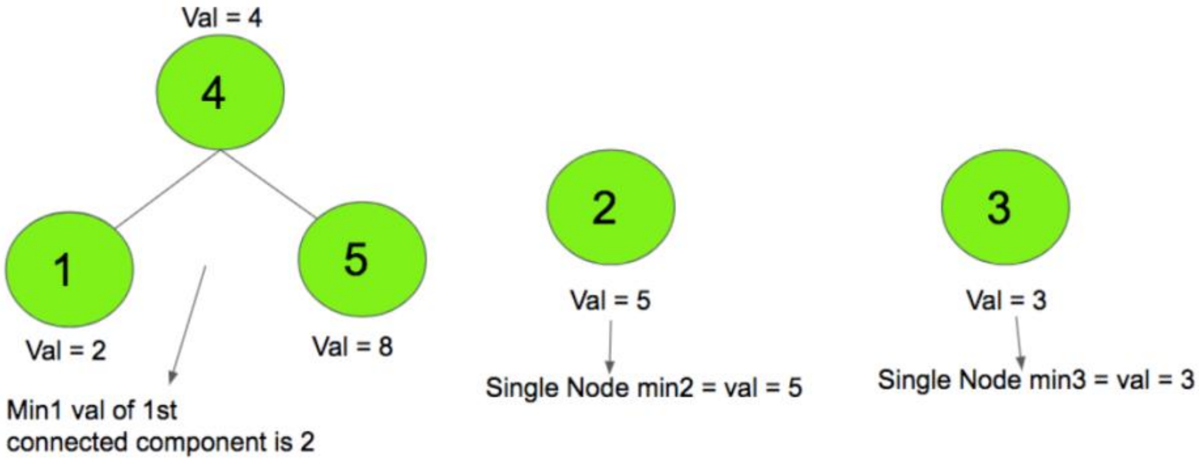
Sum of Min

Given an array of vertices **V** where V[i] represent the value of the ith vertex. Also given pair of edges where u and v represent the nodes that are connected by an UNDIRECTED edge. The task is to find the sum of the minimum element in all the connected components of the given undirected graph. If a node has no connectivity to any other node, count it as a component with one node.



Output = 2 + 5 + 3 = 10

Input:

- |V| = from 4000 to 8000
- |E| = sparse or dense
- # components = from 1 to 100

Function to Implement

```
 static int CalcSumOfMinInComps(int[] valuesOfVertices, KeyValuePair<int, int>[]
                                            edges)
```

`SumOfMin.cs includes this method.`

"valuesOfVertices": value of each vertex (vertices are named from 0 to |V| - 1)

"edges": array of edges in the graph (where **`key: sourceVertex, value: destVertex`**)

<returns> sum of the min value in each component of the graph

Example

```
vals1 = {0, 2, 5, 3, 4, 8 };
edges1[0] = new KeyValuePair<int, int>(1, 4);
edges1[1] = new KeyValuePair<int, int>(4, 5);
expected1 = 10;

vals2 = {0, 1, 6, 2, 7, 3, 8, 4, 9, 5, 10};
edges2[0] = new KeyValuePair<int, int>(1, 2);
edges2[1] = new KeyValuePair<int, int>(3, 4);
edges2[2] = new KeyValuePair<int, int>(5, 6);
edges2[3] = new KeyValuePair<int, int>(7, 8);
edges2[4] = new KeyValuePair<int, int>(9, 10);
expected2 = 15;
```

C# Help

Queues

Creation

To create a queue of a certain type (e.g. string)

```
Queue<string> myQ = new Queue<string>() //default initial size

Queue<string> myQ = new Queue<string>(initSize) //given initial size
```

Manipulation

1. `myQ.Count` ➔ get actual number of items in the queue
2. `myQ.Enqueue(“myString1”)` ➔ Add new element to the queue
3. `myQ.Dequeue()` ➔ return the top element of the queue (FIFO)

Lists

Creation

To create a list of a certain type (e.g. string)

```
List<string> myList1 = new List<string>() //default initial size

List<string> myList2 = new List<string>(initSize) //given initial size
```

Manipulation

4. `myList1.Count` ➔ get actual number of items in the list
5. `myList1.Sort()` ➔ Sort the elements in the list (ascending)
6. `myList1[index]` ➔ Get/Set the elements at the specified index
7. `myList1.Add(“myString1”)` ➔ Add new element to the list
8. `myList1.Remove(“myStr1”)` ➔ Remove the 1st occurrence of this element from list

9. `myList1.RemoveAt(index)` ➔ Remove the element at the given index from the list
10. `myList1.Contains(“myStr1”)` ➔ Check if the element exists in the list

Dictionary (Hash)

Creation

To create a dictionary of a certain key (e.g. string) and value (e.g. array of strings)

```
//default initial size
Dictionary<string, string[]> myDict1 = new  Dictionary<string, string[]>();
```

```
//given initial size
Dictionary<string, string[]> myDict2 = new  Dictionary<string, string[]>(size);
```

Manipulation

1. `myDict1.Count` ➔ Get actual number of items in the dictionary
2. `myDict1[key]` ➔ Get/Set the value associated with the given key in the dictionary
3. `myDict1.Add(key, value)` ➔ Add the specified key and value to the dictionary
4. `myDict1.Remove(key)` ➔ Remove the value with the specified key from the dictionary
5. `myDict1.ContainsKey(key)` ➔ Check if the specified key exists in the dictionary

Creating 1D array

```
int [] array = new int [size]
```

Creating 2D array

```
int [,] array = new int [size1, size2]
```

Length of 1D array

```
int arrayLength = my1DArray.Length
```

Length of 2D array

```
int array1stDim = my2DArray.GetLength(0)

int array2ndDim = my2DArray.GetLength(1)
```

Sorting single array

Sort the given array in ascending order

```
Array.Sort(items);
```

Sorting parallel arrays

Sort the first array "master" and re-order the 2nd array "slave" according to this sorting

```
Array.Sort(master, slave);
```