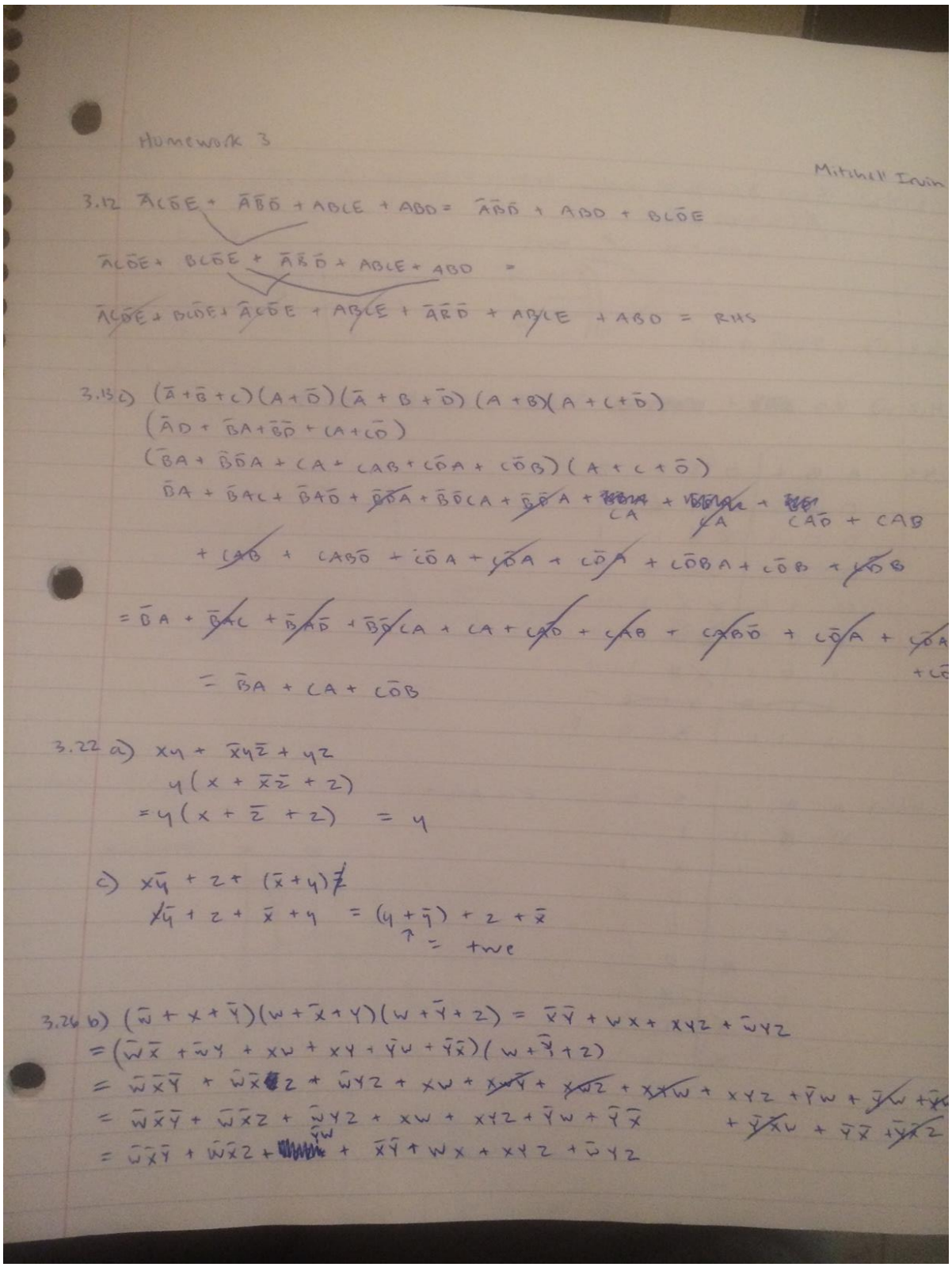


Homework 3

Mitchell Irvin

3.12 $\bar{A}C\bar{D}E + \bar{A}\bar{B}\bar{D} + ABCE + ABD = \bar{A}\bar{B}\bar{D} + ABD + BC\bar{D}E$

$\bar{A}C\bar{D}E + BC\bar{D}E + \bar{A}\bar{B}\bar{D} + ABCE + ABD =$

$\bar{A}C\bar{D}E + BC\bar{D}E + \bar{A}C\bar{D}E + ABCE + \bar{A}\bar{B}\bar{D} + ABCE + ABD = RHS$

