

# Contest Problems

## High School Coding Contest

Saturday, April 4/2020, @9:00-11:00 AM *Send problems:* [mmalita@anselm.edu](mailto:mmalita@anselm.edu)  
I code therefore I am!

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### Problem 1. Consecutive numbers

Ask for a positive integer  $n$ , then print all the possible sequences of consecutive integers that add up to  $n$  (if there are any).

*Example 1.*

Enter n? 5  
2 + 3  
Solutions = 1

*Example 2.*

Enter n ? 15  
1 + 2 + 3 + 4 + 5  
4 + 5 + 6  
7 + 8  
Solutions = 3

*Example 3.*

Enter n? 4  
Solutions = 0

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### Problem 2. Best players

You have  $n$  players (ask for  $n$ ) and for each you ask for the player's first name and the number of points (integers  $\geq 0$ ). Then sort the players by name and then by points. After each group (player, points) you display comma (follow format from the example).

The player name should always be capitalized, if input is wrong the program asks again.

*Example 1.*

How many players? 3  
1 Enter player and points? ann 7  
2 Enter player and points? +dan 8  
2 Enter player and points? Dan 8  
3 Enter player and points? ben 5  
**Total: 20**  
**Sorted by name: Ann 7, Ben 5, Dan 8**  
**Sorted by points: Dan 8, Ann 7, Ben 5**

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### Problem 3. Sum of numbers in a sentence

The program asks you to input a sentence, then finds all the positive integers in the sentence and displays them together with their sum.

*Example 1.*

Enter sentence? Amounts are 200, 500 and 15 EUR.  
200 500 15  
715

*Example 2.*

Enter sentence? There were 14 juniors, 3 seniors and 0 freshmen.  
14 3  
17

*Example 3.*

Enter sentence? How much is 2+30+6?  
2 30 6  
38

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**Problem 4. Squeeze list**

You enter a list of integers (until you type 0), then group them by clusters of consecutive numbers as presented in the examples. Print the sequence sorted without repetitions, ignore the ending 0. Instead of a group of consecutive integers just print the interval where the sequence starts and ends.

If the number is isolated (that is the previous and next is missing) then the number will be reported once.

*Example 1.*

Input? 3 4 1 2 8 9 9 0  
Sorted: 1 2 3 4 8 9  
1-4  
8-9

*Example 2.*

Input? 3 5 1 2 9 8 0  
Sorted: 1 2 3 5 8 9  
1-3  
5  
8-9

*Example 3.*

Input? 13 2 14 3 15 107 0  
Sorted: 2 3 13 14 15 107  
2-3  
13-15  
107

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**Problem 5. Find tables**

Find all squared smaller tables from a given table. The program generates a random table (matrix) size  $n \times m$  filled with digits (0-9) and asks you to print all the matrices  $k \times k < \min(n,m)$  that can be found inside your table selecting rows and columns that are close to each other.

*Example 1.*

Enter size matrix (n x m)? 3 3  
Enter size smaller matrix (k x k)? 2  
2 8 3

2 6 4  
0 6 6

2 8  
2 6

8 3  
6 4

2 6  
0 6

6 4  
6 6

Solutions= 4

*Example 2.*

Enter size matrix(n x m)? 3 4

Enter size smaller matrix(k x k)? 4

Solutions= 0