

BA211-Uddin-WAHN [244-0559].

Date 8th February 2025ASSIGNMENT # 1 :-

Q1). $(1073)_{10}$

Ans:-

1024 512 256 128 64 32 16 8 4 2 1

1 0 0 0 0 1 1 0 0 0 1 ← [BINARY Number].

Q2). $(81)_{10}$

Ans:-

128 64 32 16 8 4 2 1

0 1 0 1 0 0 0 1 ← [BINARY Number]

Q3). $(27.315)_{10}$

Ans:-

128 64 32 16 8 4 2 1 . 0 . 5 0 . 2 5 0 . 1 2 5 0 . 0 6 2 5 0 . 0 3 1 2 5 0 . 0 1 5 6 2 5

0 0 0 1 1 0 1 1 . 0 1 0 1 0 0 Ans:-

Ans:- 0

Q4). (a). 1110_{10}

Ans:- $+ 11100_2$

1010110₂

(b). 1011011_2

Ans:- $+ 110101_2$

1100000

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$$(0 - 1) = 1$$

05(A). 101110

$$\underline{\underline{Ans}} - \underline{100100}_2$$

0010102

$$\text{Q5) (B). } \begin{array}{r} 100 \\ \times 100 \\ \hline \end{array}$$

Ans:- - . 110 2

1000110

Roughwool-

$$\begin{array}{r}
 & 1 & 0 & 1 \\
 100 & \times & 0 & 0 \\
 & 1 & 1 & 0 \\
 \hline
 1 & 0 & 0 & 1 & 1 & 0
 \end{array}$$

$$\text{Q6)(A). } (\text{FA25})_{16} \rightarrow (\text{175045})_8$$

Ans: F A a S

8421 8422 8423 8424
1111 1010 0010 0101

Non break into 3 →

001111 1010 0010 0101

001	111	101	000	100	101
421	421	421	421	421	421
1	7	5	0	4	5

$$\text{Q6. (B). } (F920)_{16} \rightarrow (174440)_8$$

ANSWER

F 9 2 0

8421 8421 8421 8421
1111 9001 0019 0000

- Nonbreeding 3 →

$$\begin{array}{ccccccccc}
 0^o & \overbrace{111} & \overbrace{100} & 00 & 10 & 00 & 20 \\
 & \downarrow & \downarrow & & & & \downarrow \\
 & 42 & 42 & & 42 & & 42 & 1 \\
 001 & 111 & 100 & 100 & 100 & 000 \\
 421 & 421 & 421 & 421 & 421 & 421 \\
 1 & 7 & 4 & 4 & 4 & 0
 \end{array}$$

$$(96). (c). \quad (\cancel{10}10) (1100)_2 \rightarrow (010400)_8$$

Ans:-

$$1 \quad 1 \quad 0 \quad 0$$

8921 8921 8921 8921
0002 0001 0000 0000

Graph into 3 →

0 1 0 4 0 0

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Q7) (A). $(777)_8 \rightarrow (1FF)_{16}$

Ans:-

$$\begin{array}{r} 4_2 \overset{7}{1} \\ 4_2 \overset{7}{1} \\ 4_2 \overset{7}{1} \\ \hline 111 \quad 111 \quad 111 \end{array}$$

$$\begin{array}{cccc} 8421 & 8421 & 8421 \\ 0001 & 1111 & 1111 \\ \hline (1 & F & F)_{16} \end{array}$$

(B). $(123)_8 \rightarrow (053)_{16}$

Ans:-

$$\begin{array}{ccc} 1 & 2 & 3 \\ \cancel{0} \cancel{1} & \cancel{8} \cancel{1} & \\ 4_2 1 & 4_2 2 & 4_2 1 \\ \hline 001 & 010 & 011 \\ 8421 & 8421 & 8421 \\ 0000 \cancel{1} \cancel{9} \cancel{0} 1 & & 0011 \end{array}$$

$$(0 \quad 5 \quad 3)_{16}$$

(C). $(635)_8 \rightarrow (19D)_{16}$

Ans:-

$$\begin{array}{ccc} 6 & 3 & 5 \\ \cancel{4} \cancel{2} 1 & \cancel{4} \cancel{2} 1 & \cancel{8} \cancel{4} 2 1 \\ \hline 110 & 011 & 101 \\ 0001 & 1001 & 1101 \\ 8421 & 8421 & 8421 \end{array}$$

$$(1 \quad 9 \quad D)_{16}$$

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(B).

