Inside Dictionaries and Sorted Dictionaries

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Overview

Dictionary, SortedDictionary, SortedList

Case sensitive keys

Custom types as keys

- Implementing `Equals()` and `GetHashCode()`

Demo

TourBooker app

- Countries currently stored as a list
- But lists are not good for lookup
- Fix by using a dictionary

To change how keys are compared

- Need to tell the dictionary upfront
- Because dictionary must adjust internal storage
- Use an equality comparer

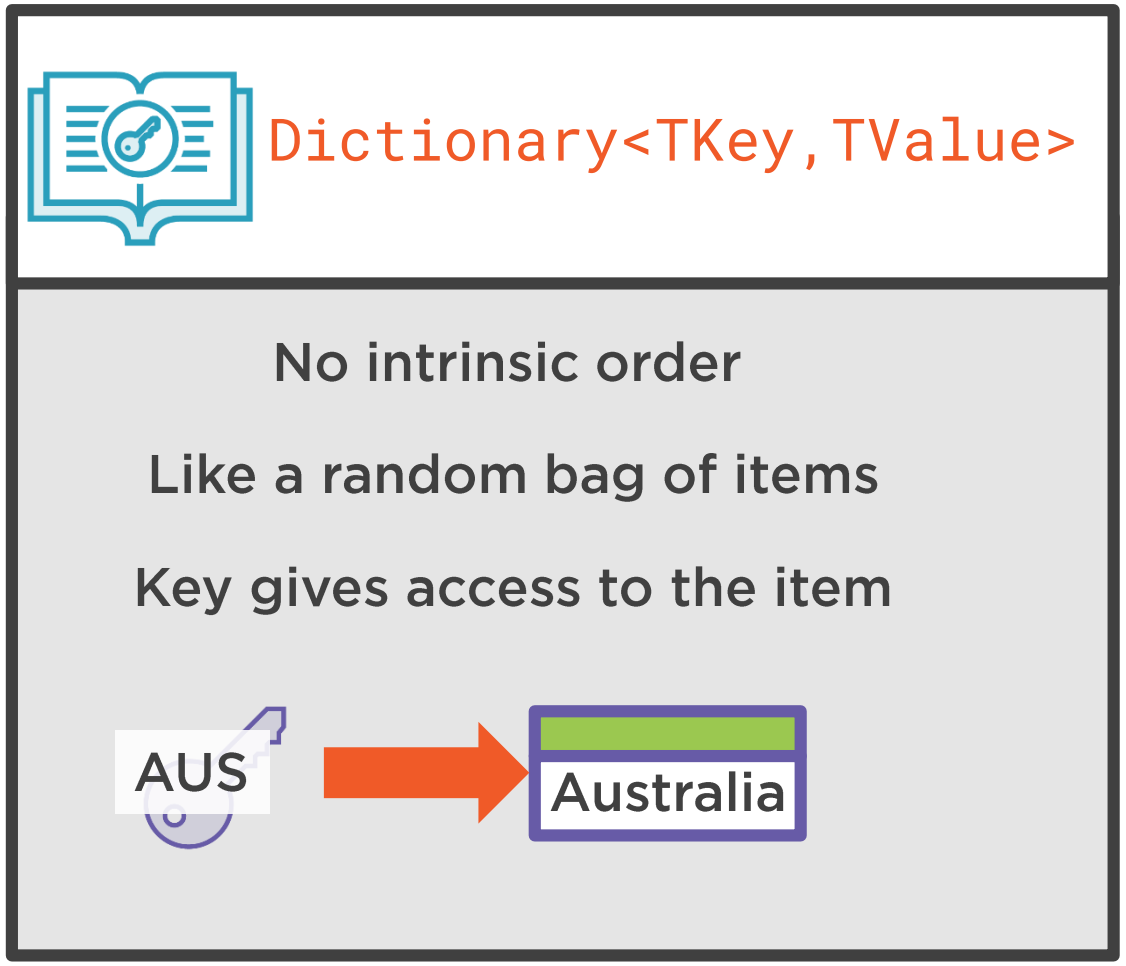
Equality Comparer

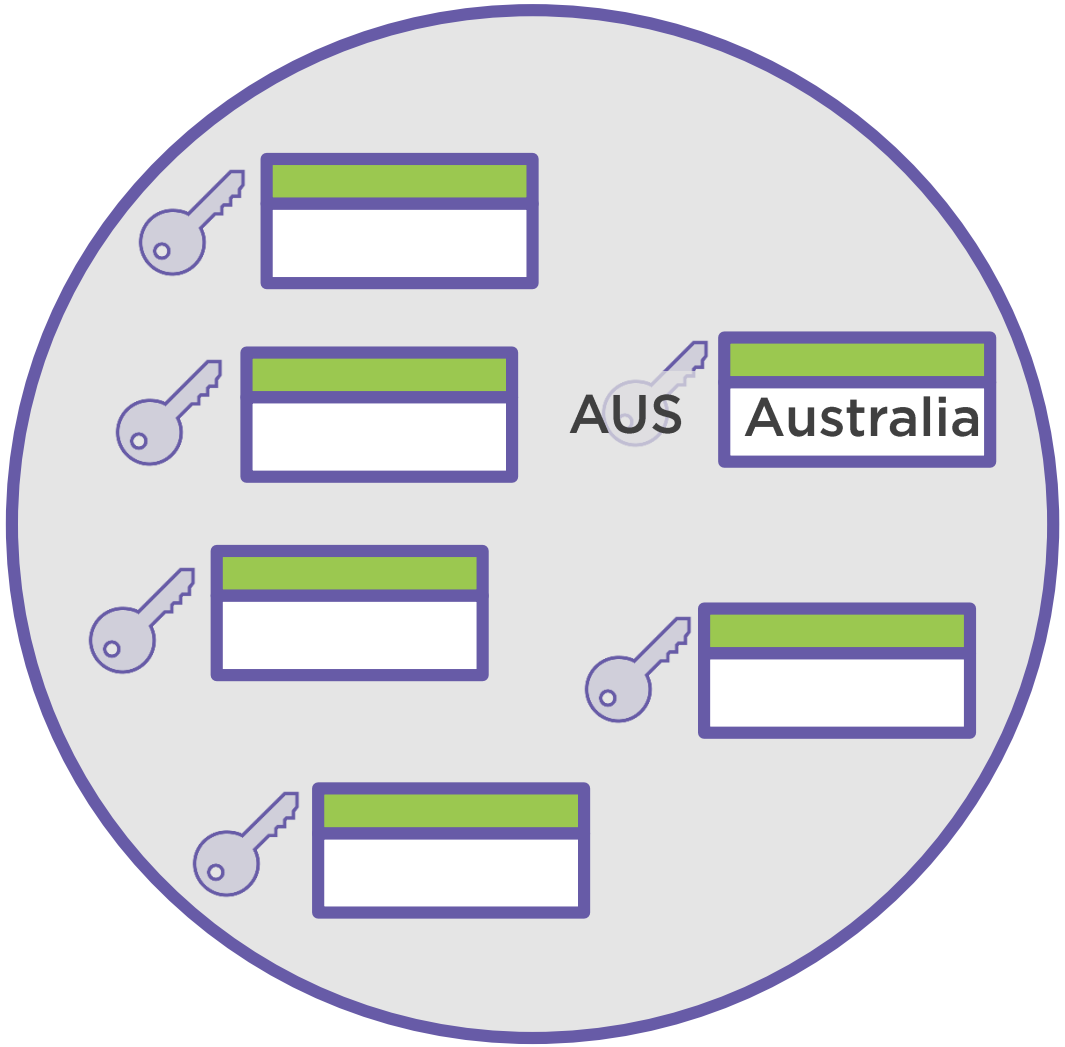
Object that knows how to test for equality.

