DOKUZ EYLUL UNIVERSITY

ENGINEERING FACULTY

DEPARTMENT OF COMPUTER ENGINEERING

CME 2204 Algorithm Analysis

Assignment-1

Comparison of Heapsort, Quicksort and Introsort

by

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PROGRESS DESCRIPTION

In this assignment, want us to compare three different sorting algorithm time complexity and commant obout which one is better which case. This three sorting algorithm are heap sort, quick sort and intro sort. Under the quick sorting there are four different case, these are chose first element as pivot, random element as pivot, two different element as pivot and compare first,middle and last element in array and chose biggest one as pivot. Quick sort is divide and conquer algoritm, chose any element as pivot and compare other elements with pivot and sorting array, while working quick sort do not open new array for sorting, it’s work only input array. Heap sort is in-place algorithm too, is find largest element in array and actually there is not tree but if we thing as tree it’s degreasing form root to leafs and biggest element is root. In intro sort, actually this is mixed algorithm to heap sort and quick sort. First of all we calculate max depth of array as given formula and select pivot and partition of the array until max depth equal to zero, if max depth equal to zero than we call heap sort method. All tasks are completed in this assignment.

Results Table

Shown as in the table there is little bit changes between which element chosen as pivot. First of all there is three different sorting algorithm and these algorithms’s run time analysis or big-o notations are: n\*logn for every case to heap sort, n\*logn for best and average case and n^2 to quick sort and n\*logn for every case to intro sort. If I start to campare my result table, we can see those:

If elements are equal integers in array, heap sort is best one, and than dual pivot is almost equal heap sort, in quick sort algoritm dual pivot is best one for this case, after that first element pivot and intro sort are comming, for this case random and middle of three elements pivot are worst.

If elements are randomly assigned, running time is definitely increase for every case by the equal integers elements. For this scenario dual and first element and middle of three as pivot are best running time, random elements as pivot is almost as good as them but little bit much and intro sort is really worst for this case.

If elements are increasing or decreasing order, I want to interpret this two case together because running times are almost equal for this two case. For those case heap sort, first element as pivot quick sort and random element as pivot quick sort are best and than intro sort almost equal them, but middle of three and dual pivot in quick sort are too bad for this cases.

Assume that we have a Java hash map that contains tweet numbers of twitter

hashtags. Let's say, we have a hash map like [“pazar”:23800, “Istanbul”:19400,

“BirTavsiyeVerin”:5112, “BesiktasinMaciVar”:11000, .... ]. Imagine that there

are hundreds of thousands of hashtags, if we rank the popularity of these tweeter

hashtags from the most popular to the unpopular one, which sorting algorithm do

you use to do this operation faster?

I will use quick sort algorithm for this case, because as shown in the table best one is quick sort algorithm for randomly integer numbers. And I will use first, midlle of three or dual pivot, not use random number.

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