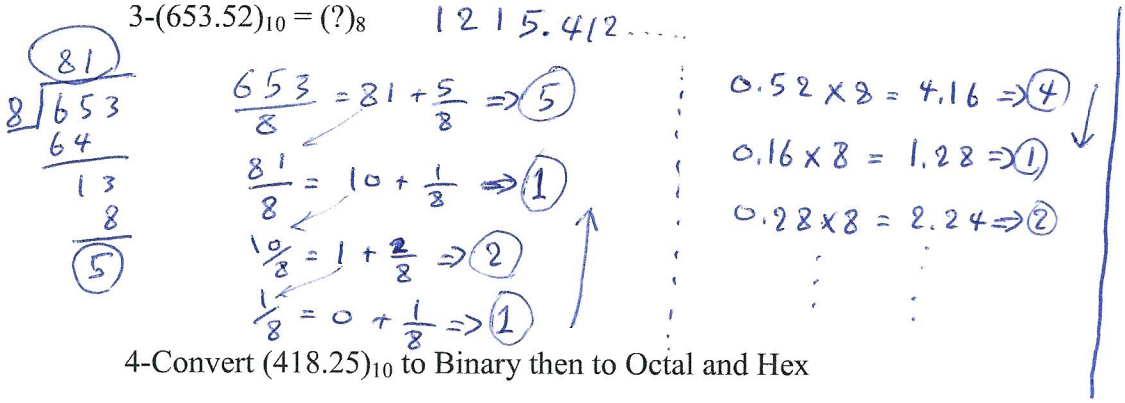
EE 208: Tutorial#1

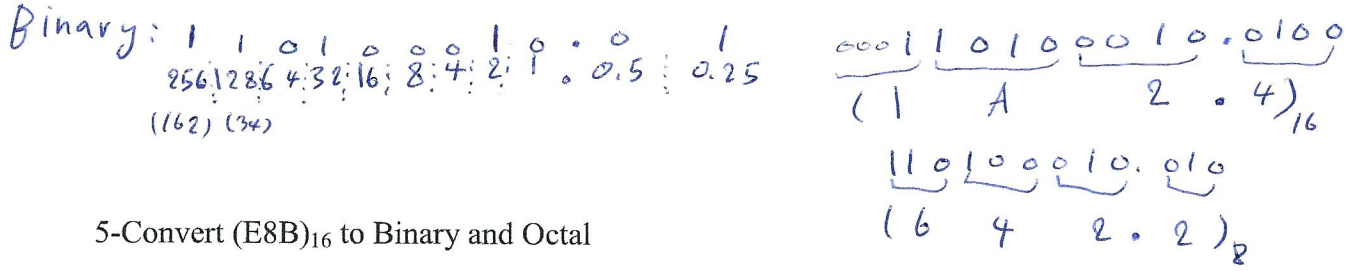
1-(1A2.4)$_{16}$ =(?)$_{10}$ => 1 x 16^2 + 10 x 16^1 + 2 x 16^0 + 4 x 16^{-1} = (418.25)$_{10}$

2- (1011)$_2$ =(?)$_{10}$ => 1 x 2^3 + 0 x 2^2 + 1 x 2^1 + 1 x 2^0 = (11)$_{10}$

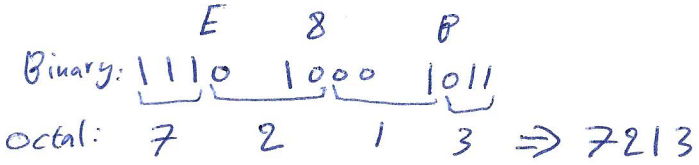
3-(653.52)$_{10}$ = (?)$_8$ 1215.412....



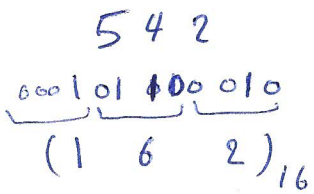
4-Convert (418.25)$_{10}$ to Binary then to Octal and Hex



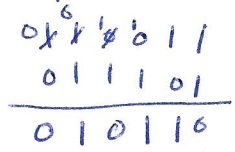
5-Convert (E8B)$_{16}$ to Binary and Octal



6-Convert (542)$_8$ to Binary then to Hex



7-1 1 0 0 1 1 - 0 1 1 1 0 1



8-110 X 101 , $(AB)_{16}$ x $(2F)_{16}$

110 (6)
101 (5)
110
0000
11000
11110 (30)

