South China University of Technology

《Course》Experiment Report

Experiment Title： Experiment 1 The Quicksort Algorithm

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Class： CST 2019 International Group： -

Collaborator： -

Teacher： Mr. Yan Xiaoyang

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| **Description** |
| 【Objective and Requirement】  Objective：  （1）Learn the sorting algorithms.  （2）Understand the difference between the quicksort algorithm and other sorting algorithms, such as: insertion sorting algorithm, straight selection algorithm, etc..  （3）Simulate these algorithms using computer with high-level languages.  （4）Solve some sorting problem with different sort algorithms.  Requirement：   1. The template should be used for all kinds of data type, such as: integer, real, double, etc. in the program; 2. Programs should be made by Object-Oriented Programming (OOP) method; 3. The results should be compared with ones of other algorithms, such as: Straight selection sort, insert sort, Heapsort, etc., and draw the graph to find their differences. 4. Write down the report in which there should be the execution results of the program.   【Environment】  Operating System：Windows |
| **Content** |
| From the execution of programs  Sorting array of integers has same random order of int  First result is quicksort , second result is from insertion sort.    From comparison of graph of quicksort and insertion sort with n element  N=5    N=10    N=50    Quicksort has O(nlogn)  Insertion sort has O(n2)  From above comparison of graph between quicksort and insertion sort, can be seen when n = 5 insertion sort has advantage over quick sort. When n is 10 , 50 or larger quick sort will have an advantage over insertion sort. Insertion sort is faster for small n because Quick Sort has extra overhead from the recursive function calls. Insertion sort is also more stable than Quick sort and requires less memory. Best case of insertion sort is O(n).Best case of quick sort is O(nlogn). |
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| **Conclusion** |
| I have learnt few of the sorting algorithms such as quick sort and insertion sort and understand the difference between them. |
| **Teacher’s Comments and Score** |
| Comment：  Score：           Signature：                                                 Date： |