

PROGRAMMING TEST -- MTECH EXECUTIVE ADMISSIONS
IIT Jodhpur

1. In the following function you will be given an array A and it's length n as input. You are required to do the following operation for every element in the array:

$$A[i\%n] = A[i\%n] \text{ XOR } A[n - (i\%n) - 1]$$

Here XOR represents the bitwise XOR operation, and % is the modulus operator.

Example:

`int* bitXor([1,2], 2)` will return the array [3,1]

2. Consider the following function which takes as input, an array A of integers, and the length of the array as arguments. Write the function body so that it returns the maximum number of trailing zeroes in the binary representations of each number in the array.

`int countTrails(int *a, int n)`

Example: `countTrails({2,4,8,6,5},5)` returns 3 as 8 has the highest number of trailing zeroes.

3. Write a function `specialChar(char **s)` which accepts a set of strings and the number of strings being passed. It returns the number of characters that are common in all.

Example:

`int specialChar({"gbcda","bcad","bgc"},3)` returns 2 as characters b and c are common in all three.

4. Complete the function which takes an array L of size N, and a number X as arguments. It returns the number of positions in L which has positional advantage. Meaning, a location i in L has positional advantage if the sum of L_i and X is greater than all the other elements of L (except L_i). The function returns the number of such positions

Example:

`int findAdvantagePoints([1,2,3,2,1], 5, 6)` returns 3

Because:

$$(1+6) < (2+3+2+1)$$

$$(2+6) > (1+3+2+1) \text{ (advantage)}$$

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$$(1+6) < (1+2+3+2)$$