$$(A). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+83 \rightarrow (0 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 1 \quad 1)$$

$$15 - 23 \rightarrow 50 \quad 1 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad \underline{\text{Ans}}.$$

$$(B). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+101 \rightarrow 0 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1 \quad \underline{\text{Ans}}$$

$$(C). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+114 \rightarrow 0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1 \quad 0$$

$$-114 \rightarrow 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1 \quad 0 \quad \underline{\text{Ans}}$$

$$(B). (A). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+66 \rightarrow 0 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 0$$

$$\begin{matrix} \text{Take 1st} \\ \text{complement} \end{matrix} \rightarrow 1 \quad 0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1 \quad \underline{\text{Ans}}$$

$$(B). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+116 \quad 0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1 \quad 0 \quad 0$$

$$(C). \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

$$+99 \rightarrow 0 \quad 2 \quad 2 \quad 0 \quad 0 \quad 0 \quad 9 \quad 1$$

$$\begin{matrix} \text{Take 1st} \\ \text{complement} \end{matrix} \rightarrow 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad \underline{\text{Ans}}$$

(c).	128	64	32	16	8	4	2	1
<u>Ans:-</u>	1	0	1	1	1	0	1	1

Sign Number → $1 \oplus 32 + 16 + 8 + 2 + 1 = [-59]$ Ans:-
MSB

Q12) (A).	128	64	32	16	8	4	2	1
<u>Ans:-</u>	1	0	1	1	1	0	0	1

Sign Number → 0 1 0 0 0 1 1 0 → 1st complement.
MSB is 1 so
→ 64 + 4 + 2 → 70 → But As MSB is 1 so → [-70] Ans:-
-ve

(B). Ans:-	128	64	32	16	8	4	2	1
	0	1	1	0	0	1	0	0

Sign Number
MSB is 0

so +ve so No complement Required = $64 + 32 + 4 = [+100]$ Ans:-

(c).	128	64	32	16	8	4	2	1
<u>Ans:-</u>	1	0	1	1	1	1	0	1

Sign Number
MSB is 1
so -ve

$64 + 2 = [-66]$ Ans:-

Q13) (A).	128	64	32	16	8	4	2	1
<u>Ans:-</u>	1	0	1	0	1	1	0	0

Take 1st complement → 0 1 0 . 1 0 1 0 1 1 (2)

As -ve. Take 2nd → + 0 1 0 1 1 0 1 1 1

Complement → 0 1 0 1 0 0 1 0 0

$64 + 32 + 4 = (-84)$

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Q13)

(B). $128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$
Ans. $0 \quad 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1$ (2)

As signed

$$= 64 + 32 + 16 + 8 + 1$$

Number and
it is 50 so the Number

$$= + 121_{10}$$

(C). $128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$

Ans. $1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0$ (2).

Assigned

Number and
it is 50 - ve \rightarrow 1st complement

+ \rightarrow 2nd complement

$$\begin{array}{r} 0 \quad 0 \quad 0 \quad 1 \quad 0 \quad 0 \quad 0 \\ \hline 1 \end{array}$$

$$\hookrightarrow -16_{10}$$

Q14). (A). $+38 + (-27) = 1011111$ Ans.

$+38 \rightarrow 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$
 $0 \quad 0 \quad 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad 0$

Take 1st complement $1 \quad 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 10 \quad 1$

Take 2nd complement $+ \quad \quad \quad \quad \quad \quad \quad \quad 1$

$(-38) \rightarrow 1 \quad 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 1 \quad 0$ Now add both

∴

$+27 \rightarrow 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \quad 111011010 (-38)$

$$0 \quad 0 \quad 0 \quad 1 \quad 1 \quad 0 \quad 1 \quad 1$$

$$+ 111000101 (-27)$$

$$110111111$$

Take 1st
complementTake 2nd
complement

$+ \quad \quad \quad \quad \quad \quad \quad \quad 1$

Final carry is produced But it will be ignored As 2 complement:

$$(-27) \rightarrow 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1 \quad 0 \quad 1$$

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$$014)(D). (-102) + (-85) \rightarrow [01000101]$$

Add both :-

1101011101010 (-102)

Ans:-

$$+102 \rightarrow 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \quad +101010101110 (-85)$$

0 1 1 0 0 1 1 0

101000101Take 1st complement $\rightarrow 1000110^101$ \hookrightarrow Discard 1 as 2nd complementTake 2nd complement $\rightarrow +$

1

10011010 (-102).

$$+85 \rightarrow 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$$

0 1 0 1 0 1 0 1

Take 1st complement $\rightarrow 10101010$

1

10101011

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(Q15).

