RAVINDRA BABU RAVULA JOB INTERVIEW PREPARATION

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Course Info
In this course, we started from the basics of algorithms and made the concepts very simple so that anyone with minimum or no prior knowledge also can understand, learn and master easily. This course covers algorithmic techniques for solving problems arising in the field of computer science. It is a mix of theory and practice. You will not only design algorithms and estimate their complexity, but also you will get a deeper understanding of algorithms by implementing them in C Programming Language.

This course will act as a catalyst to your preparation to crack the interviews of the product based companies. Understanding the power and limitations of algorithms helps you to solve the real-life problems smarter and faster.

In this course, we will explain all the possible ways to solve the problem and analyse each solution using Time & Space Complexity. After finishing this course, you will be able to solve most of the problems with an optimal solution.

Requirements
You are supposed to have a good Internet connection to watch the videos otherwise you need to buffer the

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Courses syllabus
1. C-Programming
1.1 Introduction
1.2 Flow Control
1.3 Functions
1.4 Arrays
1.5 Pointers
1.5 Structure and Unions
2. Data Structures
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2.2 Queues .
2.3 Linked List (Single Linked List, Doubly linked list, Circular linked list).
2.4 Trees (Tree Traversals, Tree Operations, Binary Search Tree, AVL Tree)
2.5 Hashing
2.6 Heaps (Max Heap, Min Heap, Heap Sort)
2.7 Graphs (Representation of graphs, BFS, DFS)
2.8 Skip List
2.9 Red-Black Trees
2.10 B Trees
2.11 B+ Trees
2.12 Splay Trees
2.13 Binomial Heap
2.14 Fibonacci Heap
2.15 Ternary Search Tree
2.16 Disjoint Sets
3. Algorithms
3.1 Analysis.
3.2 Sorting Techniques.
3.3 Divide and Conquer.
3.4 Greedy Algorithms .
3.5 Backtracking .
3.6 Dynamic Programming .
3.7 Complexity Classes .
4. Problem solving using Data Structures and Algorithms

4.1 Arrays.

Find a pair in an array of size ‘n’, whose sum is X
Find a majority element in an array of size ‘n’
Find the number occuring odd number of times in a given array of size ‘n’
Algorithm to reverse an array
Algorithm to rotate array of size ‘n’ by ‘d’ elements
Algorithm to segregate 0’s and 1’s in an array
Find the maximum difference between two elements such that larger element appears after the smaller element
Algorithm to merge an array of size ‘n’ into another array of size ‘m+n’.
Algorithm to find two repeating numbers in a given array
Algorithm to find duplicate elements in O(n) time and O(1) extra space, for a given array of size ‘n’
Find the index in an array such that the sum of elements at lower indices is equal to the sum of elements at higher indices.
Algorithm to find the maximum difference of j – i such that a[j] > a[i], for a given an array of ‘n’ elements.
Algorithm to find the triplet whose sum is X
Algorithm to find a sub array whose sum is X
Algorithm to find the largest sub array with equal number of 0’s and 1’s
Algorithm to find the number of triangles that can be formed with three different array elements as three sides of triangles, for a given unsorted array of n elements
Algorithm to find the smallest integer value that can’t be represented as sum of any subset of a given array.
Algorithm to find the common element in given three sorted arrays
Algorithm to find the contiguous sub-array with maximum sum, for a given array of postive and negative numbers.
Given an array of integers, sort the array into a wave like array and return it. (arrange the element into a sequence such that a1>=a2<=a3>=a4<=a5—-etc.
Algorithm to find the next greater number formed after permuting the digits of given number
Algorithm to find the sum of bit difference in all pairs that can be formed from array of n elements.
Trapping rain water problem
Algorithm to find the minimum number of platforms required for the railway station so that no train waits according to arrival and departure time
Rotate 2-Dimentional array
Lock and Key problem
Rearrange an array so that a[i] becomes a[a[i]] with O(1) extra space
Traverse a matrix of integers in spiral form
Given an array consisting 0’s, 1’s and 2’s, write a algorithm to sort it
Given a positive number X, print all jumping numbers(all adjacent digits in it differ by 1) smaller than or equal to X
Given an array and an integer ‘k’, find the maximum, for each and every contiguous subarray of size ‘k’

Search an element in a sorted rotated array
Find the maximum value of a[j]-a[i]+a[l]-a[k], for every four indices i, j, k, l such that i< j < k < l.

