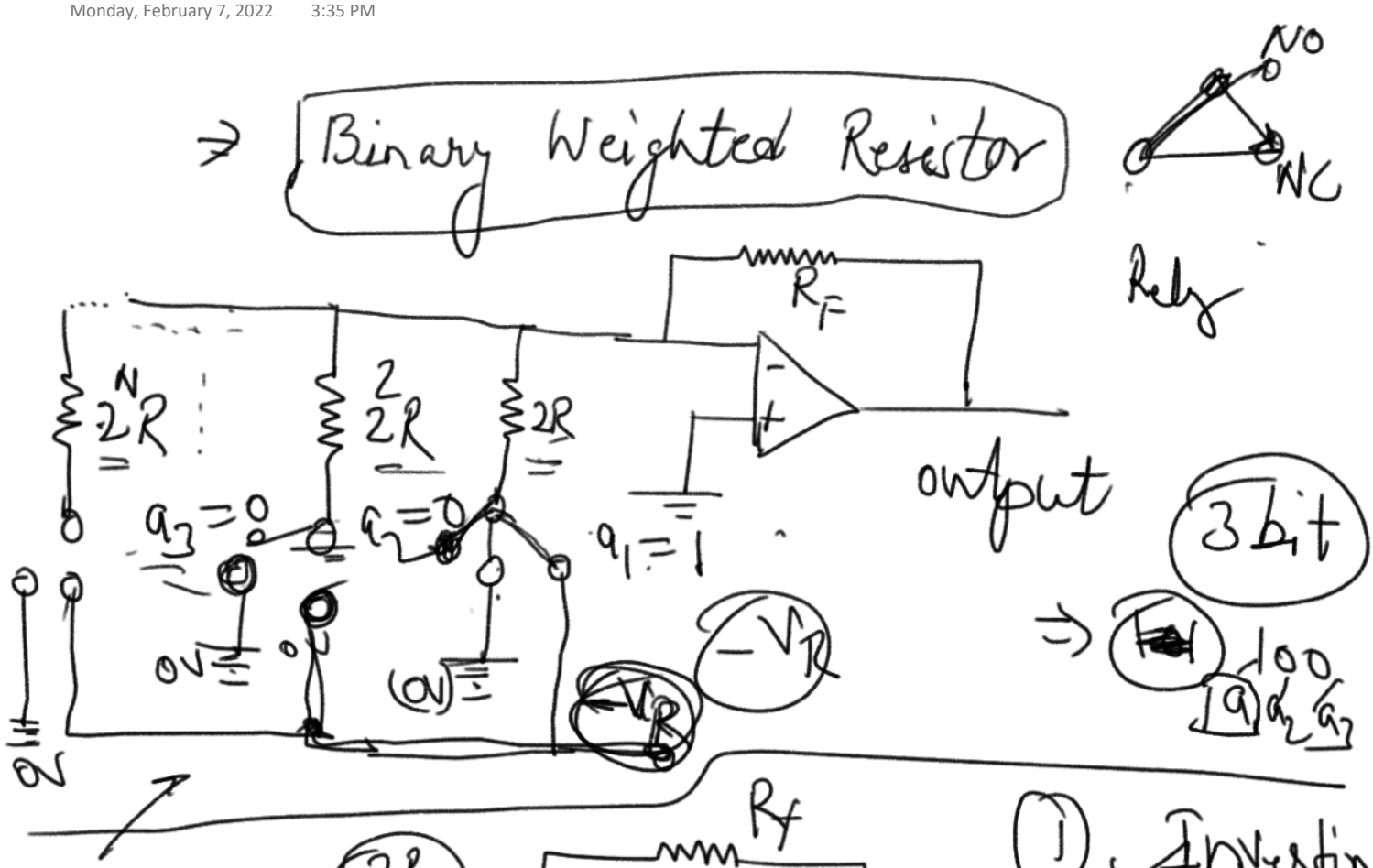
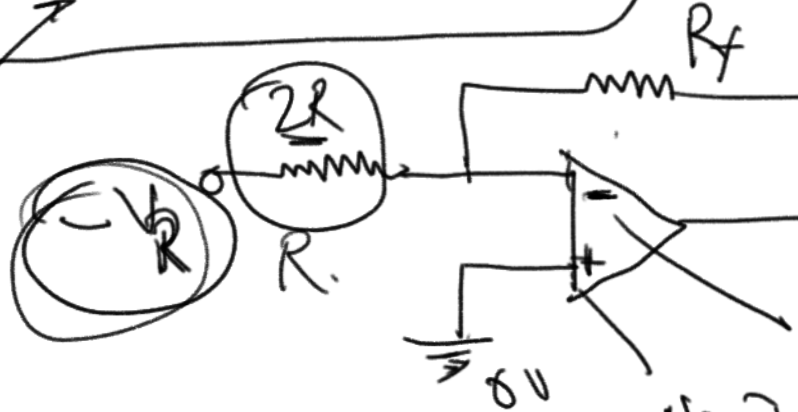
# Digital to Analog

