When to use IList and when to use List

Asked 16 years, 4 months ago Modified 2 years, 10 months ago Viewed 190k times



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I know that IList is the interface and List is the concrete type but I still don't know when to use each one. What I'm doing now is if I don't need the Sort or FindAll methods I use the interface. Am I right? Is there a better way to decide when to use the interface or the concrete type?



C#

.net

()

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asked Aug 19, 2008 at 23:09

Rismo

6,577 • 11 • 38 • 33

- If anyone is still wondering, I find the best answers here: <u>stackoverflow.com/questions/400135/listt-or-ilistt</u>
 - Crismogram May 22, 2018 at 3:13

12 Answers

Sorted by:

Highest score (default)





There are two rules I follow:

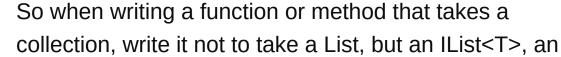
212

Accept the most basic type that will work



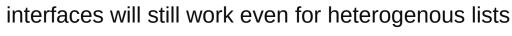
Return the richest type your user will need







ICollection<T>, or IEnumerable<T>. The generic



because System. Object can be a T too. Doing this will save you headache if you decide to use a Stack or some

other data structure further down the road. If all you need to do in the function is foreach through it,

IEnumerable<T> is really all you should be asking for.

On the other hand, when returning an object out of a function, you want to give the user the richest possible set of operations without them having to cast around. So in that case, if it's a List<T> internally, return a copy as a List<T>.

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edited Aug 20, 2008 at 1:58

answered Aug 20, 2008 at 1:33



18.7k ● 6 ● 60 ● 61

55 You shouldn't treat input/output types any differently. Input and output types should both be the most basic type (preferably interface) that will support clients needs. Encapsulation relies on telling clients as little about the implementation of your class as possible. If you return a concrete List, you can't then change to some other better





type without forcing all of your clients to re-compile/update.

– Ash Sep 12, 2010 at 8:53

- 17 I disagree with the 2 rules... I would use most primitive type and specialy when returning in this case IList (better IEnumarable) and you should work with List in your function inside. Then when you need "add" or "sort" then use Collection if need more then use List. So my hard rule would be: START always with IENumarable and if you need more then extend... ethem Apr 26, 2013 at 18:25
- For your convenience, the "two rules" have a name: robustness principle (a.k.a. Postel's law). easoncxz Jun 13, 2015 at 11:12
- I very strongly disagree about Point #2, especially if this is at a service/api boundary. Returning modifiable collections can give the impression that the collections are "live" and calling methods like Add() and Remove() may have effects beyond just the collection. Returning a read-only interface such as IEnumerable is often the way to go for data-retrieval methods. Your consumer can project it into a richer type as-needed. STW Sep 23, 2016 at 22:29
- Alas, IList<T> is the only collection interface that allows fast indexed access [] . Often one of my requirements is returning such an indexed collection. My other requirement is being able to change the actual collection (list, array, ...) without API changes, meaning the return type should be an interface. These requirements bring us to IList<T> . Unfortunately, this also grants Add(), among other methods (which even throws for arrays!). So the collection interfaces are less than ideal. Alternatively, return a ReadOnlyCollection<T>, e.g. by calling resultList.AsReadOnly(). Timo Oct 24, 2016 at 12:01



Microsoft guidelines as checked by FxCop discourage use of List<T> in public APIs - prefer IList<T>.

64



Incidentally, I now almost always declare one-dimensional arrays as IList<T>, which means I can consistently use the IList<T>.Count property rather than Array.Length. For example:

```
public interface IMyApi
{
    IList<int> GetReadOnlyValues();
}
public class MyApiImplementation : IMyApi
{
    public IList<int> GetReadOnlyValues()
        List<int> myList = new List<int>();
        ... populate list
        return myList.AsReadOnly();
    }
public class MyMockApiImplementationForUnitTests : IMy
{
    public IList<int> GetReadOnlyValues()
    {
        IList<int> testValues = new int[] { 1, 2, 3 };
        return testValues;
    }
}
```

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answered Sep 17, 2008 at 17:08

to StackOverflow

125k • 33 • 210 • 341

4 I like this explanation / example the most! – JonH Nov 4, 2009 at 18:12



40

IEnumerable

You should try and use the least specific type that suits your purpose.

