

Lab: Boolean Logic

Due Sep 6 by 11:59pm **Points** 1

Please solve the following problems in teams of 2 - 3.

For the first three problems, do the following:

- Write the full SOP expression for the given truth table.
- Use a K-map to simplify it.

1.

A	B	C	out
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0

1	1	1	1
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2.

A	B	C	D	out
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
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	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0

1	1	1	1	1
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3.

A	B	C	D	out
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1

4. For this problem, you will have to construct the truth table and complete the two steps required in the first three problems (writing the SOP expression and simplifying it with a K-map).

Construct a truth table with four input variables - A, B, C, and D. Pretend that A and B together represent a two-digit binary number, and C and D together represent a two-digit binary number. The output should be 1 if and only if the first two-digit binary number is strictly greater than the second two-digit binary number.

For example, if A is 1, B is 0, C is 0, and D is 1, that means that A and B together form the number 10, and C and D together form the number 01. Since 10 is greater than 01, the output in this case should be 1.