- Implements `IEqualityComparer<T>`

Enumerating a Dictionary

Dictionaries





Dictionaries

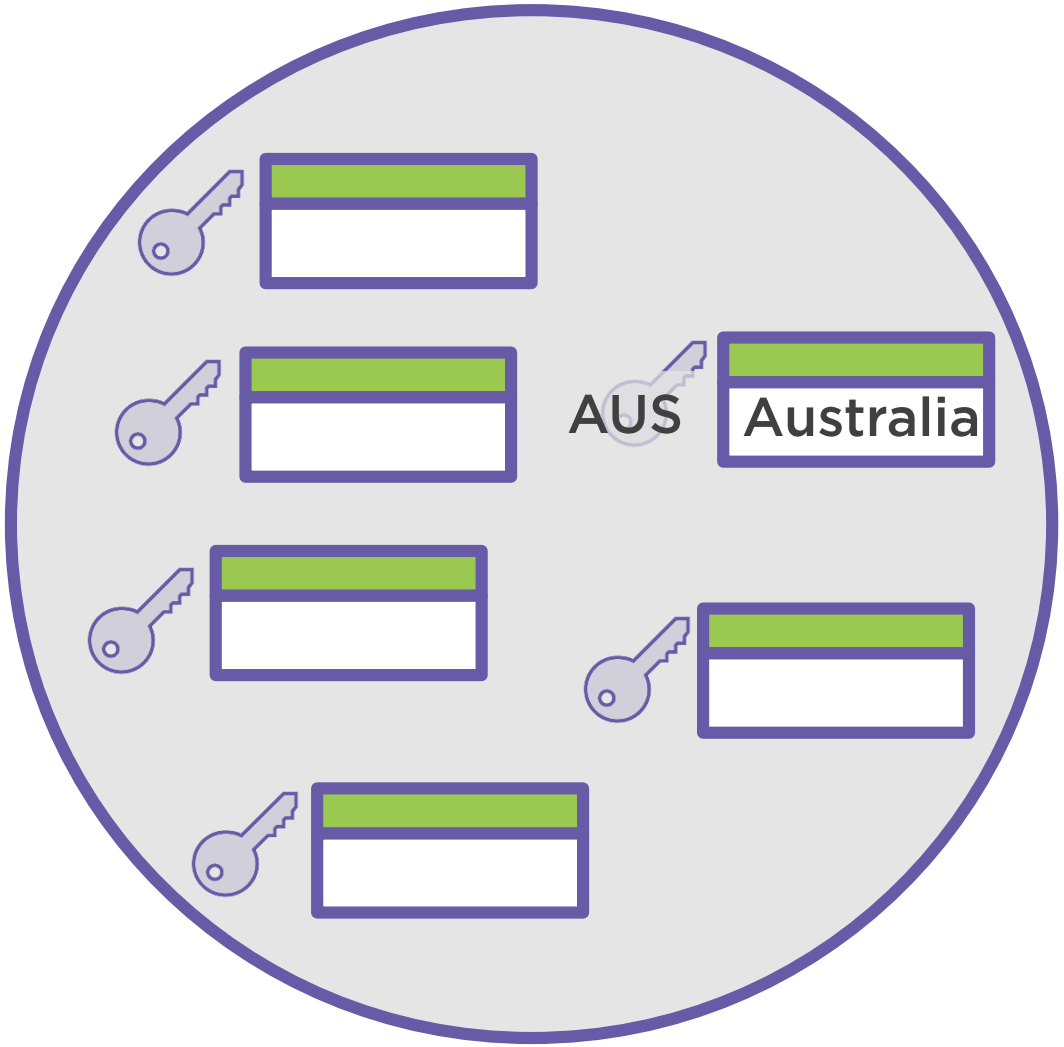
`Dictionary<TKey,TValue>`

No intrinsic order

