

Answer Key: Individual Homework #1
 EECS 270 – FALL 2009

Note: If you suspect there is a problem with any answer, please come to office hours to discuss it.

Note2: AND's (*) are sometimes implicit (all others are explicit); For example: $ab!c == a*b*!c$;

1)

a.

ABC	!A!B!C	A*B	(A*B)+(!C)	A+(!B)	(A+(!B))*(!C)	((A*B)+(!C))+((A+(!B))*(!C))
000	111	0	1	1	1	1
001	110	0	0	1	0	0
010	101	0	1	0	0	1
011	100	0	0	0	0	0
100	011	0	1	1	1	1
101	010	0	0	1	0	0
110	001	1	1	1	1	1
111	000	1	1	1	0	1

b.

$$F = !A!B!C + !AB!C + A!B!C + AB!C + ABC$$

2)

- a. 11
- b. 1010
- c. 101100
- d. 1111110

3)

- a. 6
- b. 19
- c. 29
- d. 397

4)

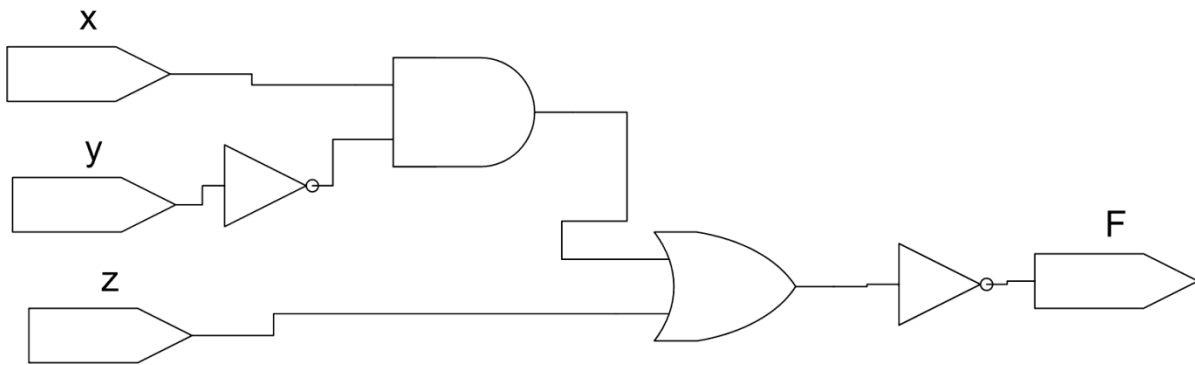
- a. 10000000_2
- b. 80_{16}
- c. 11202_3
- d. 1003_5
- e. 88_{15}

5)

- a. a, b, c, d

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- b. a, !a, b, a, c, d, !c
 - c. a, !a*b, a*c*d, !c
- 6) T=Tall, H = Heavy, F = Fast; !T=short, !H=light, !F=slow
- a. Ride = (T*(!H))^((!T)*H)
 - b. Ride = ((!T)*(!H)) + (T*H)
 - c. <not required>
 - d. Play = (T*H) + (F*H) ; ALSO acceptable: !Play = (!T*!F)+!H ;
- 7) F = abd'+acd'+abc'+ac'd
- 8) F=!((x*y)+z)



- 9) a. F = ab+cd ;
- G = !(1*!(!(a*b)* !(c*d)))

Use: X AND 1 = X to get rid of the *1, then just use Demorgan's law

G = (!a+!b)*(!c+!d)
... so F = !G

b.

G is shown below

abcd	a*b	c*d	ab+cd [=F]	!(a*b)	!(c*d)	!(a*b)* !(c*d)	!(!(a*b)* !(c*d))	1*!(!(a*b)* !(c*d))	!(1*!(!(a*b)* !(c*d))) [=G]
0000	0	0	0	1	1	1	0	0	1
0001	0	0	0	1	1	1	0	0	1
0010	0	0	0	1	1	1	0	0	1
0011	0	1	1	1	0	0	1	1	0
0100	0	0	0	1	1	1	0	0	1
0101	0	0	0	1	1	1	0	0	1
0110	0	0	0	1	1	1	0	0	1
0111	0	1	1	1	0	0	1	1	0
1000	0	0	0	1	1	1	0	0	1

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1001	0	0	0	1	1	1	0	0	1
1010	0	0	0	1	1	1	0	0	1
1011	0	1	1	1	0	0	1	1	0
1100	1	0	1	0	0	0	1	1	0
1101	1	0	1	0	0	0	1	1	0
1110	1	0	1	0	0	0	1	1	0
1111	1	1	1	0	0	0	1	1	0

... so $F = !G$

10)

a)

B2,B1,B0	L
000	1
001	1
010	1
011	0
100	0
101	0
110	0
111	0

b) $L = !B2 * (!B1 + !B0)$ in the reduced form

c)

