



INSTITUTE OF  
TECHNOLOGY  
DEVELOPMENT  
OF CANADA

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# Introduction to Computers



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# CONVERSION TABLE

- DECIMAL – BASED-10  
**0,1,2,3,4,5,6,7,8,9**
- HEXADECIMAL – BASED-16
- OCTAL – BASED-8
- QUATERNARY – BASED-4
- BINARY – BASED-2

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# HEXADECIMAL TO DECIMAL

- **HEXADECIMAL – BASED-16**  
**0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F**

Ex:  $(A1F6)_{16}$

Hex number	A	1	F	6
Successive powers of 16	$16^3$	$16^2$	$16^1$	$16^0$
calculation	$10 \times 4096$	$1 \times 256$	$15 \times 16$	$6 \times 1$
decimal	40960	256	240	6

$$(A1F6)_{16} = (41,462)_{10}$$



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# HEXADECIMAL TO BINARY

Ex:  $(A1F6)_{16}$

Which numbers you  
can Sum to get A(10)?



Which numbers you  
can Sum to get 6?



Hex.	A				1				F				6			
Successive powers of 2	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1
Binary	1	0	1	0	0	0	0	1	1	1	1	1	0	1	1	0

$$(A1F6)_{16} = (1010000111110110)_2$$



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## DECIMAL TO HEXADECIMAL

- Binary Number :  $(41,462)_{10}$

16	41,462	remainder -> 6
16	2591	remainder -> 15
16	161	remainder -> 1
16	10	remainder -> 10

$$(10)_1(15)_16 = (A1F6)_{16}$$



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# OCTAL TO DECIMAL

- OCTAL – BASED-8

0,1,2,3,4,5,6,7

Ex:  $(507)_8$

Octal number	5	0	7
Successive powers of 8	$8^2$	$8^1$	$8^0$
calculation	$5 \times 64$	$0 \times 8$	$7 \times 1$
decimal	320	0	7

$$(507)_8 = (327)_{10}$$

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# OCTAL TO BINARY

Ex:  $(507)_8$

Hex.	5			0			7		
Successive powers of 2	4	2	1	4	2	1	4	2	1
Binary	1	0	1	0	0	0	1	1	1

$$(507)_8 = (101000111)_2$$

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# DECIMAL TO OCTAL

- Decimal Number :  $(327)_{10}$

8	327	remainder -> 7
8	40	remainder -> 0
8	5	remainder -> 5

↑  
 $(507)_8$

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# CONVERTING BINARY TO DECIMAL

- Binary Number :  $(10101)_2$

Binary number	1	0	1	0	1
Successive powers of 2	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
calculation	$1 \times 16$	$0 \times 8$	$1 \times 4$	$0 \times 2$	$1 \times 1$
decimal	16	0	4	0	1

$$(10101)_2 = 16 + 0 + 4 + 0 + 1$$

$$(10101)_2 = (21)_{10}$$



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# CONVERTING REAL NUMBERS

- $(0.1011)_2$

Decimal Number
Successive powers of 2
calculation
decimal

.	1	0	1	1
	$2^{-1}$	$2^{-2}$	$2^{-3}$	$2^{-4}$
	$1 \times 0.5$	$0 \times 0.25$	$1 \times 0.125$	$1 \times 0.0625$
	0.5	0	0.125	0.0625

$$(0.1011)_2 = (0.6875)_{10}$$

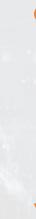


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# CONVERTING REAL NUMBERS

$\cdot(0.6875)_{10}$

2	0.6875	decimal point-> 1
2	0.375	decimal point-> 0
2	0.75	decimal point-> 1
2	0.5	decimal point -> 1



$(0.\textcolor{red}{1}011)_2$

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# CONVERTING REAL NUMBERS

•  $(0.3)_{10}$

0.3	x 2	0.6	decimal point-> 0
0.6	x 2	1.2	decimal point-> 1
0.2	x 2	0.4	decimal point-> 0
0.4	x 2	0.8	decimal point -> 0
0.8	x 2	1.6	decimal point -> 1
0.6	x 2	1.2	de cimal point -> 1
0.2	x 2	0.4	decimal point -> 0
0.4	x 2	0.8	decimal point -> 0
0.8	x 2	1.6	decimal point -> 1
0.6	x 2	1.2	decimal point -> 1
...			

$(0.\textcolor{red}{0}100110011)_2$

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# Thank You!

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