4Bit BCD  8Bit BCD Code

**BCD Code** : We represent each digit of decimal number in 4 Bits / 8-bit

**Excess-3 Code** : We represent a decimal / Binary number by adding '3'

↳ XS-N

**Gray Code** :

↳ Sequence of number represented as 1 bit Change.

# Reflective Code:

↳ A code is reflective when the code is self complementing.

Complement : Make all zeroes → 1 & all Ones → 0

Ex $x = 1\,0\,1\,0 \longrightarrow x^c = 0\,1\,0\,1$

$\Downarrow$ $\Downarrow$

10 5

Self Complementing → Reflective Code

0 - 16

[Bin ↔ dec]

Ex 2 $1\,0\,1\,1 \longrightarrow x^c \Rightarrow 0\,1\,0\,0$

$\Downarrow$ $\Downarrow$

11 ↔ 4

Self Complementing → Reflective Code

8421 BCD Code, Excess-3 Code, 5421 BCD Code etc are reflective Code

* Gray Code are not reflective.

| Decimal | BCD | XS-3 |
|---|---|---|
| 0 | 0000 | 0011 |
| 1 | 0001 | 0100 |
| 2 | 0010 | 0101 |
| 3 | 0011 | 0110 |
| 4 | 0100 | 0111 |
| 5 | 0101 | 1000 |
| 6 | 0110 | 1001 |
| 7 | 0111 | 1010 |
| 8 | 1000 | 1011 |
| 9 | 1001 | 1100 |

XS-3

4 ↔ 5

3 ↔ 6

2 ↔ 7

1 ↔ 8

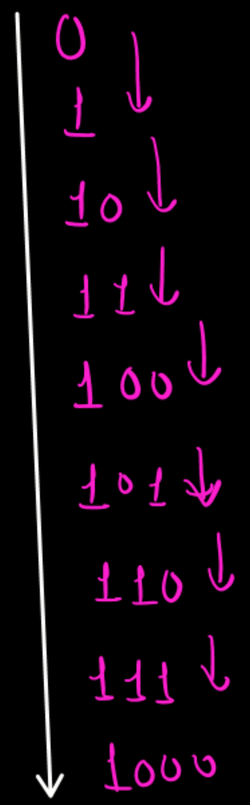
0 ↔ 9

# Sequential Code :

→ Each succeeding Code is one binary number greater than its preceding Code.

succeeding → Next

preceding → Previous



# Alphanumeric Code :

→ A binary number can only understand 0 & 1. (two Symbols)

→ But it is not enough for Communication b/w two Computers.

→ We need Code to represent 26 alphabets (small & Capital), and numbers from 0 to 9, punctuation marks & symbols.

→ The Codes that represents numbers alphanumeric Characters are Alpa Code
(alpha → Alphabes, numeric → Numbers)

Representation :

(A) ASCII (American Standard Code for Information Interchange) : 7 bit Code

(B) EBCDIC (Extended Binary Coded Decimal Interchange Code) : 8 bit Code

## (A) ASCII (American Standard Code for Information Interchange)

↳ A 7 bit Character Code where every single bit represent a unique Character.

↳ Modern Character encoding

7 bits ⇒ $2^7$ numbers = 128 numbers
[Range = 0 to 127]
← decimal

| [ASCII Char] | [decimal Code] |
|---|---|
| 0-9 | 48 to 57 |
| A-Z | 65 to 90 |
| a-z | 97 to 122 |
| @ | 64 |
| \ | 92 |
| ? | 63 |
| > | 62 |

| ASCII | decimal |
|---|---|
| = | 61 |
| < | 60 |
| ; | 59 |
| : | 58 |

| Decimal | Binary | ASCII |
|---|---|---|
| 65 | 1000001 | A |
| 66 | 1000010 | B |
| 67 | 1000011 | C |
| ⋮ | | |

Memory

Screen

## (B) UNICode ( Universal Code)

It is an Standard that Consists encoding or representation of all the texts (all languages) in binary format.

→ ~ 144697 Characters are represented in UNICODE