**CSc 300 – Assignment #6 – Gamradt**

**Due: 12-04-23 (Late: NONE ACCEPTED)**

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Show step by step how (1) Merge Sort and (2) Quick Sort would sort the following list in ascending order using the techniques discussed in class. Quick Sort uses a first element pivoting scheme. Clearly and neatly show and label all work. If no work is shown, 0 points will be earned. Submit this WORD document to **ken.gamradt@gmail.com** after you’ve added your solution to it.

43 12 32 20 14 39 21 28 48

# **Merge Sort –**

**43 - 12 - 32 - 20 - 14 - 39 - 21 - 28 - 48** //Original List of 9 elements

**43 - 12 - 32 - 20 - 14 39 - 21 - 28 - 48** //Split into 2 lists

**43 - 12 - 32** **20 - 14 39 - 21 28 - 48** //Split into 4 lists

**43 - 12 32 20 14 39 21 28 48** //Split into 8 lists

**43 12 32 20 14 39 21 28 48** //Split into 9 lists (Spliting stops here since all lists are each a size of 1)

**12 - 43 20 - 32 14 - 39 21 - 28 48** //Combine into pairs (Ommited the 48 based on what was shown in the slides)

**12 - 20 - 32 - 43 14 - 21 - 28 - 39** **48** //Combine into pairs

**12 - 14 - 20 - 21 - 28 - 32 - 39 - 43 48** //Combine into pairs

**12 - 14 - 20 - 21 - 28 - 32 - 39 - 43 - 48** //Combine into pairs

# **Quick Sort –**

### With Gamradt’s Presentation Schema

**P** = Pivot element

**L** = Left of pivot (smaller)

**R** = Right of pivot (larger)

**()**= Sorted

**43 - 12 - 32 - 20 - 14 - 39 - 21 - 28 - 48** //Original List of 9 elements

P L L L L L L L L

**12 - 32 - 20 - 14 - 39 - 21 - 28 (43) 48** // After first partitioning

P R R R R R R P

**(12) - 32 - 20 - 14 - 39 - 21 - 28 (48)** // After second partitioning

P L L L L L

**20 - 14 - 21 - 28 (32) 39** // After third partitioning

P L R R P

**14 - (20) - 21 - 28 (39)** // After fourth partitioning

P P R

**(14) (21) 28** // After fifth partitioning

P

**(28)** // List size 1 is sorted

//Sorted List

**12 - 14 - 20 - 21 - 28 - 32 - 39 - 43 - 48**

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### Full Work used to create the schema

**43 - 12 - 32 - 20 - 14 - 39 - 21 - 28 - 48** //Original List of 9 elements

(43) - 12 - 32 - 20 - 14 - 39 - 21 - 28 - 48 //Select 43 as pivot

**12 - 32 - 20 - 14 - 39 - 21 - 28 (43) 48** //

12 - 32 - 20 - 14 - 39 - 21 - 28 48 //Split list into halves

(12) - 32 - 20 - 14 - 39 - 21 - 28 (48) //Select 12, 48 as pivots

**(12) - 32 - 20 - 14 - 39 - 21 - 28 (48)** //

32 - 20 - 14 - 39 - 21 - 28 //Split list into halves

(32) - 20 - 14 - 39 - 21 - 28 //Select 32 as pivot

**20 - 14 - 21 - 28 (32) 39** //

20 - 14 - 21 - 28 39 //Split list into halves

(20) - 14 - 21 - 28 (39) //Select 20 and 30 as pivots

**14 - (20) - 21 - 28 (39)** //

14 21 - 28 //

(14) (21) - 28 //Select 14 and 21 as pivots

**(14) (21) 28** //

28 //

**(28)** //

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### Quick Glance View

**43 - 12 - 32 - 20 - 14 - 39 - 21 - 28 - 48** // Original List of 9 elements

**12 - 32 - 20 - 14 - 39 - 21 - 28 48** // After first partitioning

**32 - 20 - 14 - 39 - 21 - 28** // After second partitioning

**20 - 14 - 21 - 28 39** // After third partitioning

**14 21 - 28** // After fourth partitioning

**28** // After fifth partitioning

**12 - 14 - 20 - 21 - 28 - 32 - 39 - 43 - 48** // Final sorted list