

# CSE260

## Assignment 02

*This assignment must be hand-written. Show ALL steps in ALL questions*

- Perform the following Division operations. You must show every calculation including the multiplication operations necessary in between,
  - $(43A6BE)_{16} / (24C)_{16}$
  - $(1011011101)_2 / (110)_2$
  - $(63A219)_{12} / (189)_{12}$
- Simplify the following Boolean equation using the laws of boolean algebra and draw the simplified equation using basic logic gates:
  - $F(A, B, C, D) = \overline{(\overline{A}B + \overline{B}C)} + \overline{(D + \overline{B}C)}$
  - $F(x, y, z) = \prod(0, 2, 5, 7)$
  - $F(a, b, c) = \sum(0, 1, 2, 4, 5, 6, 7)$
- Draw the following functions using **1. NAND** gates only; **2. NOR** gates only (do not simplify the equation). You may want to draw horizontally on your script.
  - $F(x, y, z) = x'y + z'$
  - $F(a, b, c, d) = b'c + a'd + (a+c')b'$
- Convert the following equation to its canonical POS form using boolean algebra and find out the maxterms. [You cannot find SOP first and then convert it to POS]
  - $F(a, b, c, d) = bd + b'c(a+c') + a'c$
  - $F(w, x, y, z) = x'y + y(z+x'z)$
- Find the complement of the following expression using both De Morgan's Theorem and without using the theorem:
  - $a'b + a'b'$
  - $(ad' + c')(a' + b)(b + c')a'd'$
- Find out canonical SOP, minterms, canonical POS and maxterm for the following expressions:
  - $F(X, Y, Z) = XY' + YZ'$
  - $F(P, Q, R, S) = Q + R'S' + Q'S$
- [Ungraded]** Simplify the following boolean expressions using K-map:
  - $F(X, Y, Z) = X'Y'Z + XY'Z + X'YZ' + XY'Z' + XYZ$
  - $F(A, B, C) = \sum(1, 2, 5, 7) + d(0, 4, 6)$
  - $F(X, Y, Z) = \sum(0, 1, 6, 7) + d(3, 5)$
  - $F(A, B, C, D) = \sum(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$
  - $F(w, x, y, z) = \sum(1, 3, 4, 6, 8, 9, 11, 13, 15) + d(0, 2, 14)$
- [Ungraded]** You have finished your CSE260 Midterm and you are calculating your final grade in advance to estimate whether the level of effort you are giving is good enough to do well in this course. The only possible grades are Pass and Fail. You will definitely pass the course if you do well in the Final. However, if you do bad in finals, you can only pass if you have done well in mid and have good quiz marks. For any other case, you will fail.  
**Consider, Q** for Quiz, **M** for Mid and **F** for Final Marks.
  - Devise a truth table** from the above scenario.

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- (b) Build a K-map from the truth table
- (c) Implement the circuit using any gate.

Ungraded extra practice - You do not need to submit this part

Book: [Digital Logic and Computer Design by M. Morris Mano](#)

PDF Page 79, Book Page 69

Problems 2.2, 2.3, 2.4, 2.5, 2.6, 2.9, 2.11, 2.12, 2.16