NUMBER SYSTEM

INTRODUCTION

NUMBER SYSTEM CHART

System	Base	Symbols
Decimal	10	0, 1, … 9
Binary	2	0, 1
Octal	8	0, 1, … 7
Hexa-decimal	16	0, 1, … 9, A, B, … F

BASIC CONVERSION

DECIMAL

OCTAL

BINARY

HEXADECIMAL

BINARY TO DECIMAL

Technique

Multiply each bit by 2^n, where *n* is the "weight" of the bit

The weight is the position of the bit, starting from 0 on the right

Add the results EX:-

101011_2 =>	1	x	2^0	=	1
	1	x	2^1	=	2
	0	x	2^2	=	0
	1	x	2^3	=	8
	0	x	2^4	=	0
	1	x	2^5	=	32
					43_{10}

DECIMAL TO BINARY

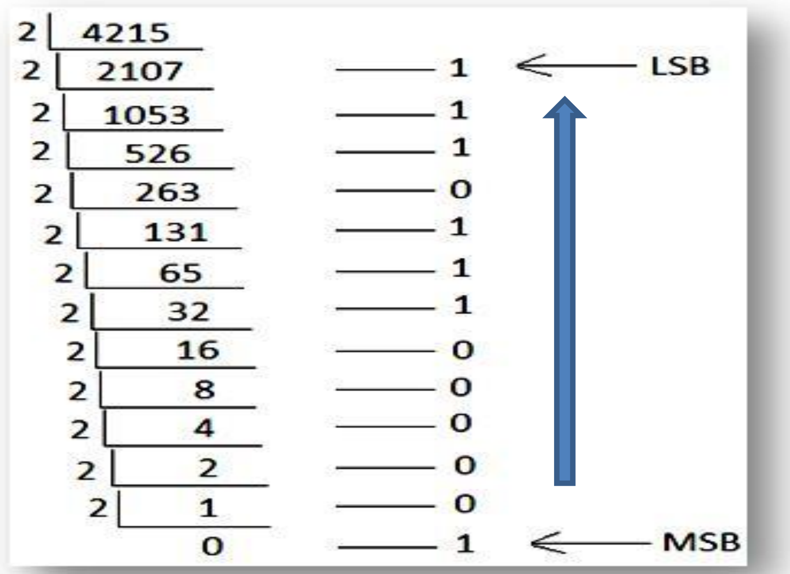
Technique

– Divide by two, keep track of the remainder
– First remainder is bit 0 (LSB, least-significant bit)
– Second remainder is b

Example:-

$(1000001110111)_2$

$(4215)_{10}$



OCTAL TO HEXADECIMAL

- When converting from octal to hexadecimal, it is often easier to first convert the octal number into binary and then from binary into hexadecimal.

Example:- convert 345 octal into hexadecimal

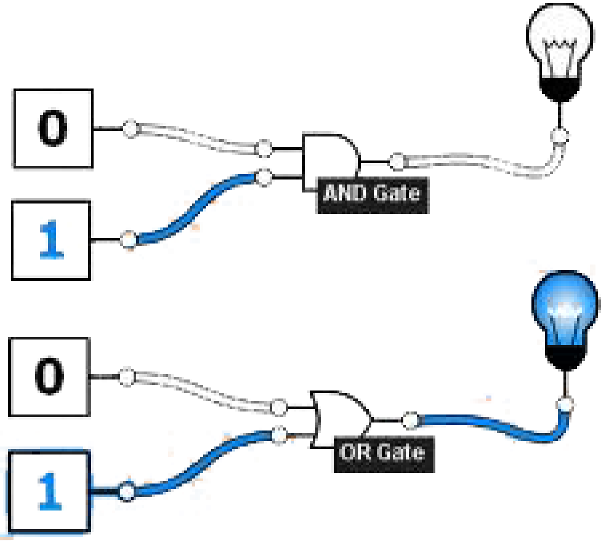
Octal =	3	4	5	
Binary =	011	100	101	= 011100101 binary

Now from binary to Hexadecimal

Binary =	1110	0101	
Hexadecimal =	E	5	= E5 hex

INTRODUCTION : ELECTRONICS

- Device that performs a basic operation on electrical signals
- Methods for describing the behavior of gates and circuits
  - – Boolean expressions
  - – logic diagrams
  - – truth tables



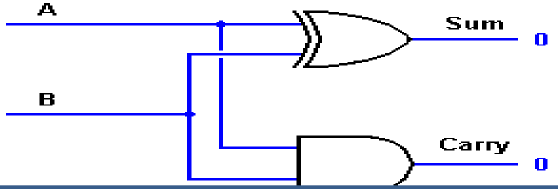
BOOLEAN EXPRESSION

- Demonstrates the activity of electrical circuits in terms of algebraic notation

- Example is :
  - *Product Terms* – Terms that are ANDed together and called MAX Terms
    - XYZ
    - (A+B)(C+D)(A+D)
  - *Sum Terms* – Terms that are ORed together and called MIN Terms
    - X+Y+Z
    - XYZ + VX

LOGIC DIAGRAM

- Defines the function of a gate by listing all possible input combinations and the corresponding output



Truth Table

- Defines the function of a gate by listing all possible input combinations and the corresponding output

A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

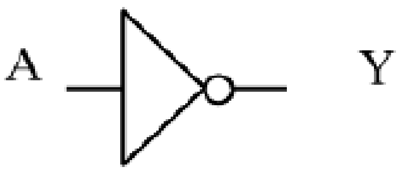
TYPES OF GATES

- **Can be classified as**
  - Basic gates
  - (OR, AND, NOT)
  - Universal gates
  - (NAND, NOR)
  - Exclusive gates
  - (X-OR, X-NOR)

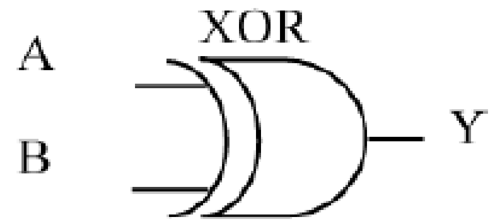
LOGICAL GATES

Basic Logic Gates

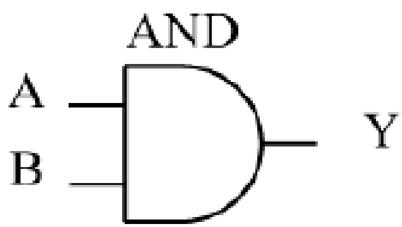
A	Y
0	1
1	0



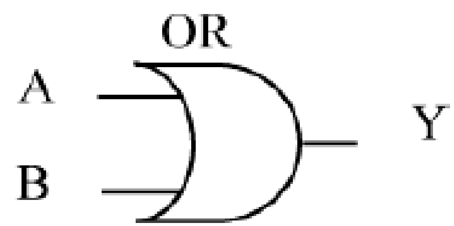
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0



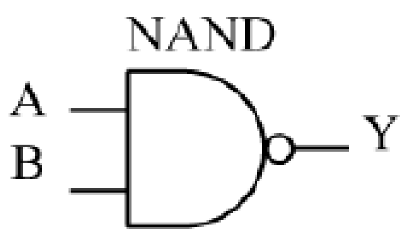
A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



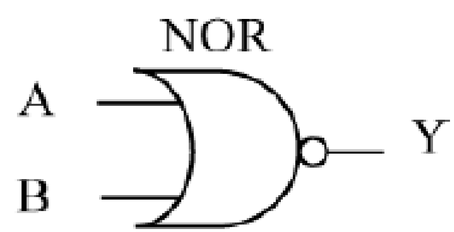
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0



A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0




Thank You
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