

ECE 130 HW#6 – Due Thursday, March 25

1. Consider the following truth table where the four-bit number A (A3, A2, A1, A0) is input and X is output:

A3	A2	A1	A0	X
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

a. Convert the truth table into a K-Map.

b. Use the K-Map to develop a *minimized sum-of-products* equation for the output X.

c. Use the K-Map to develop a *minimized product-of-sums* equation for the output X.

d. State the number of inputs used for each of the two equations. Based on these numbers, which equation is more efficient? Why?

e. Implement the more efficient equation using either NAND-NAND or NOR-NOR two level logic. Draw your circuit below. You can use the complemented and uncomplemented forms of all of the variables.