**Custom List Class Project (out of 150 points)**

**User Stories**

The built-in List<T> class is a generic class that acts as a wrapper over the array class. **You cannot use built-in List or Array methods or properties.** For questions regarding *how* to approach a specific feature, please start by referring to the C# List<T> class documentation to get an idea of how the built-in List<T> class handles various situations and methods.

**(20 points)** As a developer, I want to use Test Driven Development (TDD), so that I can write tests for my methods to pass to ensure proper functionality within my application. There needs to be several tests per method.

**(5 points):** As a developer, I want to make good, consistent commits.

**(10 points): As a developer, I want to use a custom-built list class that stores its values in an array, so that I can store any data type in my collection.**

**(10 points):** As a developer, I want a read-only Count property implemented on the custom-built list class, so that I can get a count of the number of elements in my custom list class instance.

**(10 points):** As a developer, I want a Capacity property implemented on the custom-built list class, so that I can publicly see the size of my private array.

**(10 points): As a developer, I want to create a C# indexer so that I can make the objects in my list accessible via index. I want to properly ensure that a user cannot access an out-of-bounds index.**

**(10 points): As a developer, I want the ability to add an object to an instance of my custom-built list class by imitating the C# Add() method.**

**(10 points): As a developer, I want the ability to remove an object from an instance of my custom-built list class by imitating the C# Remove() method.**

**(10 points): As a developer, I want to be able to override the ToString method that converts the contents of the custom list to a string. HINT: You can use .ToString() inside the method for this**

**(10 points):** As a developer, I want to be able to overload the + operator, so that I can add two instances of the custom list class together.

* List<int> one = new List<int>() {1,3,5}; and List<int> two = new List<int>() {2,4,6};
* List<int> result = one + two;
* result has 1,3,5,2,4,6

**(10 points):** As a developer, I want to be able to overload the – operator, so that I can subtract one instance of a custom list class from another instance of a custom list class.

* List<int> one = new List<int>() {1,3,5}; and List<int> two = new List<int>() {2,1,6};
* List<int> result = one - two;
* result has 3,5

**(5 points):** As a developer, I want to write documentation in a .txt file that describes the details and functionality of my – operator overload. I want to include details such as “syntax”, “parameters”, “return type”, and an example of it being used, with the output. I want to use the following piece of documentation as a guideline for my own documentation:

https://msdn.microsoft.com/en-us/library/cd666k3e%28v=vs.110%29.aspx?f=255&MSPPError=-2147217396

**(10 points):** As a developer, I want the ability to zip two custom list class instances together in the form of a zipper. An example:

* I have List<int> odd = new List<int>() {1,3,5}; and List<int> even = new List<int>() {2,4,6};
* odd.Zip(even);
* When lists odd and even are zipped together, your new list will contain values 1,2,3,4,5,6

**(10 points):** As a developer, I want the custom list class to be iterable.

**(10 points):** As a developer, I want to use C# best practices, SOLID design principles, and good naming conventions on the project.

**(Bonus 5 points):** As a developer, I want the ability to sort an instance of my custom-built list class. To be eligible for the bonus points, you may not use Array.Sort() that is already built in and you must tell us what sorting algorithm you used.

**(Bonus 5 points):** As a developer, I want the ability to earn bonus points for an EASTER EGG user story, regarding implementing a specific good practice on one of the methods specified in a user story above.

**NOTICE: get your unit tests (test methods) checked off by an instructor before you begin writing your methods to ensure you are on the correct path.**

**Add Method**

**How does it work?**

**First need to make sure a list is created by declaring the list and instantiating the list.**

**But then we will need to:**

**1) Get list count**

**2) Get maximum values for Array**

**3) If the Count of the Array would make it equal to the Max Capacity of the array then we need to create a new array which will double the array size. It will copy all of the values for the old array, and add them in the appropriate indexes of the new array.**

**When we add a new array.**

**We will need to loop through old array**

**How does remove method work**

**We take an array, It has four numbers: { 1, 2, 3, 4 }**

**We want to remove 1**

**We loop through and find 1 in the array.**

**(10 points):** As a developer, I want to be able to overload the + operator, so that I can add two instances of the custom list class together.

* List<int> one = new List<int>() {1,3,5}; and List<int> two = new List<int>() {2,4,6};
* List<int> result = one + two;
* result has 1,3,5,2,4,6

Get two CustomList customList objects.

Get Count of array 1 = count1

GetCount of array 2 = count2

Add counts to get size of new array following max capacity definition = newCount

Create new array

Loop through first array count1 times and add 1st array values

Loop through second array count2 times and add 2nd array values.