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CCT College Dublin Continuous Assessment

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Cohort:	*FT*		
Module Title(s):	Algorithms & Constructs		
Assignment Type:	*Individual*	Weighting(s):	*50%*
Assignment Title:	*CA2*		
Lecturer(s):	Muhammad Iqbal		
Student Name:	Zakaria Houssat		
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Feedback Date:	Following release of approved results by the college		

Sorting and Searching Algorithm Choices Justifications

1. Organization Choice: Tech Company

For this assignment, I decided to model an organization type of a Tech Company. The company also supports clients in the software and technology sector, including software development, technical support and HR Management.
The typical organization is made up of different management positions (Head Manager, Project Manager, Team Lead) and departments (Software development, Technical support, Human resources).
Every employee is part of a department, and it has a manager. It will maintain the continuity of the smooth working and surveillance of the employees as the goals of the different departments. The business environment is on a dynamic, cutting edge and close management cooperation between departments and management and management and workers are necessary.

2. Sorting Algorithm Choice: Merge Sort

I chose to implement the recursive sorting algorithm as Merge Sort for the employee names. It is used since the algorithm is efficient for bigger data sets. Its O(n log n) worst-case running time is significantly better than that of elementary algorithms, such as bubble sort or insertion sort, which have $O(n^2)$ worst-case time complexity.
Furthermore, Merge Sort is not just a sort algorithm, it is a 'stable' one - that is, a sort which does not reorder any sets of elements with the same key thus preserving any previously preexisting order with those same keys. It is particularly useful for sorting employee names that are similar. Moreover, it also works favorably within interconnected systems or large databases, and is highly practicable for subsequent scaling up if more employee details are fed into the system.

3. Searching Algorithm Choice: Binary Search

I decided to use Binary Search for searching employee names in the sorted collection. Binary Search is very efficient since in every step it diminishes the number of possible candidates by half by a systematic way O(log n). By contrast, a basic linear search has time complexity O(n). Once the employee names are sorted out by Merge Sort , Binary Search is the optimal option. This method keeps fetching the data really fast, not only now but also even if the set gets bigger expansion-by-expansion as the program is further developed.

GitHub Repositories Link:

https://github.com/HOUSSAT99/CA_2_TechCompanyOrg.git