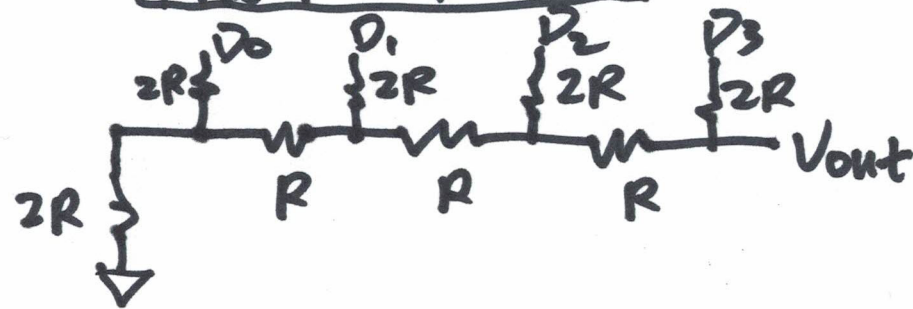


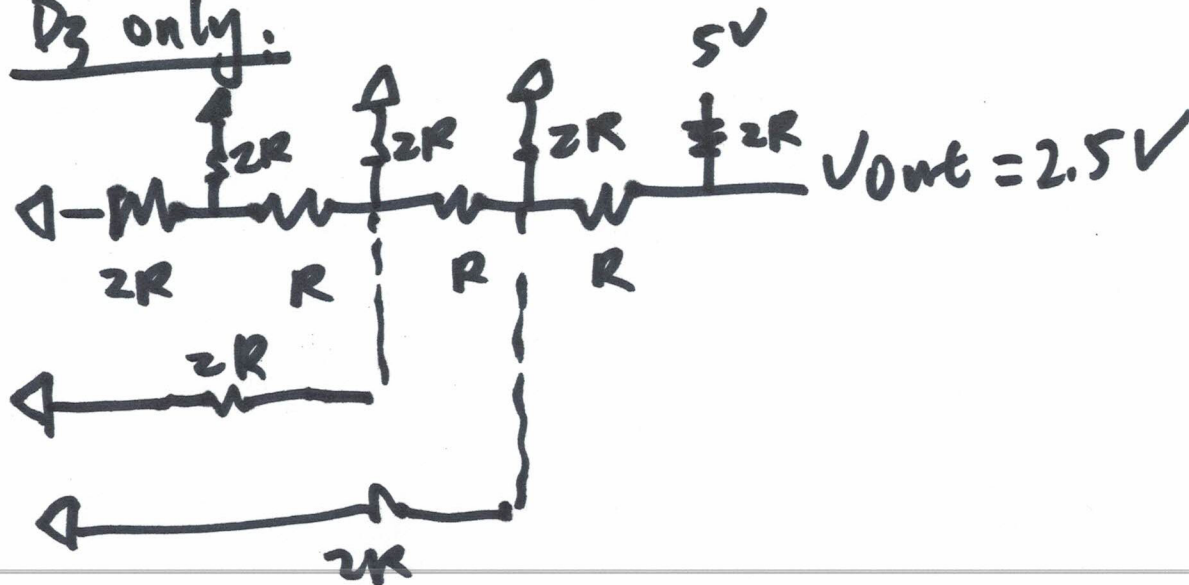
The R-2R DAC

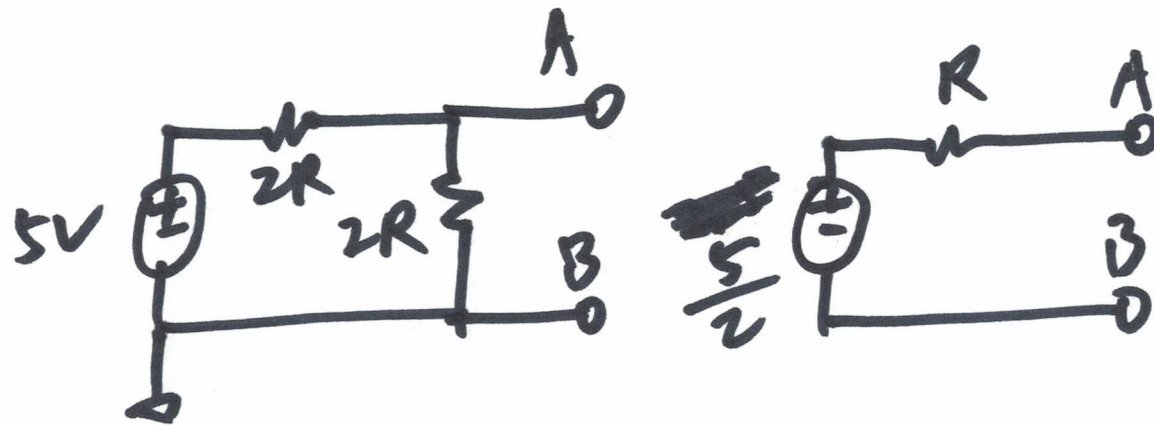
