Assigment 3 التاريخ ١٤ / ١ / ١

## 3.1

A) $\Rightarrow f(x,y,z) = \Sigma(0,2,4,5)$

| x \ yz | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | 1 | | | 1 |
| 1 | 1 | 1 | | |

$F = y'z' + xy' + x'z$

B) $f(x,y,z) = \Sigma(0,2,4,5,6)$

| x \ yz | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | 1 | . | 1 | 1 |
| 1 | 1 | | | 1 |

$F = x'y + z'$

C) $f(x,y,z) = \Sigma(0,1,2,3,5)$

$\Rightarrow f = x'y + xy'$

D) $f(x,y,z) = \Sigma(1,2,3,5,6,7)$

$\Rightarrow F = x'y + z$

| x \ yz | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 0 | | 1 | 1 | 1 |
| 1 | | 1 | 1 | 1 |

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3.2

A) $f(x,y,z) = \Sigma(2,3,6,7)$

| xy \ z | 0 | 1 |
|---|---|---|
| 00 | | |
| 01 | 1 | 1 |
| 10 | | |
| 11 | 1 | 1 |

$F = xyz$

B) $f(A,B,C,D) = \Sigma(3,7,11,13,14,15)$

$F = ABC + ABC + CD$

C) $f(w,x,y,z) = \Sigma(11,12,13,14,15)$

$F = wx + zxy$

D) $f(w,x,y,z) = \Sigma(8,10,12,13,14)$

$F = wx + zy.$

3.3 (A) $F(W,X,Y,Z) = \Sigma(1,4,5,6,12,14,15)$

| xy \ y | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | | 1 | | |
| 01 | 1 | 1 | | 1 |
| 11 | 1 | | 1 | 1 |
| 10 | | | | |

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B) $f(A,B,C,D) = \Sigma(2,3,6,7,12,13,14)$

$F = ACD + A'C' + A'B'C' + ABC$

C) $f(W,X,Y,Z) = \Sigma(1,3,4,5,6,7,9,11,13,15)$

$F = WX + X'Y$

D) $F(A,B,C,D) = \Sigma(0,2,4,5,8,10,13,15)$

$F = BD + B'D + AB'$

3.4 A) $\bar{A}\bar{B}\bar{C}\bar{D} + AC'D' + B'CD' + A'BCD + BC'D$

$F = B'D' + A'BD + ABC'$

B) $X'Z + W'XY' + W(X'Y + XY')$

$F = XY' + X'Z + WX'Y$

C) $\bar{A}\bar{B}CD + AB'C + A'B'C' + ABCD + AB'C$

$F = AB + CD(A' + B')$

D) $A'B'C'D' + BC'D + A'CD' + A'BCD + ACD'$

$F = A'B'C + AB'C + AB'C'$

$F = A'B'C$

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3.5 A) $WYZ + W'X' + WXZ$

$F(W,X,Y,Z) = \Sigma m(0,1,2,3,11,13,14,15)$

B) $A'B + A'CD + B'CD + BC'D'$

$F(A,B,C,D) = \Sigma m(3,4,5,6,7,11,13)$

3.6) $F(W,X,Y,Z) = \Sigma(0,1,2,5,8,10,13)$

$= \Pi(3,4,6,7,9,12,14,15)$

The simplest form

$F = YZ + WX'Z' + XZ'$

$F = (YZ + WX'Z + XZ')'$

$= YZ \cdot WXZ \cdot XZ'$

$F = (Y'+Z')(W'+X+Z)(X'+Z)$

3.7 ⓐ $X'Z' + Y'Z' + YZ' + Y$

SOP

$F = Z' + XY \rightarrow$ POS $F = XZ' + Y'Z$

$F = (X+Z)(Y'+Z')$

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3.7

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b) $A\bar{C}D + \bar{C}D + A\bar{B} + AB\bar{C}D$

SoP ( $F = A\bar{B} + \bar{C}D + A\bar{C}$

PoS )

$F = A'D' + A'C + BC'D'$

$F = (A+D)(A+C')(B'+C+D)$

c) $(A'+B+D')(A'+B'+C)(B'+C+D')$

SoP → $F = C'D' + A'D' + A'BC'$

$F = (C+D)(A+D)(A+B+C)$

PoS

$(D + A'D + AD + AC$

d) $B\bar{C}D + AB\bar{C} + ACD$

SoP →

$F = AD + AB\bar{C} + BCD$

PoS

$\bar{F} = A'C' + A'B' + CD' + B'D'$

$F = (A+C)(A+B)(B'+D)(C+D)$

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3.8)

