DIGITAL ELECTRONICS

UNIT-I - DIGITAL FUNDAMENTALS

NUMBER SYSTEMS

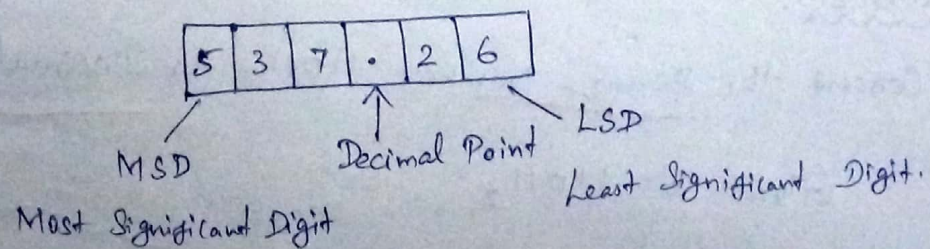
Number System is a basis for Counting various items. We human use decimal number system but the modern computer uses binary number system 0 and 1.

Let us discuss the following number systems.

Decimal Number System
Binary Number System
Octal Number System
Hexa decimal Number System.

Decimal Number System

The base or radix of the decimal number system is 10. The decimal numbers are 0, 1, 2, 3, 4, 5, 6, 7, 8 & 9.



Binary Number System

In binary number system each binary digit is commonly known as bits.

The base (radix) of binary number system is 2. The binary numbers are 0 and 1.

Ex: 11001_2

Octal Number System

The base of octal number system is 8. The octal numbers are 0, 1, 2, 3, 4, 5, 6 & 7.

Ex. 785 is an octal number

985 is not an octal number.

Hexa decimal Number System.

The base of hexadecimal number system is 16

The hexadecimal number system consists of the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and the alphabets A, B, C, D, E, F.

Ex: AB.C6

PROBLEM!

1.) Convert the Binary Number 11011_2 to Decimal Number

Given $N = 11011_2$

Convert to decimal

$$N = 1\times2^4 + 1\times2^3 + 0\times2^2 + 1\times2^1 + 1\times2^0$$

$$= 1+16+1\times8+0+1\times2+1$$

$$= 27_{10}$$

2) Convert binary number 10110.11_2 to decimal number.

Given $N = 10110.11_2$

Converting to decimal

$$N = 1\times2^4 + 0\times2^3 + 1\times2^2 + 1\times2^1 + 0\times2^0 + 1\times2^{-1} + 1\times2^{-2}$$

$$= 16 + 0 + 4 + 2 + 0 + 0.5 + 0.25$$

$$N = 22.75_{10}$$

Relation Between Decimal, Binary, Octal & Hexadecimal number

Decimal	Binary	Octal	Hexadecimal
0	0000	0	0
1	0001	1	1
2	0010	2	2
3	0011	3	3
4	0100	4	4
5	0101	5	5
6	0110	6	6
7	0111	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