MY CHOICE
Date:
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* Self Complimenting Codes — Lecture 10

* Weighted
* Non weighted : x-3 code is self complimenting for base 10

BCD → It is weight code cuz we are able to assign the weight

Ex: 1001 0111
$2^3 2^2 2^1 2^0$ $2^3 2^2 2^1 2^0$ → weight

9 7

x-3 = BCD + 3 → Non weighted code

Q which excess code ~~to~~ is self complementing for base 20 ? → gate question

* Self complementing for base r !
1's compliment of the coded no gives (r-1)'s compliment of the no. itself

(2+3) → x-3 ; 1's compliment

$(2)_{10}$ → 0101 → 1010 → 10 - 3 = 7
x-3

Let no is a & Let 'k' excess is self complimenting for base 20

a + k

$2^{5-1} - (a+k)$ = Coded number = $19 - a + k$

↓

1's Complement of Coded number

31 − a − k = 19 − a + k

$2k = 12$

$k = 6$

for base 20 x − 6 is self complementing (gate question)

* For base 10 which excess code is self complimenting?

$(3)_{10} \xrightarrow{x=3} 3+3=6 \rightarrow 0110 \rightarrow 1001$

Let no. is "a" and "k" excess is self complimenting for base 10

$15 - (a+k) = 9 - a + k$

$15 - a + k = 9 - a + k$

$2k = 15 - 9$

$k = 3$

Let base is "r" and "k" excess is self complimenting

Let no is 'a', d bits are need to represent base r

$(2^d - 1) - (a + k) = (r - 1) - a + k$

$2^d - 1 - a - k = r - 1 - a + k$

$2k = r \quad 2^d - r$

formula $\longrightarrow \quad k = \frac{2^d - r}{2}$

$r = 10$

$k = \frac{2^4 - 10}{2} = 3$ Ans

$r = 20 \quad k = \frac{2^5 - 20}{2} = 6$ Ans

$r = 18$

$k = \frac{2^d - r}{2} = \frac{2^5 - 18}{2} = \frac{32 - 18}{2} =$

$r = 19 \rightarrow$ we do not have excess codes as self complimenting for odd base

Why

$r = 19 \quad \frac{2^5 - 19}{2} = \frac{32 - 19}{2} = 6.5$ ✗

* Self Complimenting weighted Code

- 8421 - weight for base 10 ^8421 is 8421 is SC ? (gate Ques)
- 2421 is S.C for base 10
  weight

My Brain is not able process this, so for now I'm leaving it as it is

Simple trick : Sum of the weight should be 9

8421 → Sum = 9, so it is SC for base 10

2421 → 9 — ✓
84-2-1 → 9 — ✓
642-3 → 9 — ✓
3321 → 9 — ✓

* Representation of numbers

- Integer
  - unsigned → 0 to n
  - signed → -n to +n
- Real no.
  - Fixed point notation
  - Floating point notation

* Signed
  - SMR → Signed magnitude Representation
  - 1's → 1's Complement Representation
  - 2's → 2's " "

Q1 Represent $(25)_{10}$ in 8bit unsigned Representation

00011001 Ans

Q2 Represent $(36)_{10}$ in 8 bit register of 8085 microprocessor assuming unsigned representation

00100100 Ans

Q3 Represent $(45)_{10}$ in 16 bit register using unsigned representation

0000 0000 0010 1101

0 0 2 D H = 002DH

Q4 Represent $(45)_8$ in 8 bit register unsigned representation

00100101

2 5 → Hex Representation

Q5 Find the smallest and largest decimal number represented in 8 bit register using usigned representation

00000000 → Smallest

11111111 → $2^{8-1} = 255$

generalized ans largest no. in n bit reg

1 ---- n → 2^{n-1} =

* Range of unsigned integers represented in 'n' bit

0 to $2^n - 1$

* Signed Integer → −ve ⇒ 1, +ve ⇒ 0