4.2 Linked List

Algorithm to find the nth node from end of the linked list
Algorithm to find the middle node in a linked list
Algorithm to find the intersection point of two linked lists
Reversal of linked list
Algorithm to detect loop in linked list
Algorithm to find starting node of a loop in a linked list
Algorithm to check given linked list is palindrome (or) not
Algorithm to reverse alternative K nodes in a single linked list
Algorithm to clone a linked list with next and random pointer are given…many more
Stack
Reversal of a stack
Algorithm to find next greater element on the right side of an array.
Implemention of the following operations in stack in O(1) time. Push(), pop(), isEmpty(), isFull() and getMin().
Algorithm to find the celebrity in minimum number of questions in a party.
Algorithm to the stock span problem is a financial problem where we have a series of ‘n’ daily price for a stock and we need to calculate span of stock’s price for all n days
Algorithm to merge overlapping intervals
Find the largest rectangular area possible in a given histogram.
Given an integer array of size ‘n’, find the maximum of the minimum’s of every window size in the array.
Calculate minimum number of bracket reversals needed to make an expression balenced.
Design a stack, to find getmin() in O(1) time and O(1) space complexity.
Find if an expression has duplicate or not….many more

4.3 Queues

Given an array and an integer k, find the maximum for each and every contiguous subarray of size k.
Implement LRU Cache.
Find the first cicular tour that visits all petrol pumps
Find the largest multiple of 3.

4.4 Trees

Implement in order traversal without stack and recursion
Convert a binary tree into its mirror tree
Check if a given binary tree is sum tree or not
Determine if the given two trees are identical or not
Print out all of its roof to leaf paths in a given binary tree
Find a lowest common ancestor of a given two nodes in a abinary search tree
Find a lowest common ancestor of a given two nodes in a binary tree

Level order traversal in spiral form
Convert an arbitrary binary tree to a tree that holds children sum property
Find the Diameter of a BST
Construct tree from given inorder and post order traversal
Convert a Binary Tree to a circular DLL
Evaluation of expression tree
Print extreme node of each level of Binary Tree in alternative order
Print cousins of a given node in Binary Tree
Diagonal traversal of Binary Tree
Construct tree from ancestor matrix
Given a Binary Tree, find vertical sum of the nodes that are in same vertical line.
Find multiplication of sums of data of leaves at same level.
Given a binary tree, find maximum value we can get by subtracting value of node B from value of node A
Print nodes in a top view of Binary Tree.
Given a Binary Tree and a number k, remove all nodes that lie only on root to leaf path(s) of length smaller than k.
Serialize and deserialize an N-ary tree.
Reverse alternate levels of a perfect Binary Tree.
Print all nodes that are at distance k from a leaf node.
Custom tree problem.
Construct complete binary tree from its linked list representation.
Find next right nodes of given leafs in a binary tree.
Given a binary tree, print boundary nodes of the binary tree Anti-Clockwise starting from the root.
Convert a given tree to its sum tree.
Given a binary tree, find out if the tree can be folded or not.
Find largest sub tree having identical left and right sub tree.
Convert a normal binary search tree to balanced BST.
Check if removing an edge can divide a binary tree in the form of n-ary tree.
locking and unlocking of resource arranged on the form of n-ary tree.

4.5 Heaps

Find K largest (or smallest) elements in array.
Tournament tree method using binary heap .
Find a Median in a stream of integers.
Sort a nearly sorted array(or k sorted).
Given array representation of min Heap, convert it to max Heap.
Check if a given binary tree is Heap.
Find kth largest element in a stream.
Print all elements in sorted order from row and column wise sorted matrix.

Given n ropes of different length, connect with minimum cost.
Given k sorted arrays of size n each, merge them.
Design an efficient data structure for given operations find min(), findmax(), deletemin(), Insert(),delete().

4.6 Strings

Find a maximum occurring character in the input string.
Remove all duplicates from a given string.
A program to check if strings are rotations of each other or not.
Find the smallest window in a string containing all characters of another string
Revere words in a given string.
Find all distinct palindromic sub strings of a given string
Remove all adjacent duplicate characters in a string
Given a string, find the Run length encoding of given string.
Check whether two strings are anagram of each other or not.
Find the first non-repeating character from a stream of characters.
Given an array of strings , find if the string can be of characters.
Find a excel column name from a given column number.
Convert one string to another using minimum number of given operation
Check if a given sequence of moves for a robot is circular (or) not.
Print concatenation of zig-zag string in ‘n’ rows.
Minimum number of palindromic sub sequence to be removed to empty a binary string.
All combinations of string that can be used to dial a number.

