ACM ICPC Dhaka Site 2015 Preliminary Contest Editorial

First of all, I was the coordinator of this problem set, ভুল ত্রুটি নিজ গুনে ক্ষমা করবেন.

Problem A: Back to the Past

Setter: Md. Shiplu Hawlader / Md Mahbubul Hasan

Guess the person named Professor Dr. James.

Problem B: Search the Khoj

Setter: Md. Shiplu Hawlder, Alternate Writer: Md Mahbubul Hasan

Category: Adhoc.

Just go through the contact list and print the strings with hamming distance at most 1.

Problem C: Moroccan Wooden Box

Setter: Shahriar Manzoor, Alternate Writer: Darek Kisman

Category: Geometry

This is the hardest problem of this set. There is a closed formula for the seven ball problem but for eight ball you have to do bisection. I don't know much about this problem as I am also weak in geometry like you :P.

You can find the editorial from problem setter here.

Problem D: XOR Subset

Setter: Hasnain Heickal Jami, Alternate Writer: Md. Shiplu Hawlader and Ridowan Muhammad

Category: Number theory

Only the first condition matters. If we ignore the second condition, each way comes twice. So how can we ensure the first condition? There are N elements, each of them has three options. Either in X, or in Y or in neither. So total ways are 3^N. The answer where both X and Y is empty comes only once, so the final result is (3^N + 1)/2. To make your life easier we have explicitly mentioned the Fermat's little theorem in the description.

Problem E: Emoticons

Setter: Md Mahbubul Hasan, Alternate Writer: Zobayer Hasan

Category: Adhoc

Though this is a similar problem of same author from past IUPC, one of my favorite problems in this set. But I have failed to solve in O(n). Both the judge and alternate writer's solution takes O(n log n). Binary

search over the answer. With a fixed length now try to count three values over the whole string from first to last, number of ^ found, number of ^_ found and number of ^_^ found. Eureka!!!

Problem F: Brain Fry

Setter: Ridowan Muhammad, Alternate Writer: Md. Shiplu Hawlader

Category: DP, Probability, Graph

Straight forward DP (assuming you know probability and expected number). The trickiest part of this problem is to count the number of adjacent restaurant. You have to avoid the university if it in adjacency list. Most of the teams who attempted (including the problem setter) missed it. By the way, the story of this problem is 100% true :P.

Problem G: Geek Power Inc.

Setter: Zobayer Hasan, Alternate Writer: Md. Shiplu Hawlader

Category: Adhoc

A cute little problem :P. Just sort according to the power rating and count in decreasing order.

Problem H: Marbles in Jars

Setter: Hasnain Heickal Jami, Alternate Writer: Ridowan Muhammad

Category: Adhoc, Counting

we need to assign a particular number with each jar which should be unique for all the jars. This number is the value of X for that jar. So to find number of different winning strategies, we need to do the following.

sort all M

ans = m1 * (m2-1) * (m3-2)* ... *(mn-n+1)

Problem I: Jumping Frogs 2

Setter: Muhammed Hedayet Alternate Writer: Hasnain Heickal Jami

Category: Adhoc

Though some brute force solutions got AC, but it was one of the hard problems in this set. For each pair of frogs I and J, where 0 <= I <= J < F and positioni < positionj, pre calculate when the ith one is going to overtake the jth one in O(F^2 * lg(N)) time and store/update the first and last frog to reach that segment if appropriate. Thus we'll be able to get the head and tail latencies for all the segments in O(N) time with a sweep from left to right. If the tail latency for a segment is less than head latency for the segment immediate right to it, then all the frogs meet in this segment. First such segment is the answer.

N.B. : Collected from Md. Shiplu Hawlader's facebook post