ECEn 220 HW5

2.1, 2, 4, 5, 8, 9, 11, 14
9.1, 2, 3, 5, 6, 9, 10

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2.1

$242_{10} = 11110010_2$

242 − 162 ($3^4 \times 2$) = 80; 80 − 54 ($3^3 \times 2$) = 26; 26 − 18 ($3^2 \times 2$) = 8; 8 − 6 (3×2) = 2; 2

242 − 192 ($8^2 \times 3$) = 50; 50 − 48 (8×6) = 2; 2

242 − 240 (16×15(F)) = 2; 2

22222_3 362_8 $F2_{16}$

2.2

71.93
− 64 ($2^6 \times 1$) = 7.93
− 0 ($2^5 \times 0$) = 7.93
− 0 ($2^4 \times 0$) = 7.93
− 0 ($2^3 \times 0$) = 7.93
− 4 ($2^2 \times 1$) = 3.93
− 2 ($2^1 \times 1$) = 1.93
− 1.00 ($2^0 \times 1$) = 0.93
− 0.50 ($2^{-1} \times 1$) = 0.43
− 0.25 ($2^{-2} \times 1$) = 0.18
− 0.125 ($2^{-3} \times 1$) = 0.055
− 0 ($2^{-4} \times 0$) = 0.055
− 0.03125 ($2^{-5} \times 1$) = 0.02375
− 0.015625 ($2^{-6} \times 1$) = 0.008125

71.93
− 50 ($5^2 \times 2$) = 21.93
− 20 ($5^1 \times 4$) = 1.93
− 1 ($5^0 \times 1$) = 0.93
− 0.80 ($5^{-1} \times 4$) = 0.13
− 0.12 ($5^{-2} \times 3$) = 0.01
− 0.008 ($5^{-3} \times 1$) = 0.002
− 0.0016 ($5^{-4} \times 1$) = 0.0004
− 0.00032 ($5^{-5} \times 1$) = 0.00008
− 0.000064 ($5^{-6} \times 1$) = 0.000016

1000111.111011_2

241.431111_5

2.4 $0110\ 0100\ 1001\ 0000\ 0111_2$

64907_{16}

2.5 1101 1110 1010 1111 . 1011 1110

2.8 $5A6F_{16} = 5 \times 16^3 + 10 \times 16^2 + 6 \times 16 + 15 = 23151$

23151 − 20480 ($8^5 \times 5$) = 2671
2671 − 2560 ($8^3 \times 5$) = 111
111 − 64 ($8^2 \times 1$) = 47
47 − 40 ($8^1 \times 5$) = 7
7 ($8^0 \times 7$)

55157_8

2.9 422_{10}

$0100\ 0010\ 0010_{BCD}$

2.11 0001 0101 0010 BCD

152_{10}

152 − 128 ($2^7 \times 1$) = 24
24 − 16 ($2^4 \times 1$) = 8
8 ($2^3 \times 1$)

10011000_2

2.14

H e l l o , _ w o r l d . CR LF
48 65 6C 6C 6F 2C 20 77 6F 72 6C 64 2E 0D 0A

9.1 4+5

0100
+0101
1001 = 9

9.2 8+5

1000
+0101
1101 = 13

9.3 12+15

1100
+1111
11011 = 27

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9.5 $4+5=9$

$$\begin{array}{r} 0100 \\ +0101 \\ \hline 1001 = -7 \end{array} \qquad \begin{array}{r} 00100 \\ +00101 \\ \hline 01001 = 9 \end{array}$$

