Pair Sorting Method

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Abstract: We have known with several processes of sorting. Here it is tried to establish a new process of sort named pair sort. The term 'pair' means two. So it implies a process where only two elements are sorted at a time and it is very easy to do. At first the process is started with left most pair, then it is sorted the next pair and so on. In the second phase, it is taken the next two number as first pair leaving the first number, sorted it, then next pair and so on. The aim of the process is to sort an array that is in memory in a simple and easy way.

I. INTRODUCTION

Let A be a list of n elements A1,A2,A3,………….,An in memory. Sorting A refers to the operation of rearranging the contents of A so that they are increasing in order either numerically or lexicographically that is, so that

A1<A2<A3<……………<An

II. PAIR SORT

Suppose, there is an array in memory named A with n elements A[1],A[2],A[3],………A[n]. The pair sorts method for sorting a works as follows. At the beginning, it is taken left most pair, sort it, then take the next pair, sort it and so on. More precisely:

Pass 1: Take A[1],A[2] from n number of elements and sort it. Then take A[3],A[4], sort it and so on upto last pair.

Pass 2: Take the first pair of elements except the left most number, sort it i.e take A[2],A[3] and sort it. Then take A[4], A[5] as the next pair, sort it and so on until the last pair is sorted in this pass.

Pass 3:Ttake the first pair of elements including the left most element as the first element of the pair and sort it i.e take A[1],A[2] and sort it. Then take A[3] ,A[4] as the next pair, sort it and continues until the last pair is sorted in this pass.

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Pass n: take the left most two elements i.e A[1],A[2] as first pair and sort it when n is odd, otherwise take A[2],A[3] as first pair, sort it and so on.

[N.B. This method generally takes maximum n passes for n number of elements. The round will be ended when the required result will be met, though it is not the nth pass.]

Example:

Suppose an array A contains 9 elements as follow

70,50,60,48,53,10,8,15,6

Now we shall try to sort the numbers in increasing order.

Round	A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]	A[9]
1	70	50	60	48	53	10	8	15	6
2	50	70	48	60	10	53	8	15	6
3	50	48	70	10	60	8	53	6	15
4	48	50	10	70	8	60	6	53	15
5	48	10	50	8	70	6	60	15	53
6	10	48	8	50	6	70	15	60	53
7	10	8	48	6	50	15	70	53	60
8	8	10	6	48	15	50	53	70	60
9	8	6	10	15	48	50	53	60	70
SORTED	6	8	10	15	48	50	53	60	70

III. COMPLEXITY OF PAIR SORT ALGORITHM

If there are even numbers of elements (let n) in the array, then each round gives n/2 pair i.e comparisons. Therefore for n number of passes i.e maximum number of comparisons, we have (n x n)/2=n^2/2 comparisons. So the complexity is $O(n^2)$.

If there are odd number of elements(let n) in the array, then each round gives (n-1)/2 pair i.e comparisons. Therefore for n number of passes give (n-1)/2 comparisons. So the complexity is $O(n^2)$.

References

1.   S. Lipschutz and G.A.V. Pai , "Data Structures", T. M. H. Education Pvt. Ltd.

AUTHOR(S) PROFILE

GOUTAM MONDAL received B.TECH in Computer Science from Govt. College of Engg. & Textile Technology, Serampore under West Bengal University of Technology in 2006 And M.Sc in Computer Science from Vinayaka Mission University in 2013. Now engaged as an Assistant Teacher in Belsingha Sikshayatan,W.B,India.