Assignment #10 – MIPS Arrays and Loops **CS 218 Spring 2021**

Purpose: Write a simple MIPS program that will work with arrays of values.

You will be provided the list of numbers in a txt file.

Instructions

Create an array of word sized integers using the provided data file. Write a program that will determine and output the median (average of middle two values), minimum, maximum, and average of a list of numbers. Sort the numbers in ascending order using a count sort. All values are between 0 and 999 (inclusive). Print the unsorted and sorted lists with 5 values per line.

Count Sort

A count sort is a non-comparison based sort. A count is performed on each potential value possible in the array. Once the count is done, the original array is overwritten.

Example:

Values are between 0 and 9

List: 1, 7, 3, 4, 3, 6, 9, 2, 1, 0

Counts

```
0: 1 instance    0
1: 2 instances   1, 1
2: 1 instances   2
3: 2 instances   3, 3
4: 1 instance    4
5: 0 instances
6: 1 instance    6
7: 1 instance    7
8: 0 instances
9: 1 instance    9
```

Sorted List: 0, 1, 1, 2, 3, 3, 4, 6, 7, 9

Submission

Once completed, upload the MIPS assembly source code file (.asm) to the class website.

Example Execution

```
Unsorted List:
57 307 757 64 335
832 885 475 25 309
258 439 285 685 934
881 345 64 742 776
316 778 818 356 482
628 283 444 537 921
676 428 288 587 569
420 706 395 25 852
402 930 196 68 745
70 698 87 384 144
353 345 782 45 510
296 315 2 309 676
556 794 45 289 423
79 899 337 71 525
16 313 291 763 437
855 125 419 582 70
948 112 220 131 369
332 282 196 470 152
935 753 197 964 362
998 371 838 338 644


Sorted List:
2 16 25 25 45
45 57 64 64 68
70 70 71 79 87
112 125 131 144 152
196 196 197 220 258
282 283 285 288 289
291 296 307 309 309
313 315 316 332 335
337 338 345 345 353
356 362 369 371 384
395 402 419 420 423
428 437 439 444 470
475 482 510 525 537
556 569 582 587 628
644 676 676 685 698
706 742 745 753 757
763 776 778 782 794
818 832 838 852 855
881 885 899 921 930
934 935 948 964 998


Minimum: 2
Maximum: 998
Average: 448
Median: 389
```