



CMPE 212, Digital Systems Design

Assignment #2

Due: Wed 2/24/16 in the class

Question 1:

(10 Points)

Expand the following function into canonical SOP form.

$$f(A, B, C, D) = \bar{A}B + BD + AC + \bar{B}\bar{C}$$

Question 2:

(10 Points)

Expand the following function into canonical POS form.

$$f(x, y, z) = (\bar{x} + \bar{y} + z)(y + \bar{z})(x + y)(z + \bar{x})$$

Question 3:

(10 Points)

Find the truth table for the following switching function.

$$f(a, b, c) = \bar{c}(\bar{b} + a)(a + \bar{c})(b + c)$$

Question 4:

(20 Points)

Find the simplest switching expression for the following functions.

a. $f_a(a, b, c, d) = \prod M(1, 2, 6, 7, 11, 12, 14, 15)$

b. $f_b(a, b, c, d) = \sum m(0, 4, 6, 7, 9, 10, 12, 13, 14)$

Question 5:

(30 Points)

Using switching algebra, simplify the following expressions:

a. $f(x, y, z) = (y + \bar{x})(xy + z) + xy\bar{x} + \bar{x}\bar{y}z + (x + y)(\bar{x} + z)$

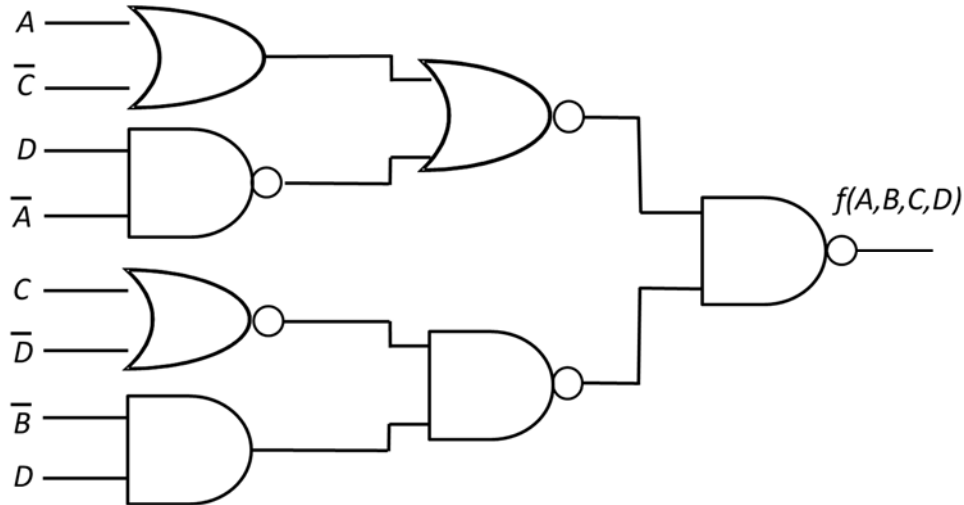
b. $f(W, X, Q) = (Q + \bar{W})(X + \bar{Q})(W + X + Q)(\bar{W} + \bar{X})$

c. $f(A, B, C) = \overline{(\bar{A} + \bar{B})(A + \bar{A}B)(\bar{A} + \bar{B} + \bar{A}\bar{B}C) + (A + B)(\bar{A} + C)}$

Question 6:

(10 Points)

Find the minimum equivalent circuit for the one shown in the following figure.

**Question 7:**

(10 Points)

Giving the timing diagram in the following figure, find the simplest switching expression for $Y = f_1(A, B, C)$ and $Z = f_2(A, B, C)$

