
//listMagicSpell.FindIndex(a => a == "Spell0")  :  -1
//FindIndex() return -1 if the index can not be found.
Console.WriteLine("1.3. ListObject.Contains() ---------------------- ");
bool containsSpell3 = listMagicSpell.Contains("Spell03");
Console.WriteLine($"listMagicSpell.Contains(\"Spell03\")  :  " +
                  $"{containsSpell3}");
//1.3.ListObject.Contains()----------------------
//listMagicSpell.Contains("Spell03")  :  True
string firstContainSpell03 = listMagicSpell.FirstOrDefault(x => x.Contains("Spell03"));
Console.WriteLine($"listMagicSpell.FirstOrDefault(x => x.Contains(\"Spell03\"))  :  " +
                  $"{firstContainSpell03}");
//listMagicSpell.FirstOrDefault(x => x.Contains("Spell03"))  :  Spell03
string firstContainSpell0 = listMagicSpell.FirstOrDefault(x => x.Contains("Spell0"));
Console.WriteLine($"listMagicSpell.FirstOrDefault(x => x.Contains(\"Spell0\"))  :  " +
                  $"{firstContainSpell0}");
//listMagicSpell.FirstOrDefault(x => x.Contains("Spell0"))  :  Spell01
Console.WriteLine("1.4. ListObject.Equals() ---------------------- ");
string firstEqualsSpell02 = listMagicSpell.FirstOrDefault(x => x.Equals("Spell02"));
Console.WriteLine($"listMagicSpell.FirstOrDefault(x => x.Equals(\"Spell02\"))  :  " +
                  $"{firstEqualsSpell02}");
//1.4.ListObject.Equals()----------------------
//listMagicSpell.FirstOrDefault(x => x.Equals("Spell02"))  :  Spell02
string firstEqualsSpell0 =
    listMagicSpell.FirstOrDefault(x => x.Equals("Spell0")) == null ?
   "Not Found" :
    listMagicSpell.FirstOrDefault(x => x.Equals("Spell0"));
Console.WriteLine($"listMagicSpell.FirstOrDefault(x => x.Equals(\"Spell0\"))  :  " +
                  $"{firstEqualsSpell0}");
//listMagicSpell.FirstOrDefault(x => x.Equals("Spell0"))  :  Not Found
```

```
            Console.WriteLine("1.5. ListObject[index] ---------------------- ");
            string magicSpell0 = listMagicSpell[0]; // get index 0 value string.
            Console.WriteLine($"listMagicSpell[0]  ==  {listMagicSpell[0]}");
            Console.WriteLine($"listMagicSpell[1]  ==  {listMagicSpell[1]}");
            Console.WriteLine($"listMagicSpell[2]  ==  {listMagicSpell[2]}");
            Console.WriteLine($"listMagicSpell[3]  ==  {listMagicSpell[3]}");
            //Console.WriteLine($"listMagicSpell[4]  ==  {listMagicSpell[4]}");   // Error! Throw Example.
            //1.5.ListObject[index]----------------------
            //listMagicSpell[0] == Spell01
            //listMagicSpell[1] == Spell02
            //listMagicSpell[2] == Spell03
            //listMagicSpell[3] == Spell04
        }
        // 2. -------------------------------------------
        static void DictionarySample()
        {
            Dictionary<string, Gamer> dictionaryGamers = new Dictionary<string, Gamer>();
            dictionaryGamers.Add("Name01", new Gamer { Id = 1, Name = "Name01", Email = "1@1.com" });
            dictionaryGamers.Add("Name02", new Gamer { Id = 2, Name = "Name02", Email = "2@2.com" });
            dictionaryGamers.Add("Name03", new Gamer { Id = 3, Name = "Name03", Email = "3@3.com" });
            dictionaryGamers.Add("Name04", new Gamer { Id = 4, Name = "Name04", Email = "4@4.com" });
            Console.WriteLine("2.1. dictionaryGamers --------------------");
            KeyValuePair<string, Gamer> name01KeyValue =
                dictionaryGamers.FirstOrDefault(x => x.Key == "Name01");
            Gamer gamer1 = dictionaryGamers.FirstOrDefault(x => x.Key == "Name01").Value;
            KeyValuePair<string, Gamer> name02KeyValue =
                dictionaryGamers.FirstOrDefault(x => x.Key == "Name02");
            KeyValuePair<string, Gamer> name03KeyValue =
                dictionaryGamers.FirstOrDefault(x => x.Key == "Name03");
            KeyValuePair<string, Gamer> name04KeyValue =
                dictionaryGamers.FirstOrDefault(x => x.Key == "Name04");
            Console.WriteLine($"name01KeyValue.Key == {name01KeyValue.Key}  ;  " +
                              $"gamer1.ToString() == {name01KeyValue.Value.ToString()}");
            Console.WriteLine($"name02KeyValue.Key == {name02KeyValue.Key}  ;  " +
                              $"gamer2.ToString() == {name02KeyValue.Value.ToString()}");
            Console.WriteLine($"name03KeyValue.Key == {name03KeyValue.Key}  ;  " +
                              $"gamer3.ToString() == {name03KeyValue.Value}");
            Console.WriteLine($"name04KeyValue.Key == {name04KeyValue.Key}  ;  " +
                              $"gamer4.ToString() == {name04KeyValue.Value}");
            //2.1.dictionaryGamers--------------------
            //name01KeyValue.Key == Name01; gamer1.ToString() == Id == 1; Name == Name01; Email: 1@1.com
            //name02KeyValue.Key == Name02; gamer2.ToString() == Id == 2; Name == Name02; Email: 2@2.com
            //name03KeyValue.Key == Name03; gamer3.ToString() == Id == 3; Name == Name03; Email: 3@3.com
            //name04KeyValue.Key == Name04; gamer4.ToString() == Id == 4; Name == Name04; Email: 4@4.com
            Console.WriteLine("2.2. dictionaryGamers input key output value ----------------");
            Gamer g1 = dictionaryGamers["Name01"];
            Console.WriteLine("dictionaryGamers[\"Name01\"]  ==  {0}", g1);
            //2.2.dictionaryGamers input key output value ----------------
            //dictionaryGamers["Name01"] == Id == 1; Name == Name01; Email: 1@1.com
            Console.WriteLine("2.3. dictionaryGamers input Index output value ----------------");
            string lastItem = dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count - 1);
            Console.WriteLine($"dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count -
1)  ==  {lastItem}");  // Key, "Name04"
```

