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No. ROLL : 2029177

BRANCH : CSEC

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Date:

C programming Lab :- Assignment 1

Q.1 Decimal to binary, octal, hexa.

(i) $(162)_{10}$

$$= (10100010)_2 = (242)_8 = (A2)_{16}$$

(ii) $(193)_{10}$

$$= (11000001)_2 = (301)_8 = (C1)_{16}$$

(iii) $(128)_{10}$

$$= (10000000)_2 = (200)_8 = (80)_{16}$$

(iv) $(32)_{10}$

$$= (100000)_2 = (40)_8 = (20)_{16}$$

(v) $(47)_{10}$

$$= (101111)_2 = (57)_8 = (2F)_{16}$$

(vi) $(93)_{10}$

$$= (1011101)_2 = (135)_8 = (5D)_{16}$$

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Q.2 Convert binary to octa, hexa, decimal

$$(i) (01011)_2 \Rightarrow [001011] \\ (11)_{10} = (13)_8 = (B)_{16}$$

$$(ii) (11000001)_2 \Rightarrow [11000001] \\ (193)_{10} = (301)_8 = (C1)_{16}$$

$$(iii) (1011101)_2 \Rightarrow [1011101] \\ (93)_{10} = (135)_8 = (5D)_{16}$$

$$(iv) (10001111)_2 \Rightarrow [10001111] \\ (143)_{10} = (217)_8 = (8F)_{16}$$

Q.3 Hexa to decimal, octal, binary

$$(1) (A023)_{16} \Rightarrow \text{Binary} \Rightarrow (A)_{16} = (1010)_2 \quad (0)_{16} = (0000)_2 \\ (2)_{16} = (0010)_2 \quad (3)_{16} = (0011)_2 \\ \Rightarrow (1010000000100011)_2$$

$$\text{Decimal} \Rightarrow A \times 16^3 + 0 \times 16^2 + 2 \times 16^1 + 3 \times 16^0 \\ \Rightarrow 10 \times 4096 + 0 + 2 \times 16 + 3 \\ \Rightarrow (40995)_{10}$$

$$\text{Octal} \Rightarrow (120043)_8 \quad [1010000000100011] \\ \begin{array}{cccccc} 1 & 2 & 0 & 0 & 4 & 3 \end{array}$$

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(2) (A105)₁₆

$$\begin{aligned} & \text{Decimal} \Rightarrow A \times 16^3 + 1 \times 16^2 + D \times 16^1 + 5 \times 16^0 \\ & \Rightarrow 10 \times 4096 + 1 \times 256 + 13 \times 16 + 5 \times 1 \\ & \Rightarrow (41429)_{10} \end{aligned}$$

$$\text{Binary} \Rightarrow (A)_{16} = (1010)_2 \parallel (1)_{16} = (0001)_2 \parallel (D)_{16} = (1101)_2 \parallel (5)_{16} = (0101)_2$$

$$\Rightarrow (1010000111010101)_2$$

$$\begin{aligned} \text{Octal} & \Rightarrow (\underbrace{101}_1 \underbrace{0000}_2 \underbrace{1110}_7 \underbrace{1010}_2 \underbrace{101}_5)_8 \\ & \Rightarrow (120725)_8 \end{aligned}$$

(3) (016BC)₁₆

$$\begin{aligned} \text{Binary} & \Rightarrow (0)_{16} = (0000)_2 \quad (1)_{16} = (0001)_2 \quad (6)_{16} = (0110)_2 \\ & \quad (B)_{16} = (1011)_2 \quad (C)_{16} = (1100)_2 \\ & \Rightarrow (00000001011010111100)_2 \end{aligned}$$

$$\begin{aligned} \text{Decimal} & \Rightarrow 0 \times 16^4 + 1 \times 16^3 + 6 \times 16^2 + B \times 16^1 + C \times 16^0 \\ & \Rightarrow 4096 + 6 \times 256 + 11 \times 16 + 12 \times 1 \\ & \Rightarrow (5820)_{10} \end{aligned}$$

$$\begin{aligned} \text{Octal} & \Rightarrow \left[\underbrace{0000}_0 \underbrace{0001}_1 \underbrace{0110}_3 \underbrace{1011}_2 \underbrace{1100}_4 \right] \\ & = (13274)_8 \end{aligned}$$

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④ $(123AE)_{16}$

Binary :- $(1)_{16} = (0001)_2$ $(2)_{16} = (0010)_2$ $(3)_{16} = (0011)_2$
 $(A)_{16} = (1010)_2$ $(E)_{16} = (1110)_2$
 $\Rightarrow (00010010001110101110)_2$