Like a random bag of items

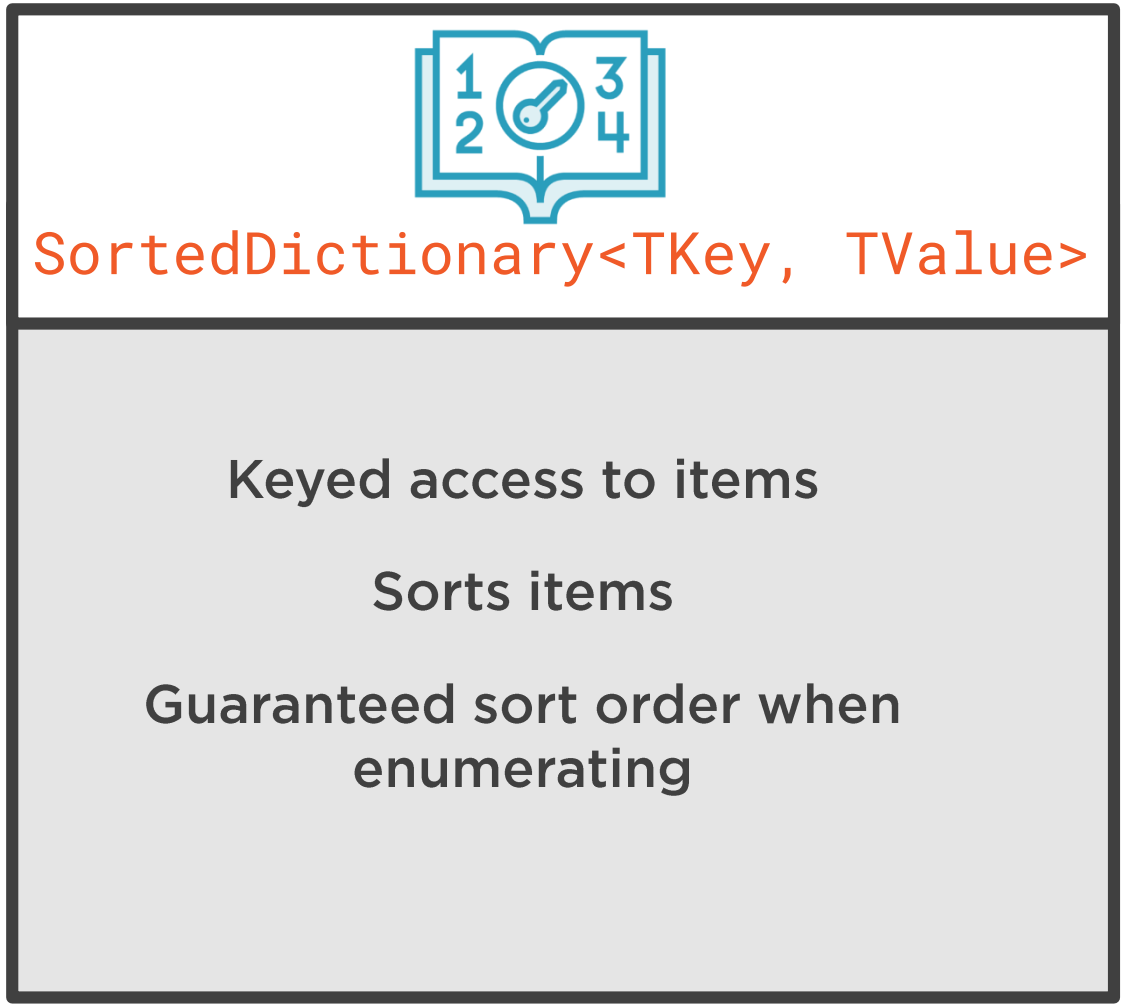
Key gives access to the item

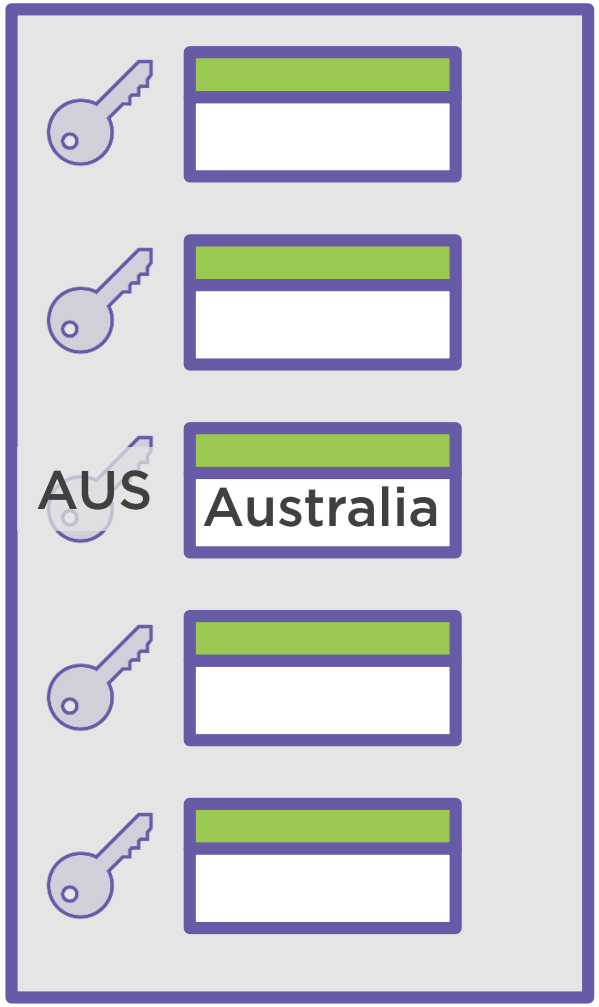
Do not rely on the order!