```
            Console.WriteLine($"dictionaryGamers[dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count -
1)]  ==  " +
                              $"{dictionaryGamers[lastItem]}"); // Value, (Id == 4 ; Name == Name04 ;
Email : 4@4.com)
            //2.3.dictionaryGamers input Index output value ----------------
            //dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count - 1) == Name04
            //dictionaryGamers[dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count - 1)] == Id == 4;
Name == Name04; Email: 4@4.com
            string fitstItem = dictionaryGamers.Keys.ElementAt(0);
            Console.WriteLine($"dictionaryGamers.Keys.ElementAt(0)  == {fitstItem}");  // Key, "Name01"
            Console.WriteLine($"dictionaryGamers[dictionaryGamers.Keys.ElementAt(0)]  ==  " +
                              $"{dictionaryGamers[fitstItem]}");    // Value, (Id == 1 ; Name == Name01 ;
Email : 1@1.com)
            //dictionaryGamers.Keys.ElementAt(0) == Name01
            //dictionaryGamers[dictionaryGamers.Keys.ElementAt(0)] == Id == 1; Name == Name01;
Email: 1@1.com
        }

        // 3. ------------------------------------------
        static void ListOfStringIndexerSample()
        {
            Console.WriteLine("3.1. input index integer, output string magicSpell ---------------");
            MagicSpell magicSpell = new MagicSpell();
            string magicSpell0 = magicSpell[0]; // input is index integer of List, output is magicSpell
string.
            Console.WriteLine($"magicSpell[0]  ==  {magicSpell[0]}");  //magicSpell[0]  ==  Spell01
            Console.WriteLine($"magicSpell[1]  ==  {magicSpell[1]}");  //magicSpell[1]  ==  Spell02
            Console.WriteLine($"magicSpell[2]  ==  {magicSpell[2]}");  //magicSpell[2]  ==  Spell03
            Console.WriteLine($"magicSpell[3]  ==  {magicSpell[3]}");  //magicSpell[3]  ==  Spell04
            //Console.WriteLine($"magicSpell[4]  ==  {magicSpell[4]}");   // Error! Throw Example
            //3.1.input index integer, output string magicSpell ---------------
            //magicSpell[0] == Spell01
            //magicSpell[1] == Spell02
            //magicSpell[2] == Spell03
            //magicSpell[3] == Spell04
            Console.WriteLine("3.2. magic spell changed ---------------");
            magicSpell[0] += "New";
            magicSpell[1] += "New";
            magicSpell[2] += "New";
            magicSpell[3] += "New";
            Console.WriteLine($"magicSpell[0]  ==  {magicSpell[0]}");  //magicSpell[0]  ==  Spell01New
            Console.WriteLine($"magicSpell[1]  ==  {magicSpell[1]}");  //magicSpell[1]  ==  Spell02New
            Console.WriteLine($"magicSpell[2]  ==  {magicSpell[2]}");  //magicSpell[2]  ==  Spell03New
            Console.WriteLine($"magicSpell[3]  ==  {magicSpell[3]}");  //magicSpell[3]  ==  Spell04New
            //3.2.magic spell changed ---------------
            //magicSpell[0] == Spell01New
            //magicSpell[1] == Spell02New
            //magicSpell[2] == Spell03New
            //magicSpell[3] == Spell04New
            Console.WriteLine("3.3. Add magic spell if index is not found. ---------------");
            magicSpell[4] = "Spell05";
            Console.WriteLine($"magicSpell[4]  ==  {magicSpell[4]}");  //magicSpell[4]  ==  Spell05
            //3.3.Add magic spell if index is not found. -------------- -
            //magicSpell[4] == Spell05
```

```
    Console.WriteLine("3.4. Input string magicSpell, output index integer. ---------------");
    Console.WriteLine($"magicSpell[\"Spell05\"]  ==  " +
                      $"{magicSpell["Spell05"]}");  //magicSpell["Spell05"]  ==  4
    Console.WriteLine($"magicSpell[\"Spell03New\"]  ==  " +
                      $"{magicSpell["Spell03New"]}");  //magicSpell["Spell03New"] == 2
    //Console.WriteLine($"magicSpell[\"Spell0\"]  ==  " +
    //                  $"{magicSpell["Spell0"]}");  //Error! Throw Example
    //3.4.Input string magicSpell, output index integer. ---------------
    //magicSpell["Spell05"] == 4
    //magicSpell["Spell03New"] == 2
}

// 4. -----------------------------------------
static void ListOfGamerIndexerSample()
{
    Console.WriteLine("4.1. input Id output name --------------------------------");
    Team team = new Team();
    Console.WriteLine($"Id 1 Gamer Name == team[1] == {team[1]}");
    Console.WriteLine($"Id 2 Gamer Name == team[2] == {team[2]}");
    Console.WriteLine($"Id 3 Gamer Name == team[3] == {team[3]}");
    Console.WriteLine($"Id 4 Gamer Name == team[4] == {team[4]}");
    //4.1.input Id output name------------------------------- -
    //Id 1 Gamer Name == team[1] == Name01
    //Id 2 Gamer Name == team[2] == Name02
    //Id 3 Gamer Name == team[3] == Name03
    //Id 4 Gamer Name == team[4] == Name04
    Console.WriteLine("4.2. input Id output name : Change Names ----------------------");
    team[1] += "New";
    team[2] += "New";
    team[3] += "New";
    team[4] += "New";
    Console.WriteLine($"Id 1 Gamer Name == team[1] == {team[1]}");
    Console.WriteLine($"Id 2 Gamer Name == team[2] == {team[2]}");
    Console.WriteLine($"Id 3 Gamer Name == team[3] == {team[3]}");
    Console.WriteLine($"Id 4 Gamer Name == team[4] == {team[4]}");
    //4.2.input Id output name: Change Names ----------------------
    //Id 1 Gamer Name == team[1] == Name01New
    //Id 2 Gamer Name == team[2] == Name02New
    //Id 3 Gamer Name == team[3] == Name03New
    //Id 4 Gamer Name == team[4] == Name04New
    Console.WriteLine("4.3. if input Id does not exist, then add new gamer -----------------");
    team[5] = "Name05";
    Console.WriteLine($"Id 5 Gamer Name == team[5] == {team[5]}");
    //4.3. if input Id does not exist, then add new gamer ---------------- -
    //Id 5 Gamer Name == team[5] == Name05
    Console.WriteLine("4.4. input Email output name -----------------");
    Console.WriteLine($"1@1.com Gamer Name == team[\"1@1.com\"] == {team["1@1.com"]}");
    Console.WriteLine($"2@2.com Gamer Name == team[\"2@2.com\"] == {team["2@2.com"]}");
    Console.WriteLine($"3@3.com Gamer Name == team[\"3@3.com\"] == {team["3@3.com"]}");
    Console.WriteLine($"4@4.com Gamer Name == team[\"4@4.com\"] == {team["4@4.com"]}");
    Console.WriteLine("Changing names---------------");
    team["1@1.com"] += "New2";
    team["2@2.com"] += "New2";
```