Ans:- Basically BCD uses a 4 bit code to represent each decimal digit. But the important note is that it can represent numbers from 0 to 9. The numbers greater than 9 cannot be individually represented like (17) it is greater than 9 so we will separate 1 and 7 take out binary equivalent in 4 bits and give a whole 8 bit answer. The difference between BCD representation and binary representation also are in binary whole number is converted into binary. But in BCD each decimal digit is represented only in 4 bit. Also BCD requires more bits than binary. Also BCD representation is much easier for human interpretations and digital displays. Example $45 \rightarrow$ In BCD it is $\begin{smallmatrix} 0100 & 0101 \\ 0100 & 0101 \end{smallmatrix}$ but in binary it is $\begin{smallmatrix} 1001 & 0101 \\ 0010 & 0101 \end{smallmatrix}$

(Q16).

Ans:- Basically BCD can be used in any scenario where a single digit needs to be transmitted or displayed. For example A calculator or a digital clock. Also some more ^{Realworld} _{Human-Readable} numbers applications are calculators as internally they store data in BCD format that performs simply the arithmetic operations and display. Further more Bank ATMs where the numeric key pad inputs and transaction displays use BCD for processing etc. Also used in electricity, gas, water.

(Q17). (a). $(57)_{10} \rightarrow (01010111)$.Ans:-

$$\begin{array}{r} 5 \\ 8421 \\ 0101 \end{array} \quad \begin{array}{r} 7 \\ 8421 \\ 0111 \end{array} \rightarrow \text{BCD.}$$

(B). $(109)_{10} \rightarrow (0001\ 0000\ 1001)$.Ans:-

$$\begin{array}{r} 1 \\ 8421 \\ 0001 \end{array} \quad \begin{array}{r} 0 \\ 8421 \\ 0000 \end{array} \quad \begin{array}{r} 9 \\ 8421 \\ 1001 \end{array}$$

(Q18).

(D). $89 + 68 \rightarrow (157)$

Ans:

$$\begin{array}{r}
 8 & 9 \\
 6 & 8 \\
 \hline
 8421 & 8421 \\
 1000 & 1001 \\
 \hline
 0110 & 1000 \\
 \end{array}$$

$$1000^1 \quad 1001 \quad (+89)$$

$$+ \quad 0110 \quad 1000 \quad (+68)$$

$$\underline{11111} \quad 0001$$

$$1311(15) + 0110 \quad \underline{\underline{0001}}$$

$$\underline{0001} \quad \underline{010} \quad \underline{10001}$$

$$\begin{array}{r}
 2 \quad 5 \quad 2 \\
 + \quad 1 \quad 5 \quad 7 \\
 \hline
 0110
 \end{array}
 \rightarrow \text{All 6.}$$

(Q19(A)).

Ans: 110011001 (Error) (It's odd-parity)

The are 5 1's so there is an issue as in Even only here ~~are~~ should be 1's only in even.

(B). 10111111010001010. it's (correct)

Ans: There are 10 1's so it is fine it is even parity.

(C). 01010110 As it has 5 1's so it's has error \rightarrow it's not even parity.

Ans: (error)

(D). 0111000100101101 (it's correct).

Ans: It's fine As it 8 one's so it is even parity.

(Q20) (a). 0110 1 Parity bit

Ans: As there are even 1's so we have to add 1 as Parity bit to make odd.

(b) 101101 2 Parity bit

Ans: As there are 4 1's so we have to add 1 as Parity bit to make odd

(c) 101101011111 0 Parity bit

Ans: As there are 9 1's already odd so it should be 0.

(d) 10011100101 1 Parity bit

Ans: As there are 6 1's already odd 1 as parity bit should be 1. GENIUS