Sorted Dictionaries

SortedDictionary





Demo

SortedDictionary to order countries

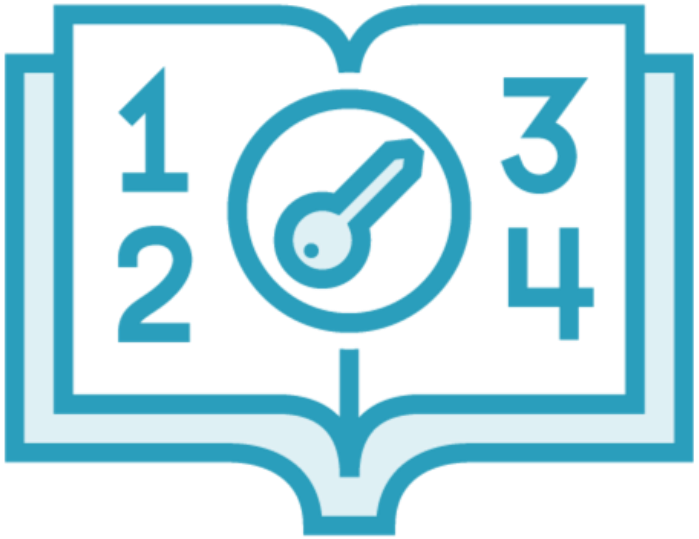
- But will still have problems

SortedDictionary sorts items – but can only sort in order of keys

SortedDictionary<Tkey, Tvalue>

You'll see
a perfect scenario
for
SortedDictionary
later in this
course

But this
list of countries
isn't it!



`SortedList<TKey, TValue>`

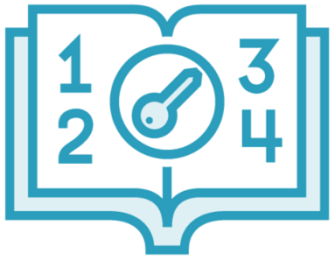
- Functionally a dictionary
- Internally uses a list