```
        team["3@3.com"] += "New2";
        team["4@4.com"] += "New2";
        Console.WriteLine($"1@1.com Gamer Name == team[\"1@1.com\"] == {team["1@1.com"]}");
        Console.WriteLine($"2@2.com Gamer Name == team[\"2@2.com\"] == {team["2@2.com"]}");
        Console.WriteLine($"3@3.com Gamer Name == team[\"3@3.com\"] == {team["3@3.com"]}");
        Console.WriteLine($"4@4.com Gamer Name == team[\"4@4.com\"] == {team["4@4.com"]}");
        //4.4.input Email output name---------------- -
        //1@1.com Gamer Name == team["1@1.com"] == Name01New
        //2@2.com Gamer Name == team["2@2.com"] == Name02New
        //3@3.com Gamer Name == team["3@3.com"] == Name03New
        //4@4.com Gamer Name == team["4@4.com"] == Name04New
        //Changing names---------------
        //1@1.com Gamer Name == team["1@1.com"] == Name01NewNew2
        //2@2.com Gamer Name == team["2@2.com"] == Name02NewNew2
        //3@3.com Gamer Name == team["3@3.com"] == Name03NewNew2
        //4@4.com Gamer Name == team["4@4.com"] == Name04NewNew2
    }

// 5. -----------------------------------------
    static void ListOfGamerIndexerSample2()
    {
        Console.WriteLine("5.1. input index output gamer --------------------------------");
        TeamA teamA = new TeamA();
        Gamer gamer0 = teamA[0];
        Console.WriteLine($"Index==0 Gamer Name == team[0] == {gamer0.ToString()}");
        Console.WriteLine($"Index==1 Gamer Name == team[1] == {teamA[1]}");
        Console.WriteLine($"Index==2 Gamer Name == team[2] == {teamA[2]}");
        Console.WriteLine($"Index==3 Gamer Name == team[3] == {teamA[3]}");
        //5.1.input index output gamer------------------------------- -
        //Index == 0 Gamer Name == team[0] == Id == 1; Name == Name01; Email: 1@1.com
        //Index == 1 Gamer Name == team[1] == Id == 2; Name == Name02; Email: 2@2.com
        //Index == 2 Gamer Name == team[2] == Id == 3; Name == Name03; Email: 3@3.com
        //Index == 3 Gamer Name == team[3] == Id == 4; Name == Name04; Email: 4@4.com
        Console.WriteLine("5.2. input index output gamer : Change Names ----------------------");
        teamA[0].Name += "New"; //Call Get Method.
        teamA[1] = new Gamer { Name = "Name02New2" };  //Call Set Method.
        teamA[2].Name += "New"; //Call Get Method.
        teamA[3].Name += "New"; //Call Get Method.
        Console.WriteLine($"Index==0 Gamer Name == team[0] == {teamA[0]}");
        Console.WriteLine($"Index==1 Gamer Name == team[1] == {teamA[1]}");
        Console.WriteLine($"Index==2 Gamer Name == team[2] == {teamA[2]}");
        Console.WriteLine($"Index==3 Gamer Name == team[3] == {teamA[3]}");
        //5.2.input index output gamer: Change Names ----------------------
        //Index == 0 Gamer Name == team[0] == Id == 1; Name == Name01New; Email: 1@1.com
        //Index == 1 Gamer Name == team[1] == Id == 2; Name == Name02New2; Email: 2@2.com
        //Index == 2 Gamer Name == team[2] == Id == 3; Name == Name03New; Email: 3@3.com
        //Index == 3 Gamer Name == team[3] == Id == 4; Name == Name04New; Email: 4@4.com
        Console.WriteLine("5.3. if input index does not exist, then add new gamer -----------------");
        //teamA[5].Name = "Name05";   // Call Get method and get Error!
        teamA[5] = new Gamer
        {
            Id = 5,
            Name = "Name05",
            Email = "5@5.com"
```

```
        };
        Console.WriteLine($"Index==4 Gamer Name == team[4] == {teamA[4]}");
        //5.3. if input index does not exist, then add new gamer ---------------- -
        //Index == 4 Gamer Name == team[4] == Id == 5; Name == Name05; Email: 5@5.com
        Console.WriteLine("5.4. input Email output name -----------------");
        Console.WriteLine($"1@1.com Gamer Index == team[\"1@1.com\"] == {teamA["1@1.com"]}");
        Console.WriteLine($"2@2.com Gamer Index == team[\"2@2.com\"] == {teamA["2@2.com"]}");
        Console.WriteLine($"3@3.com Gamer Index == team[\"3@3.com\"] == {teamA["3@3.com"]}");
        Console.WriteLine($"4@4.com Gamer Index == team[\"4@4.com\"] == {teamA["4@4.com"]}");
        //5.4.input Email output name---------------- -
        //1@1.com Gamer Index == team["1@1.com"] == 0
        //2@2.com Gamer Index == team["2@2.com"] == 1
        //3@3.com Gamer Index == team["3@3.com"] == 2
        //4@4.com Gamer Index == team["4@4.com"] == 3
    }

