C- programming Lab

Lecture-1 H/W.

Q1. convert decimal to binary, octal and Hexa.

(i) $(162)_{10}$
binary $= (10100010)_2$, octal $= (242)_8$, Hexa $= (A2)_{16}$

(ii) $(193)_{10}$
binary $= (11000001)_2$, octal $= (301)_8$, Hexa $= (C1)_{16}$

(iii) $(128)_{10}$
binary $= (10000000)_2$, octal $= (200)_8$, Hexa $= (80)_{16}$

(iv) $(32)_{10}$
binary $= (100000)_2$, octal $= (40)_8$, Hexa $= (20)_{16}$

(v) $(47)_{10}$
binary $= (101111)_2$, octal $= (57)_8$, Hexa $= (2F)_{16}$

(vi) $(93)_2$
binary $= (1011101)_2$, octal $= (135)_8$, Hexa $= (5D)_{16}$

Q2. Convert binary to octaldecimal, hexadecimal and decimal:-

(i) $(01011)_2$

decimal $= (11)_{10}$

octadecimal $= (13)_8$ [001011]

Hexadecimal $= (B)_{16}$

(ii) $(11000001)_2$

decimal $= (193)_{10}$

octadecimal $= (301)_8$ [11000001]

Hexadecimal $= (C1)_{16}$

(iii) (1011101)

Decimal = $(93)_{10}$

octadecimal = $(135)_8$ [1011101]

Hexadecimal = $(5D)_{16}$

(iv) $(10001111)_2$

Decimal = $(143)_{10}$

octaldecimal = $(217)_8$ [10001111]

Hexadecimal = $(8F)_{16}$

Q3. Hexadecimal to decimal, octa and binary :-

(i) $(A023)_{16}$

binary-

$(A)_{16} = (1010)_2$, $(0)_{16} = (0000)_2$

$(2)_{16} = (0010)_2$, $(3)_{16} = (0011)_2$

grouping,

$(A023)_{16} \rightarrow (1010\ 0000\ 0010\ 0011)_2$

decimal = $A \times 16^3 + 0 \times 16^2 + 2 \times 16^1 + 3 \times 16^0$

$= 10 \times 4096 + 0 + 2 \times 16 + 3 \times 1$

$= (40995)_{10}$.

octadecimal = $(120043)_8$. [1010000000100011]

(ii) $(A105)_{16}$

binary-

$(A)_{16} = (1010)_2$, $(1)_{16} = (0001)_2$, $(0)_{16} = (1101)_2$

$(5)_{16} = (0101)_2$.

grouping,

$(A105)_{16} \rightarrow (1010\ 0001\ 1101\ 0101)_2$.

decimal = $A \times 16^3 + 1 \times 16^2 + D \times 16^1 + 5 \times 16^0$

$= 10 \times 4096 + 1 \times 256 + 13 \times 16 + 5 \times 1$

$= (41429)_{10}$

octadecimal = $(120725)_8$ [1 010 000 111 01 0101 → 1 2 0 7 2 5]

(iii) $(016BC)_{16}$

binary,

$(0)_{16} = (0000)_2$, $(1)_{16} = (0001)_2$, $(6)_{16} = (0110)_2$

$(B)_{16} = (1011)_2$, $(C)_{16} = (1100)_2$.

grouping,

$(016BC)_{16} \Rightarrow (0000\ 0001\ 0110\ 1011\ 1100)_2$.

decimal,

$= 0 \times 16^4 + 1 \times 16^3 + 6 \times 16^2 + B \times 16^1 + C \times 16^0$

$= 0 + 1 \times 4096 + 6 \times 256 + 11 \times 16 + 12 \times 1$

$= (5820)_{10}$.

octadecimal = $(13274)_8$ [0 000 000 01 011 01 011 11 100 → 1 3 2 7 4]

