Data Structure and Algorithm Training Program

Week 1: Practice Problems

Practice Problem Level : Easy

	Problem Description	Expected Time Complexity	Additional Details
Problem 1	Recursive code to find maximum Value in an array	O(n)	Iterative solution has been discussed in the Week 1 lecture video.
Problem 2	Write a Program to Reverses the order of the elements of a given array.	O(n)	**[Example 1]** Input A[] = {3,5,7,2,4} Output : A[] = {4,2,7,5,3} **[Example 2]** Input : A[] = {2,1} Output : A[] = {1,2}
Problem 3	Write Iterative Program for Binary Search	O(logn)	Recursive solution has been discussed in the Week 1 lecture video.
Problem 4	Write a program to check given string is palindrome or not. [A string is said to be palindrome if reverse of the string is same as string]	O(n)	**[Example 1]** Input : X[] = {A,B,C,B,A} Output : True **[Example 2]** Input : X[] = {A,B,B,A} Output : True **[Example 3]** Input : X[] = {A,B,A,B} Output : False

Practice Problem Level : Medium

	Problem Description	Expected Time Complexity	Additional Details
Problem 5	Merge Two Sorted Array of different size.	O(n+m) n=Size of 1st Array m=Size of 2nd Array	**[Example 1]** Input : A[] = {1,4,6,8}, B[] = {2,3} Output : C[] = {1,2,3,4,6,8} **[Example 2]** Input : A[] = {1, 2}, B[] = {4,5,6} Output : C[] = {1,2,4,5,6} **[Example 3]** Input : A[] = {6,8}, B[] = {1} Output : C[] = {1,6,8}
Problem 6	Find a minimum value in sorted and rotated array	O(logn)	**[Example 1]** Input : A[] = {7,8,9,11,1,4,6} Output : 1 **[Example 2]** Input : A[] = {8,6,5,4,2} Output : 2 **[Example 3]** Input : A[] = {4,6,8,9} Output : 4
Problem 7	Find Maximum and Minimum Value in an array.	O(n)	**[Example 1]** Input : A[] = {4,3,1,9,8} Output : Max=9, Min=1 **[Example 2]** Input : A[] = {3,6} Output : Max=6, Min=3 **[Example 3]** Input : A[] = {2} Output : Max=2, Min=2

Practice Problem Level : Difficult

	Problem Description	Expected Time Complexity	Additional Details
Problem 8	Write Recursive program for Insertion Sort Algorithm	O(n)	Iterative solution has been discussed in the Week 1 lecture video.
Problem 9	Given two sorted arrays A and B each of size n. Write a program to find the median of the array obtained by merging these two arrays. Note : After the merging, size of larger array would be 2n. Then median = Average of (n-1)th and (n)th value.	O(logn)	**[Example 1]** Input : A[] = {1,6,9], B[] = {4,8,12] Output = 7 **Explanation :** After merging A and B, we get array {1,4,6,8,9,12]. There are two middle elements : 6 and 8. Then Median = (6+8)/2=7 **[Example 2]** Input : A[] = {1,4,10,11], B[] = {5,8,12,15] Output = 9 [This is average of 8 and 10]
Problem 10	Find position of an element in a sorted array of infinite numbers	O(logn) n = Position of element in the array	**[Example 1]** Input: A[] = {1,3,4,7,12,15,16,19,22,.....} Element to be Found = 19 Output : 7 [This is the Index of 19 in sorted array]

Enjoy Algorithms!

Thank You.