// 6. -----------------------------------------
    static void Dictionary_String_Gamer_IndexerSample()
    {
        TeamB teamB = new TeamB();
        Console.WriteLine("6.1. Dictionary of Gamer by string key ---------------");
        //Gamer gamerKey1 = teamB["Key1"];
        Console.WriteLine($"teamB[\"Key1\"] == {teamB["Key1"]}");
        Console.WriteLine($"teamB[\"Key2\"] == {teamB["Key2"]}");
        Console.WriteLine($"teamB[\"Key3\"] == {teamB["Key3"]}");
        Console.WriteLine($"teamB[\"Key4\"] == {teamB["Key4"]}");
        //6.1.Dictionary of Gamer by string key ---------------
        //teamB["Key1"] == Id == 1; Name == Name01; Email: 1@1.com
        //teamB["Key2"] == Id == 2; Name == Name02; Email: 2@2.com
        //teamB["Key3"] == Id == 3; Name == Name03; Email: 3@3.com
        //teamB["Key4"] == Id == 4; Name == Name04; Email: 4@4.com
        Console.WriteLine("6.2. Add new gamer by string key ---------------");
        teamB["Key5"] = new Gamer
        {
            Id = 5,
            Name = "Name05",
            Email = "5@5.com"
        };
        Console.WriteLine($"teamB[\"Key5\"] == {teamB["Key5"]}");
        //6.2.Add new gamer by string key --------------- -
        //teamB["Key5"] == Id == 5; Name == Name05; Email: 5@5.com
        Console.WriteLine("6.3. Modify Gamer by string key ---------------");
        Gamer teamAGamer01 = teamB["Key1"];
        teamAGamer01.Name += "New3";
        Console.WriteLine($"teamB[\"Key1\"] == {teamB["Key1"]}");
        //6.3.Modify Gamer by by string key --------------- -
        //teamB["Key1"] == Id == 1; Name == Name01New3; Email: 1@1.com
        Console.WriteLine("6.4. Modify Gamer by string key ---------------");
        teamB["Key1"] = new Gamer();
        Console.WriteLine($"teamB[\"Key1\"] == {teamB["Key1"]}");
        //6.4.Modify Gamer by string key --------------- -
        //teamB["Key1"] == Id == 1; Name == Name01New3; Email: 1@1.com
        Console.WriteLine("6.5. Modify Gamer by string key ---------------");
        teamB["Key1"] = new Gamer
```

```
            {
                Id = 101,
                Name = "Name101",
                Email = "101@101.com"
            };
            Console.WriteLine($"teamB[\"Key1\"] == {teamB["Key1"]}");
            //6.5.Modify Gamer by string key -------------- -
            //teamB["Key1"] == Id == 101; Name == Name101; Email: 101@101.com
            Console.WriteLine("6.6. Dictionary of Gamer by int index ---------------");
            //Gamer gamerKey1 = teamB["Key1"];
            Console.WriteLine($"teamB[0] == {teamB[0]}");
            Console.WriteLine($"teamB[1] == {teamB[1]}");
            Console.WriteLine($"teamB[2] == {teamB[2]}");
            Console.WriteLine($"teamB[3] == {teamB[3]}");
            Console.WriteLine($"teamB[4] == {teamB[4]}");
            //6.6.Dictionary of Gamer by int index ---------------
            //teamB[0] == Id == 101 ; Name == Name101; Email: 101@101.com
            //teamB[1] == Id == 2 ; Name == Name02; Email: 2@2.com
            //teamB[2] == Id == 3 ; Name == Name03; Email: 3@3.com
            //teamB[3] == Id == 4 ; Name == Name04; Email: 4@4.com
            //teamB[4] == Id == 5 ; Name == Name05 ; Email : 5@5.com
            Console.WriteLine("6.7. Add new gamer by int index ---------------");
            teamB[5] = new Gamer
            {
                Id = 6,
                Name = "Name06",
                Email = "6@6.com"
            };
            Console.WriteLine($"teamB[5] == {teamB[5]}");
            //6.7.Add new gamer by int index ---------------
            //teamB[5] == Id == 6; Name == Name06; Email: 6@6.com
            Console.WriteLine("6.8. Modify Gamer by int index ---------------");
            Gamer teamAGamer02 = teamB[1];
            teamAGamer02.Name += "New4";
            Console.WriteLine($"teamB[1] == {teamB[1]}");
            //6.8.Modify Gamer by int index ---------------
            //teamB[1] == Id == 2; Name == Name02New4; Email: 2@2.com
            Console.WriteLine("6.9. Modify Gamer by int index ---------------");
            teamB[1] = new Gamer();
            Console.WriteLine($"teamB[1] == {teamB[1]}");
            //6.9.Modify Gamer by int index ---------------
            //teamB[1] == Id == 2; Name == Name02New4; Email: 2@2.com
            Console.WriteLine("6.10. Modify Gamer by int index ---------------");
            teamB[1] = new Gamer
            {
                Id = 102,
                Name = "Name102",
                Email = "102@102.com"
            };
            Console.WriteLine($"teamB[1] == {teamB[1]}");
            //6.10.Modify Gamer by int index ---------------
            //teamB[1] == Id == 102; Name == Name102; Email: 102@102.com
        }
    }
}
```

```
namespace OnLineGame
{
    // 3. ---------------------------------------------------
    public class MagicSpell
    {
        private List<string> _listMagicSpells;
        public MagicSpell()
        {
            _listMagicSpells = new List<string>
            {
                "Spell01", "Spell02", "Spell03", "Spell04"
            };
        }
        /// <summary>
        /// Use "this" keyword to create an indexer.
        /// This indexer takes "int index" as parameter
        /// Return the magicSpell from the List by the "int index".
        /// Or set the magicSpell in the List by the "int index".
        /// Or Add new magicSpell to the List
        /// if the input index does not exist.
        /// </summary>
        /// <param name="index">The index integer of the List</param>
        /// <returns>The magicSpell from the List by the "int index".</returns>
        public string this[int index]
        {
            // Just like properties indexers have get and set accessors
            get
            {
                string magicSpell = _listMagicSpells[index];
                if (magicSpell != null)
                {
                    return magicSpell;
                }
                throw new IndexOutOfRangeException($"The index=={index} magic spell can not be found.");
            }
            set
            {
                if (index <= _listMagicSpells.Count-1)  //means index integer will be found.
                {
                    // string magicSpell = _listMagicSpells[index];
                    _listMagicSpells[index] = value;
                }
                else
                {
                    _listMagicSpells.Add(value);
                }
            }
        }
        /// <summary>
        /// Use "this" keyword to create an indexer.
        /// This indexer takes "string magicSpell" as parameter
        /// Return the index of List by the input magicSpell.
        /// </summary>
        /// <param name="magicSpell">The string value of magicSpell.</param>
        /// <returns>The index of List by the input magicSpell</returns>
```

