Marcus Domingo
ECE-301-002 HW 5

5.1: (a) $(0111011110)_2 = (478)_{10}$

(b) $(1011100111)_2 = (743)_{10}$

(c) $(3751)_8 = (2025)_{10}$

(d) $(A25F)_{16} = (41567)_{10}$

(e) $(F0F0)_{16} = (61680)_{10}$

5.2: (a) $0111011110 = (478)_{10}$

(b) $1011100111 = (-280)_{10}$

(c) $1111111110 = (-1)_{10}$

5.3: (a) $0111011110 = (478)_{10}$

(b) $1011100111 = (-281)_{10}$

(c) $1111111110 = (-2)_{10}$

5.4: $73 =$

(a) $Singed\ Magnitude = 000001001001$

(b) $1's\ Complement = 000001001001$

(c) $2's\ Complement = 000001001001$

$1906 =$

(a) $Signed\ Magnitude = 011101110010$

(b) $1's\ Complement = 011101110010$

(c) $2's\ Complement = 011101110010$

$-95 =$

(a) $Signed\ Magnitude = 100001011111$

(b) $1's\ Complement = 111110100000$

(c) $2's\ Complement = 111110100001$

$-1630 =$

(a) $Signed\ Magnitude = 111001011110$

(b) $1's\ Complement = 100110100001$

(c) $2's\ Complement = 100110100010$

5.5: $00110110 + 01000101 = 01111011$

$54 + 69 = 123$

$01110101 + 11011110 = [1]01010011$ Overflow Occurs

$117 + (-34) = 83$

$11011111 + 10111000 = [1]10010111$ Overflow Occurs

$(-33) + (-72) = (-105)$

$00110110 - 00101011 = 00001011$

$54 - 43 = 10$

$01110101 - 11010110 = [0]10011111$ Overflow Occurs

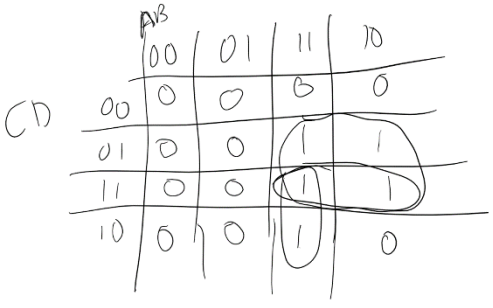
$117 - (-42) = 159$

$11010011 - 11101100 = [1]11100111$ Overflow Occurs

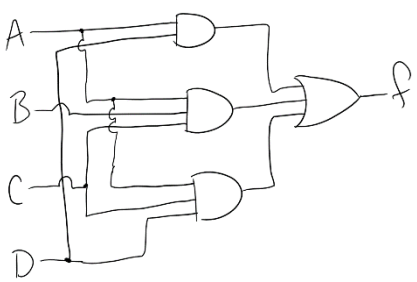
$(-45) - (-20) = (-25)$

2.: (a) There are no Static-1 hazards because all of the adjacent 1's in the K-Map are covered.

(b) No product terms have to be added.



(c)



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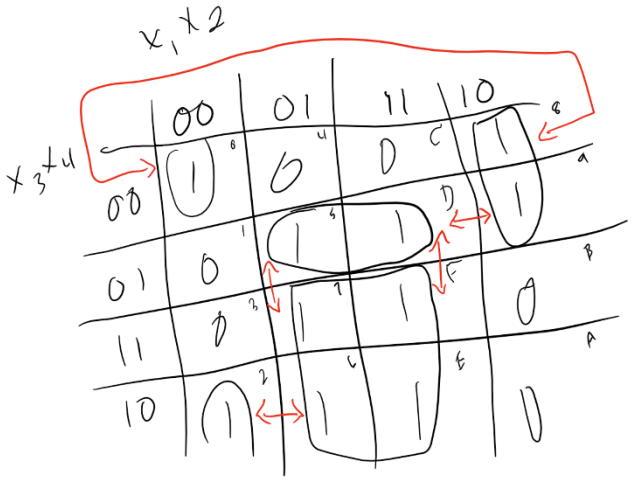
3.: (a) $H(x1, x2, x3, x4) = \prod M(1,3,4,A,B,C) = \sum m(0,2,5,6,7,8,9,D,E,F)$

(b) $= x1'x2'x4' + x2x3 + x2x3'x4 + x1x2'x3'$

(c)



