De La Salle University
College of Computer Studies

CCICOMP Problem Set 1 – Number Systems Conversion

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Section: S13C Grade:

1.0 Number Systems Conversion

1.1 Complete the following table by indicating the **missing information** for each:

Number System	Base Value	Digits
Decimal	Base-10	0, 1, 2, 3, 4, 5, 6, 7, 8, 9
Binary	Base-2	0, 1
Octal	Base-8	0, 1, 2, 3, 4, 5, 6, 7
Hexadecimal	Base-16	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F

1.2 Complete the following table below by filling up the values on each of the rows for the **Binary**, **Octal**, and **Hexadecimal** columns, corresponding to their equivalent value in **Decimal**:

Decimal (Base-10)	Binary (Base-2)	Octal (Base-8)	Hexadecimal (Base-16)
0	0	0	0
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F
16	10000	20	10

1.3 Complete each table below and answer the questions provided.

Decimal	**Place Value**	Ten Thousands	Thousands	Hundreds	Tens	Units/Ones	Radix Point	Tenths
	Position	4	3	2	1	0		-1
	$10^{Position}$	10^4	10^3	10^2	10^1	10^0		10^{-1}
	Value of $10^{Position}$	10000	1000	100	10	1		0.1

1. The value of 1234_{10} in Decimal is 1234.
2. The value of 2401_{10} in Decimal is 2401.

**Hint: Decimal is also Base-10*

Binary	**Place Value**	Ten Thousands	Thousands	Hundreds	Tens	Units/Ones	Radix Point	Tenths
	Position	4	3	2	1	0		-1
	$2^{Position}$	2^4	2^3	2^2	2^1	2^0		2^{-1}
	Value of $2^{Position}$	10000	1000	100	10	1		0.1
	Value in Decimal	16	8	4	2	1		0.5

3. The value of 101_2 in Decimal is 5.
4. The value of 1001_2 in Decimal is 9.
5. The value of 1110_2 in Decimal is 14.
6. The value of 10101_2 in Decimal is 21.
7. The value of 11010_2 in Decimal is 26.

Octal	**Place Value**	Ten Thousands	Thousands	Hundreds	Tens	Units/Ones	Radix Point	Tenths
	Position	4	3	2	1	0		-1
	$8^{Position}$	8^4	8^3	8^2	8^1	8^0		8^{-1}
	Value of $8^{Position}$	10000	1000	100	10	1		0.1
	Value in Decimal	4096	512	64	8	1		0.125

8. The value of 14_8 in Decimal is 12.
9. The value of 27_8 in Decimal is 23.
10. The value of 103_8 in Decimal is 67.
11. The value of 123_8 in Decimal is 83.

Hexadecimal	**Place Value**	Ten Thousands	Thousands	Hundreds	Tens	Units/Ones	Radix Point	Tenths
	Position	4	3	2	1	0		-1
	$16^{Position}$	16^4	16^3	16^2	16^1	16^0		16^{-1}
	Value of $16^{Position}$	10000	1000	100	10	1		0.1
	Value in Decimal	65536	4096	256	16	1		0.0625

12. The value of 12_{16} in Decimal is 18.
13. The value of 49_{16} in Decimal is 73.
14. The value of 123_{16} in Decimal is 291.

1.4 Complete the conversion formula table below by writing the corresponding formula used for conversion:

FROM \ TO	Binary	Octal	Decimal	Hexadecimal
Binary		Group binary	Multiply each	Group binary
Octal	Convert each		Multiply each	Convert each
Decimal	Continuously	Continuously		Continuously
Hexadecimal	Convert each	Convert each	Multiply each	

General Formula
Decimal -> Base Continuously divide
Base -> Decimal Multiply each digit I

1.5 Convert the following table by providing their Decimal, Binary, Octal, Hexadecimal equivalences:

Binary	Octal	Decimal	Hexadecimal
1010	12	**10**	A
100	4	4	4
100 0000	**100**	64	40
110 0100	144	**100**	64
1 0000 0000	400	256	**100**
1100 0011	303	195	C3
100101	**45**	37	25
111111	77	**63**	3F
10100001	241	161	**A1**
1011 0110	266	182	B6
1010011	**123**	83	53
1111011	173	**123**	7B
100100011	443	291	**123**