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UNIT-3

Computer Organization -> Subject

★ - Number systems :

→ There are 4 tips

1) Decimal Number system
2) Binary Number system
3) Octal Number system
4) Hexadecimal Number system

Base	
10	(0....9)
02	(0, 1)
08	(0....7)
16	(0....15)

↓

10 → A , 11 - B , 12 - C , 13 - D , 14 - E , 15 - F

1. Decimal to Binary

(543)10 (?)2

	543	
2	271	1
2	135	1
2	67	1
2	33	1
2	16	1
2	8	0
2	4	0
2	2	0
	1	0

= (1000011111)2

2) Binary to Decimal

(1110101)2 (?)10

64	32	16	8	4	2	1
1	1	1	0	1	0	1

= 64+32+16+4+1

= (117)10

e.g.

	117	
2	58	1
2	29	0
2	14	1
2	7	0
2	3	1
	1	1

$(1110111o1)_2$ $(?)_{10}$

128	64	32	16	8	4	2	1
1	1	0	1	1	1	0	1

128 +64 +16 +8 +4 +1

$= (221)_{10}$

→ Decimal to Binary | Binary to Decimal

(3) Decimal to octal

$(117)_{10}$ $(?)_8$

	117	
8	14	5
8	1	6

$= (165)_8$

$(154)_{10}$ $(?)_8$

	154	
8	19	2
8	2	3

$= (232)_8$

(4) Decimal to Hexadecimal

$(754)_{10}$ $(?)_{16}$

	754	
16	47	2
16	2	15

$= (2152)_{16}$

$= (2F2)_{16}$

$(897)_{10}$ $(?)_{16}$

	897	
16	56	1
16	3	8

$= (381)_{16}$

1) $(421)_{10}$ $(?)_2$

	421	
2	21	1
2	1	1

$= (111)_2$

2) $(10111011)_2$ $(?)_{10}$

128	64	32	16	8	4	2	1
1	0	1	1	1	0	1	1

$= 128+32+16+8+2+1$

$= (187)_{10}$

3) $(425)_{10}$ $(?)_8$

	425	
8	53	1
	6	5

$= (651)_8$

4) $(788)_{10}$ $(?)_{16}$

	788	
16	49	4
	3	1

$= (314)_{16}$

5) Binary to octal → 4+2+1 = 7

$(110111101)_2$ $(?)_8$

011	011	101
421	421	421
2+1	2+1	4+1
3	3	5

$= (335)_8$

$(111011101)_2$ $(?)_8$

111	011	101
421	421	421
4+2+1	2+1	4+1
7	3	5

$= (735)_8$

6) Octal to Binary

$(432)_8$ $(?)_2$

4	3	2
421	421	421
100	011	010

$= (100011010)_2$

$(753)_8$ $(?)_2$

7	5	3
421	421	421
111	101	011

$= (111101011)_2$

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1) $(1110111)_2$ $(?)_8$

001 110 111
421 421 421
1 4+2 4+2+1

$= (167)_8$

2) $(111110111)_2$ $(?)_8$

111 110 111
421 421 421
4+2+1 4+2 4+2+1

$= (767)_8$

3) $(454)_8$ $(?)_2$

4 5 4
421 421 421
100 101 100
$= (100101100)_2$

4) $(756)_8$ $(?)_2$

7 5 6
421 421 421
111 101 110
$= (111101110)_2$

5) $(111110110)_2$ $(?)_8$

111 110 110
421 421 421
4+2+1 4+2 4+2
$= (766)_8$

★ 1) $(754)_{10}$ $(?)_8$

	754	
8	94	2
8	11	6
8	1	3

$= (1362)_8$

→ Decimal to octal

2) $(563)_{10}$ $(?)_{16}$

	563	
16	35	3
16	2	3

$= (233)_{16}$

Decimal to Hexadecimal

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3) $(1101111)_2$ (?)8

001 101 111
421 421 421
1 4+1 4+2+1

$=(157)_8$

→ Binary to octal

4) $(743)_8$ $(?)_2$

7 4 3
421 421 421
111 100 011

$=(111100011)_2$

Octal to Binary

5) $(743)_{10}$ $(?)_2$

2	743	
2	371	1
2	185	1
2	92	1
2	46	0
2	23	0
2	11	1
2	5	1
2	2	1
	1	0

$=(1011100111$

→ Decimal to Binary

6) $(110111)_2$ $(?)_{10}$

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

$=32+16+4+2+1$

$=(55)_{10}$

→ Binary to Decimal

7) Hexadecimal to Binary → 8+4+2+1

1) $(A43)_{16}$ $(?)_2$

10 4 3
8421 8421 8421
1010 0100 0011

$=(101001000011)_2$

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3 $(ABD)_{16}$ $(?)_2$

10	11	13
8421	8421	8421
1010	1011	1101

$= (101010111101)_2$

8 ✱ Binary to hexadecimal.

1. $(10110111)_2$ $(?)_{16}$

1011	0111
8421	8421
11	7

$= (117)_{16}$ $= (B7)_{16}$

2 $(111011101011)_2$ $(?)_{16}$

0011	1011	1011
8421	8421	8421
3	11	11

$= (31111)_{16}$ $= (3BB)_{16}$

9 ✱ Octal to hexadecimal.