بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيمِ

BCD Binary coded decimal

- Assigns a four digit binary code to each digit [0-9] in a decimal (base-10).

- Numbers > 9, having 2 or more digits in the decimal system, are expressed digit by digit.
  - The BCD rendition of the base-10 number 15 is 0001 0101

- 0 = 0000
- 1 = 0001
- 2 = 0010
- 3 = 0011
- 4 = 0100
- 5 = 0101
- 6 = 0110
- 7 = 0111
- 8 = 1000
- 9 = 1001

BCD Cont.

- The following codes are not valid BCD codes
  - 1010
  - 1011
  - 1100
  - 1101
  - 1110
  - 1111

2421 Code

- A weighted code.
  - The weights assigned to the four digits are 2, 4, 2, and 1.

- The 2421 code is the same as that in BCD from 0 to 4; however, it differs from 5 to 9

- This is a self-complementary code,
  - the 9's complement of the decimal number is obtained by changing the 1s to 0s and 0s to 1s

2421 Code Cont.

2421

	x	y	z	t
0	O	O	O	O
1	O	O	O	1
2	O	O	1	O
3	O	O	1	1
4	O	1	O	O
5	1	O	1	1
6	1	1	O	O
7	1	1	O	1
8	1	1	1	O
9	1	1	1	1

2421 Code Cont.

- The following codes are not valid 2421 codes
    - 0101
    - 0110
    - 0111
    - 1000
    - 1001
    - 1010

Excess-3 Code

- First, add 3 and then convert to binary.

Decimal digits	Excess-3 code
0	0011
1	0100
2	0101
3	0110
4	0111
5	1000
6	1001
7	1010
8	1011
9	1100

Excess-3 Code Cont.

Decimal digits	Excess-3 code
10	N/A
11	N/A
12	N/A
13	N/A
14	N/A
15	N/A

Excess-3 Code Cont.

- This is a self-complementary code.

Decimal digits	Excess-3 code
0	0011
①1	0100
2	0101
3	0110
④4	0111
⑤5	1000
6	1001
7	1010
⑧8	1011
9	1100

Excess-3 Code Cont.

- The following codes are not valid Excess-3 codes
  - 0000
  - 0001
  - 0010
  - 1101
  - 1110
  - 1111

Gray Code

0 (0000)
1 (0001)
2 (0011)
3 (0010)
4 (0110)
5 (0111)
6 (0101)
7 (0100)

8 (1100)
9 (1101)
10 (1111)
11 (1110)
12 (1010)
13 (1011)
14 (1001)
15 (1000)

Thanks ☺