CSE 331 /L-20/02.05.2024/

IC 138 ⇒ D-MUX for interfacing RAM

Enable Pin { G1 ⇒ 1, $\overline{G2A}$ ⇒ 0, $\overline{G2B}$ ⇒ 0 } Normal operation or MUX is active

~~A B C~~ C B A

MSB LSB

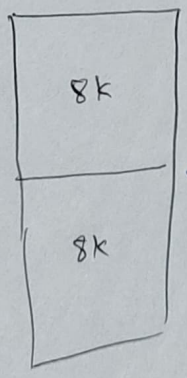
PLA ⇒ Programable Logic Array

EPROM ⇒ 4k - each size 4k × 8

total size = 4k × 4 = 16k × 8

EPROM-0 = even, EPROM-1 = odd } Lower 8 bit

EPROM-2 = even, EPROM-3 = odd } Higher 8 bit

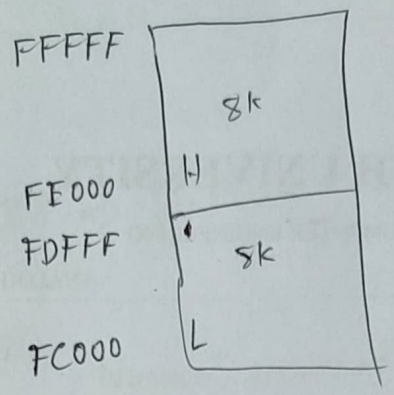


even 4k / odd 4k

A_0 used for even or odd.

ROM = Read only memory ⇒ $\overline{OE}$ = output Enable

$\overline{CE}$ = Chip Enable



$A_0 - A_{12}$ ⇒ Already used

C B A

A_{19} A_{18} A_{17} A_{16} A_{15} A_{14} A_{13}

1 1 0

1 1 1

1 → F

C B A

1 1 0 ⇒ Y_6 ⇒ L

1 1 1 ⇒ Y_7 ⇒ H

A_{15} A_{14} A_{13} A_{12}

1 1 0 × → 0 ⇒ C, 1 ⇒ D } $Y_6 = L$

1 1 1 × → 0 ⇒ E, 1 ⇒ F } $Y_7 = H$

× → 0 or 1

⊗ Configure Given, find out the address limit or according to address limit configure the circuit.

Configuration may change in mux output or mux enable and input pin.