SortedList vs. SortedDictionary

`SortedList<TKey, TValue>`

Functionally the same

Uses less memory



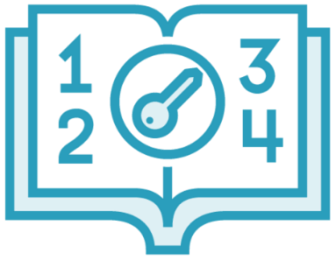
`SortedDictionary<TKey, TValue>`

Functionally the same

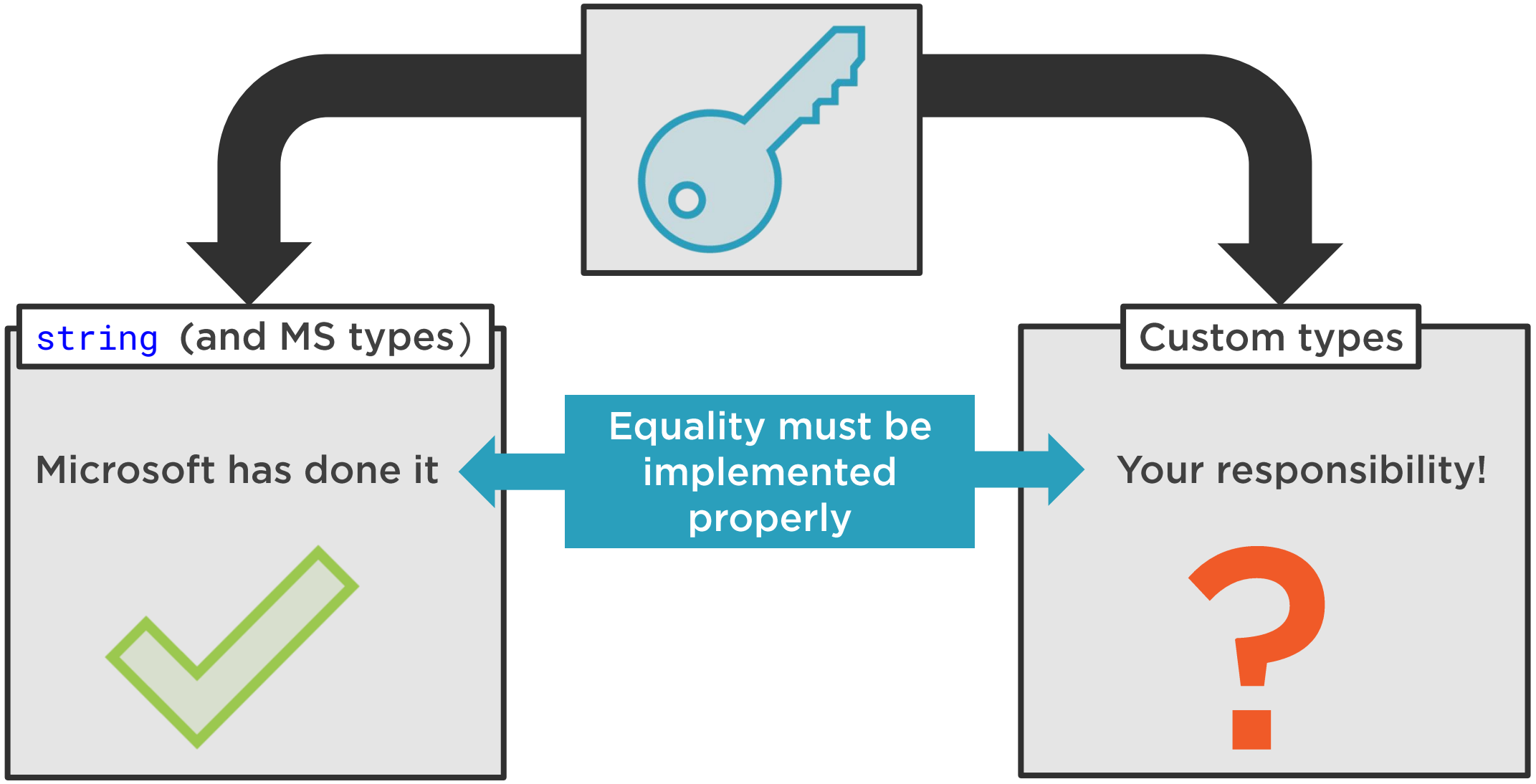
Modifications scale better

- O(log n) vs O(n)