```
    public int this[string magicSpell]
    {
        // Just like properties indexers have get and set accessors
        get
        {
            int index = _listMagicSpells.FindIndex(ms => ms == magicSpell);
            if (index != -1)
            {
                return index;
            }
            throw new Exception("The magicSpell spell can not be found in the list.");
        }
        // You can not change the index, so no "set".
    }
}
// 4. ---------------------------------------------------
public class Gamer
{
    public int Id { get; set; }
    public string Name { get; set; }
    public string Email { get; set; }
    public override string ToString()
    {
        return $"Id == {Id} ; Name == {Name} ; Email : {Email}";
    }
}
public class Team
{
    private List<Gamer> _listGamers;
    public Team()
    {
        _listGamers = new List<Gamer>();
        _listGamers.Add(new Gamer
        { Id = 1, Name = "Name01", Email = "1@1.com" });
        _listGamers.Add(new Gamer
        { Id = 2, Name = "Name02", Email = "2@2.com" });
        _listGamers.Add(new Gamer
        { Id = 3, Name = "Name03", Email = "3@3.com" });
        _listGamers.Add(new Gamer
        { Id = 4, Name = "Name04", Email = "4@4.com" });
        //Gamer aa = _listGamers[0];
    }
    /// <summary>
    /// Use "this" keyword to create an indexer.
    /// This indexer takes "int index" as parameter
    /// Return the gamer name from the List by the "int index".
    /// Or set the gamer name in the List by the "int index".
    /// Or Add new gamer to the List if the index does not exist.
    /// </summary>
    /// <param name="id">The gamer Id</param>
    /// <returns>the gamer name from the List by the "int index"</returns>
    public string this[int id]
    {
        // Just like properties indexers have get and set accessors
        get
        {
```

```
            Gamer gamer = _listGamers.
                FirstOrDefault(g => g.Id == id);
            if (gamer != null)
                return gamer.Name;
            throw new Exception("The Id can not be found in the list.");
        }
        set
        {
            Gamer gamer = _listGamers.
                FirstOrDefault(x => x.Id == id);
            if (gamer != null)
            {
                gamer.Name = value;
            }
            else
            {
                _listGamers.Add(new Gamer { Id = id, Name = value, Email = String.Empty });
            }
        }
    }
    /// <summary>
    /// Use "this" keyword to create an indexer.
    /// This indexer takes "string email" as parameter
    /// Return the gamer name from the List by the "string email".
    /// Or set the gamer name in the List by the "string email".
    /// </summary>
    /// <param name="email">The gamer Email</param>
    /// <returns>the gamer name from the List by the "string email"</returns>
    public string this[string email]
    {
        // Just like properties indexers have get and set accessors
        get
        {
            Gamer gamer = _listGamers.
                FirstOrDefault(g => g.Email == email);
            if (gamer != null)
                return gamer.Name;
            throw new Exception("The email can not be found in the list.");
        }
        set
        {
            Gamer gamer = _listGamers.
                FirstOrDefault(g => g.Email == email);
            if (gamer != null)
            {
                gamer.Name = value;
            }
            else
            {
                throw new Exception("The email can not be found in the list.");
            }
        }
    }
}

// 5. ------------------------------------------
public class TeamA
{
```

```
private List<Gamer> _listGamers;
public TeamA()
{
    _listGamers = new List<Gamer>();
    _listGamers.Add(new Gamer
    { Id = 1, Name = "Name01", Email = "1@1.com" });
    _listGamers.Add(new Gamer
    { Id = 2, Name = "Name02", Email = "2@2.com" });
    _listGamers.Add(new Gamer
    { Id = 3, Name = "Name03", Email = "3@3.com" });
    _listGamers.Add(new Gamer
    { Id = 4, Name = "Name04", Email = "4@4.com" });
    //Gamer aa = _listGamers[0];
}
/// <summary>
/// Use "this" keyword to create an indexer.
/// This indexer takes "int index" as parameter
/// Return the gamer from the List by the "int index".
/// Or set the gamer in the List by the "int index".
/// Or Add new gamer to the List
/// if the input index does not exist.
/// </summary>
/// <param name="index">The index integer of the List</param>
/// <returns>The gamer from the List by the "int index".</returns>
public Gamer this[int index]
{
    // Just like properties indexers have get and set accessors
    get
    {
        Gamer gamer = _listGamers[index];
        if (gamer != null)
        {
            return gamer;
        }
        throw new IndexOutOfRangeException($"The index=={index} Gamer can not be found.");
    }
    set
    {
        if (index <= _listGamers.Count - 1)  //means index integer will be found.
        {
            //_listGamers[index] = value; // Not good enough
            Gamer gamer = _listGamers[index];
            gamer.Id = value.Id == default(int) ? gamer.Id : value.Id;
            gamer.Name = value.Name == default(string) ? gamer.Name : value.Name;
            gamer.Email = value.Email == default(string) ? gamer.Email : value.Email;

        }
        else
        {
            _listGamers.Add(value);
        }
    }
}
/// <summary>
/// Use "this" keyword to create an indexer.
/// This indexer takes "string email" as parameter
```

```
    /// Return the index of List by the input email.
    /// </summary>
    /// <param name="email">The string value of email.</param>
    /// <returns>The index of List by the input email</returns>
    public int this[string email]
    {
        // Just like properties indexers have get and set accessors
        get
        {
            int index = _listGamers.FindIndex(g => g.Email == email);
            if (index != -1)
            {
                return index;
            }
            throw new Exception("The email can not be found in the list.");
        }
        // You can not change the index, so no "set".
    }
}


