C-on-test - Intra-IIT Round Brought to you by CSEA, IITB in associatio
n
with VERITAS software.

Problem 1. ~~~~~~~~~~ With Election fever on its high and politicians running short on time you have write an program which they can use to call junta to come forward and vote... The program should print Come-Sure-Come on a line by itself just once. No leading or trailing spaces. The output is case sensitive i.e. come-sure-come would be regarded as incorrect. As an concerned citizen of this country you should do your bit towards it. Ask yourself, Do you want an elected government or are you apathetic ?

Problem 2. ~~~~~~~~~~ Elections over, mps' elected, the auction house

set and the horse-trading is on. All the mp's are seated in a circle. Each belongs to either the H front or the T front of the regional faction of the secular group of the leftist liberal democratic anti-communalist pro-poor progressive party of India. In the center of

the circle is THE ONE of the current polity Akal Bechari Bhaggayi (ABB). His aim is to convert all the mp's to either H or T group. But mps' being mps', having had years of experience are not so easy. They always go in pairs (so they can use each other as excuse later). In each step ABB can ask any 2 adjacent mp's to toggle their loyalty. Tim
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however is of the essence. Everyone wants a piece of the action and if

ABB doesnot convert fast he will be out of center stage. This is where

you come into the picture. You being the brilliant students from IITB can surely use your skills to help him out. Help ABB figure out the minimum number of steps required to achieve his aim. You will be given

a string consisting of H's and T's as input on a single line. The size

of the input is bounded above by 1600. Consider the input string to be

the Circle listed out clockwise from some point. You have to output th
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number of steps it will take ABB to convert all mp's to one type. The number is to be printed on a line by itself. No leading or trailing data. If it is not possible to do the conversion then output -1. Sampl
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Input: HTTH ~~~~~~~~~~~~~ Sample Output: 1 (for above example. Either

pair of T's or H's) ~~~~~~~~~~~~~~

Problem 3 ~~~~~~~~~ Long long ago in a far far land of Venice, lived noble Shylock and an evil young prince Antonio. The prince wanted to be the richest man ever and using his force, made all shylocks play a game. He would give the first few triplets of a sequence and ask the shylock to give the first number in the Nth triplet. Shylock had to reply within a certain time bound or he loses his life and money. If he succeeds he gets freedom and cash equal to the answer. The first few triplets of the sequence are (2 0 0), (3 1 0), (4 0 1), (5 2 0), (5 1 1)... No one could beat the sequence. The noble shylock went to the wise nerd for help. The nerd immediately pulled out his palmtop and made a few quick calculations... Thus spake the nerd "Consider all numbers Z of the form 2^x + 3^y (thats 2 raised to x plus 3 raised to y). The values of x and y are non-negative integers. By varying the values of x and y one will get different values of Z. (Z x y) form the

triplets. Write down all these triplets and sort on increasing Z. If the Z's are same take any ordering on x and y since only Z is important. This will give you your sequence. Now you are on your own. I cannot help you further" Now you must help our hero Shylock. Write a program which when given N will output the indices x y that make the Nth number in the sequence. Shylock is smart enough to figure out Z from x and y. Input format: The number N (positive integer) on a line by itself. ~~~~~~~~~~~~~ No leading or trailing data. Output format: The numbers x y seperated by a blank on a single line ~~~~~~~~~~~~~ No

leading or trailing data. The order of x and y is important. No comma to seperate them. Just a blank. In case of multiple possible answers, give any one pair among the set of all the possible solutions. Example :
Input : 3 output: 0 1 OR Input: 4 ouptut: 2 0 or 1 1 either output will do since there are 2 possible solutions. NOTE: You must give only one of the above. Giving both will get you 0 points. NOTE: You are supposed to output *only* the values x and y. You * SHOULDN'T * output the value of z or N.

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problem 4. ~~~~~~~~~~ Since someone just cribbed about the way the statements are written here is the next problem in a nutshell. You are

given a string as input (upto 6666 chars in length). You have to find the longest substring in the given string that appears atleast twice in the input string. Some portion in the two occurances may overlap. The entire string is given in a single line and that is the only line of input. The output of the program is the substring thats satisfies the above condition. The string is to be printed as output on a line by itself. No leading or trailing data. Example: Input: HaHaHa Output: HaHa The middle Ha overlaps. Input: abcxxxabc Output: abc

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problem 5. ~~~~~~~~~~ Ever played minesweeper ? Well microsoft just decided to make this game a bit more evil. Instead of generating a static board, based on the current configuration of the board it generates a new configuration of mines that is consistent with the current state of the board. YOU have to write this program for micro$oft (Ughh!). It is known that the size of the board is 8x8. The current state board is specified on the standard input by listing out the state of each cell in a row. The state of each row is given on a seperate line. The numbering of the rows and cols start from top left corner and indexed from (0,0) to (7,7). A number of -1 indicates that the minecell has not been opened. A number of 0 or above indicates the number of mines around the cell. Further, all cells around a 0 are opened (are not -1) as in minesweeper. And the given board is consistent (we played the games - so there). The output of the program is just a list of row,column of one possible choice of mine locations.

For example, given the following board: -1 -1 -1 -1 -1 -1 1 0 = Notice that this corner has been opened. -1 -1 -1 -1 -1 -1 2 1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 You could output: 0,5 2,7 as a possible choice of mine locations. Notice that you have to give row,column and NOT column,row. Of course only one solution set is to be printed. It does not matter how many mines you place as long as the conditions are met. In the same problem you could have given 0,5 2,7 0,0 and it would still be right though the mine placed at 0,0 does not play any role.

Problem 6. ~~~~~~~~~~ Evil Dr. Evil wants to take over the World! You

,
Austin Powers, must thwart his attempts and save the world once more.
Dr. Evil has created a deadly network - the "Death Web" - of nukes
connected by cables. When Dr. Evil, sitting on his Moon Base, presses
a
trigger, there is a loud "Kaboom!" and the world goes up a "Poof!".
Obviously you are the only one smart enuff to prevent this catastrophe
.
What the MI6 has reported is that Dr. Evil, the dummy of dummies, has
had a fatal error in his network plan. "Nuke defusing for dummies"
tells you that if you locate a cycle of connected nukes over the world

and defuse just that, then the whole network gets defused and Dr. Evil

is sure to commit suicide in the bargain. You know the locations of al
l
the nukes and there interconnections. What you decide is that you have

to find the SMALLEST connected cycle to defuse the whole network in
time, before the world goes "Kaboom!!". For example: in the network 0
-- 1 --- 2 -- 3 | | 5-----4 Obviously 1-2-4-5-1 is the smallest cycle.

Obviously a monstrous brain like yours can't be taken for granted, so
you just have to find the length of the smallest cycle. In the above
example, it is 4 (four). Input Format: ~~~~~~~~~~~~ The number of nuke
s
N on the first line. The nukes are numbered 0 to N-1. The number of
connections between nukes on the second line. The actual connections i
n
the format: x y where x is one of the nukes on a connection, and y is
the number of the other. Output Format: ~~~~~~~~~~~~~~ Just the length

of the smallest cycle on a single line by itself. No leading or
trailing data. Just the number! Eg. In the above network: Input: 6 6 0

1 1 2 2 3 1 5 2 4 5 4 Output: 4 NOTE: The nukes are numbered from 0 to

(N-1).