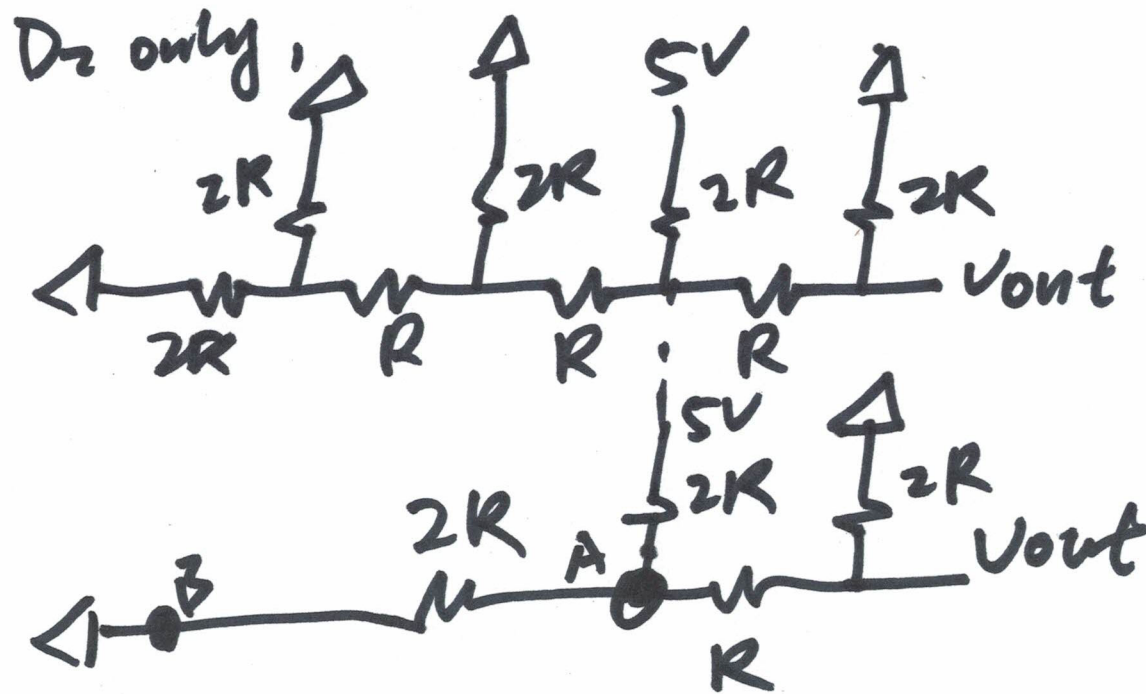


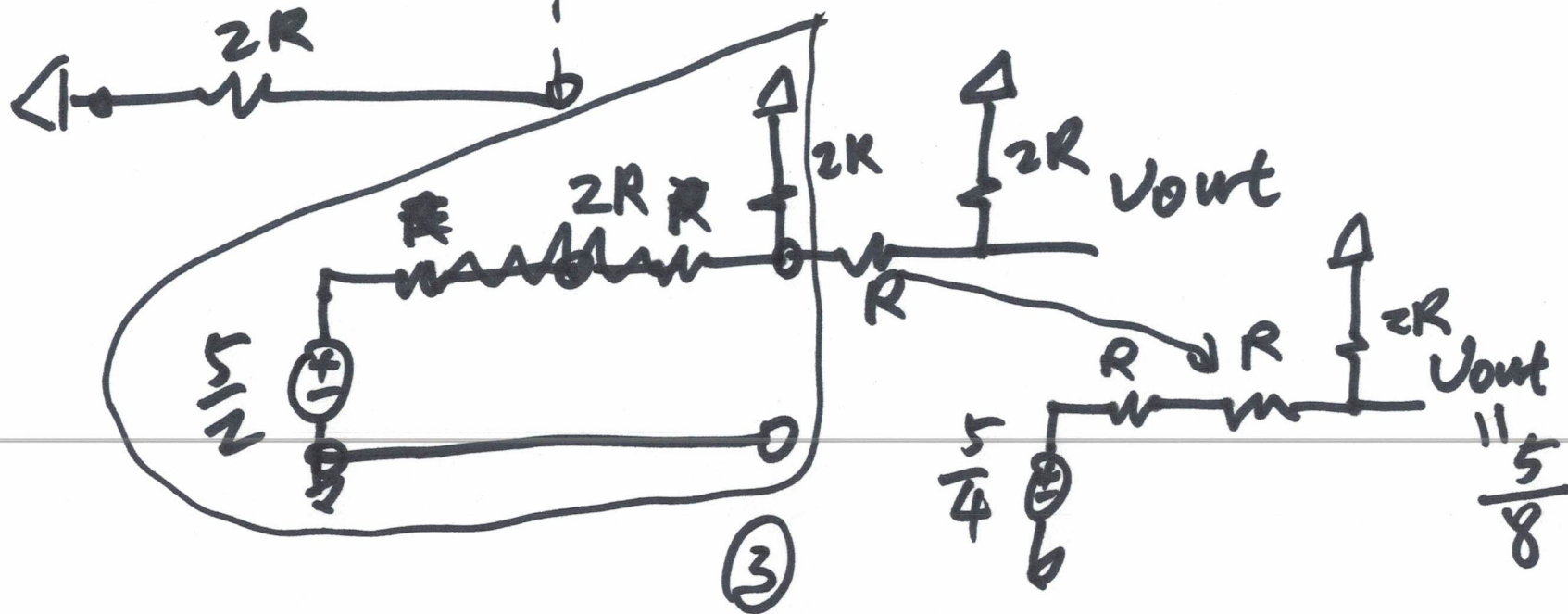