// 6. ------------------------------------------
public class TeamB
{
    private Dictionary<string, Gamer> _dictionaryGamers;
    public TeamB()
    {
        _dictionaryGamers = new Dictionary<string, Gamer>();
        _dictionaryGamers.Add("Key1", new Gamer
        { Id = 1, Name = "Name01", Email = "1@1.com" });
        _dictionaryGamers.Add("Key2", new Gamer
        { Id = 2, Name = "Name02", Email = "2@2.com" });
        _dictionaryGamers.Add("Key3", new Gamer
        { Id = 3, Name = "Name03", Email = "3@3.com" });
        _dictionaryGamers.Add("Key4", new Gamer
        { Id = 4, Name = "Name04", Email = "4@4.com" });
    }
    /// <summary>
    /// Use "this" keyword to create an indexer.
    /// This indexer takes "string key" as parameter
    /// Return the Gamer from the Dictionary by the "string key".
    /// Or set the Gamer in the Dictionary by the "string key".
    /// Or Add new Gamer to the Dictionary
    /// if the input "string key" does not exist.
    /// </summary>
    /// <param name="index">The string key of the Dictionary</param>
    /// <returns>The Gamer from the Dictionary by the "string key".</returns>
    public Gamer this[string key]
    {
        get
        {
            KeyValuePair<string, Gamer> gamerKeyValue = _dictionaryGamers.
                FirstOrDefault(x => x.Key == key);
            Gamer gamer = _dictionaryGamers.
                FirstOrDefault(x => x.Key == key).Value;
            if (gamer != null)
```

```
                {
                    return gamer;
                }
                throw new KeyNotFoundException("The key can not be found.");
            }
            set
            {
                KeyValuePair<string, Gamer> gamerKeyValue =
                    _dictionaryGamers.FirstOrDefault(x => x.Key == key);
                Gamer gamer =
                    _dictionaryGamers.FirstOrDefault(x => x.Key == key).Value;

                if (gamer != null)
                {
                    gamer.Id = value.Id == default(int) ?
                        gamer.Id : value.Id;
                    // if new index does not exist, then use old index.
                    gamer.Name = value.Name == default(string) ?
                        gamer.Name : value.Name;
                    gamer.Email = value.Email == default(string) ?
                        gamer.Email : value.Email;
                }
                else
                {
                    _dictionaryGamers.Add(key, value);
                }
            }
        }
        /// <summary>
        /// Use "this" keyword to create an indexer.
        /// This indexer takes "int index" as parameter
        /// Return the Gamer from the Dictionary by the "int index".
        /// Or set the Gamer in the Dictionary by the "int index".
        /// Or Add new Gamer to the Dictionary
        /// if the input index does not exist.
        /// </summary>
        /// <param name="index">The index integer of the Dictionary</param>
        /// <returns>The Gamer from the Dictionary by the "int index".</returns>
        public Gamer this[int index]
        {
            // Just like properties indexers have get and set accessors
            get
            {
                string keyOfTheIndex = _dictionaryGamers.Keys.ElementAt(index); // get the key of the
index.
                Gamer gamerOfTheIndex = _dictionaryGamers[keyOfTheIndex];
                if (gamerOfTheIndex != null)
                {
                    return gamerOfTheIndex;
                }
                else
                {
                    throw new IndexOutOfRangeException("Gamer can not be found by the index.");
                }
            }
            set
            {
```

```
                if (index <= _dictionaryGamers.Count - 1)  //means index integer will be found.
                {
                    //_dictionaryGamers[_dictionaryGamers.Keys.ElementAt(index)] = value; // Not good
enough
                    string keyOfTheIndex = _dictionaryGamers.Keys.ElementAt(index); // get the key of the
index.
                    Gamer gamerOfTheIndex = _dictionaryGamers[keyOfTheIndex];
                    gamerOfTheIndex.Id = value.Id == default(int) ?
                        gamerOfTheIndex.Id : value.Id;
                    gamerOfTheIndex.Name = value.Name == default(string) ?
                        gamerOfTheIndex.Name : value.Name;
                    gamerOfTheIndex.Email = value.Email == default(string) ?
                        gamerOfTheIndex.Email : value.Email;
                }
                else
                {
                    _dictionaryGamers.Add("Key"+ (_dictionaryGamers.Count + 1), value);
                }
            }
        }
    }
}
```

