














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-  Hasibur Shanto
-  Bimurta Bismoy Sanchi
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# NCPC 2016 Preliminary Editorial

 SHIPLU HAWLADER · SUNDAY, FEBRUARY 21, 2016

## Problem A: Am I in the Correct Direction?

Problem Setter: [Alina Zaman](#)

Special Thanks: Md. [Shiplu Hawlader](#)

Category: Giveaway

Correct output of the problem is “East”. Though one can solve the problem without any calculation just by submitting 4 possible output.

## Problem B: Day of the Year

Problem Setter: [Alina Zaman](#)

Special Thanks: Md. [Shiplu Hawlader](#)

Category: Ad-hoc, Giveaway

The limit of this problem is such that you can't use loop to find the day. You have find an equation to solve the problem.

Find the difference between the days, mod it by 7 and find the next day according to the current.

The most important case of this problem is when  $Y < X$ . Many teams suffered for this case.

Problem Setter: [Shahriar Manzoor](#)

Special Thanks: Monirul Hasan ([Tomal Is-a Tree](#)), Md. [Shiplu Hawlader](#)

Category: Ad-hoc

if the  $(d+1)$  th digit is zero and all digits after that is zero, the situation is "No change"

else If the  $(d+1)$  th digit is 5 and all the digits after that is zero, the situation is ambiguous.

else if  $(d+1)$  th digit is greater than or equal to 5, rounding up causes less error.

else if  $(d+1)$  th digit is 4 or less, rounding down causes less error.

## Problem D: Power from Power

Problem Setter: [Ridowan Muhammad](#)

Special Thanks: [Bidhan Roy](#)

Category: Mathematics, Number Theory

$$a^b = c^d$$

Suppose  $a = p^q$ , where  $p$  is prime number. So we can rewrite the equation as,

$$\begin{aligned} (p^q)^b &= p^{(b*q)} \\ &= p^r \quad [let \ r = b*q] \end{aligned}$$

Again let  $x$  is a divisor of  $r$  and  $y = r / x$ . So

$$\begin{aligned} p^r &= (p^x)^y = c^d \\ So \ c &= p^x \text{ and } y = d. \end{aligned}$$














How many way you can write  $p^x$  and  $y$  or we can say how many way we can write  $r = x*y$ .

So we have to find number of divisor of  $r$  or  $b*q$ .

Another case can be like  $a = p_1^{q_1} * p_2^{q_2} ... p_k^{q_k}$ . Here  $p_1, p_2, ... p_k$  are prime numbers.

## Problem E: Friendly Neighborhood

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Special Thanks: [Anindya Das](#)

Category: Computational Geometry

If you closely look into the equations and conditions, you can easily find out that this is a straight forward Convex Hull problem.

## Problem F: Team Selection

Problem Setter: [Bidhan Roy](#)

Special Thanks: [Ridowan Muhammad](#)

Category: DP, Counting, Probability

This is a DP and Combinatorics problem. To determine the denominator, we have to compute how to take  $k$  players from  $n$  player which is Binomial Combinatorial function or  $nCr(n,k)$ . So the main problem remains to determine the numerator.

This can be done by several DP approaches. One way could be first compressing the skills so they have at most 50 different states instead of  $10^9$ . No in the dp, first sort/group the candidates so who have the required skills comes first and same skills candidates are group, non required after them. Take for each required skill at least one candidate and track which is the minimum for  $L$  for which each required skill's at least one candidate have  $\leq L$  skill level. As skills are now compressed, maximum value for  $L$  can be 50. After considering required skills candidates, check non required skills candidate. Take only with  $>L$  skill level. One extra check is make sure all required skills have been taken. Alternate solution is  $50*50*50*2$  states DP. (From Ridowan)



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**Tameem Khan** Sakhawat Hossain Saimor Alam

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**Anower Perves** See Sadik Alamin Tushar শামিন আশফাক Zunayed Shahriar Tariq Mostahid Miimo Nasir Uddin Bappi what we've missed at C. so silly 😂

Like · Reply · 2y

Sakib Shahriyar Shaheen replied · 4 Replies

**Abdullah Mohammad Daihan** when these problems would be added to TOPH or UVA ? For practise it

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