PLA ⇒ 16 LA

Fun LED,

0 = on

1 = off

Dot = Fixed

Cross = Programable

PROM ⇒ AND fixed

OR Programable

PAL ⇒ AND Programable

OR fixed

PLA ⇒ Both Programable ⇒ No Limitation

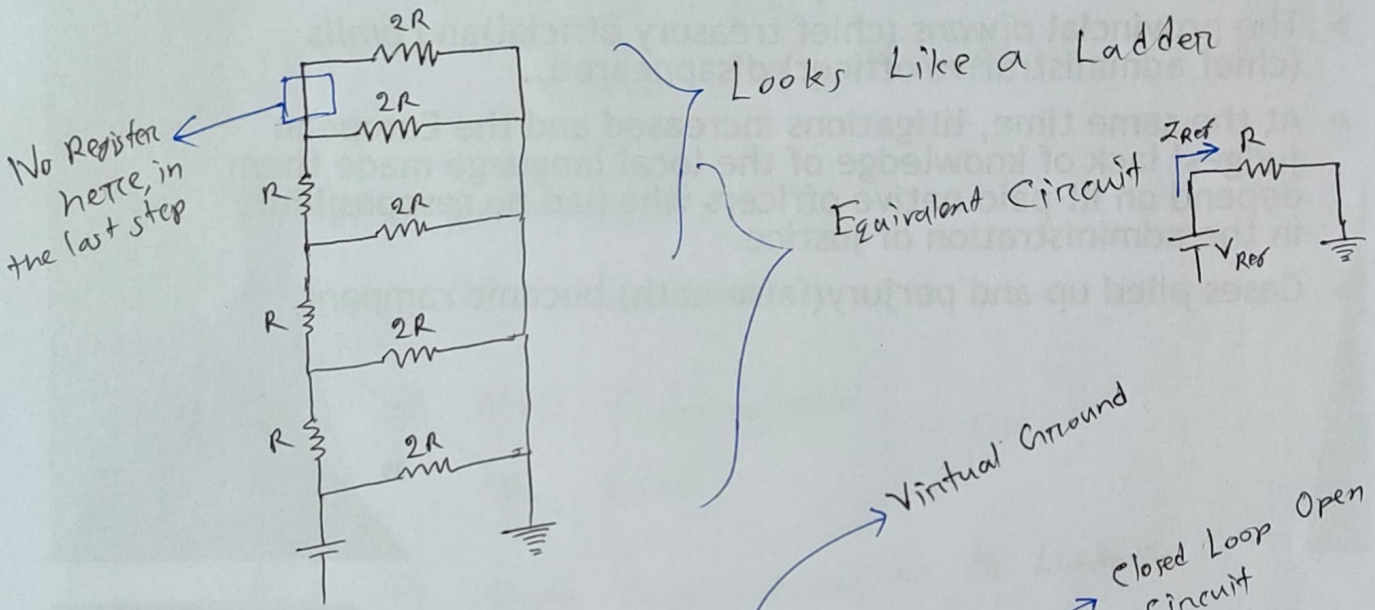
L-21 / 04.05.2024

Midterm Exam

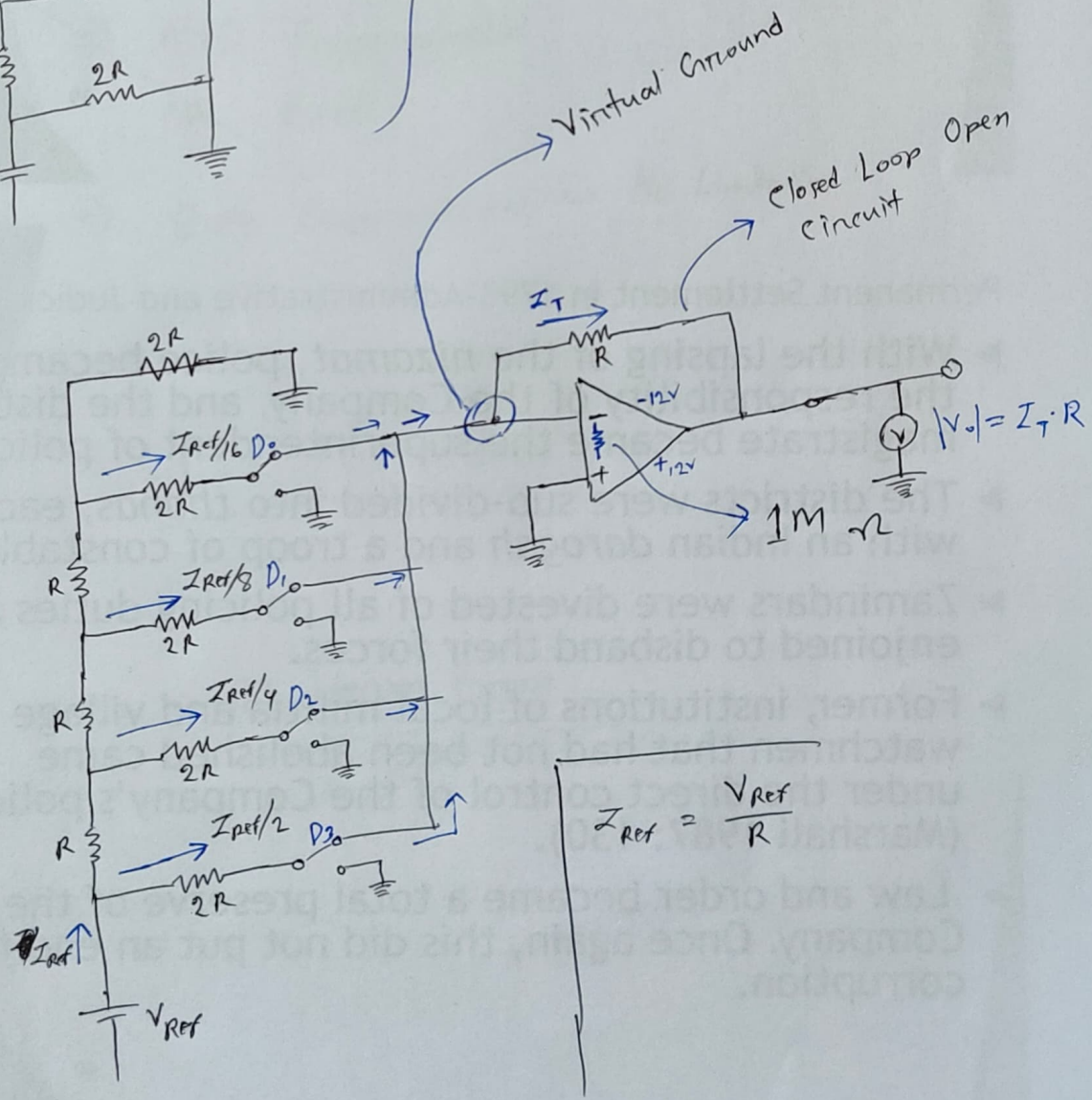
CSE 331 / L-22 / 09.05.2024 /

✳ DAC ⇒ Digital to Analogue Converter.