3.13 c) $(\bar{A}+\bar{B}+C)(A+\bar{D})(\bar{A}+B+\bar{D})(A+B)(A+C+\bar{D})$

$(\bar{A}D + \bar{B}A + \bar{B}\bar{D} + CA + C\bar{D})$

$(\bar{B}A + \bar{B}\bar{D}A + CA + CAB + C\bar{D}A + C\bar{D}B)(A + C + \bar{D})$

$\bar{B}A + \bar{B}AC + \bar{B}A\bar{D} + \bar{B}\bar{D}CA + \bar{B}\bar{D}A + CA + CA + CA\bar{D} + CAB$

$+ CAB + CAB\bar{D} + C\bar{D}A + C\bar{D}A + C\bar{D}A + C\bar{D}BA + C\bar{D}B + C\bar{D}B$

$= \bar{B}A + \bar{B}AC + \bar{B}A\bar{D} + \bar{B}\bar{D}CA + CA + CA\bar{D} + CAB + CAB\bar{D} + C\bar{D}A + C\bar{D}A + C\bar{D}$

$= \bar{B}A + CA + C\bar{D}B$

3.22 a) $xy + \bar{x}y\bar{z} + yz$

$y(x + \bar{x}\bar{z} + z)$

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

c) $x\bar{y} + z + (\bar{x}+y)\bar{z}$

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

$= true$

3.26 b) $(\bar{w} + x + \bar{y})(w + \bar{x} + y)(w + \bar{y} + z) = \bar{x}\bar{y} + wx + xyz + \bar{w}yz$

$= (\bar{w}\bar{x} + \bar{w}y + xw + xy + \bar{y}w + \bar{y}\bar{x})(w + \bar{y} + z)$

$= \bar{w}\bar{x}\bar{y} + \bar{w}\bar{x}z + \bar{w}yz + xw + xy\bar{y} + xwz + xyw + xyz + \bar{y}w + \bar{y}w + \bar{y}\bar{x}$

$= \bar{w}\bar{x}\bar{y} + \bar{w}\bar{x}z + \bar{w}yz + xw + xyz + \bar{y}w + \bar{y}\bar{x} + \bar{y}xw + \bar{y}\bar{x} + \bar{y}\bar{x}z$

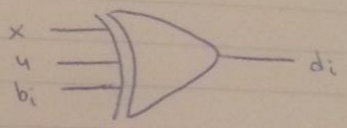
$= \bar{w}\bar{x}\bar{y} + \bar{w}\bar{x}z + \bar{y}w + \bar{x}\bar{y} + wx + xyz + \bar{w}yz$

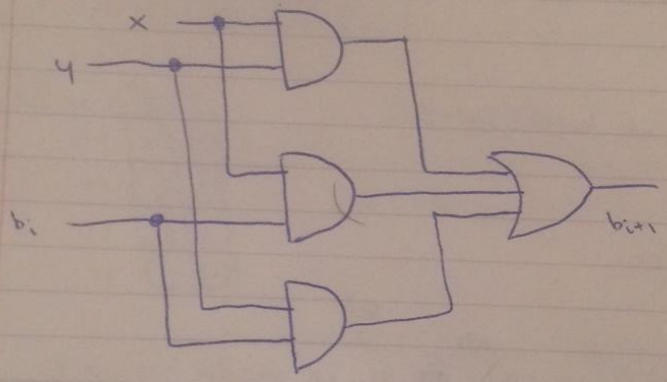
4.11 a)