4.7 Divide & Conquer

Find the median of two sorted arrays
Count inversions in an array
Find majority Element in a sorted array
Find the maximum and minimum of an array using minimum number of comparisons
The skyline problem
Given two binary strings that represent value of two integers, find the product of two strings.
Given an array of integers. Find a peak element in it.
Find the missing number in Arithmetic Progression
Given an array of n points in the plane, find out the closest pair of points in the array.

4.8 Back Tracking

Print all permutations of a given string.
Find subset of elements that are selected from a given set whose sum adds up to a given number K.
Given a set of n integers, divide the set in two subsets of n/2 sizes each such that the difference of the sum of two subsets is as minimum as possible.
Solve Sudoku using backtracking.
Given a maze, NxN matrix. A rat has to find a path from source to destination. Left top corner is the source and

right bottom corner is destination. There are few cells which are blocked, means rat can¬not enter into those cells.

4.9 Pattern searching

Given a text and a pattern, find all occurrences of pattern in a given text. Using naive approach.
Given a text and a pattern, find all occurrences of pattern in a given text. Using Rabin-Karp algorithm.
Given a text and a pattern, find all occurrences of pattern in a given text. Using Finite automata approach.
Given a text and a pattern, find all occurrences of pattern in a given text. Using Boyer moore algorithm.
Given a text and a pattern, find all occurrences of pattern in a given text. Using KMP algorithm.
Given a string, find the longest sub string which is palindrome using manacher's algorithm
Find all occurrences of a given word in a matrix.

4.10 Greedy Algorithms

Given an array of jobs with different time intervals. Find the minimum time to finish all jobs.
Given a universe of n elements, collection of subsets. Find a minimum cost sub collection that covers all elements.
Given n cities and distances between every pair of cities, select k cities to place warehouses, such that the maximum distance of a city to a warehouse is minimized.

4.11 Dynamic Programming

Find the length of the longest sub sequence of a given sequence such that all elements of the sub sequence are sorted in increasing order.
Given two sequences, find the length of longest sub sequence present in both of them.
Given a cost matrix and a position (m, n) , Find cost of minimum cost path to reach (m, n) from (0, 0).
Coin change problem.
Find the length of the longest palindrome sub sequence.
Find th sum of maximum sum sub sequence of the given array.
You have a rectangular grid of dimension 2 x n. You need to find out the maximum sum such that no two chosen numbers are adjacent , vertically, diagonally (or) horizontally.
Given an array A with n elements and array B with m elements. With m you have to insert (n-m) zero's in between array B such that the dot product of array A and array B is maximum.
Transform a string into palindrome on removing at most k characters from it.
Find the longest even length sub string such that sum of first and second half is same..
Count number of ways to reach a given score in a game.
Compute sum of digits in all number from 1 to n.
Collect maximum points in a grid using two traversals
Given a 2xn board and titles of size 2×1, count the number of ways to tile he given board using the 2×1 tiles..
Count the number of ways we can parenthesize the expression so that the value of expression evaluates to true.
Given a Binary Tree, find size of the Largest Independent Set(LIS) in it.
There are n stairs, a person standing at the bottom wants to reach the top. The person can climb either 1 stair or 2 stairs at a time. Count the number of ways, the person can reach the top.

Find total number of non-decreasing numbers with n digits.
Egg dropping problem.
Given a rod of length n inches and an array of prices that contains prices of all pieces of size smaller than n. Determine the maximum value obtainable by cutting up the rod and selling the pieces.
Given N jobs where every job is represented by Start Time, Finish Time, Profit or Value Associated. Find the maximum profit subset of jobs such that no two jobs in the subset overlap.
Box stacking problem.
Given an input string and a dictionary of words, find out if the input string can be segmented into a space-separated sequence of dictionary words.
Given a binary matrix, find out the maximum size square sub-matrix with all 1s.
Find the maximum coins you can collect by bursting the balloons wisely.
4.12 Bit Manipulation
4.13 Mathematical **Algorithms**

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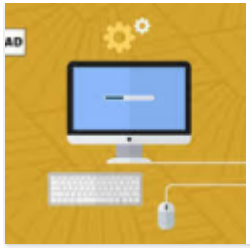

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