Demo QuickSort

Issue Description (Data Races on Array Elements, TPL)

- The quicksort implementation is broken.
- The boundaries on concurrent quicksort recursion calls are overlapping.
- Thus, data races can be provoked on certain array elements.
- The algorithm may also suffer from an endless loop

```
private static void Sort(int[] array, int left, int right)
{
   var pivot = array[(left + right) / 2];
   var lower = left;
   var upper = right;
   do
   {
       while (array[lower] < pivot) lower++;           // VARIOUS DATA RACE WARNINGS
       while (array[upper] > pivot) upper--;
       if (lower <= upper)
       {
           var temp = array[lower];
           array[lower] = array[upper];
           array[upper] = temp;
           lower++;
           upper--;
       }
   } while (lower <= upper);
   var leftTask = Task.Run(() =>
   {
       if (left < upper) Sort(array, left, lower); // MUST BE upper INSTEAD OF lower
   });
   var rightTask = Task.Run(() =>
   {
       if (lower < right) Sort(array, upper, right); //MUST BE lower INSTEAD OF upper
   });
   rightTask.Wait();
   leftTask.Wait();
}
```

Checker Output (Various Issues and Locations)

```
Issue: #0 Data race on array
  caused by write at "array[lower] = array[upper]" in QuickSort.cs line 24
    caused by call Sort at "Sort(array, upper, right)" in QuickSort.cs line 36
      caused by thread or task at "() => { if (lower < right) Sort(array..." in QuickSort.cs line 34
        caused by call Sort at "Sort(array, 0, array.Length - 1)" in QuickSort.cs line 9
          caused by call Sort at "QuickSort.Sort(array)" in Program.cs line 10
            caused by call QuickSort.Program.Main()
              caused by initial thread at "Main" in Program.cs line 7
  caused by read at "array[upper]" in QuickSort.cs line 20
    caused by call Sort at "Sort(array, left, lower)" in QuickSort.cs line 32
      caused by thread or task at "() => { if (left < upper) Sort(array..." in QuickSort.cs line 30
        caused by call Sort at "Sort(array, 0, array.Length - 1)" in QuickSort.cs line 9
          caused by call Sort at "QuickSort.Sort(array)" in Program.cs line 10
            caused by call QuickSort.Program.Main()
              caused by initial thread at "Main" in Program.cs line 7
```

... (various more issues, e.g. 8 more)

Problem Fixing

Correct the algorithm by using the following two bounds (highlighted locations).

```
var leftTask = Task.Run(() =>
{
   if (left < upper) Sort(array, left, upper);
});
var rightTask = Task.Run(() =>
{
   if (lower < right) Sort(array, lower, right);
});
```