Data Structures and Algorithms

Lab Journal - Lab 11

Name: _____

Enrollment #: _____

Class/Section: _____

Objective

This is the second lab session on sorting and will introduce students to shell sort, quick sort and merge sort.

Task 1 :

Give answers to the following.

1.	Given the following list, apply quick sort and show the contents of the list at each step of the algorithm until the point when the pivot (first) element is correctly positioned. 54 26 93 17 73 31 44 55 20

2.	Given the following two lists, step-wise merge them into on single sorted list. List 1: 15 20 25 35 45 60 65 70 List 2: 10 30 40 50 55
3.	Demonstrate the application of shell sort algorithm on the list in Question 1 by taking the following sub-list sizes : 5,3,1.

4.	Given the following list of numbers: [21, 1, 26, 45, 29, 28, 2, 9, 16, 49, 39, 27, 43, 34, 46, 40], which answer illustrates the list to be sorted after 3 recursive calls to merge sort? a. [16, 49, 39, 27, 43, 34, 46, 40] b. [21,1] c. [21, 1, 26, 45] d. [21]
5.	Given the following list of numbers: [21, 1, 26, 45, 29, 28, 2, 9, 16, 49, 39, 27, 43, 34, 46, 40], which answer illustrates the first two lists to be merged? a. [21, 1] and [26, 45] b. [1, 2, 9, 21, 26, 28, 29, 45] and [16, 27, 34, 39, 40, 43, 46, 49] c. [21] and [1] d. [9] and [16]

Task 2 :

Implement the following exercises.

Exercise 1

Implement the following sorting algorithms using a separate function for each.

- Merge Sort
- Quick Sort

Exercise 2

Generate a random list of 1,000 elements in the range [0 999]. Using shell sort algorithm, find the total number of comparisons/array element shifts carried out for the given set of span (number of sub-files) values.

- 25, 10, 5, 1
- 100, 50, 25, 10, 1
- 5, 3, 1

Also compute the exeuction times of each of the above scenraios.

Implement the given exercises and get them checked by your instructor. If you are unable to complete the tasks in the lab session, deposit this journal alongwith your programs (printed or handwritten) before the start of the next lab session.

S No.	Exercise	Checked By:
1.	Exercise 1	
2.	Exercise 2	

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