Monday, February 7, 2022 3:35 PM




① Inverting = Amplifier

② Non-Inverting Amplifier

Inverting Amplifier

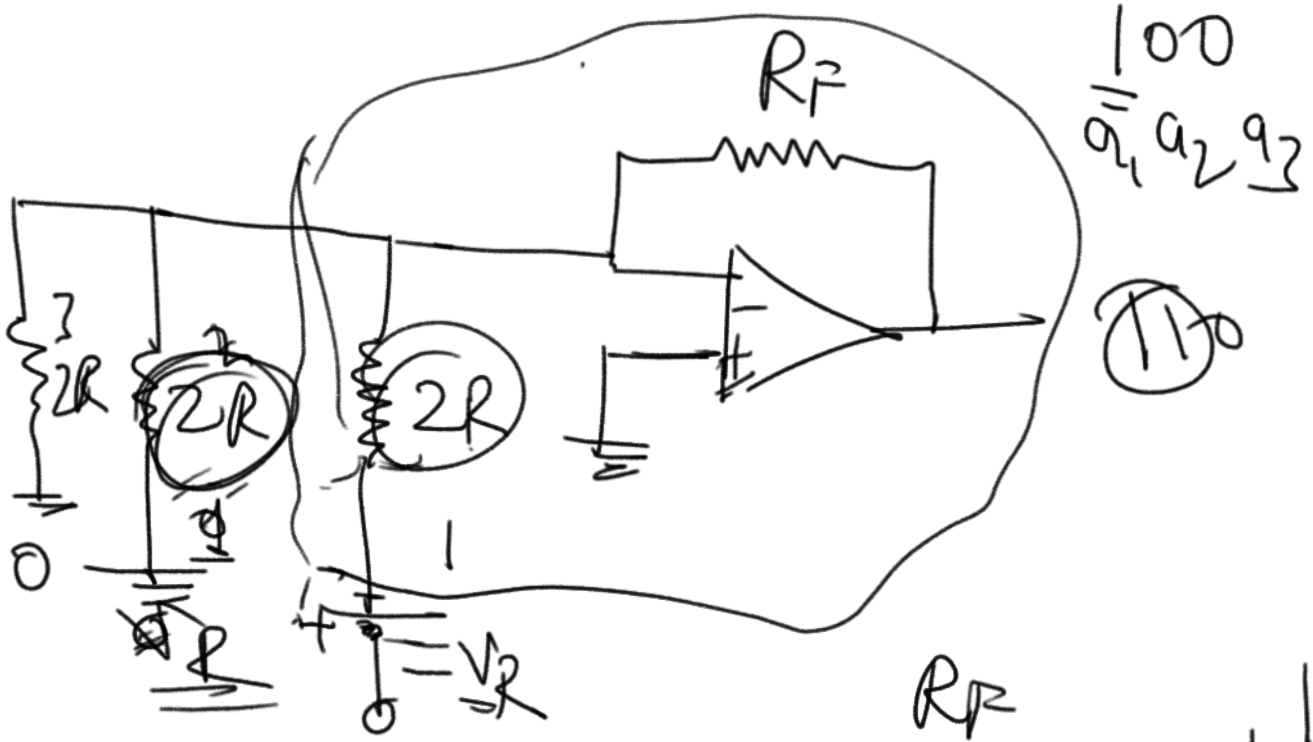
Non Inverting Amplifier

$$V_o = -\frac{R_F}{2R}(-V_R) = \frac{R_F}{2R}(V_R)$$

$$R = R_F = \frac{R_F}{2R_F}(V_R)$$

$$V_o = V_R$$

$$V_0 = \frac{V_R}{2}$$




100
$q_1 q_2 q_3$


100
100

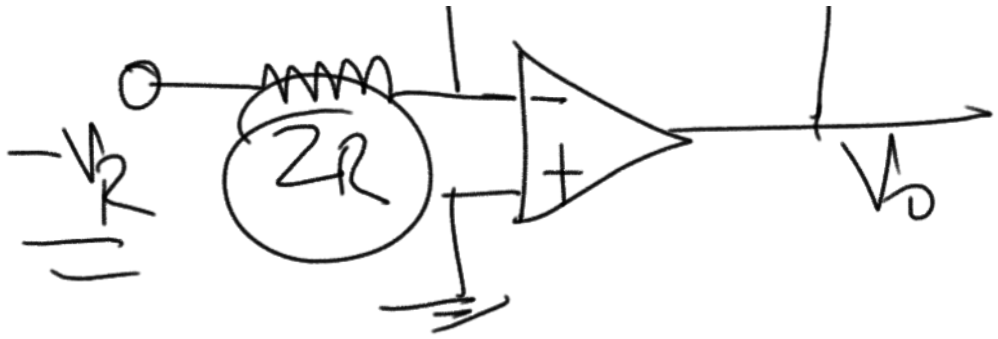
$\Rightarrow$

$V_0 \geq 8V$

$= \frac{V_R}{2} = \frac{16}{2} = 8V$

$q_1 = 1$, 000


$R_i$ = Input Resistance




Kelvin Terre
$= 2R$

$$V_0 = -\frac{R_F(-V_R)}{2R}$$

$$= \frac{V_R \cdot R_F}{2R} = \frac{V_R R_F}{2R}$$

$R = R_F$

$$V_0 = \frac{V_R}{2}$$

q2 q1 q0
1 0 0

$V_R = 2^n = 2^3 = 8V$

$$V_0 = \frac{8}{2} = 4V$$

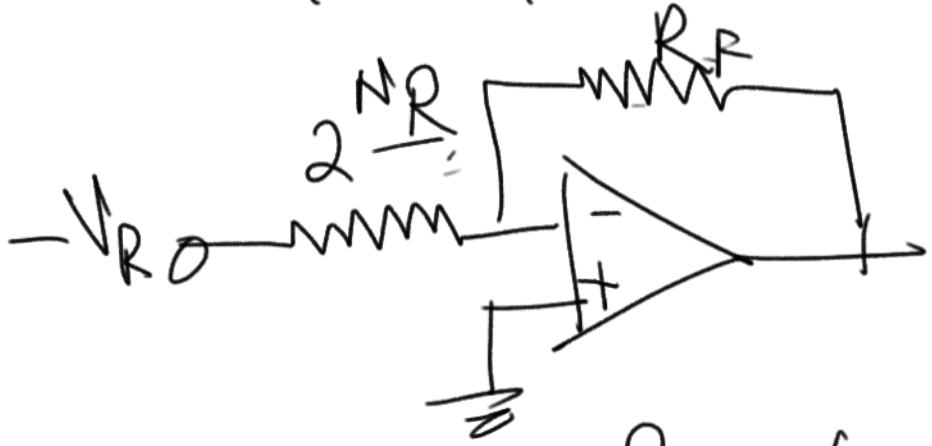
$V_0 = 4V$


1 0 0

$2^2$ $2^1$ $2^0$

$= 0 \times 2^0 + 0 \times 2^1 + 1 \times 2^2$

$\Rightarrow 0 + 0 + 2^2 = 4$




$$V_0 = \frac{-R_F}{2^N R_f} (-V_R)$$

$$= \frac{V_R}{2^N}$$

100

$= \frac{V_R}{4}$

| $q_1$ | $q_2$ | $q_3$ |
|---|---|---|
| 1 | 0 | 1 |

$$V_0 = \left[\frac{a_1}{2} + \frac{a_2}{2^2} + \cdots \frac{a_N}{2^N}\right] \cdot V_R$$

$$\Rightarrow V_0 = \left[\frac{a_1}{2} + \frac{a_2}{2^2} + \frac{a_3}{2^3} + \cdots \frac{a_N}{2^N}\right] V_R$$

