ENG-2410 Assignment #3

School of Engineering, University of Guelph
Fall 2025

Start Date: Week #3, Due Date: Week #4 (Friday, 5:00 PM) in Dropbox

Answer all questions and show all your steps.

1. **Find** the complement of the following expressions using DeMorgan's Theorem (Show your steps!):
   (a) F = $\bar{A}\bar{B} + \bar{A}B$
   (b) F = $(\bar{V}W + \bar{X})Y + \bar{Z}$
2. **Simplify** the following Boolean expression to a minimum number of literals using identities (Show all your steps!):
   (a) $ABC + \bar{A}BC$
   (b) $\overline{(A+B)}(\bar{A}+\bar{B})$
   (c) $\bar{A}BC + AC$
3. **Simplify** the following Boolean Functions using a map:
   (a) $F(W,X,Y,Z) = \sum m(0,2,8,9,10,11,12,13)$
   (b) $F(A,B,C,D) = \sum m(4,6,7,12,13,14,15)$
4. **Find the minterms** of the following expressions by first plotting each expression on a map and then **further simplifying** it:
   (a) F(X,Y,Z) = $X\bar{Y} + XZ + \bar{X}YZ$
   (b) F(W,X,Y,Z) = $XZ + \bar{W}X\bar{Y} + WXY + W\bar{Y}Z$
   (c) F(A,B,C,D) = $\bar{B}\bar{D} + ABC + \bar{A}BC$
5. **Find all the prime implicants** for the following Boolean functions, and determine which are essential:
   (a) $F(W,X,Y,Z) = \sum m(0,2,5,7,8,10,12,13,14,15)$
   (b) $F(A,B,C,D) = \sum m(0,2,3,5,7,8,10,11,14,15)$
   (c) $F(A,B,C,D) = \sum m(1,3,4,5,9,10,11,12,13,14,15)$

Deliverable

- **Name your file** as follows: ENG2410_F25_Assignment3_LastNameFirstName.pdf
- **Write** your name, the course # and Term # on the first page of your submission (i.e solution).
- **Submit** a single PDF file of your solutions.
- **Upload** your PDF file in the Course Link dropbox.
- **Late** submissions are not accepted.
- Your solution of the assignment will **not be accepted** via email.
- To **receive 100% of the mark** you should attempt all questions.
- Solutions to the assignment will be posted at 5:30 PM on Fridays.
- If you have any questions related to the assignment, please **contact your Teaching Assistant** responsible for your Tutorial Section.
- Failing to follow the instructions above will lead to a ZERO grade!!