Decimal :- $1 \times 16^4 + 2 \times 16^3 + 3 \times 16^2 + A \times 16^1 + E \times 16^0$
 $= 1 \times 65536 + 2 \times 4096 + 3 \times 256 + 10 \times 16 + 14$
 $= (74670)_{10}$

Octahedral :- $(221656)_8$

$$\left[\begin{array}{cccccc} 0001 & 0010 & 0011 & 1010 & 1110 \\ \hline 2 & 2 & 1 & 6 & 5 & 6 \end{array} \right]$$

Ex. 4 Octal to binary, hexa, decimal

① $(1271)_8$

Binary :- $(1)_8 = (001)_2$ $(2)_8 = (010)_2$ $(7)_8 = (111)_2$
 $(1)_8 = (001)_2$

$\Rightarrow (001010111001)_2$

Decimal :- $1 \times 8^3 + 2 \times 8^2 + 7 \times 8^1 + 1 \times 8^0$

$\Rightarrow 512 + 128 + 56 + 1$

$\Rightarrow 697$

Hexa :- $\left[\begin{array}{ccc} 0010 & 1011 & 1001 \\ \hline 2 & B & 9 \end{array} \right]$

$= (2B9)_{16}$

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② $(1392)_8 = \text{not defined.}$

③ $(126)_8$

Binary: $(1)_8 = (001)_2$ $(2)_8 = (010)_2$

$(6)_8 = (110)_2$

$= (001010110)_2$

Decimal: $1 \times 8^2 + 2 \times 8^1 + 6 \times 8^0$

$= 64 + 16 + 6$

$\Rightarrow (86)_{10}$

Hexa: $(56)_{16} \quad \therefore \left[\begin{array}{ccc} 001010110 \\ \hline \quad \quad \quad 5 \quad \quad \quad 6 \end{array} \right]$

④ $(1674)_8$

Binary: $(1)_8 = (001)_2$ $(6)_8 = (110)_2$ $(7)_8 = (111)_2$

$(4)_8 = (100)_2$

$\Rightarrow (00111011100)_2$

Decimal: $1 \times 8^3 + 6 \times 8^2 + 7 \times 8^1 + 4 \times 8^0$

$\Rightarrow 512 + 384 + 56 + 4$

$\Rightarrow (956)_{10}$

Hexa: $(\underbrace{0011}_3 \underbrace{1011}_B \underbrace{100}_C)_2$

$= (3BC)_{16}$

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Q.5 8 bit signed integer convert to decimal :-

(1) $(10110111)_2$

$\Rightarrow 10110111$

$01001001 \Rightarrow -73 (-ve)$

(2) $(0111011)_2$

$\Rightarrow (0111011)_2 \Rightarrow 69 (+ve)$

(3) $(11011010)_2$

$\Rightarrow (00100101) \Rightarrow -38 (-ve)$

(4) $(10111111)_2$

$\Rightarrow (01000001)_2 \Rightarrow -65 (-ve)$

Q.6

(i) -10

$[2 \text{ bits}] \rightarrow$

$0110 \rightarrow 2$

$= -10$

$[4 \text{ bits}] \rightarrow$

$1010 \rightarrow 10$

$-10 \text{ will } \rightarrow$

0101

$\begin{array}{r} 1 \\ + \end{array}$

0110

In 4 bit -10 will be 0110

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(ii) 190 in 7 bit

2	190	
2	95	0
2	47	1
2	23	1
2	11	1
2	5	1
2	2	1
		0

7 bit (190) \Rightarrow 0111110

(iii) -193 in 7 bit.

2	193	
2	96	1
2	48	0
2	24	0
2	12	0
2	6	0
2	3	0
2	1	1
		1

\Rightarrow 11000001 \Rightarrow 193

2's Complement.

00111110 Add +1 to unit.

-193 \rightarrow 0111111

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(iv) -45 in 6 bits

2	45	
2	22	1
2	11	0
2	5	1
2	2	1
	1	0
		1

101101 \rightarrow 45

2's complement

010010 add. 1

at unit

010011 \Rightarrow -45in 6 bits.

(v) -32 in 6 bits

2	32	
2	16	0
2	8	0
2	4	0
2	2	0
	1	0
		1

100000 \rightarrow 32

2's complement

011111 add 1 at

unit.

+
100000 \Rightarrow 100000 \Rightarrow -32in 6 bits.

(vi) 128 in 8 bit

128 \rightarrow 1000 0000

128 in 8 bit 1000 0000

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$(V_{II}) \downarrow \Rightarrow 0000001$

$-1 \Rightarrow$ ~~0000000~~ 2's complement

$\rightarrow 1111110$ 1 at unit for 7 bit

$\Rightarrow 1111111$