Student

Name : Metin

Surname : DEMİR

Student ID :21526902

Department : Computer Engineering

Homework

PROGRAMMING ASSIGNMENT 1

Subject : Analyzing the complexity of sorting algorithms

Advisor : Selim Yilmaz, Levent Karacan, Merve Ozdes

Program language : Java

PROBLEM

We have a data file and this data include some information about traffic flow .We have to sort about information which one is selected.Of course when we sort some information we have to spend time and space . For the best result we have choice right algorithm .Some algorithm spend to much time some one is spend to much space. In our algorithm when we sort selected information also we have move all information about this row .So we have to select all row information and store somewhere. When we sort about selected information we also have to change row place in our data. That is our problem

FINDING

In this Assignment we have to store all data somewhere. This can be a array ,arraylist or araylist of string array we have so many choice .For best ısing space ı want use array but when we declare a string array we have to know size of this array . I do not want read csv file two times(one time for learn number of line ,second time read lines and store in string array) so ı declare a string arraylist. In this arraylist how many string ı want ı can add easily. So that that ı added all row as a string to string arraylist But ı have a problem when ı sorted this ı have to reach giving index value .If ı try to reach this index value when ı sorted my data ı have lost so many time So before sorted algorithm ı declared a float arraylist . Which index user typing for all row value in this index get in this arraylist as a float . So we do not have to convert string to float when we compare value in sorted algorithms. Of course when we read file we can take index from 7 to 84 so we do not have convert string to float .In this instance we get a problem when write output because we need to all string value not just from 7 to 84 so read file as string .After all this ı choice my fist sort algorithm , quick sort algorithm in this algorithm we choice a pivot (where we want in arraylist). After that we compare all number to pivot if number is less than pivot we take this number left to pivot otherwise we put this number right to pivot .Of course when we do this in sorted algorithm we have change index of lines too ,and we keep a temporary like we changed place of float .My second algorithm is Bubble sort this algorithm .The logic this sort algorithm is

compare all number each other . Firstly we take first number from array or arraylist . Then we compare this number to other number in order if comparing number bigger is than compared number we have to exchange place this number in array or arraylist .This sort spend to much time this sort algorithm is old style work.My third and last sort algorithm is Selection sort .This algorithm logic is so simply . The logic is that we have to find smallest number . After that we have to put this number begin of array or arraylist . When we did this which array or arraylist we looking for smallest number is reduce size because begin this array or arraylist is already sorted . Of course this algorithm look like take to much time . Finally when we run this algorithm on different input file and we get table below.

My caption

Algorithm & Data Set	TrafficFlow100	TrafficFlow1000	TrafficFlow50000	TrafficFlow100000	TrafficFlowAll
Quick Sort	1	5	50	109	270
Bubble Sort	2	57	24246	112415	596748
Selection Sort	1	23	4631	23891	184297

Discussion

In this homework we used 3 sort algorithm and use 5 different input file which ones have different size sorting element. Firstly I noticed when we run program with different input file time is changed in same algorithm . For example in quick sort when file size get bigger run time get more than smaller input file.So the result of this case is when number of sorting element is get much we have to use more time .Secondly I noticed same input run time change on sort algorithm .when I sorted TrafficFlow100.csv file element with quick sort is take 1 nanosecond ,with bubble sort is take 2 nanosecond and with selection take 1 nanosecond .Of course we do not see too

many time different in this on this file input cause sorting element number is so less. When we use more bigger file ,we get time difference more than small file. Therefore ,we can see time complexity on algorithm easily .Also I noticed selection and bubble sort have same time complexity (Except best case ; is n for bubble sort ,n2 for selection) have big time difference .This cause is came from changing arraylist index in bubble sort in every compare .In selection sort make this change when we get smallest number .So that is normal status .Finally ,we learned that the size of input file effect on time complexity also algorithm .