$8+5=13$

$$\begin{array}{r} 01000 \\ +00101 \\ \hline 01101 = 13 \end{array}$$

$12+15=27$

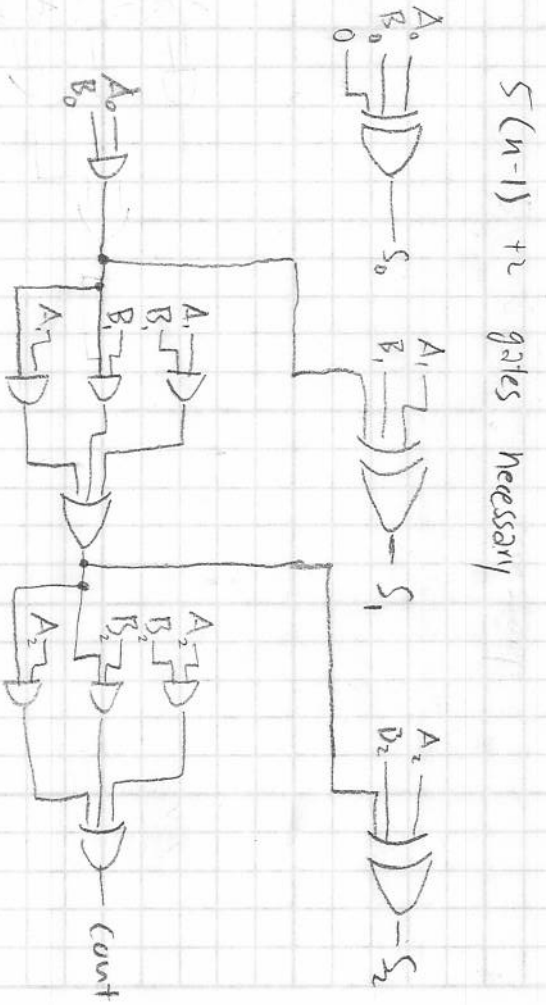
$$\begin{array}{r} 01100 \\ +01111 \\ \hline 11011 = -5 \end{array}$$

$$\begin{array}{r} 001100 \\ +001111 \\ \hline 011011 = 27 \end{array}$$

9.6 $-8+7=-1$

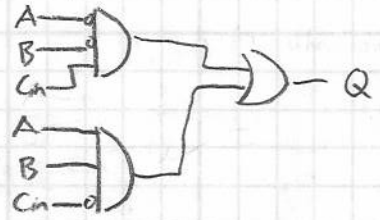
$$\begin{array}{r} 1000 \\ +0111 \\ \hline 01111 \neq -1 = 15 \end{array} \qquad \begin{array}{r} 11000 \\ +00111 \\ \hline 11111 = -1 \end{array}$$

9.9 A B



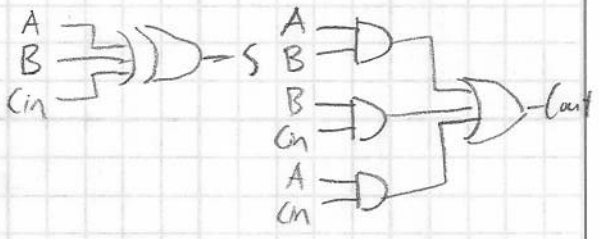
9.10

A	B	Cin	Q = overflow occured	
0	0	0	0	
0	0	1	1	$A'B'C_{in} + ABC_{in}'$
0	1	0	0	
0	1	1	0	Q = 1 when overflow occured
1	0	0	0	
1	0	1	0	
1	1	0	1	
1	1	1	0	

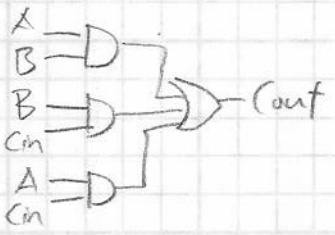


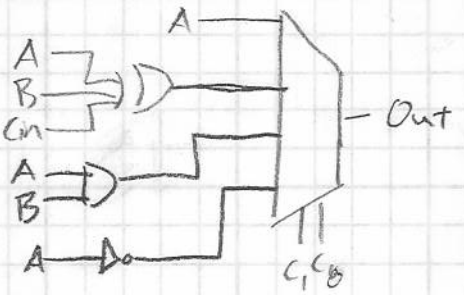
Arithmetic Lecture

1)

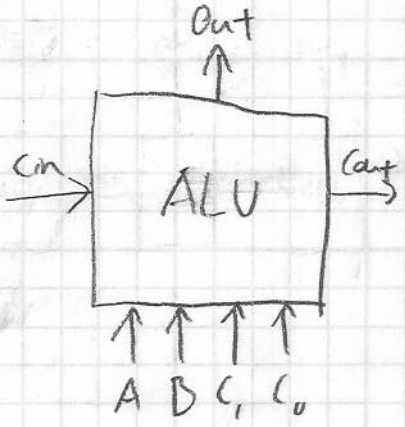


2)





3)



3) Cont'd