

Exercise Three

1.15: Find 9's & 10's Compl ...

a) 63, 325, 600

$$9's = 99,999,999 - 63,325,600 = \boxed{36,674,399}$$

$$10's = 9's + 1 = 36,674,399 + 1 = \boxed{36,674,400}$$

b) 25,000,000

$$9's = 99,999,999 - 25,000,000 = 74,999,999$$

$$10's = 9's + 1 = 74,999,999 + 1 = 75,000,000$$

1.16:

(a) Find the 16's Compl of C3DF

$$15's \text{ Compl} = FFFF - C3DF = 3C20$$

$$16's \text{ Compl} = 3C20 + 1 = \boxed{3C21} \quad \text{I}$$

(b) Convert C3DF to binary?

$$= (1100001111011111)_2$$

(c) Find 2's Compl of (b)

$$2's = (0011110000100001)_2$$

(d) Convert (c) to hexa & Compare with (a)?

$$(0011110000100001)_2$$

$$= \boxed{(3C21)} \quad \text{II}$$

Then 16's Complement of (C3DF) = 2's Com of its binary representation \neq

1.17. Perform subtraction on the given unsigned numbers using the 1's Complement of

$$(a) 4637 - 2579 = 4637$$

1's Complement + 7421

* There is a carry

$\boxed{12058}$

then Answer = $\boxed{(12058)}$

$$(b) 125 - 2579 = 0125$$

1's Compl + 7421

7546

There is no carry then result

= 1's complement of (7546) $\Rightarrow \boxed{(-7451)}$

$$(d) 1631 - 745 = 1631$$

1's complement of (0745) + 9255

here is a carry

$\boxed{10886}$

then Answer = $\boxed{(10886)}$

1.18. Perform subtraction using 2's Complement

$$(a) 10011 - 10010 = 10011$$

2's Compl + 01110

Carry

$\boxed{100001}$

then answer = $\boxed{(00001)}$

$$(b) 1001 - 110101 = 001001$$

$$2's + 001011$$

No carry

$$\text{then answer} = \boxed{010100}$$

$$\boxed{(101100)}$$

$$(d) 101000 - 010101 = 101000$$

$$2's + 101011$$

Carry

$$\text{then answer} = \boxed{011011}$$

~~1.18~~ 1.20 - Convert to binary using 2's
Signed 2's Complement:

$$(+49) = (0110001)_2 \rightarrow \text{each in 7 bits}$$

$$(+29) = (0011101)_2$$

Perform the following:-

$$(+29) + (-49) = 0011101$$

$$+ 1001111$$

$$\boxed{1101100}$$

$$\xrightarrow{2's} \boxed{(1010100)} \rightarrow \boxed{(-20)}$$

$$(-29) + (+49) = (-0011101) + (0110001)_2$$

$$\rightarrow 2's \text{ Complement} = 1100011$$

$$+ 0110001$$

discard carry

$$\boxed{X} 0010100$$

$$\text{then answer is } (0010100) = \boxed{(+20)}$$

$$(-29) + (-49) = \begin{array}{r} 1100011 \quad (-29) \\ + 1001111 \quad (-49) \\ \hline \end{array}$$

discard carry $\boxed{X}0110010 \quad (-78)$
 then the result = 2's of (0110010)
 $= \boxed{-(1001110)}$

1.21. Calculate the following using signed 10's Complement

(a) $(+9742) + (+641) =$
 $= (009742) + (00641) = \boxed{(010383)}$

(b) $(-9742) + (+641) =$

Step 1) 10's Compl of (009742)

9's = $99999 - 009742 = 990257$

$\therefore 10's = 9's + 1 = 990257 + 1 = 990258$

Step 2) Perform addition

$$\begin{array}{r} 990258 \\ + 00641 \\ \hline \end{array}$$

$990899 \rightarrow$ No Carry (negative)

Step 3) Then the result is 10's Complement of

$990899 = \boxed{(009101)}$

(c) $(-9742) \xrightarrow{10's \text{ Comp}} (990258)$

$+ (-641) \xrightarrow{10's \text{ Comp}} (999359)$

$(-10,383)$

$\boxed{X}989617 \quad (\text{negative})$

$\therefore 9's \text{ Complement of } (989617)$

$= 010382 + 1 = 010383$

\therefore Then answer = $\boxed{(-10382)}$

1.22 Convert 6514 to

1- BCD = 6 5 1 4 8 4 2 1
 = (0110010100010100)₂

2- ASCII = 6 5 1 4

= 36 35 31 34
 (011011001101010100010100)₂

even Parity bit = 0 01101100 01101010 01100010 01101000

24. Formulate a weighted binary code

(b)	6	4	2	1	Decimal
0	0	0	0	0	0
0	0	0	1	1	1
0	0	1	0	2	2
0	0	1	1	3	3
0	1	0	0	4	4
0	1	0	1	5	5
1	0	0	0	6 (0110)	6
1	0	0	1	7 (0111)	7
1	0	1	0	8	8
1	0	1	1	9	9

25. Represent the decimal number (6248) in

(a) BCD 8421 = 6 2 4 8
 (0110 0010 0100 1000)₂

(b) excess-3 code

decimal = 6 2 4 8
 add notation = 9 5 7 11

= (1001 0101 0111 1011)₂

(c) BCD 2421 code $\begin{matrix} 6 & 2 & 4 & 8 \end{matrix}$
 $= (1100001001001110)$

(d) BCD 6311 Code $\begin{matrix} 6 & 2 & 4 & 8 \end{matrix}$
 $= (1000001101011011)$

26- Find 9's Complement of 6248
 9's Compl = $9999 - 6248 = 3751$

express in 2421 = (0011110110110001)

1's Complement = (1100001001001110)

33- The state of a 12-bit register $\boxed{1000} \boxed{1001} \boxed{0111}$.
 What if it represents:-

(a) Three decimal digits in ~~BCD~~ BCD:

BCD 8421 = $(897)_{10}$

(b) in excess-3 Code?

$\begin{matrix} 8-3 & 9-3 & 7-3 \end{matrix}$
 $= (564)$

(c) in the 84-2-1 Code = $\boxed{(871)}$

$\begin{matrix} 1000 & 1001 & 0111 \end{matrix}$

$(8 \quad 7 \quad 1)$

(d) A binary number? $\begin{matrix} 2^{10} & 2^8 & 2^6 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{matrix}$
 $\begin{matrix} 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 1 \end{matrix}$

$= (2199)_{10}$

34- List the ASCII Code of 10 decimal digits with an even Parity bit in the left-most Position?

decimal	ASCII	even Parity
0	→ 48 = 11 0 0 0 0	→ 0 1 1 0 0 0 0
1	→ 50 49 = 11 0 0 0 1	→ 1 1 1 0 0 0 1
2	→ 50 = 11 0 0 1 0	→ 1 1 1 0 0 1 0
3	→ 51 = 11 0 0 1 1	→ 0 1 1 0 0 1 1
4	→ 52 = 11 0 1 0 0	→ 1 1 1 0 1 0 0
5	→ 53 = 11 0 1 0 1	→ 0 1 1 0 1 0 1
6	→ 54 = 11 0 1 1 0	→ 0 1 1 0 1 1 0
7	→ 55 = 11 0 1 1 1	→ 1 1 1 0 1 1 1
8	→ 56 = 11 1 0 0 0	→ 1 1 1 1 0 0 0
9	→ 57 = 11 1 0 0 1	→ 0 1 1 1 0 0 1