x	y	b_i	d	b_{i+1}
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

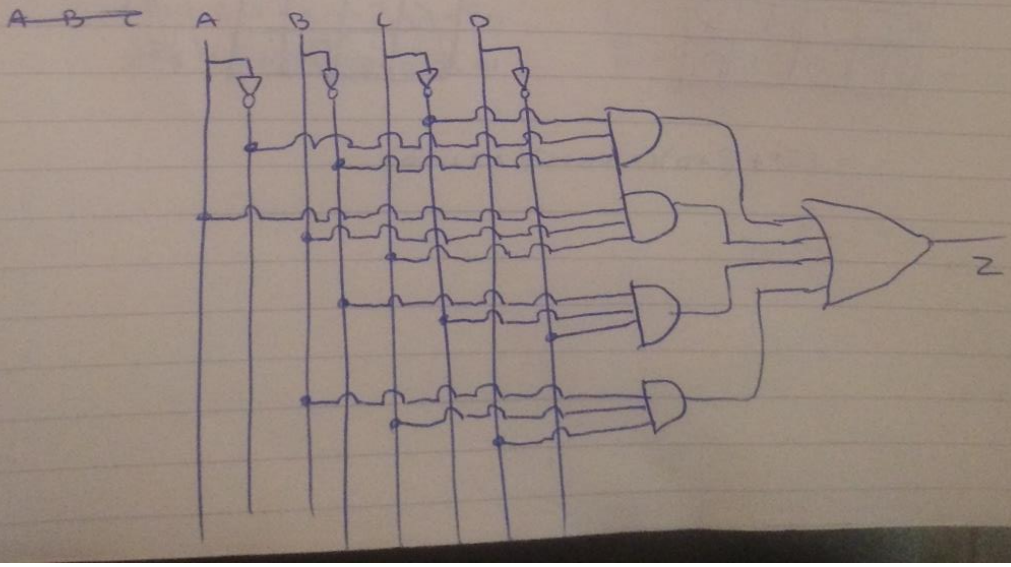
$d = x \oplus y \oplus b_i$

$b_{i+1} = \bar{x} b_i + \bar{x} y + y b_i$





4.13 $Z = \bar{A}\bar{B}\bar{C} + ABC + \bar{B}\bar{C}\bar{D} + BCD$



3.27 b) $\bar{A}B + \bar{A}C = \bar{A}D$ then $B + C = D$

$A(B + C) = AD$

$B + C = D$ ✓ true

4.1 c) $FG\bar{D} + P\bar{D}$

4.2 a) $Y = \bar{A}\bar{B}\bar{C}\bar{D}\bar{E} + A\bar{B}\bar{C}\bar{D}\bar{E} + AB\bar{C}\bar{D}\bar{E}$

4.5

A	B	C	D	E	F	Z
0	0	0	1	1	X	1
0	0	1	X	X	1	1
0	1	0	X	X	1	1
0	1	1	X	X	1	1
1	0	0	X	X	0	0
1	0	1	X	X	1	1
1	1	0	X	X	1	1
1	1	1	X	0	0	0

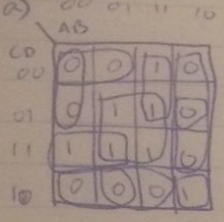
4.6 a)

A	B	C	F	G
X	X	0	1	0
0	0	1	X	1
0	1	0	0	X
X	X	1	0	1
1	0	X	0	0
1	0	1	X	1
1	1	X	1	X
1	1	X	1	1

$F = AB + \bar{C}$

8 $(\bar{A}+B)(C+\bar{D})(E)+(F+\bar{G})=Z$

9 a)

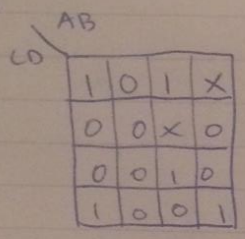


$A\bar{B}\bar{C}+\bar{B}D+\bar{A}CD+A\bar{B}C\bar{D}$

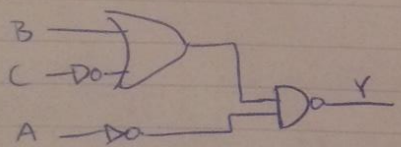
$(A+\cancel{\bar{C}}+D)(A+\cancel{\bar{B}+C})(\bar{A}+B+C)(\bar{A}+B+\bar{D})(\cancel{A+\bar{B}+\bar{C}+D})$

$(A+D)(B+C)(\bar{A}+B+\bar{D})(\bar{B}+\bar{C}+D)$ $(\bar{B}+\bar{C}$

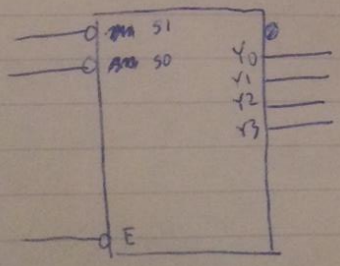
b)



10.



