Titans Invitational Coding Championship 2023

Questions

St Theresa Catholic Secondary School

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1)   A Dogs Knows

Dogs have a great sense of smell. Under perfect conditions, a Blood Hound can smell an object 20km away, a German Shepherd 17 km and a Labrador Retriever 15 km away.

In each of 10 test case, a rabbit is on a road R km North of a starting point. N dogs of breed B are each D km North of the starting point as well. You must determine how many dogs can smell the rabbit.

The input is in the form

R
N
B D
B D
.
.
.
B D

For each of 10 test cases.
You must output a single number indicating the number of dogs that can smell the rabbit.
The sample below has 3 cases, actual contest data will have 10 test cases.

Sample Input:	Sample Output:
99	0
4	2
Blood Hound 62	1
German Shepherd 20	
Blood Hound 46	
Blood Hound 56	
50	
4	
Labrador Retriever 44	
Blood Hound 5	
Blood Hound 39	
German Shepherd 5	
83	
6	
German Shepherd 8	
Blood Hound 34	
German Shepherd 52	
Labrador Retriever 19	
German Shepherd 59	
German Shepherd 95	

2) Moore's Code

You have found 10 strips of paper comprised of Morse code messages. These strips of paper are not labeled and some **may be backwards.** Write a program that will decode each of the strips of paper to write the original message in English.

Morse code was used in telecommunication from the 1840s until the 1970s. Messages were sent over wires with a series of long and short pulses that are represented here as dots and dashes.

A	.-		J	.---		S	...
B	-...		K	-.-		T	-
C	-.-.		L	.-..		U	..-
D	-..		M	--		V	...-
E	.		N	-.		W	.--
F	..-.		O	---		X	-..-
G	--.		P	.--.		Y	-.--
H	....		Q	--.-		Z	--..
I	..		R	.-.			

Each of 10 test cases contains a morse code message. Each message is a single line.

Sample input:

- ....-   - . ... -

- ... . -   -.   --.- ..-. .- ---   ... . -

-.. ---   -. --- -   .- -.. .--- ..- ... -   -.-- --- ..- .-.   - ...-   ... . —

Sample Output:

this is a test

this is only a test

do not adjust your tv set

3) Freak Went See

Write a program that will read a text passage and output the frequency of the top 10 most occurring words in order from greatest to least. The test data file contains 10 paragraphs, each separated by a blank line. All punctuation has been removed for you. Watch out for capital letters!

There will be 10 cases

Sample input:

What a curious feeling said Alice I must be shutting up like a telescope

And so it was indeed she was now only ten inches high and her face brightened up at the thought that she was now the right size for going through the little door into that lovely garden First however she waited for a few minutes to see if she was going to shrink any further she felt a little nervous about this for it might end you know said Alice to herself in my going out altogether like a candle I wonder what I should be like then And she tried to fancy what the flame of a candle is like after the candle is blown out for she could not remember ever having seen such a thing

Sample Output:

2 1 1 1 1 1 1 1 1 1

7 5 5 4 4 4 3 3 3 3

The whole line must be correct to be awarded any points

-Question contributed by ChatGPT

4)In Tear Nate Show Nail Stan Dare D. Boo K. Numb R's

Valid ISBN (International Standard Book Numbers) contain a check digit to make sure that all of the digits were copied or entered correctly. (This will not catch all errors but it will catch most). To make a valid 13-digit ISBN number from a 12 digit number you take the odd positioned digits starting at the first number and multiply them by 1 and the even positioned digits are multiplied by 3. The results are all added together and the final sum is then divided by 10. The final digit is the remainder when the sum is divided by 10. It will always be a number between 0 and 9. Each test case starts with N, the number of numbers in the test case, followed by N 13 digit numbers. You are to determine how many numbers in each test case are valid ISBN numbers.

There will be 10 cases

Sample input:

6

6026021054485

2550607579668

2798259393285

7177614309823

5157077246529

3104546392278

4

8906053273452

6262673317428

2082861473691

9624501744288

Sample Output:

3

1

5) The Missing Footy (Soccer) Standings

Disaster has struck the archives department of Footy Stats International (FSI), They have lost all of the final standings from previous years. The good news is that they have all of the results, it is your job to recreate the standings from the results, printing just the top half finishers in descending order of points.

The sample data below contains all the results from a 4 team league, each team plays all the other teams twice (once at home once away) The values separated by commas are as follows:

Home Team, Away Team, Home team Goals, Away Team Goals.

Points calculation:
Win = 3 points
Tie = 1 point
Loss = 0 points

Results from the four team league:

Fredville,Roseville,1,2
Alanville,Janeville,2,1
Fredville,Alanville,3,3
Roseville,Janeville,2,3
Fredville,Janeville,0,0
Roseville,Alanville,3,2
Roseville,Fredville,1,0
Janeville,Alanville,2,1
Alanville,Fredville,3,0
Janeville,Roseville,2,3
Janeville,Fredville,0,0
Alanville,Roseville,3,4

Output:
Roseville 15
Janeville 8

For the contest data the results will be from a 20 team team league, no teams will be tied on points. Output required is the top 10 teams in descending order of points.

-Question contributed by Mic Saunders