Pre-Lab Worksheet #3 NAME: ______LillAnne__________ LAB Section: B0__

2. Truth table:

A	B	C	D	Decimal	Divisible by 4?	X
0	0	0	0	0	Yes	0
0	0	0	1	1	No	0
0	0	1	0	2	No	0
0	0	1	1	3	No	1
0	1	0	0	4	Yes	1
0	1	0	1	5	No	1
0	1	1	0	6	No	1
0	1	1	1	7	No	0
1	0	0	0	8	Yes	1
1	0	0	1	9	No	1
1	0	1	0	10	No	1
1	0	1	1	11	No	0
1	1	0	0	12	Yes	0
1	1	0	1	13	No	0
1	1	1	0	14	No	0
1	1	1	1	15	No	1

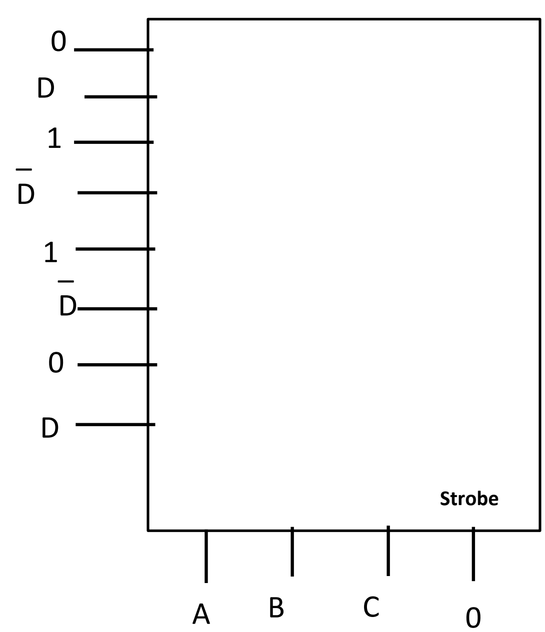
3. Karnaugh Map:

AB\CD	00	01	11	10
00	0	0	1	0
01	1	1	0	1
11	0	0	1	0
10	1	1	0	1

X= C’A’ + D’B’ + CA + DB

7. Your Circuit:

8-1 Multiplexer



Strobe is connected to: 0 or ground.

9. Truth Table:

X	Y	Cin	Cout	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

10.

Cout:

X\YCin	00	01	11	10
0	0	0	1	0
11	0	1	1	1

Cout = Y Cin + X Cin + X Y SOP

Cout = (X + Y)(Cin + Y) (Cin + X) POS

S:

X\YCin	00	01	11	10
0	0	1	0	1
1	1	0	1	0

S = X Y’ Cin’ + X’ Y’ Cin + X Y Cin + X’ Y Cin’ SOP

S= (X + Y + Cin) (X + Y’ + Cin’) (X’ + Y’ + Cin) (X’ + Y + Cin’) POS

11. Your DesignWorks Circuit:

<u>Approach 1:</u> Starting with the POS forms, apply the distributive law to reduce the large gates to 2-inputs:

S= (X + Y + Cin) (X + Y’ + Cin’) (X’ + Y’ + Cin) (X’ + Y + Cin’) = [Cin + (X + Y)(X’ + Y’))] [Cin’+ (X + Y’) (X’ + Y)]

Cout = (X + Y)(Cin + Y) (Cin + X) = (X + Y)(Cin + XY)

Then build the circuit with OR gates behind AND gates and convert them directly to NOR gates. In 2 cases, the gates used for the Sum can be re-used in the creation of Cout.