

Introduction to Computer

Lecture# 27

Topic

- Hexadecimal Number System
- Where is hexadecimal number system used?

Hexadecimal Number System

Hexadecimal Number									MSB	LSB
16^8	16^7	16^6	16^5	16^4	16^3	16^2	16^1	16^0		
4.3 G	2.6 G	16M	1M	65k	4k	256	16	1		

Hexadecimal Number System

- One common way of overcoming this problem is to arrange the binary numbers into groups or sets of four bits (4-bits). These groups of 4-bits use another type of numbering system also commonly used in computer and digital systems called **Hexadecimal Numbers**.
- Hexadecimal Number String**
- The “Hexadecimal” or simply “Hex” numbering system uses the **Base of 16** system and are

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- a popular choice for representing long binary values because their format is quite compact and much easier to understand compared to the long binary strings of 1's and 0's.
- Being a Base-16 system, the hexadecimal numbering system therefore uses 16 (sixteen) different digits with a combination of numbers from 0 through to 15. In other words, there are 16 possible digit symbols.

Base

- Base 10 (**Decimal**) — Represent any **number** using 10 digits [0–9]
- Base 2 (Binary) — Represent any **number** using 2 digits [0–1]
- Base 8 (Octal) — Represent any **number** using 8 digits [0–7]
- Base 16 (Hexadecimal) — Represent any **number** using 10 digits and 6 characters [0–9, A, B, C, D, E, F]

Hexadecimal Numbers

Decimal Number	4-bit Binary Number	Hexadecimal Number
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F
16	0001 0000	10 (1+0)
17	0001 0001	11 (1+1)
Continuing upwards in groups of four		

Where is hexadecimal number system used?

- Where is hexadecimal number system used?

Hexadecimal can be **used** to write large binary **numbers** in just a few digits. It makes life easier as it allows grouping of binary **numbers** which makes it easier to read, write and understand. It is more human-friendly, as humans are **used** to grouping together **numbers** and things for easier understanding.