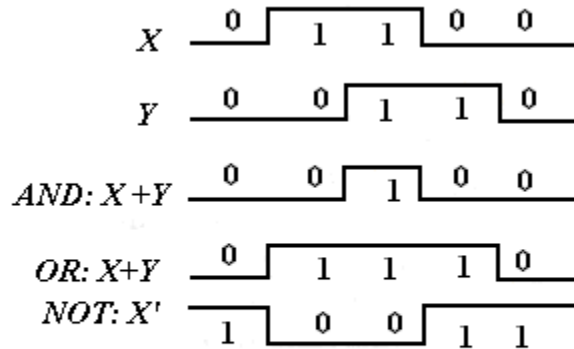


- List the Binary, Octal and hexadecimal numbers from 16 to 32.
  - Using A, B, C and D for the last four digits, list the numbers from 10 to 26 in base 14.
- What is the largest binary number that can be expressed with 12 bits? What is the equivalent decimal, Octal hexadecimal and in Base 4.
- Convert the following numbers with the indicated bases to decimal:  $(43210)_5$  and  $(198.A7)_{12}$
- Convert the following decimal numbers to binary:  
(a) 77                                      (b) 0.137                                      (c) 51.34
- Express the following numbers in decimal  $(10110.0101)_2$ ,  $(16.5)_{16}$  and  $(26.24)_7$
- Find the 16's complement of AF3B.
  - Convert AF3B to binary.
  - Find the 2's complement of the result in (b).
  - Convert the answer in (c) to hexadecimal and compare with the Answer in (a).
- Obtain the 1's and 2's complement of the following numbers:  
(a) 11101010                                      (b) 01111110                                      (c) 0000001  
(d) 10000000                                      (e) 00000000
- Perform the subtraction operation on the following unsigned binary numbers using 2's complement of the subtrahend. Where the result should negative 2's complement it and affix a minus sign.  
(a) 11011 -11001                                      (b) 110100-10101  
(c) 1011 -110000                                      (d) 101010-101011
- Convert decimal +61 and +27 to binary using the signed 1's complement representation and enough digits to accommodate the numbers. Then perform the following operations in binary equivalent:  
(a) (+27) + (-61)                                      (b) (-27) + (+61)                                      (c) (-27) + (-61)  
Convert the answers back to decimal and verify that they are correct.
- Represent the unsigned decimal numbers 954 and 675 in BCD.
- Formulate a weighted binary code for the decimal digits using weights 6,3,1,-1.
- Represent the decimal number 6754 in BCD, Excess 3 and 2421 code. Find the 9's complement of 6754 and express it in 2421 code.
- determine which of the above codes is self complementing.
  - 6 3 1 -1
  - 7 3 2 -1
  - 7 3 1 -2
  - 8 7 -4 -2

14. Assume a 3-input AND gate with output F and a 3-input OR gate with output G. Inputs are A, B, and C. Show the signals (by means of a timing diagram similar to fig 2.1) of the output F and G as functions of the three inputs ABC. Use all 8 possible combinations of ABC.



**Fig. 2.1**

**Input-Output Signal For Gates**

15. The state of 12 bit register is 100010010111. What is its content if it represents:
- (a) three decimal digits in BCD?
  - (b) three decimal digits in the Excess-3 code?
  - (c) three decimal digits in 84-2-1?
  - (d) a binary number?
16. Convert decimal 9126 to both BCD and ASCII codes. For ASCII, an odd parity bit is to be appended at the left.

*American Standard Code for International Interchange (ASCII)*

b7 b6 b5								
b4 b3 b2 b1	000	001	010	011	100	101	110	111
0000	NUL	DLE	SP	0	@	P		p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	“	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EOT	DC4		4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	‘	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	–	o	DEL
<i>Control Characters</i>								
<b>NUL</b>	Null			<b>DLE</b>	Data-link-escape			
<b>SOH</b>	Start of heading			<b>DC1</b>	Device Control 1			
<b>STX</b>	Start of text			<b>DC2</b>	Device Control 2			
<b>ETX</b>	End of text			<b>DC3</b>	Device Control 3			
<b>EOT</b>	End of transmission			<b>DC4</b>	Device Control 4			
<b>ENQ</b>	Enquiry			<b>NAK</b>	Negative acknowledge			
<b>ACK</b>	Acknowledge			<b>SYN</b>	Synchronous idle			
<b>BEL</b>	Bell			<b>ETB</b>	End-of-transmission block			
<b>BS</b>	Backspace			<b>CAN</b>	Cancel			
<b>HT</b>	Horizontal tab			<b>EM</b>	End of medium			
<b>LF</b>	Line feed			<b>SUB</b>	Substitute			
<b>VT</b>	Vertical tab			<b>ESC</b>	Escape			
<b>FF</b>	Form feed			<b>FS</b>	File separator			
<b>CR</b>	Carriage return			<b>GS</b>	Group separator			
<b>SO</b>	Shift out			<b>RS</b>	Record separator			
<b>SI</b>	Shift In			<b>US</b>	Unit separator			
<b>SP</b>	Space			<b>DEL</b>	Delete			