AB x 2F = 1F65

1
A
AB
2F
A05
1560
1F65

9- 30-10, 10-30 using signed binary

30: 0 11110
10: 0 01010

-30: 11110 → 2's c. → 100010
-10: 01010 → 2's c. → 10110

1111
30 011110
-10 10110
End carry 01 0100 (20)

-30 100010
+10 001010
-ve (1) 01100
2's c. 110011
1
110100 (-20)

Overflow & Underflow:

10- 70+80, -70-80 8 bit signed number

70: 0100 0110
-70: 1100 0110 (signed magnitude)
80: 0101 0000
-80: 1101 0000

+70 0 1000110
+80 0 1010000
(1) 0010110
150 overflow

Solution increase number of bits

-70 → 2's c. 10111010
-80 → 2's c. 10110000
-150
(1)1101010
underflow

11- BCD

$(694)_{10}$ = $(0110\ 1001\ 0100)_{BCD}$
$(835)_{10}$ = $(1000\ 0011\ 0101)_{BCD}$

1		
0110	1001	0100
+1000	+0011	+0101
1111	1100	1001
+0110	+0110	+0000
0001 0101	1 0010	1001

1.30 The following is a string of ASCII characters whose bit patterns have been converted into hexadecimal for compactness: 73 F4 E5 76 E5 4A EF 62 73. Of the eight bits in each pair of digits, the leftmost is a parity bit. The remaining bits are the ASCII code.
(a) Convert the string to bit form and decode the ASCII.
(b) Determine the parity used: odd or even?

73 F4 E5 76 E5 4A EF 62 73

73:	0_111_0011	s
F4:	1_111_0100	t
E5:	1_110_0101	e
76:	0_111_0110	v
E5:	1_110_0101	e
4A:	0_100_1010	j
EF:	1_110_1111	o
62:	0_110_0010	b
73:	0_111_0011	s

b) Odd

1.35 By means of a timing diagram similar to Fig. 1.5, show the signals of the outputs f and g in Fig. P1.35 as functions of the three inputs a, b, and c. Use all eight possible combinations of a, b, and c.

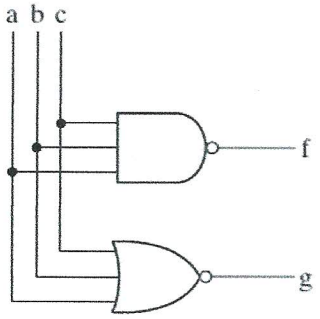
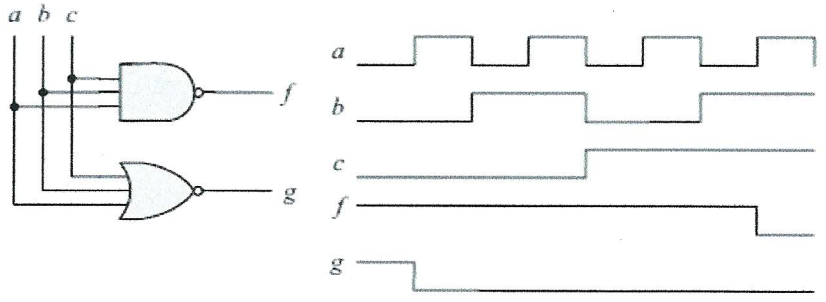


FIGURE P1.35

Solution:



Exercises

Q.1: Convert the following to Binary, Hex and Octal

$(166.5)_{10}$:

1 0 1 0 0 1 1 0 . 1 0
128 64 32 16 8 4 2 1 0.5 0.25
38 6 8

1 0 1 0 0 1 1 0 . 1 0 0 1 0 1 0 0 1 1 0 . 1
(A 6).8 (2 4 6).4

Hex: A6.8
octal: 246.4

Q.2 :

1100110 − 0111101

0 1 0 1 0 0 1

Q.3 : 112+50 using 8 bit signed number, detect if there is an overflow and if there is, fix the problem.

112 : 0 1 1 1 0 0 0 0
50 0 0 1 1 0 0 1 0
1 0 1 0 0 0 1 0

overflow use 9 bit
0 0 1 1 1 0 0 0 0
0 0 0 1 1 0 0 1 0
0 1 0 1 0 0 0 1 0
128 64 32 16 8 4 2 1 (162) ✓
160

Q.4 : What is the largest positive number that can be represented in sign magnitude format using 16-bits? Express in hexadecimal.

0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 32767 $(2^{15}-1)$
7 F F F

Range

1111 1111 1111 1111 < No. < 0111 1111 1111 1111