IEnumerable is less specific than IList.

You use IEnumerable when you want to loop through the items in a collection.

IList

IList implements IEnumerable.

You should use IList when you need access by index to your collection, add and delete elements, etc...

List

List implements IList.

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edited Mar 21, 2020 at 6:40



answered Jul 20, 2013 at 11:07

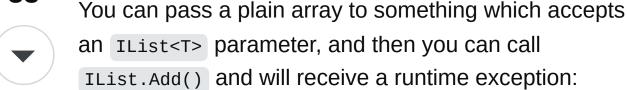


9 Excellent, clear answer, which I marked as helpful. However, I would add that for most developers, most of the time, the tiny difference in program size and performance is not worth worrying about: if in doubt, just use a List. – Graham Laight Sep 10, 2014 at 8:57



There's an important thing that people always seem to overlook:

33



```
Unhandled Exception: System.NotSupportedException: Collection was of a fixed size.
```

For example, consider the following code:

```
private void test(IList<int> list)
{
    list.Add(1);
}
```

If you call that as follows, you will get a runtime exception:

```
int[] array = new int[0];
test(array);
```

This happens because using plain arrays with IList<T> violates the Liskov substitution principle.

For this reason, if you are calling <code>IList<T>.Add()</code> you may want to consider requiring a <code>List<T></code> instead of an <code>IList<T></code>.

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answered Oct 30, 2013 at 13:47 $\frac{8 |11|22|}{21|2|7|12}$ $\frac{3|24|}{3|24|9|6|}$ Matthew Watson

109k • 12 • 174 • 295

- This is trivially true for every interface. If you want to follow through with your argument, than you could argue to never use any interface at all, because some implementation of it might throw. If you, on the other hand, consider the suggestion given by OP to prefer List<T> over IList<T> , you should also be aware of the reasons why IList<T> is recommended. (For example blogs.msdn.microsoft.com/kcwalina/2005/09/26/...)

 Micha Wiedenmann Aug 29, 2017 at 7:49
- @MichaWiedenmann My answer here is specific to when you are calling IList<T>.Add(). I'm not saying that you shouldn't use IList<T> - I'm just pointing out a possible pitfall. (I tend to use IEnumerable<T> or IReadOnlyList<T> or IReadOnlyCollection<T> in preference to IList<T> if I can.) – Matthew Watson Aug 29, 2017 at 8:06



I would agree with Lee's advice for taking parameters, but not returning.

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If you specify your methods to return an interface that means you are free to change the exact implementation later on without the consuming method ever knowing. I thought I'd never need to change from a List<T> but had





to later change to use a custom list library for the extra functionality it provided. Because I'd only returned an IList<T> none of the people that used the library had to change their code.

Of course that only need apply to methods that are externally visible (i.e. public methods). I personally use interfaces even in internal code, but as you are able to change all the code yourself if you make breaking changes it's not strictly necessary.

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answered Aug 20, 2008 at 9:12







It's always best to use the lowest base type possible. This gives the implementer of your interface, or consumer of your method, the opportunity to use whatever they like behind the scenes.







For collections you should aim to use IEnumerable where possible. This gives the most flexibility but is not always suited.