(d) $Hazard\ free = x1'x2'x4' + x2x3 + x2x3'x4 + x1x2'x3' + x2'x3'x4' + x1x3'x4 + x2x4 + x1'x3x4'$

4.:

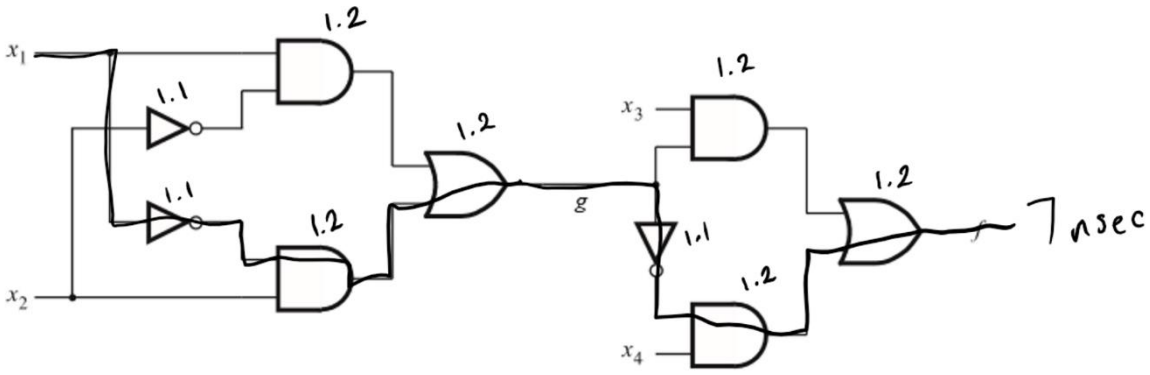
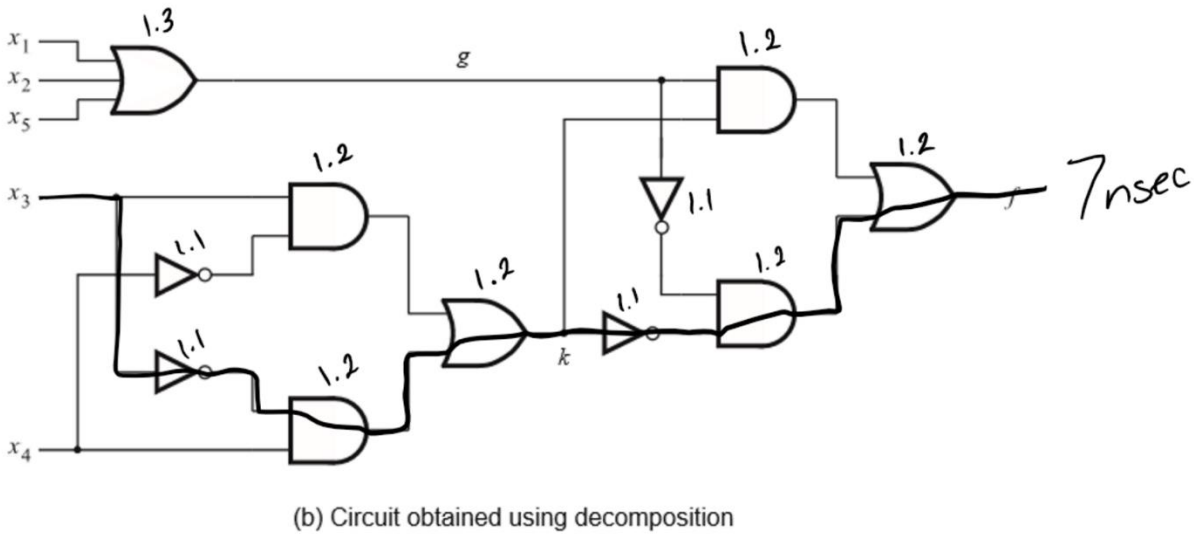


Figure 4.23 Logic circuit for Example 4.6.

$Critical\ path\ delay = 1.1nsec + 1.2nsec + 1.2nsec + 1.1nsec + 1.2nsec + 1.2nsec$

$Critical\ path\ delay = 7nsec$

5.:



(b) Circuit obtained using decomposition

Figure 4.25 Decomposition for Example 4.7.

$$Critical\ path\ delay = 1.1nsec + 1.2nsec + 1.2nsec + 1.1nsec + 1.2nsec + 1.2nsec$$

$$Critical\ path\ delay = 7nsec$$