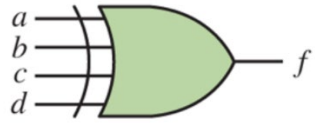
# CDA 3103 Computer Organization Homework

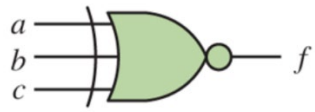
## Section I: Problems

1. (10 points) Construct true tables for the following XOR and XNOR gates.

(a)




(b)




2. (10 Points) Write the Boolean expression in Canonical sum-of-products and Canonical product-of-sum forms for the following truth table.

| *x* | *y* | *z* | *F* |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

3. (10 points) Use Boolean Identities to simplify the Canonical sum-of-product Boolean function obtained in problem 2.

4. (10 Points) Write the Boolean expression in Canonical sum-of-products and Canonical product-of-sum forms for the following truth table.

| *w* | *x* | *y* | *z* | *F* |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |

| | | | | |
|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |

5. (10 points) Use Boolean Identities to simplify the Canonical sum-of-product Boolean function obtained in problem 4.

6. (10 points) find CSOP and CPOS forms for the following functions:

   a) $F(a,b,c) = ab + a'c$

   b) $F(A,B,C,D) = A(B' + CD') + A'BC'D$

7. (40 Points) Use Boolean Identities to simplify the following Boolean functions:

   a) $xyz' + xy'z' + x'yz + x'y'z' + xyz$

   b) $wxy'z + wxyz' + wxy'z' + wx'yz + wx'y'z + wx'y'z' + w'xy'z + w'x'yz + w'x'yz'$

   c) $w'x'y' + w'xz + wxz + wx'y'z'$

   d) $(X + Y + Z + W')(V + X)(V' + Y + Z + W')$

## Section II: Submission Requirements

The following requirements are for electronic submission via Canvas.

- Your solutions must be in a single file with a file name yourname-module3-assignment-1.
- Upload the file by following the link where you download the homework description on Canvas.
- If scanned from hand-written copies, then the writing must be legible, or loss of credits may occur.
- Only submissions via the link on Canvas where this description is downloaded are graded. Submissions to any other locations on Canvas will be ignored.