$=$

$$V_0 \Rightarrow \left[\frac{1}{2} + 0 + \frac{1}{2^3}\right] V_R \qquad 2^1 = V_R$$

$$= \left[\frac{1}{2} + \frac{1}{8}\right] V_R$$

$$= \left(\frac{4+1}{8}\right) V_R = \frac{5}{8} \cdot V_R$$

101

$V_R = 2^3 = 8$

$= \frac{5}{8} \cdot 8$

$= 5 V$

1 0 1

1 1 1

$$101 \Rightarrow 1\times 2^2 + 0\times 2^1 + 1\times 2^0 = 4 + 0 + 1 = 5V$$

$$\frac{110}{q_1 q_2 q_3} = \left(\frac{q_1}{2} + \frac{q_2}{2^2} + \frac{q_3}{2^3}\right)\cdot V_R$$

$$V_R = 2^3 = 8V$$

$$= \left(\frac{1}{2} + \frac{1}{4} + 0\right)\cdot V_R$$

$$= \left(\frac{2+1}{4}\right)\cdot V_R$$

$$1000$$

$$2^4 = 16$$

$$V_R = 16$$

$$= \frac{3\cdot V_R}{4}$$

$$= \frac{3\cdot 8\cancel{2}}{\cancel{4}}$$

$$= 3\times 2 = 6V$$

$$\begin{array}{cc} 1 & 1 \\ 1 & 1 \end{array} \quad \begin{array}{c} 0 \\ 1 \end{array}$$

$$(1\,1\,0)$$

$$(1\times 2^2 + 1\times 2^1 + 0\times 2^0 = 4+2+0$$
$$= 6V$$

$$(1000) = \left(\frac{q_1}{2} + \frac{q_2}{2^2} + \frac{q_3}{2^3} + \frac{q_4}{2^4}\right)$$

$$2^4 = 16 = V_R = \left(\frac{1}{2} + 0 + 0 + 0\right) V_R$$

$$\frac{1}{2} \cdot V_R = \frac{16}{2}$$

$$= 8V$$

$$1000 = 8V$$

$$2^3 \times 1 + 0 + 0 + 0 = 8V$$