A) $F(x,y,z) = \Sigma(0,1,4,5,6)$ $\Sigma=(7,3,x$

$= \Sigma(0,1,2,3,4,5,6,7)$

B) $F = B'D' + CD' + AB(C')$ $\Sigma(0,6,8,13,14)$ $\Sigma(2,4,10)$

$= \Sigma(0,2,6,8,10,13,14)$

(C)

$F(A,B,C,D)\ \Sigma(5,6,7,12,14,11$

$\Sigma(3,9,11,15)$

| AB \ CD | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | | | X |
| 01 | X | | | 1 |
| 11 | | 1 | | 1 |
| 10 | 1 | | | X |

$F = AC + B\bar{C}D + C$

$= \Sigma(3,5,6,7,12,14)$

(d) $F = \bar{C}'D' + B\bar{C}' + A'BC$

$= \Sigma(0,4,12,7,8,10)$

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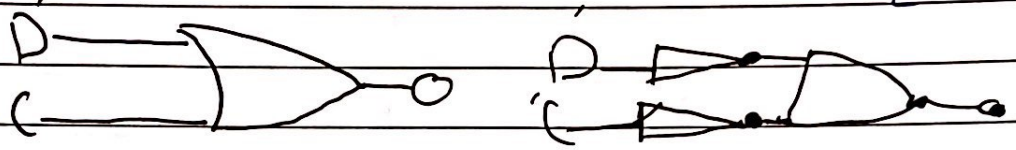
3.9

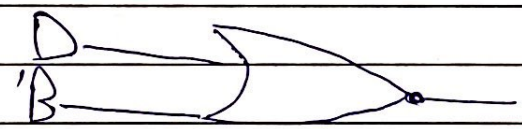
$F(A,B,C,D) = AC\acute{D} + \acute{A}C + AB\acute{C} + A\acute{B} + \acute{A}\acute{C}\acute{D}$

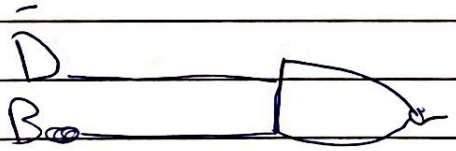
(A) $F = \acute{D} + C = (D\acute{C})'$




(B) $F(A,B,C,D) = A\bar{B}\acute{C}D + CD + A\acute{C}D$

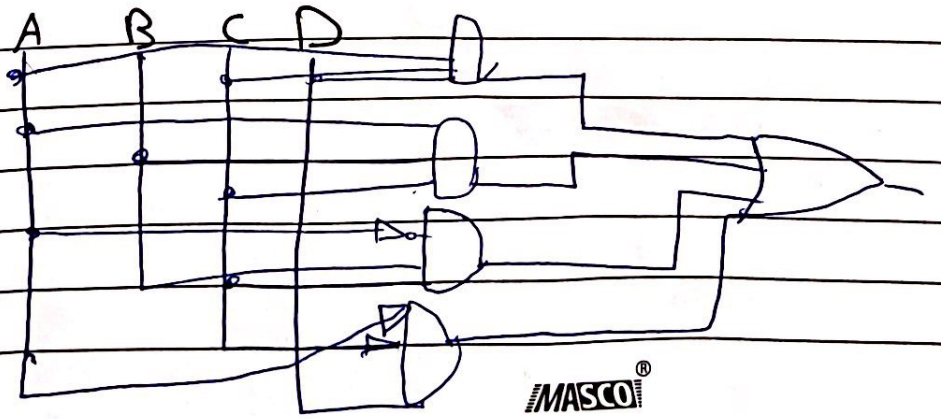
$F = D\bar{C} + \bar{B} = (\acute{D}B)'$




3.10 $F(A,B,C,D) = \Sigma(0,1,2,3,6,10,11)$

$F = \acute{A}\acute{C}\acute{D} + \acute{A}B\acute{C} + A\acute{B}\acute{C} + AC\acute{D}$