✳ R-2R Ladder Circuit



✳ DAC



Lets say, Digital Input, total 4x

$D_3 = D_2 = D_1 = D_0 = 1 \Rightarrow$ means switch is on

Then,

$$I_T = \frac{I_{Ref}}{2} + \frac{I_{Ref}}{4} + \frac{I_{Ref}}{8} + \frac{I_{Ref}}{16}$$

$$= \frac{I_{Ref}}{16}(8+4+2+1)$$

$$= \frac{V_{Ref}}{R \times 16}(8+4+2+1)$$

$$= \frac{V_{Ref}}{R \cdot 2^4}(8+4+2+1)$$

→ Number of digital input, n

then, $\frac{V_{Ref}}{R \cdot 2^n}$ (total n numbers)

⇒ We can extend or reduce as our wish.

Now,

$$|V_d| = I_T \cdot R'$$

$$= \frac{V_{Ref} \cdot R'}{R \cdot 2^4}(8+4+2+1)$$

for,

$D_3\ D_2\ D_1\ D_0$

$1\ 1\ 1\ 1 \Rightarrow |V_o| = \frac{V_{Ref}}{2^4} \cdot \frac{R'}{R}(15)$

$0\ 0\ 0\ 0 \Rightarrow |V_o| = 0$

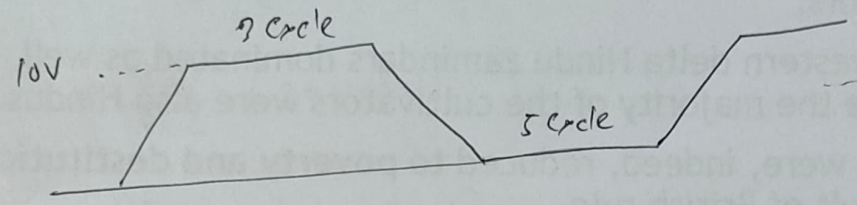
$0\ 0\ 0\ 1 \Rightarrow |V_o| = \frac{V_{Ref}}{2^4} \cdot \frac{R'}{R}(1) \Rightarrow$ Step Size Volt = 1V

→ Possible when $R' = R$ & $V_{Ref} = 16V$

⇒ if V_{Ref} is fixed then we can adjust R' & R to make it 1V.

So we learn, how to set step up voltage by manipulating the circuit. But in our internal system we can easily do it by changing our Assembly code.

Question Pattern:



Write down the code. Use step up voltage as 1V.

⇒ some changes and hint

```
L1:
    CMP  AL, 0AH
    JNL  L2

L2:
    MOV CX, 3
      delay by runing a loop

L3: decreasing part.

L4: again delay

    J    L1.
```

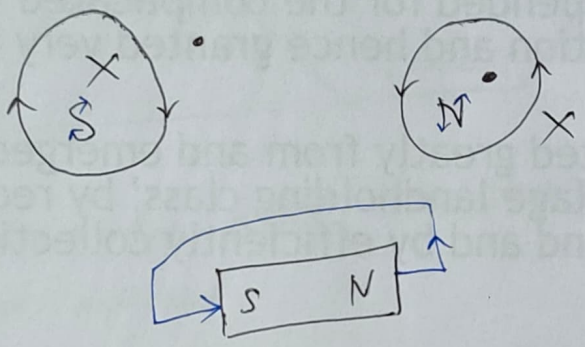
P=22

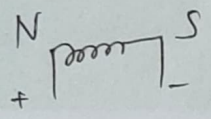
Slide - Page - 22

Stepper Motor

Here step size = 90°

in reality, = 1.8° or close to 1°





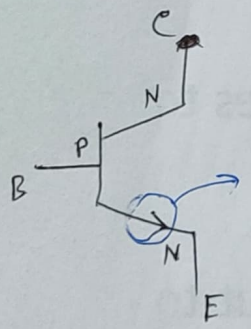
3.8

for clock-wise = ROL

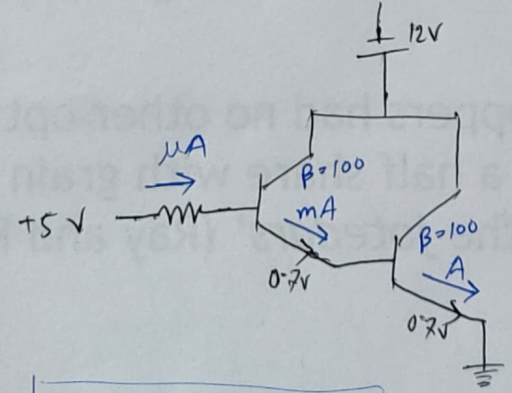
for anti-clock-wise = ROR

initial value ⇒

S_4	S_3	S_2	S_1
0	0	1	1



forward bias 0.7V need



Quiz-2
Upto this
+
make-up exam

Next 18.05.2024
Online class