```
0. DefaultValue() ==========================
default(int) == 0
default(string) == NULL
1. ListSample() ============================
1.1. listMagicSpell ------------------
listMagicSpell == {"Spell01", "Spell02", "Spell03", "Spell04" }
1.2. ListObject.FindIndex() ----------------------
listMagicSpell.FindIndex(a => a == "Spell03")  :  2
listMagicSpell.FindIndex(a => a == "Spell10")  :  -1
1.3. ListObject.Contains() ---------------------
listMagicSpell.Contains("Spell03")  :  True
listMagicSpell.FirstOrDefault(x => x.Contains("Spell03"))  :  Spell03
listMagicSpell.FirstOrDefault(x => x.Contains("Spell10"))  :  Spell01
1.4. ListObject.Equals() ---------------------
listMagicSpell.FirstOrDefault(x => x.Equals("Spell02"))  :  Spell02
listMagicSpell.FirstOrDefault(x => x.Equals("Spell10"))  :  Not Found
1.5. ListObject[index] ---------------------
listMagicSpell[0]  ==  Spell01
listMagicSpell[1]  ==  Spell02
listMagicSpell[2]  ==  Spell03
listMagicSpell[3]  ==  Spell04
2. DictionarySample() ============================
2.1. dictionaryGamers -------------------
name01KeyValue.Key == Name01  ;  gamer1.ToString() == Id == 1 ; Name == Name01 ; Email : 1@1.com
name02KeyValue.Key == Name02  ;  gamer2.ToString() == Id == 2 ; Name == Name02 ; Email : 2@2.com
name03KeyValue.Key == Name03  ;  gamer3.ToString() == Id == 3 ; Name == Name03 ; Email : 3@3.com
name04KeyValue.Key == Name04  ;  gamer4.ToString() == Id == 4 ; Name == Name04 ; Email : 4@4.com
2.2. dictionaryGamers input key output value ---------------
dictionaryGamers["Name01"]  ==  Id == 1 ; Name == Name01 ; Email : 1@1.com
2.3. dictionaryGamers input Index output value ---------------
dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count - 1)  ==  Name04
dictionaryGamers[dictionaryGamers.Keys.ElementAt(dictionaryGamers.Count - 1)]  ==  Id == 4 ; Name == Name04 ; Email : 4@4.com
dictionaryGamers.Keys.ElementAt(0)  ==  Name01
dictionaryGamers[dictionaryGamers.Keys.ElementAt(0)]  ==  Id == 1 ; Name == Name01 ; Email : 1@1.com
```

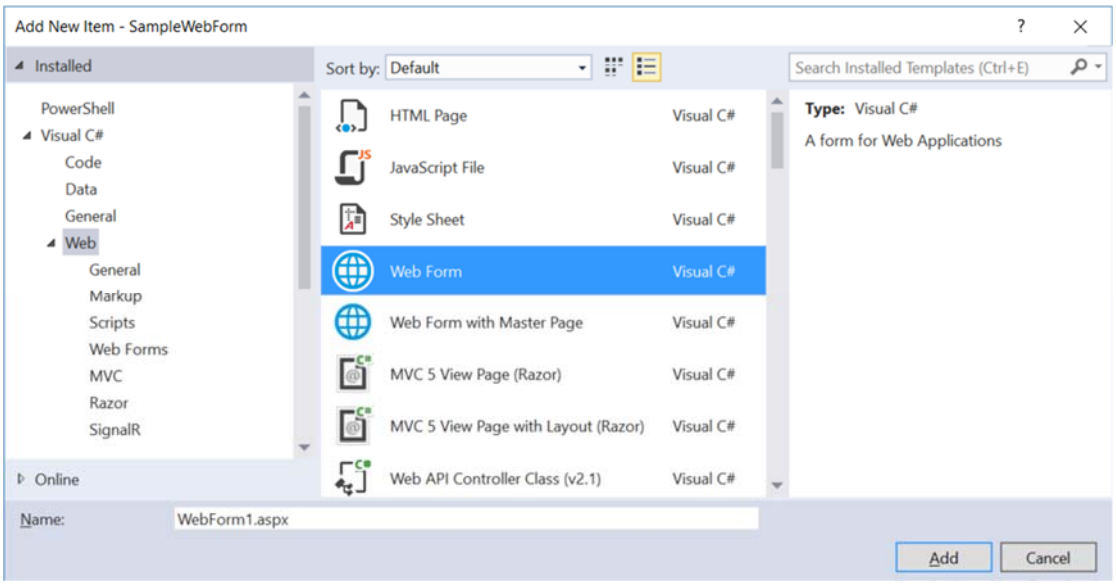
```
3.1. input index integer, output string magicSpell ---------------
magicSpell[0]  ==  Spell01
magicSpell[1]  ==  Spell02
magicSpell[2]  ==  Spell03
magicSpell[3]  ==  Spell04
3.2. magic spell changed ---------------
magicSpell[0]  ==  Spell01New
magicSpell[1]  ==  Spell02New
magicSpell[2]  ==  Spell03New
magicSpell[3]  ==  Spell04New
3.3. Add magic spell if index is not found. ---------------
magicSpell[4]  ==  Spell05
3.4. Input string magicSpell, output index integer. ---------------
magicSpell["Spell05"]  ==  4
magicSpell["Spell03New"]  ==  2
4. ListOfGamerIndexerSample() ============================
4.1. input Id output name --------------------------------
Id 1 Gamer Name == team[1] == Name01
Id 2 Gamer Name == team[2] == Name02
Id 3 Gamer Name == team[3] == Name03
Id 4 Gamer Name == team[4] == Name04
4.2. input Id output name : Change Names ----------------------
Id 1 Gamer Name == team[1] == Name01New
Id 2 Gamer Name == team[2] == Name02New
Id 3 Gamer Name == team[3] == Name03New
Id 4 Gamer Name == team[4] == Name04New
4.3. if input Id does not exist, then add new gamer -----------------
Id 5 Gamer Name == team[5] == Name05
```

```
4.4. input Email output name -----------------
1@1.com Gamer Name == team["1@1.com"] == Name01New
2@2.com Gamer Name == team["2@2.com"] == Name02New
3@3.com Gamer Name == team["3@3.com"] == Name03New
4@4.com Gamer Name == team["4@4.com"] == Name04New
Changing names--------------
1@1.com Gamer Name == team["1@1.com"] == Name01NewNew2
2@2.com Gamer Name == team["2@2.com"] == Name02NewNew2
3@3.com Gamer Name == team["3@3.com"] == Name03NewNew2
4@4.com Gamer Name == team["4@4.com"] == Name04NewNew2
5. ListOfGamerIndexerSample2() ============================
5.1. input index output gamer --------------------------------
Index==0 Gamer Name == team[0] == Id == 1 ; Name == Name01 ; Email : 1@1.com
Index==1 Gamer Name == team[1] == Id == 2 ; Name == Name02 ; Email : 2@2.com
Index==2 Gamer Name == team[2] == Id == 3 ; Name == Name03 ; Email : 3@3.com
Index==3 Gamer Name == team[3] == Id == 4 ; Name == Name04 ; Email : 4@4.com
5.2. input index output gamer : Change Names ----------------------
Index==0 Gamer Name == team[0] == Id == 1 ; Name == Name01New ; Email : 1@1.com
Index==1 Gamer Name == team[1] == Id == 2 ; Name == Name02New2 ; Email : 2@2.com
Index==2 Gamer Name == team[2] == Id == 3 ; Name == Name03New ; Email : 3@3.com
Index==3 Gamer Name == team[3] == Id == 4 ; Name == Name04New ; Email : 4@4.com
5.3. if input index does not exist, then add new gamer ----------------
Index==4 Gamer Name == team[4] == Id == 5 ; Name == Name05 ; Email : 5@5.com
5.4. input Email output name -----------------
1@1.com Gamer Index == team["1@1.com"] == 0
2@2.com Gamer Index == team["2@2.com"] == 1
3@3.com Gamer Index == team["3@3.com"] == 2
4@4.com Gamer Index == team["4@4.com"] == 3
```

