New Zealand Programming Contest 2024

EDITORIALS

The statistics are given separately. Note there were 88 teams taking part in the contest who made at least 1 submission.

Editorials for 30 and 100 point problems are available separately.

3 POINT PROBLEMS

3 point problems are designed so that there are no difficult algorithms required, and the solution should be quite straightforward.

A Leap Year *74 solutions*

The easiest way to solve this problem is to solve the correct tense and the type of year separately.

The tense is found by comparing the year to 2024. If equal use “is”, if lower use “was” else use “will be”.

To be a leap year, the year must be divisible by 400, or divisible by 4 and not by 100. If not a leap year it is a common year.

Most solutions for any problem.

B Discounts *36 solutions*

Because you get a free item if you buy the right number, the number of free items is

number required ÷ (number to buy + 1)

From that you can easily work out how many must be bought and how much is saved.

C Crime Scene *56 solutions*

This problem was recycled from 2011 where it was an archaeological dig.

If you represent the grid as a 2D array, add 1 to the appropriate value for each item in the list of cells. It is then easy to output the totals for the required grid cells.

D Football Pools *47 solutions*

The points are calculated by comparing the home and away scores for each of the 8 matches. If they are not equal, score 1 point. Otherwise, if both are 0 score 2 points, otherwise score 3 points.

The other part of the output is to find the correct match to go with each score draw. At least 1 test case would have no score draws so make sure the correct output for that case is given.

10 POINT PROBLEMS

10 point problems are designed so that there are no difficult algorithms required, and the solution should not be very complicated.

E Check Digits *66 solutions*

This is quite straightforward – just apply the algorithm. If you end up with 10, reject the ID, otherwise add the appropriate check digit. Most solutions for a 10 point problem.

F Hex Search *31 solutions*

Keep a list of non hex characters, and a separate list of each hex number.

Process each row of characters adding non hex characters to the list. Hex numbers may consist of more than one digit, so make sure you start a new number appropriately (after a non hex character or the end of the line).

Output the non hex characters first (you could display these as they are found), then convert each hex number to decimal.

G Geese *54 solutions*

A strange problem with mutant geese and knights who could be very short or very tall. Clearly a computer game! First intended as a 30 point problem but downgraded.

Easily solved if the heads and knights were sorted and knights removed one at a time. A head would be removed if the removed knight was greater or equal to it in size, and the total cost would be increased. If you run out of knights before all the heads are removed, doom follows.

H Croquet Free Turns *13 solutions*

No unusual algorithms were needed for this, but complicated as many rules had to be applied. The most complicated 10 point problem for a while.

- The lowest handicap in each team was the stronger player, but if both were the same the first named was the stronger.
- For each team, compare their stronger player with the weaker in the other team. Halve the difference in handicaps to give free turns.
- Make sure this goes to the right player as the stronger player in one team may be weaker than the weaker player in the other team.
- Round halves up unless both players in a team have half free turns, in which case round down for the stronger player.
- Check that your output is correct if players being compared have the same handicap.
- Make sure your solution gives the correct answer to Sample Input 2 as this example contains quite a few important cases.