11 2:4 decoder, low true everything except outputs



3 decoder

Truth Table

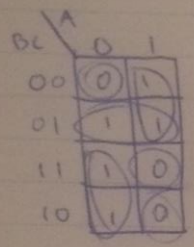
E	S1	S0	Y3	Y2	Y1	Y0
0	X	X	0	0	0	0
1	0	0	0	0	0	1
1	0	1	0	0	1	0
1	1	0	0	1	0	0
1	1	1	1	0	0	0

$Y_3^0=\bar{S}1\bar{S}0E$, $Y_3^1=\bar{S}1S0E$, $Y_3^2=S1\bar{S}0E$, $Y3=S1S0E$

6 $(A\bar{B}\bar{C})(D+\bar{E}) + \bar{G}F = \bar{Z}$

$Z = \overline{(A\bar{B}\bar{C})(D+\bar{E}) + \bar{G}F}$

7. $Z = (A+B+C)(\bar{A}+\bar{B}+\bar{C})(\bar{A}+\bar{B}+C)$

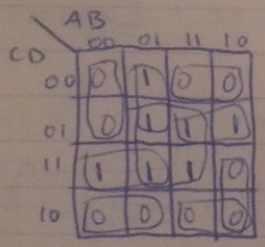


$A\bar{B} + \bar{B}C + AB = A + \bar{B}C$

$(A+B+C)(\bar{A}+\bar{B}+\bar{C})(\bar{A}+\bar{B}+C)$

$= (A+B+C)(\bar{A}+\bar{B})$

b) $Z = \bar{A}B\bar{C} + \bar{A}\bar{B}CD + BCD + A\bar{B}\bar{C}\bar{C} + A\bar{C}D$



$Z = BD + A\bar{B}C + A\bar{C}D + \bar{A}CD$

$Z = (A+B+C)(\bar{A}+C+D)(\bar{A}+B+\bar{C})(A+\bar{C}+D)$

Mitchell Irvin Homework 3 EEL3701

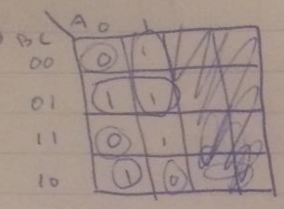
1. $A\bar{B} + C = F$

$\overline{A\bar{B} + C} = F$

2. $A + \bar{B} = F$

$\bar{A} + B = F$

3 a)

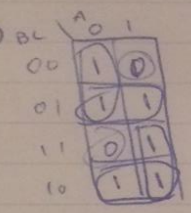


$Z = A\bar{B}\bar{C} + A\bar{B}C + \bar{A}B\bar{C}$

$= A\bar{B} + \bar{A}B\bar{C}$

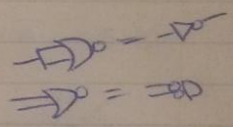
$Z = (A + B + C)(A + \bar{B} + \bar{C})(\bar{A} + \bar{B} + C)$

b)



$Z = \bar{A}\bar{B} + \bar{B}C + AB + B\bar{C}$

$= AB\,(A + \bar{B} + \bar{C})(\bar{A} + B + C)$



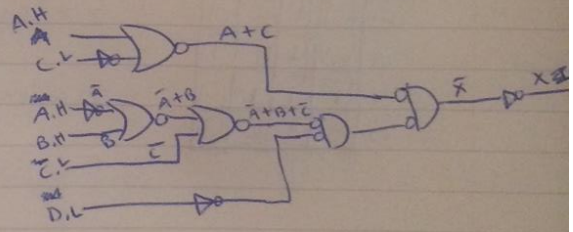
4. $X = \overline{\bar{D} \cdot A\bar{B}C + \bar{A}\bar{C}}$

$= \bar{D} \cdot (\overline{A\bar{B}C}) \cdot (\overline{\bar{A}\bar{C}})$

$= \bar{D} \cdot (\bar{A} + B + \bar{C})(A + C)$

$(\bar{A}C + BA + BC + \bar{C}A) \cdot \bar{D}$

$\bar{D}\bar{A}C + B\bar{D}A + B\bar{D}C + \bar{D}\bar{C}A$



4.16 $Z = A1 + B2 + C3$

4.25 a) $F_1 = \bar{A}\bar{B}\bar{C} + ABC$

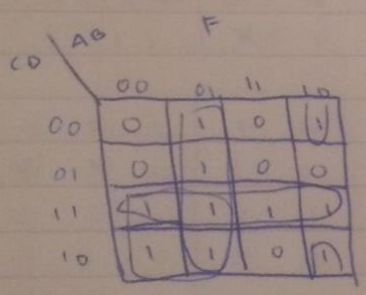
$F_3 = A\bar{B}\bar{C} + \bar{A}BC + A\bar{B}C + ABC$

