High School Coding Contest Saint Anselm College
Saturday, April 29, 2017 @9:00-11:00 AM
Contest Problems *I code therefore I am!*

General: we do not test for invalid input.

Problem 1. Time worked

Write a program that computes the total time needed to finish all n problems at a coding contest. The program will ask for the number of problems n, and the corresponding time needed to solve each problem. Times should be input in the format HH:MM where H, M are digits (0-9). The program will display the resulting time in 2 formats: in minutes (ex: 127 min) and hour and minutes (ex: 2 h 7 min). The answer 2 h 67 min is not acceptable, it should be 3 h 7 min. Also the answer 3 h 0 min is not acceptable, it should be just 3 h.

Example1. Input: Enter n? 3
Enter hours worked? 01:23 00:34 00:07
Output: 124 min = 2 h 4 min

Example2. Input: Enter n? 4
Enter hours worked? 01:03 00:34 00:07 02:00
Output: 224 min = 3 h 44 min

Example3. Input: Enter n? 3
Enter hours worked? 00:00 01:11 02:22
Output: 213 min = 3 h 33 min

Problem 2. Duck Duck Goose problem

There are N of children sitting in a circle. You go around the circle and eliminate the Kth child until all children have been removed. Write a program that simulates the elimination process. The user should be prompted to enter values for N and K. The output should list the children in the order in which they are removed. You assume the initial order of children is 1 2 .. N

Example1. INPUT: Enter number of children, N? 5
Enter K? 3
OUTPUT: 3 1 5 2 4

Example2. INPUT: Enter number of children, N? 7
Enter K? 3
OUTPUT: **3 6 2 7 5 1 4**

Problem 3. The Word Vortex

Write a program that accepts a word of length **N** (1 <= N <= 30) and draws concentric squares as borders in the following manner: for each character a border is made, from outside to inside and filled with the corresponding letter.

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Example1.   INPUT: Enter string?  JOE
            OUTPUT:     JJJJJ
                        JOOOJ
                        JOEOJ
                        JOOOJ
                        JJJJJ
Example2.   INPUT: Enter word? MARK
            OUTPUT: MMMMMMM
                    MAAAAAM
                    MARRRAM
                    MARKRAM
                    MARRRAM
                    MAAAAAM
                    MMMMMMM
```

Problem 4. People in a Boat

There are N people on the shore (from 1,.. N) and you have a boat with a capacity to transport K people. List all possible ways you can load the boat. The order in which you list the people taking the boat does not matter.

```
Example1:
Enter N and K? 4 2
Output:   1 2    1 3    1 4    2 3    2 4    3 4

Example2:
Enter N and K? 5 3
Output:  1 2 3    1 2 4    1 2 5    1 3 4    1 3 5    1 4 5    2 3 4   2 3 5
2 4 5   3 4 5
```

Problem 5. Prime all over

Print the **greatest** prime numbers with 1 digit, 2 digits, up to 7 digits that have this property: as you read the number from left to right, wherever you stop, the number should be prime. (Program should run in less than 40 secs)

Example: ABCD should have this property:

A is prime
AB is prime
ABC is prime
ABCD is prime

ABCD should be the greatest number on 4 digits with this property

OUTPUT: seven integers on one line