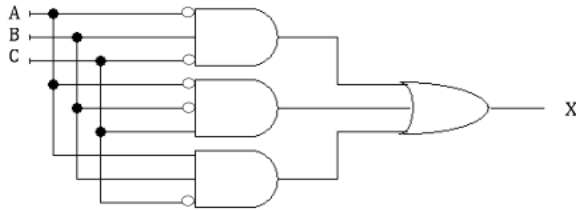# CS 2420 Lab 5

Topics: SOP/POS equations and K-maps

Pre Lab: Try and do as much of this lab as you can excluding the building parts.

Warning: DO NOT GIVE THE CHIPS A VOLTAGE HIGHER THAN +5V

T1. SOP/POS

A	B	C	X
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Based on the design above, fill in the truth table on the right of what the output is supposed to be.

SOP Equation

Using the truth table you have created find the Sum of Products (SOP) equation for this design.

SOP equation: _____

POS Equation

Using the truth table you have created find the Product of Sums (POS) equation for this design.

POS equation: _____

K-maps
Build two K-maps and find the minimum equation for each the SOP and POS equation.
Show your groupings

Min. SOP equation: _____

Min. POS equation: _____

Build it

On the Elvis board build the minimum SOP or POS equation you think will need less equipment in order to implement. Use DIO 0-2 for inputs and run your output to an LED to easily see the output. Show your instructor your working circuit to get credit for this section.

T2. K-Maps
   a) Without using a truth table, fill in the K-maps below in order to reduce into their minimum sum-of-products (SOP) form. Be sure to note the orientation of the inputs. This will play a key role in how the terms are ordered. Take note of the type of equation that is being presented and think of what is grouped to make such an equation.
   DO NOT BUILD A TRUTH TABLE AND THEN FILL IN THE K-MAPS

$F_1(A,B,C) = (A' + C')(A' + B')(B' + C)$

AB / C

Minimum Function: _____

BC / A

Minimum Function: _____

$F_2(A,B,C) = A'B'C' + AC + AB + BC'$

AB / C

Minimum Function: _____

BC / A

Minimum Function: _____

$F_3(A,B,C) = \sum m(0,1,2,3,5,7)$

AB / C

Minimum Function: _____

BC / A

Minimum Function: _____

b) Looking at your K-maps and equations decide if it would be better to build three separate circuits for each equation or would it be better to combine functions to make one circuit with three outputs. Based on your decision build your circuit(s) in DSCH. Take a screen shot for your report.

c) Based on your decision to build three different circuits or one with three outputs above, justify your decision below and state whether or not you think it was still the correct decision and why. Be specific.