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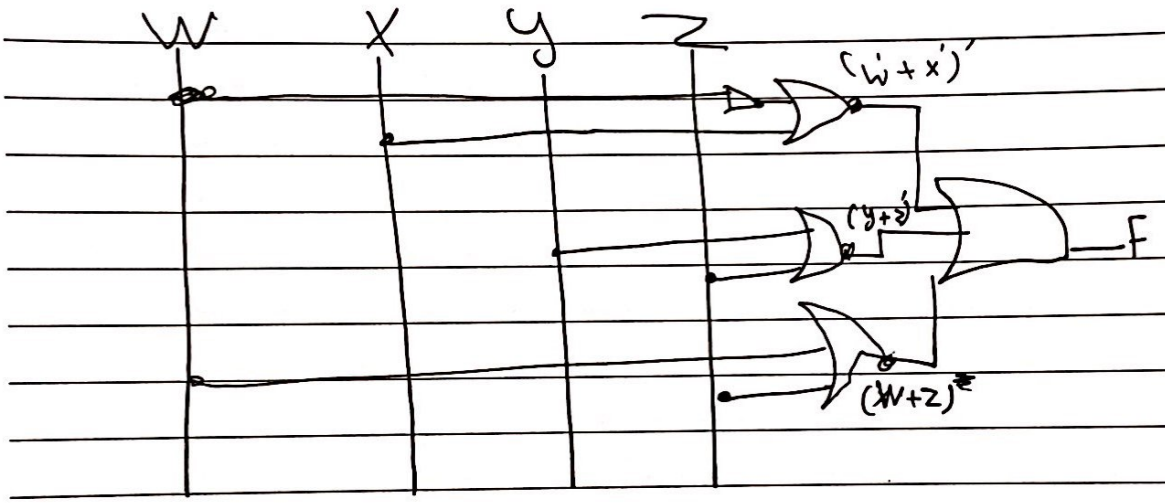
3.11

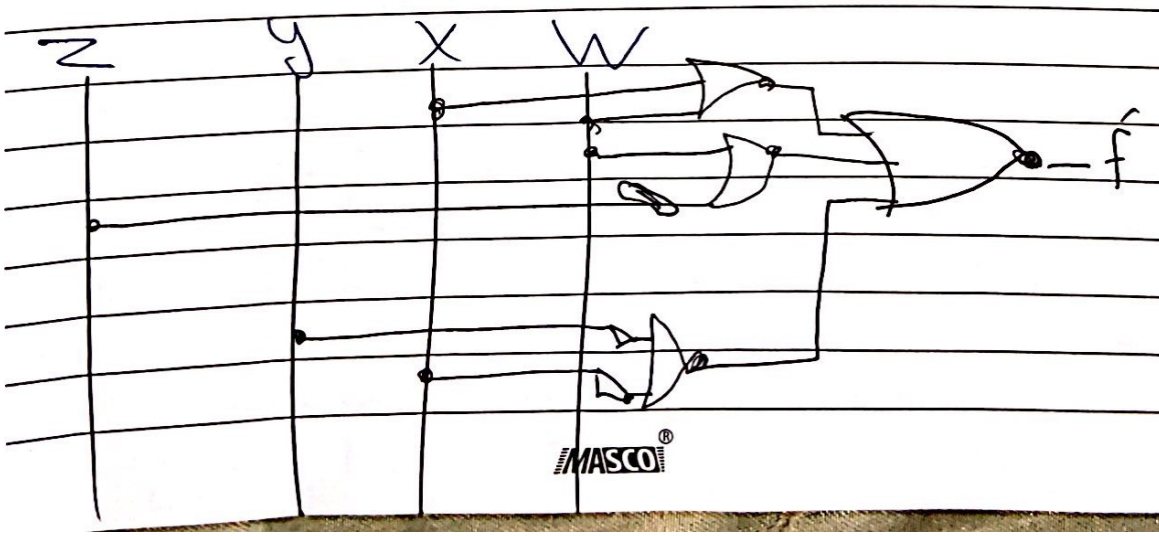
(A) $F = wx' + y'z' + w'yz'$




(B) $F(w,x,y,z) = \Sigma(0,3,12,15)$

$F = w'x' + wz + xy$

$f' = ((w+x) + (w+z')' + (x'+y')')'$

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