Name of the type is clearer



Dictionary Keys

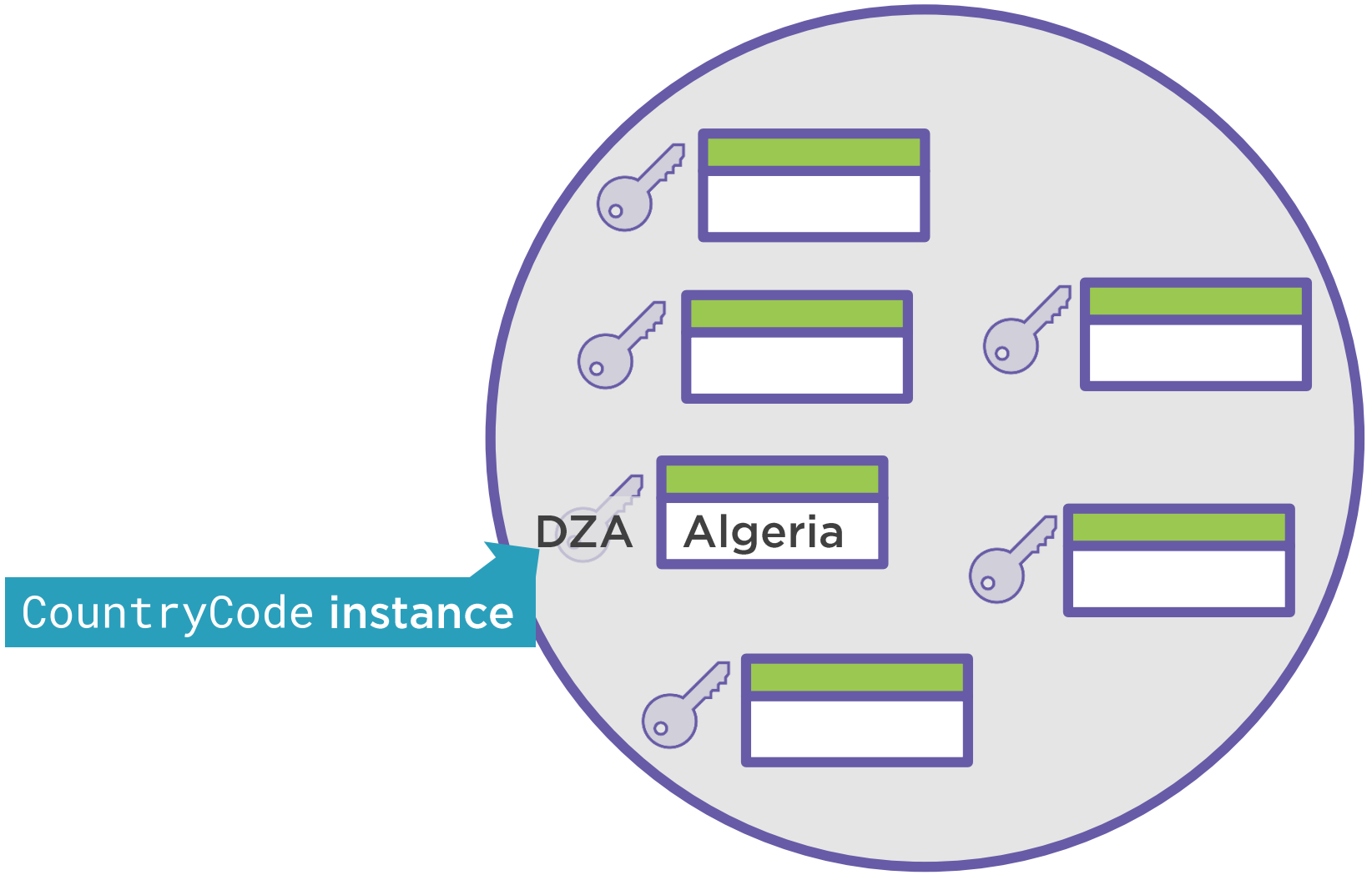


Demo

No longer use string for country code

- Custom country code type
- This type will be a key

Dictionaries



String Equality

```
string bankHol1Name = "New Year's Day";
string bankHol2Name = "New Year's Day";
bool areEqual = (bankHol1Name == bankHol2Name);
```

This does test whether values are equal

That's why strings work out of the box as dictionary keys

Object.GetHashCode()

Generates a hash code

Mainly used under the hood in .NET

Dictionaries rely on GetHashCode() extensively

Lookup will fail if key doesn't implement GetHashCode()

C# Equality and Comparisons

by Simon Robinson

This course teaches you how equality and comparisons function in .NET and the correct way to implement equality and comparisons for your own types.

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Table of contents | Description | Transcript | Exercise files | Discussion | Recommended

Course author

Simon Robinson

Simon Robinson first cut his developer teeth in the early 1980s writing a scheduling system in BBC Basic(!) for his local college. Since then, his programming career has spanned industries ranging...

Course info

Level	Intermediate
Rating	★★★★½ (613)
My rating	★★★★★
Duration	4h 51m

To use a custom type as a dictionary key:

- Override `object.Equals()`
- Override `object.GetHashCode()`
  - Easiest way is to use existing MS implementations

Even easier: Use standard MS types as keys

Summary

Looking up by key

- Custom comparer for case insensitivity

Dictionary enumeration

- KeyValuePairs
- SortedDictionary/SortedList to guarantee order

Custom types as keys

- Need to implement `Equals()` and `GetHashCode()`

Next up: Linked lists