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CS502 - Fundamentals of Algorithms Solved MCQs from Quiz#1

Solved by Umair Saulat

Heaps can be stored in arrays without using any pointers; this is due to the _____ nature of the binary tree,

left-complete

right-complete

tree nodes

tree leaves

Sieve Technique can be applied to selection problem?

True

False

A heap is a left-complete binary tree that conforms to the _____

increasing order only

decreasing order only

heap order

(log n) order

A (an) _____ is a left-complete binary tree that conforms to the heap order

heap

binary tree

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search tree

Divide-and-conquer as breaking the problem into a small number of
pivot
Sieve
smaller sub problems
Selection

In Sieve Technique we do not know which item is of interest
True
False

The recurrence relation of Tower of Hanoi is given below T(n)={1 if n=1 and 2T(n-1) if n >1 In order to move a tower of 5 rings from one peg to another, how many ring moves are required?
16
10
32
31

In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _____ series in the analysis,
linear
arithmetic
geometric
exponent

For the heap sort, access to nodes involves simple

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For the heap sort, access to nodes involves simple _____ operations.

arithmetic
binary
algebraic
logarithmic

For the sieve technique we solve the problem,

recursively
mathematically
precisely
accurately

The sieve technique works in _____ as follows

phases
numbers
integers
routines

Slow sorting algorithms run in,

T(n^2)
T(n)
T(log n)

A (an) _____ is a left-complete binary tree that conforms to the heap order

heap
binary tree
binary search tree
array

In the analysis of Selection algorithm we make a

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In the analysis of Selection algorithm, we make a number of passes, in fact it could be as many as,
T(n)
T(n / 2)
log n
n / 2 + n / 4

The sieve technique is a special case, where the number of sub problems is just
5
many
1
few

In which order we can sort?
increasing order only
decreasing order only
increasing order or decreasing order
both at the same time

Analysis of Selection algorithm ends up with,
T(n)
T(1 / 1 + n)
T(n / 2)
T((n / 2) + n)

The analysis of Selection algorithm shows the total running time is indeed _____in n,
arithmetic
geometric
linear

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2) + n)

The analysis of Selection algorithm shows the total running time is indeed _____in n,
arithmetic
geometric
linear
orthogonal

How many elements do we eliminate in each time for the Analysis of Selection algorithm?
n / 2 elements
(n / 2) + n elements
n / 4 elements
2 n elements

For the heap sort we store the tree nodes in
level-order traversal
in-order traversal
pre-order traversal
post-order traversal

One of the clever aspects of heaps is that they can be stored in arrays without using any _____.
pointers
constants
variables
functions



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en

Divide-and-conquer as breaking the problem into a small number of
pivot
Sieve
smaller sub problems
Selection

How much time merge sort takes for an array of numbers?
T(n^2)
T(n)
T(log n)
T(n log n)

The reason for introducing Sieve Technique algorithm is that it illustrates a very important special case of,
divide-and-conquer
decrease and conquer
greedy nature
2-dimension Maxima

The number of nodes in a complete binary tree of height h is
2^(h+1) – 1
2 * (h+1) – 1
2 * (h+1)
((h+1) ^ 2) – 1

Sieve Technique applies to problems where we are interested in finding a single item from a larger set of

_____

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^) – 1
2 ^ (n+1) – 1
2 * (h+1)
((h+1) ^ 2) – 1

Sieve Technique applies to problems where we are interested in finding a single item from a larger set of

_____

n items
phases
pointers
constant

Memorization is?
To store previous results for future use
To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later
To make the process accurate
None of the above

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Which sorting algorithm is faster
O (n log n)
O n^2
O (n+k)
O n^3

Quick sort is
Stable & in place
Not stable but in place
Stable but not in place
Some time stable & some times in place

One example of in place but not stable algorithm is
Merger Sort
Quick Sort
Continuation Sort
Bubble Sort

In Quick Sort Constants hidden in T(n log n) are
Large
Medium
Small
Not Known

Continuation sort is suitable to sort the elements in range 1 to k
K is Large
K is not known
K may be small or large
K is small

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^ own

Continuation sort is suitable to sort the elements in range 1 to k
K is Large
K is not known
K may be small or large
K is small

In stable sorting algorithm.
If duplicate elements remain in the same relative position after sorting
One array is used
More than one arrays are required
Duplicating elements not handled

Which may be a stable sort?
Merger
Insertion
Both above
None of the above

An in place sorting algorithm is one that uses ___ arrays for storage
Two dimensional arrays
More than one array
No Additional Array
None of the above

We do sorting to,
keep elements in random positions
keep the algorithm run in linear order
keep the algorithm run in (log n) order
keep elements in increasing or decreasing order

In Sieve Technique we donot know which item is of

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ne algorithm run in (log n) order

keep elements in increasing or decreasing order

In Sieve Technique we donot know which item is of interest

True

False

Sorting is one of the few problems where provable _____ bonds exits on how fast we can sort,

upper

lower

average

log n

The reason for introducing Sieve Technique algorithm is that it illustrates a very important special case of,

divide-and-conquer

decrease and conquer

greedy nature

2-dimension Maxima

Analysis of Selection algorithm ends up with,

T(n)

T(1 / 1 + n)

T(n / 2)

T((n / 2) + n)

In in-place sorting algorithm is one that uses arrays for storage :

An additional array

No additioanal array

Both of above may be true according to algorithm

More than 3 arrays of one dimension.

Which sorting algorithn is faster :

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han 3 arrays of one dimension.

Which sorting algorithn is faster :
O(n^2)
O(nlogn)
O(n+k)
O(n^3)

The running time of quick sort depends heavily on the selection of
No of inputs
Arrangement of elements in array
Size o elements
Pivot elements

Which may be stable sort:
Bubble sort
Insertion sort
Both of above

For the Sieve Technique we take time
T(nk)
T(n / 3)
n^2
n/3



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