NUMBER SYSTEMS

Number Systems

* **Many Numbers Systems exist:**

  - **Binary (0,1)**
  - **Decimal (0,1,2,3,4,5,6,7,8,9)**
  - **Hexadecimal (0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F)**

Number Conversion

- Binary to Decimal Conversion
- Decimal to Binary Conversion
- Decimal to Hexadecimal Conversion
- Hexadecimal to Decimal Conversion

Binary to Decimal Conversion

Example: Convert 101101 Binary Number into Decimal number System.

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**
		1	0	1	1	0	1

32 + 0 + 8 + 4 + 0 + 1= **45**

Binary to Decimal Conversion

Example 2: Convert 11111111 Binary Number into Decimal Number System:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**
1	1	1	1	1	1	1	1

128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = **255**

Decimal to Binary Conversion

Example 1: Convert 59 Decimal Number into Binary Number Systems:

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	**64**	**32**	**16**	**8**	**4**	**2**	**1**
0	0	1	1	1	0	1	1

So the Number is= **111011**

Decimal to Hexadecimal Conversion

Example 1: Convert 22 Decimal Number to Hexadecimal Number Systems:

16^2	16^1	16^0
256	16	1
	1	6

* So 22 Decimal Number in Hexadecimal Number is **16**

Decimal to Hexadecimal Conversion

Example 2: Convert 42 Decimal No to Hexadecimal No

16^2	16^1	16^0
256	16	1
	2	10

* So 42 Decimal Number in Hexadecimal Number is 210 where in Hexadecimal Number 10=A so the answer is **2A.**

Hexadecimal to Decimal Conversion

Example 1: Convert C2 Hexadecimal No to Decimal No

* C represents the decimal number 12

16^2	16^1	16^0
256	16	1
	C	2
	12	2
	192	2

So C2 equal in Decimal is= 192 + 2= **194**

Conclusion

- There are many methods of Binary ,Decimal and Hexadecimal Number Conversion.
- This is the Simplest Method.
- Conversion up to 8 Binary Digits.
- Maximum Decimal Number is 55.