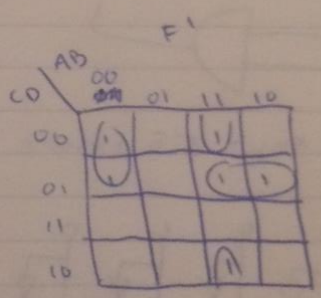
$= A\bar{B} + BC$

4.32 haven't been taught any of this yet

4.33

5.12 $F = A\bar{B}\bar{D} + \bar{A}B + \bar{A}C + CD$





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

$F' =$

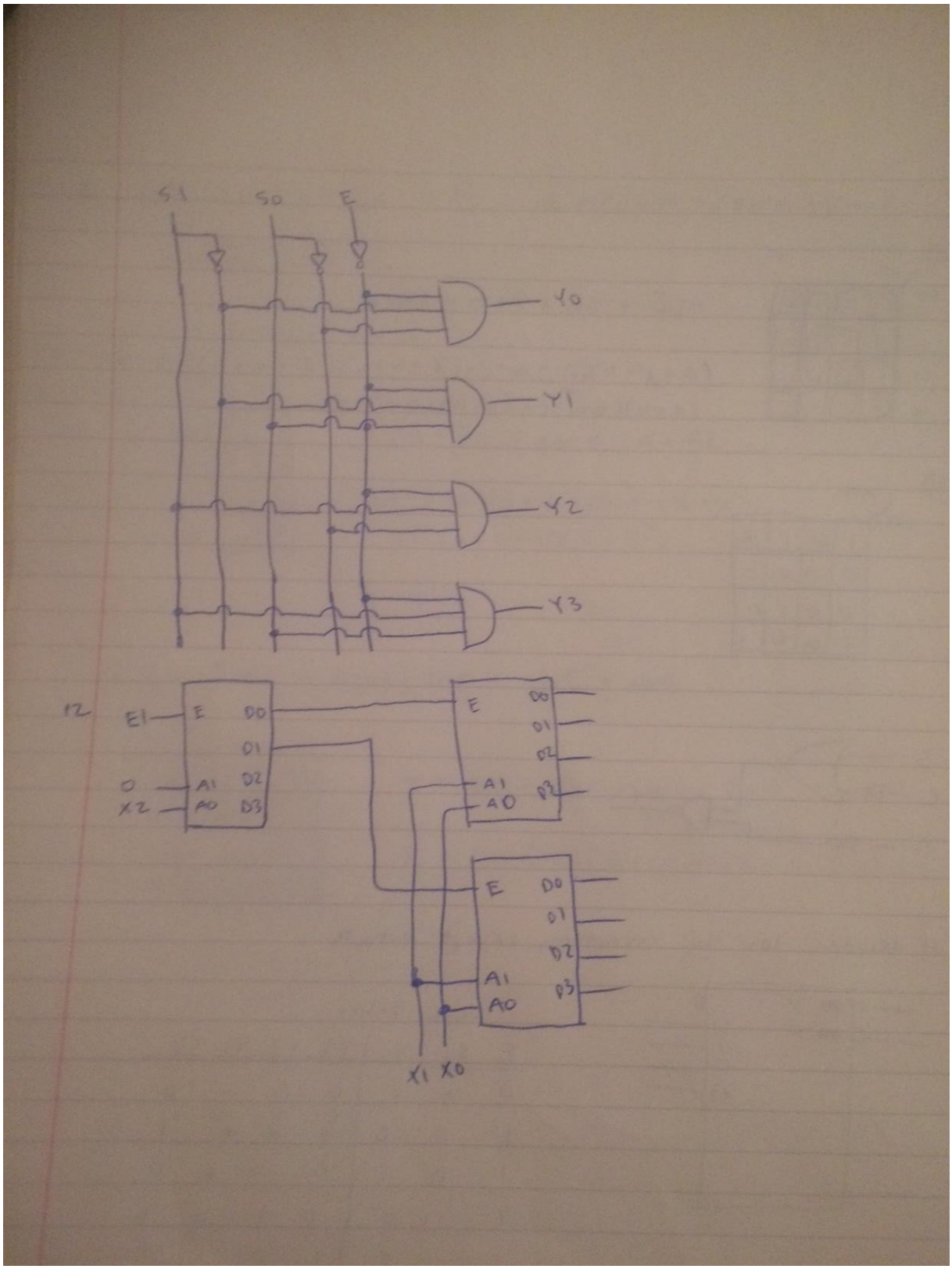
$F = (\bar{A} + \bar{B} + D)(A + B + C)(\bar{A} + C + \bar{D})$

7.3 a,b

7.15 c

7.16 a,b

7.24 b


S1
S0
E
Y0
Y1
Y2
Y3
12
E1
E
D0
D1
D2
D3
0
X2
A1
A0
E
D0
D1
D2
D3
A1
A0
E
D0
D1
D2
D3
A1
A0
X1
X0