2421 Code (2*-4-2-1)

(BCD type) *→ MSB ②

Decimal digit	Set - I (Lower Significance) 2 4 2 1	Set - II (Self Complementing) 2 4 2 1
0	0 0 0 0	0 0 0 0
1	0 0 0 1	0 0 0 1
2	0 0 1 0	0 0 1 0
3	0 0 1 1	0 0 1 1
4	0 1 0 0	0 1 0 0
5	0 1 0 1	1 0 1 1 → 2+2+1
6	0 1 1 0	1 1 0 0 → 2+4
7	0 1 1 1	1 1 0 1
8	1 1 1 0	1 1 1 0
9	1 1 1 1	1 1 1 1

This is pretened set.

3 → (2) 4 2 1
(1) 0 0 1 → X

↓ Higher so not used

4 → 2 4 2 1

(1) 0 1 0 X

↓ Higher significance

Self Complementing is called Reflective Code.

9 → Complement of 0

9 → 0

1111 → 0000

8 → Complement of 1

1110 → 0001

7 → Complement of 2

1101 → 0010

Decimal	7421	5421	3321	$84\bar{2}\bar{1}$	$74\bar{2}\bar{1}$
0	0000	0000	0000	0000	0000
1	0001	0001	0001	0111	0111
2	0010	0010	0010	0110	0110
3	0011	0011	0011	0101	0101
4	0100	0100	0101	0100	0100
5	0101	1000	1010	1011	1010
6	0110	1001	1100	1010	1001
7	1000	1010	1101	1001	1000
8	1001	1011	1110	1000	1111
9	1010	1100	1111	1111	1110

HW

1) Convert $(37)_{10}$ to 2421 code

2) Decimal equivalent.

0100 1100 1110

↳ 2421 code.

Excess 3 Code

(XS-3 Code)

Decimal → 8421 Code $\xrightarrow[0011]{\text{add}}$ Excess-3

(BCD Code)

A → BCD → A+3

5 → 0101 → 0101

+ 0011

1000 → XS-3 Code.

(8) X-3 Code.

↳ X-3 code ~~dont~~ is unweighted code.

↳ 4-bit Code (0-9)

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

0000
+0011
0011

} self complementing

Ex:- 1 Excess-3 Code of decimal

i) 24 → BCD 0010 0100 add → 0011

```
  0010  0100
  0011  0011
-------------
  0101  0111   XS-3 Code
-------------
   5     7
```

2) 658

↓ BCD

```
  1 1    1 1 1
  0110   0101   1000
  ----   ----   ----
   6      5      8
+ 0011   0011   0011
-------------------
  1001   1000   1011   XS-3 Code.
-------------------
```

Check XS-3 Code is Self Complementing

9 ⟷ 0 → 9
1 → 8
2 → 7

0011 —Complement→ 1100 (9)
0100 → 1011 (8)

XS-3 Code is the only unweighted Code which is Self-Complementing

Imp

* $w_3\ w_2\ w_1\ w_0$

$w_3 + w_2 + w_1 + w_0 = 9$

(Sum = 9) → self Complementing

2-4-2-1 → 9

2+4+2+1 → 9 (Self Complementing

8-4-2-1.

8+4+2+1 → 15 (Not Self Complementing

3-3-1-1 } self Complementing
4-3-1-1 } Codes

only in Case of weighted Code.

H.W i) XS-3 Code of 16, 39, 1208

2) Code is Self-Complements

5-2-1-1.