(iv) $(123AE)_{16}$

binary-

$(1)_{16} = (0001)_2$, $(2)_{16} = (0010)_2$, $(3)_{16} = (0011)_2$

$(A)_{16} = (1010)_2$, $(E)_{16} = (1110)_{16}$

grouping,

$(123AE)_{16} \Rightarrow (0001\ 0010\ 0011\ 1010\ 1110)_2$.

decimal $= 1 \times 16^4 + 2 \times 16^3 + 3 \times 16^2 + A \times 16^1 + E \times 16^0$

$= 1 \times 65536 + 2 \times 4096 + 3 \times 256 + 10 \times 16 + 14 \times 1$

$= (74670)_{10}$.

octadecimal = $(221656)_8$. [0001 001 000 111 010 111 0 → 2 2 1 6 5 6]

Q4. octal to binary, hexa and decimal :-

(i) $(1271)_8$

binary- $(1)_8 = (001)_2$, $(2)_8 = (010)_2$, $(7)_8 = (111)_2$

$(1)_8 = 001$

grouping,

$(1271)_8 \rightarrow (001\,010\,111\,001)_2$.

decimal -

$1 \times 8^3 + 2 \times 8^2 + 7 \times 8^1 + 1 \times 8^0$

$= 1 \times 512 + 2 \times 64 + 7 \times 8 + 1 \times 1$

$= 697$.

hexa - $(2B9)_{16}$ [0010 1011 1001 — 2 B 9]

(ii) $(1392)_8$ → not defined.

(iii) $(126)_8$

binary,

$(1)_8 = (001)_2$, $(2)_8 = (010)_2$, $(6)_8 = (110)_2$.

grouping,

$(126)_8 = (001\,010\,110)_2$

decimal,

$= 1 \times 8^2 + 2 \times 8^1 + 6 \times 8^0$

$= 86$.

hexa,

$= (56)_{16}$ [001 010 110 — 5 6]

(iv) $(1674)_8$

binary,

$(1)_8 = (001)_2$, $(6)_8 = (110)_2$, $(7)_8 = (111)_2$, $(4)_8 = (100)_2$

grouping,

$(1674)_8 = (001\,110\,111\,100)_2$

decimal

$= 1\times8^3 + 6\times8^2 + 7\times8^1 + 4\times8^0$

$= 512 + 384 + 56 + 4 = 956.$

hexa,

$= (3BC)_{16}$ $\quad [001110111100]$ (3 B C)

Q5) 8 bit signed integers convert to decimal :-

(i) $(10110111)_2$

→ 10110111
01001001 ⟶ ⇒ −73 (−ve)

(ii) $(0111011)_2$

⇒ $(0111011) = 59$ (+ve).

(iii) $(11011010)_2$

⇒ (11011010)
00100110 ⟶ ⇒ −38 (−ve)

(iv) $(10111111)_2$

⇒ (10111111)
01000001 ⟶ = −65 (−ve).

Q6)

(i) −10

2 bits

01|10| → 2

−10.

4 bits

1010 → 10

−10 will be,

0101
+ 1
0110

In 4 bits −10 will be 0110

(ii) 190 in 7 bits

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

In 7 bits 190 will be 0111110

(iii) -193 in 7 bits

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

1100000 1 ⟶ 193.

2's compliment

0011111 0

Add +1 to units place.

1111111

-193 in 7 bits 0111111

(iv) -45 in 6 bits.

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

101101 ⟶ 45

2's compliment

010010

+1

010011 ⟶ -45.

(v) -32 in 6 bits.

32 ⟶ 100000

-32 ⟶ 011111 ⟶ 2's compliment

Add +1 to units place.

011111

+1

100000 -32 in 6 bits is 100000

(vi) 128 in 8 bits.

128 ⟶ 10000000

128 in 8 bits is 10000000

(vii) -1 in 7 bits

1 in ⟶ 0000001

-1 in 7 bits ⟶ 2's compliment

1111110

\+ 1

1111111