C C++ DS JAVA DATA STRUCTURES
TRAINING INSTITUTE KPHB HYDERABAD

Algorithm Class

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https://sites.google.com/site/algorithmclass

Data Structures for interviews

Course details

By

Algorithm Class

Website

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Importance of Data Structures

If you are strong enough in Data Structures, you can

- evaluate the quality of a program
  (Analysis of Algorithms: running time and memory space)

- write fast programs with less memory usage

- solve new problems efficiently by choosing appropriate data structures and algorithms

- Most importantly through this course you would be solving more number of **interview questions** on data structures after each topic.

Why interviewer concentrates more on DS

To find in you…

- How smart you are to pick the appropriate data structure for a given problem
- How strong you are on programming basics (DS)
- How good you are to decompose problems
- How quick you are to find solutions with a better logic
- To test your programming skills

… etc.

Algorithm Analysis

- Introduction to

  - Arrays
  - Strings
  - Structures and Unions
  - Pointers

- Algorithm analysis

Stacks

CONCEPTS

- Array and linked list implementation of a stack
  - create stack()
  - isempty()
  - push()
  - pop()
- infix to post fix conversion
- evaluate postfix expression

PROBLEMS

1. Check for balanced parentheses in an expression

2, Match brackets

3. check palindrome or not

4. Reverse a string

5. Sort stack

...etc

Recursion

- How to write recursive programs
- Call flow analysis using call stack
- Call flow analysis using recursion tree

Queues

- Array implementation
- Linked list implementation
- Circular queue
- Interview questions on queues

Queues

CONCEPTS

a) Array and linked list implementation of a queue
 create queue()
 isempty()
 insert()
 remove()

b) circular queue

c) double ended queue

PROBLEMS

1. Queue using 2 stacks

2. Sort queue

3. Reverse Queue

...etc

Linked lists

- Single Linked list
- Circular linked list
- Double linked list

35 + interview problems on LLs

like ….

Find common node which is common to both the lists. You are allowed to traverse both the lists only once.
delete a node p given in a linked list efficiently .....etc

Linked lists

CONCEPTS

a) linked list

- insertFront()
- insertAfter()
- insertEnd()
- DelFirst()
- DelEnd()
- DeleAfter()

b) Circular linked list

- insert()
- remove()
- stack as CLL
- queue as CLL

c) Doubly linked list

- setLeft()
- setRight()
- remove()
- removeLeft()
- RemoveRight()

Tournament tree

➢Tournament tree

- How to find max element in the given elements
- How to find max element and second max element element in the given elements
- Tournament tree data structure

Trees

- Trees ADT
- Binary Tree
- Binary search tree
- Preorder, Inorder and Postorder traversals
- Construct tree from Inorder and Postorder traversal
- Construct tree from Inorder and Preorder traversal
- Interview questions on trees

Trees

a) Tree terminology

b) General tree

c) expression tree

d) Binary Tree

e) Binary Search Trees
createtree()
setleft()
setRight()
createTree()
disposeTree()
FindKey()
findMin()
findMax()

f) Preorder, inorder and post order traversals

PreTraversal()

postTraversal()

inorderTrav()

Trees

g) find inorder successor, predecessor

h) Construct original tree from given pre order and in order traversals.

Construct original tree from given post order and in order traversals.

i) Tree delete operation

j) AVL tree

30 + problems on trees

questions like

Find number of full nodes in a tree.

Function to return 1 if there exists a path from the root to a leaf whose values sum is S otherwise ...etc

Sorting

- Bubble sort
- Insertion sort
- Quick sort
- Merge sort
- Heap sort
- Priority queue

Interview questions on sorting

1. given a binary digits like 001101 arrange the numbers such that zeroes should follow 1s ike 0001111.

2. Find Triplets of a+b+c=k in an array
etc

Searching

- Binary search
- Hash table
- AVL trees

Interview questions on searching

Sorted array with duplicates write a function that returns the lowest index of an element x in that array

... etc

TRIES

node Structure

getNode()

insert()

search()

5 problems on tries

Suffix trees

Suffix trees

node Structure

getNode()

insert()

search()

suffix array

build suffix array

search()

4 problems

Graphs

Adjacency matrix

Adjacency list

BFS

DFS

Kruskal's minimum spanning tree

Disjaskra's shortest path

Graphs problems

Detect Cycle in a graph

Topological sorting

Check Graph is bipartite or not

check the given graph is tree or not

Find the number of islands

.. etc

Dynamic Programming

Introduction to dynamic programming

memorization (top down)

tabulation (Bottom up)

optimal sub structure

8 problems on dynamic programming

Advanced Data Structures

Red-Black trees

ntroduction
insert()
delete()

Splay Trees

Intruduction
search()
insert()

Ternary Search Tree

Introduction
insert()
search()

CONTACT

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