```
6. Dictionary_String_Gamer_IndexerSample() ==============================
6.1. Dictionary of Gamer by string key ---------------
teamB["Key1"] == Id == 1 ; Name == Name01 ; Email : 1@1.com
teamB["Key2"] == Id == 2 ; Name == Name02 ; Email : 2@2.com
teamB["Key3"] == Id == 3 ; Name == Name03 ; Email : 3@3.com
teamB["Key4"] == Id == 4 ; Name == Name04 ; Email : 4@4.com
6.2. Add new gamer by string key ---------------
teamB["Key5"] == Id == 5 ; Name == Name05 ; Email : 5@5.com
6.3. Modify Gamer by string key ---------------
teamB["Key1"] == Id == 1 ; Name == Name01New3 ; Email : 1@1.com
6.4. Modify Gamer by string key ---------------
teamB["Key1"] == Id == 1 ; Name == Name01New3 ; Email : 1@1.com
6.5. Modify Gamer by string key ---------------
teamB["Key1"] == Id == 101 ; Name == Name101 ; Email : 101@101.com
6.6. Dictionary of Gamer by int index ---------------
teamB[0] == Id == 101 ; Name == Name101 ; Email : 101@101.com
teamB[1] == Id == 2 ; Name == Name02 ; Email : 2@2.com
teamB[2] == Id == 3 ; Name == Name03 ; Email : 3@3.com
teamB[3] == Id == 4 ; Name == Name04 ; Email : 4@4.com
teamB[4] == Id == 5 ; Name == Name05 ; Email : 5@5.com
6.7. Add new gamer by int index ---------------
teamB[5] == Id == 6 ; Name == Name06 ; Email : 6@6.com
6.8. Modify Gamer by int index ---------------
teamB[1] == Id == 2 ; Name == Name02New4 ; Email : 2@2.com
6.9. Modify Gamer by int index ---------------
teamB[1] == Id == 2 ; Name == Name02New4 ; Email : 2@2.com
6.10. Modify Gamer by int index ---------------
teamB[1] == Id == 102 ; Name == Name102 ; Email : 102@102.com
```

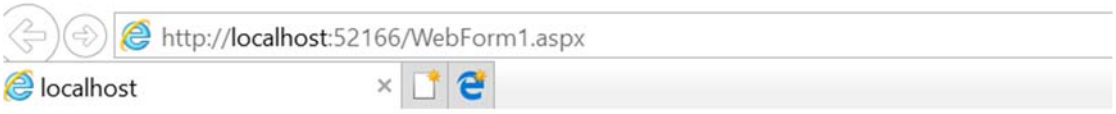
==========

3. SampleWebForm : WebForm1.aspx.cs




```
using System;
namespace SampleWebForm
{
    public partial class WebForm1 : System.Web.UI.Page
    {
        protected void Page_Load(object sender, EventArgs e)
```

```
        {
            // Using the string indexer to store session data
            Session["Session1"] = "Session1 Data";
            Session["Session2"] = "Session2 Data";
            Session["Session2"] = "Session2New Data";   // Change data
            //Session[2] = "Session3 Data";   // Error! can not use int index to set session data
            Session["Session3"] = new Gamer
            {
                Id = 1,
                Name = "Name01",
                Email = "1@1.com"
            };
            // input int index indexer, output object
            Response.Write($"Session[0].ToString() ==  " +
                           $"{Session[0].ToString()} <br/>");
            // input string indexer, output object
            Response.Write($"Session[\"Session2\"].ToString()  ==  " +
                           $"{Session["Session2"].ToString()} <br/>");
            // input int index indexer, output object
            Response.Write($"Session[2].ToString() ==  " +
                           $"{Session[2].ToString()} <br/>");
            // input string indexer, output object
            Response.Write($"Session[\"Session3\"].ToString()  ==  " +
                           $"{Session["Session3"].ToString()} <br/>");
            //Session[0].ToString() == Session1 Data
            //Session["Session2"].ToString() == Session2New Data
            //Session[2].ToString() == Id == 1; Name == Name01; Email: 1@1.com
            //Session["Session3"].ToString() == Id == 1; Name == Name01; Email: 1@1.com
        }
    }
    public class Gamer
    {
        public int Id { get; set; }
        public string Name { get; set; }
        public string Email { get; set; }
        public override string ToString()
        {
            return $"Id == {Id} ; Name == {Name} ; Email : {Email}";
        }
    }
}
```



Session[0].ToString() == Session1 Data
Session["Session2"].ToString() == Session2New Data
Session[2].ToString() == Id == 1 ; Name == Name01 ; Email : 1@1.com
Session["Session3"].ToString() == Id == 1 ; Name == Name01 ; Email : 1@1.com

```
// Using the string indexer to store session data
Session["Session1"] = "Session1 Data";
Sess
Sess
//Se
Sess
{
```

System.Web.SessionState.HttpSessionState System.Web.UI.Page.Session { get; }
Gets the current Session object provided by ASP.NET.

Exceptions:
System.Web.HttpException

Session is HttpSessionState

Now you may open dotPeek and check HttpSessionState
dotPeek is free software which allows you see the code from dll.
https://www.jetbrains.com/decompiler/
Here is the link you may download it.

```
/// <summary>Gets or sets a session value by name.</summary>
/// <returns>The session-state value with the specified name, or null if the item does not exist.</returns>
/// <param name="name">The key name of the session value. </param>
public object this[string name]
{
  get
  {
    return this._container[name];
  }
  set
  {
    this._container[name] = value;
  }
}
```

```
/// <summary>Gets or sets a session value by numerical index.</summary>
/// <returns>The session-state value stored at the specified index, or null if the item does not exist.</returns>
/// <param name="index">The numerical index of the session value. </param>
public object this[int index]
{
  get
  {
    return this._container[index];
  }
  set
  {
    this._container[index] = value;
  }
}
```