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answered Aug 19, 2008 at 23:41

tgmdbm

1,563 • 12 • 19

1 It is always best to **accept** the lowest base type possible.

Returning is a different story. Choose what options are likely to be useful. So you think your client might want to use

indexed access? Keep them from <code>ToList()</code> -ing your returned <code>IEnumerable<T></code> that was already a list, and return an <code>IList<T></code> instead. Now, clients can benefit from what you can provide without effort. – Timo Oct 24, 2016 at 12:06



5







If you're working within a single method (or even in a single class or assembly in some cases) and no one outside is going to see what you're doing, use the fullness of a List. But if you're interacting with outside code, like when you're returning a list from a method, then you only want to declare the interface without necessarily tying yourself to a specific implementation, especially if you have no control over who compiles against your code afterward. If you started with a concrete type and you decided to change to another one, even if it uses the same interface, you're going to break someone else's code unless you started off with an interface or abstract base type.

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answered Aug 19, 2008 at 23:20





You are most often better of using the most general usable type, in this case the IList or even better the IEnumerable interface, so that you can switch the implementation conveniently at a later time.





1

However, in .NET 2.0, there is an annoying thing - IList does not have a **Sort()** method. You can use a supplied adapter instead:

```
ArrayList.Adapter(list).Sort()
```

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edited Sep 17, 2008 at 17:22

answered Sep 17, 2008 at 17:14



petr k.

8,100 • 7 • 43 • 52



I don't think there are hard and fast rules for this type of thing, but I usually go by the guideline of using the lightest possible way until absolutely necessary.



For example, let's say you have a Person class and a Group class. A Group instance has many people, so a List here would make sense. When I declare the list object in Group I will use an IList<Person> and instantiate it as a List.



public class Group {
 private IList<Person> people;

public Group() {
 this.people = new List<Person>();
 }
}

And, if you don't even need everything in IList you can always use IEnumerable too. With modern compilers and processors, I don't think there is really any speed difference, so this is more just a matter of style.

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answered Aug 19, 2008 at 23:17



why not make it a just a List in the first place? I still don't understand why bonus you get from making it a IList then in the constructor you make it into a List<> − chobo2 Dec 19, 2011 at 20:56 ✓

I agree, if you are explicitly creating a List<T> object then you lose the advantage of the interface? – The_Butcher Sep 18, 2017 at 13:15

This still doesn't seem to cover the reasoning to use IList over List specifically. – Bonez024 Feb 2, 2022 at 19:46



You should use the interface only if you need it, e.g., if your list is casted to an IList implementation other than List. This is true when, for example, you use NHibernate, which casts ILists into an NHibernate bag object when retrieving data.



If List is the only implementation that you will ever use for a certain collection, feel free to declare it as a concrete List implementation.





In situations I usually come across, I rarely use IList directly.

1

Usually I just use it as an argument to a method





```
void ProcessArrayData(IList almostAnyTypeOfArray)
{
    // Do some stuff with the IList array
}
```

This will allow me to do generic processing on almost any array in the .NET framework, unless it uses IEnumerable and not IList, which happens sometimes.

It really comes down to the kind of functionality you need. I'd suggest using the List class in most cases. IList is best for when you need to make a custom array that could have some very specific rules that you'd like to encapsulate within a collection so you don't repeat yourself, but still want .NET to recognize it as a list.

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answered Aug 19, 2008 at 23:17



Dan Herbert **103k** • 51 • 192 • 221



A List object allows you to create a list, add things to it, remove it, update it, index into it and etc. List is used

1

whenever you just want a generic list where you specify object type in it and that's it.





TList on the other hand is an Interface. Basically, if you want to create your own custom List, say a list class called BookList, then you can use the Interface to give you basic methods and structure to your new class.

IList is for when you want to create your own, special sub-class that implements List.

Another difference is: IList is an Interface and cannot be instantiated. List is a class and can be instantiated. It means:

```
IList<string> list1 = new IList<string>(); // this is
IList<string> list2 = new List<string>(); // this wil
List<string> list3 = new List<string>(); // this wil
```

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edited Feb 16, 2022 at 17:30

UkFLSUI

5,672 • 6 • 37 • 49

answered Aug 19, 2013 at 4:53

