# CS430
# Problem Set #1

Date assigned: Friday, September 7, 2012
Date due: Wednesday, September 12, 2012
Points: 50

1) (5 pts) Work problem 2.4 on p. 61

2) (15 pts) Using the IAS instruction set, write an assembly language program that adds consecutive natural numbers up to a value specified at location 0 in memory. Place the result at location 1 in memory. Any hard-coded constants are to be placed starting at location 2 and identified as to their use. The IAS program is to begin at location 5 in memory.

a) First, write the program using the equation $Y = \frac{N(N+1)}{2}$
b) Second, write the program without using the formula from a). Instead use a loop.

Each solution is to be in a table as follows:

| Location | Instruction / Value | Comments |
|---|---|---|
| 0 | | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5L | | |
| 5R | | |
| and so on | | |

3) (6 pts) Simplify each of the following Boolean expressions using the postulates and theorems we discussed in class. You do not need to identify the postulate or theorem being applied but only apply one postulate or theorem at a time as you simplify each expression.

(a) (BE + C + F)C
(b) AB' + B + AC

4) (24 pts) Using the software Logisim v2.7.1 found in the CS430 Public folder you are to design a combinational circuit that takes two inputs and displays the output on a seven-segment LED. The idea is shown in your book on pp. 402-403 (problem 11.8). Your LED will display only the values 0, 1, 2, and 3 as there are

only two inputs to the circuit, thus, 00 displays 0, 01 displays 1, and so on.

a) You are to design a minimal circuit for the problem just specified. This circuit is to use only AND, OR, and NOT gates as well as two inputs and a 7-segment display.

b) Using Logism, you are to implement the circuit described. Your circuit is to have two interactive inputs and a 7-segment display as output. The two inputs are to be labeled X and Y. Paste a copy of your circuit solution into your Word solution and drop the circuit as your last name in the CS430 Drop folder on Turing.

Note1: Please make sure your problem sets are typed, answered in order, and stapled together.

Note2: A hard copy of your Problem Set Solution is due on the instructor's desk by 11:45am on the day the assignment is due. Also, place a copy of this solution (01lastname.doc) and your circuit (01lastnameCircuit.circ) into a folder 01lastname. Then place the folder 01lastname in the CS430 Drop Box by 11:45am on the day in which the assignment is due.

Note3: I don't mind you talking about particular problems at a very high level (not a specific solution level) and even lending resources of where more information can be found. Further, all of your solutions are to be original and in your own words. If you have any questions, let me know.