COMSATS University Islamabad
Islamabad Campus
Department of Computer Science

Design and Analysis of Algorithm

Quiz 3

CLO-3: Design new algorithms for different computational problems

Time: 15 minutes
Registration: FA23-BCS-080
Class: BCS 5

Total Marks: 10
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Section: B

Question	Marks = 10

Suppose you are given an unsorted array A[1..n], which contains all but one of the n + 1 integers in the range 0, . . . , n (so exactly one of these elements is missing from A). To simplify the problem somewhat, we will assume that $n = 2^k - 1$ for some integer k. Hence each array element has a binary representation using k bits. You want to determine the missing integer. You are not allowed to access an entire integer in A with a single operation. The only way to access the elements of A is by calling the function *bitvalue*(i, j), which returns the value of the j^{th} bit of A[i]. Give a ***divide-and-conquer*** algorithm that finds the missing integer and makes only O(n) calls to the function *bitvalue*().

ANSWER IN THIS BOX