

Double Range

```
//http://isotopescreencapture.codeplex.com/  
//The MIT License (MIT)  
using System.Collections.Generic;  
  
namespace Isotope.Collections.Ranges  
{  
    public struct DoubleRange  
    {  
        public readonly double _Lower;  
        public readonly double _Upper;  
  
        public double Lower  
        {  
            get { return this._Lower; }  
        }  
  
        public double Upper  
        {  
            get { return this._Upper; }  
        }  
  
        private DoubleRange(double lower, double upper)  
        {  
            this._Lower = lower;  
            this._Upper = upper;  
        }  
  
        ///   
        /// Creates a range from the lower and upper values  
        ///   
        ///   
        /// (0,0) -> [0]  
        /// (0,1) -> [0,1]  
        /// (0,5) -> [0,1,2,3,4,5]  
        /// (2,5) -> [2,3,4,5]
```

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///
/// ///
public static DoubleRange FromEndpoints(double lower, double
upper)
{
return new DoubleRange(lower, upper);
}

public double Length
{
get { return this.Upper - this.Lower; }
}

public override string ToString()
{
var invariant_culture =
System.Globalization.CultureInfo.InvariantCulture;
return string.Format(invariant_culture, "Range({0},{1})",
this.Lower, this.Upper);
}

private static bool _intersects_exclusive(DoubleRange range1,
DoubleRange range2)
{
bool val = (range1.Lower < range2.Lower) && (range1.Upper >
range2.Lower);
return val;
}

private static bool _intersects_inclusive(DoubleRange range1,
DoubleRange range2)
{
bool val = (range1.Lower <= range2.Lower) && (range1.Upper >=
range2.Upper);
return val;
}

///

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/// Tests if this range interests with another
///
/// the other range /// true if they intersect
public bool IntersectsExclusive(DoubleRange range)
{
    bool val = _intersects_exclusive(this, range) ||
        _intersects_exclusive(range, this);
    return val;
}

public bool IntersectsInclusive(DoubleRange range)
{
    bool val = _intersects_inclusive(this, range) ||
        _intersects_inclusive(range, this);
    return val;
}

private static bool _touches(DoubleRange range1, DoubleRange
range2)
{
    var val = (range1.Upper == range2.Lower);
    return val;
}

///

/// Tests if this range touches another. For example (1-2)
touches (3,5) but (1,2) does not touch (4,5)
///
/// the other range /// true if they touch
public bool Touches(DoubleRange range)
{
    var val = _touches(this, range) || _touches(range, this);
    return val;
}

///

/// Tests if this range contains a specific double

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///
/// the double /// true if the number is contained
public bool Contains(double n)
{
return (this.Lower <= n) && (n <= this.Upper); } ///
/// Join this range with another and return a single range
that contains them both. The ranges must either touch or
interest.
/// for example (0,2) amd (3,7) will yield (0,7)
///

/// the other range /// the merged range
public DoubleRange JoinWith(DoubleRange range)
{
if (this.IntersectsExclusive(range) || this.Touches(range))
{
double new_Upper = System.Math.Max(this.Upper, range.Upper);
double new_Lower = System.Math.Min(this.Lower, range.Lower);
return DoubleRange.FromEndpoints(new_Lower, new_Upper);
}
else
{
throw new System.ArgumentException("Ranges cannot be joined
because they do not touch or overlap");
}
}

public IEnumerable Values
{
get
{
double step = 1.0;
return this.GetValues(step);
}
}

public IEnumerable GetValues(double step)
{

```

```
if (step <= 0.0) { throw new  
System.ArgumentOutOfRangeException("step", "must be  
positive"); } double i = this.Lower; while (i <= this.Upper) {  
yield return i; i += step; } } } } [/csharp]
```