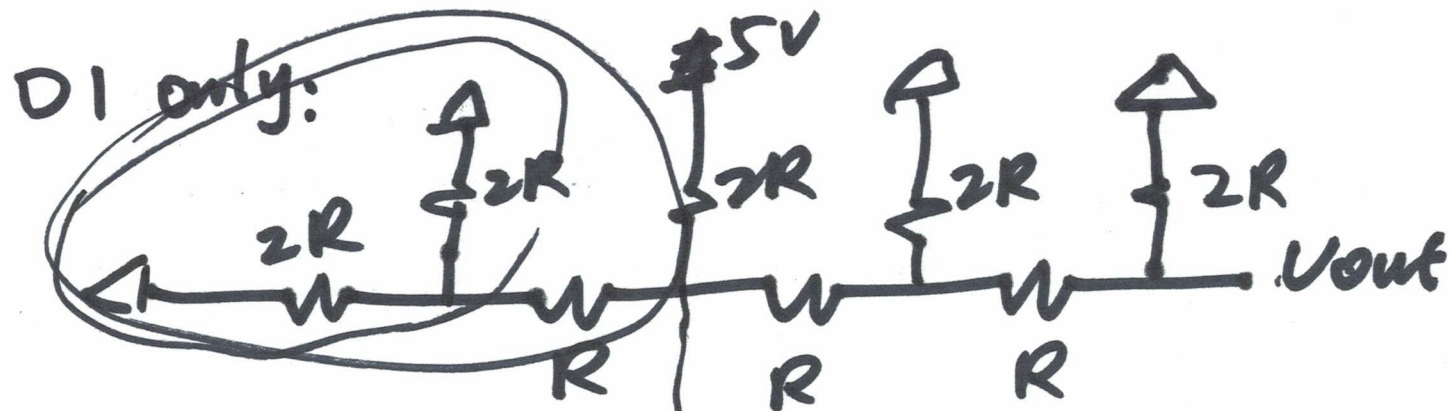
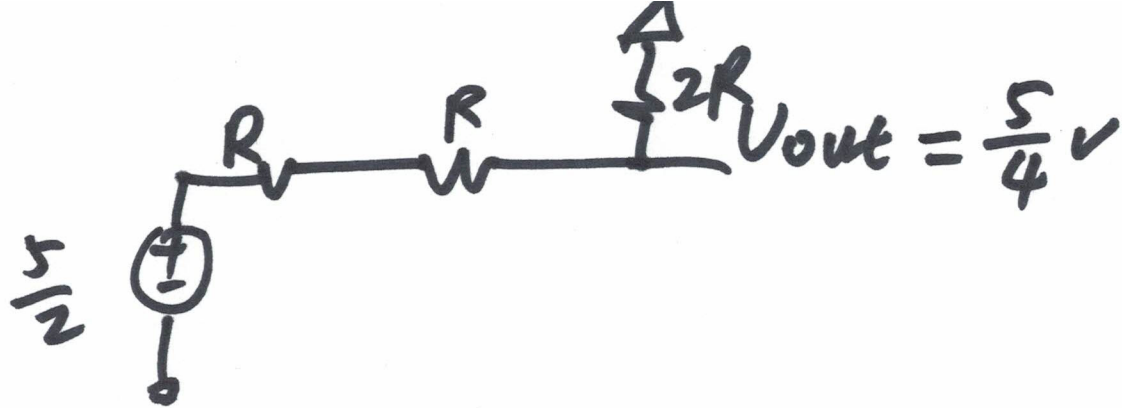
If $D_3 D_2 D_1 D_0 = 1111$ ($1 = 5V$)

Super position:

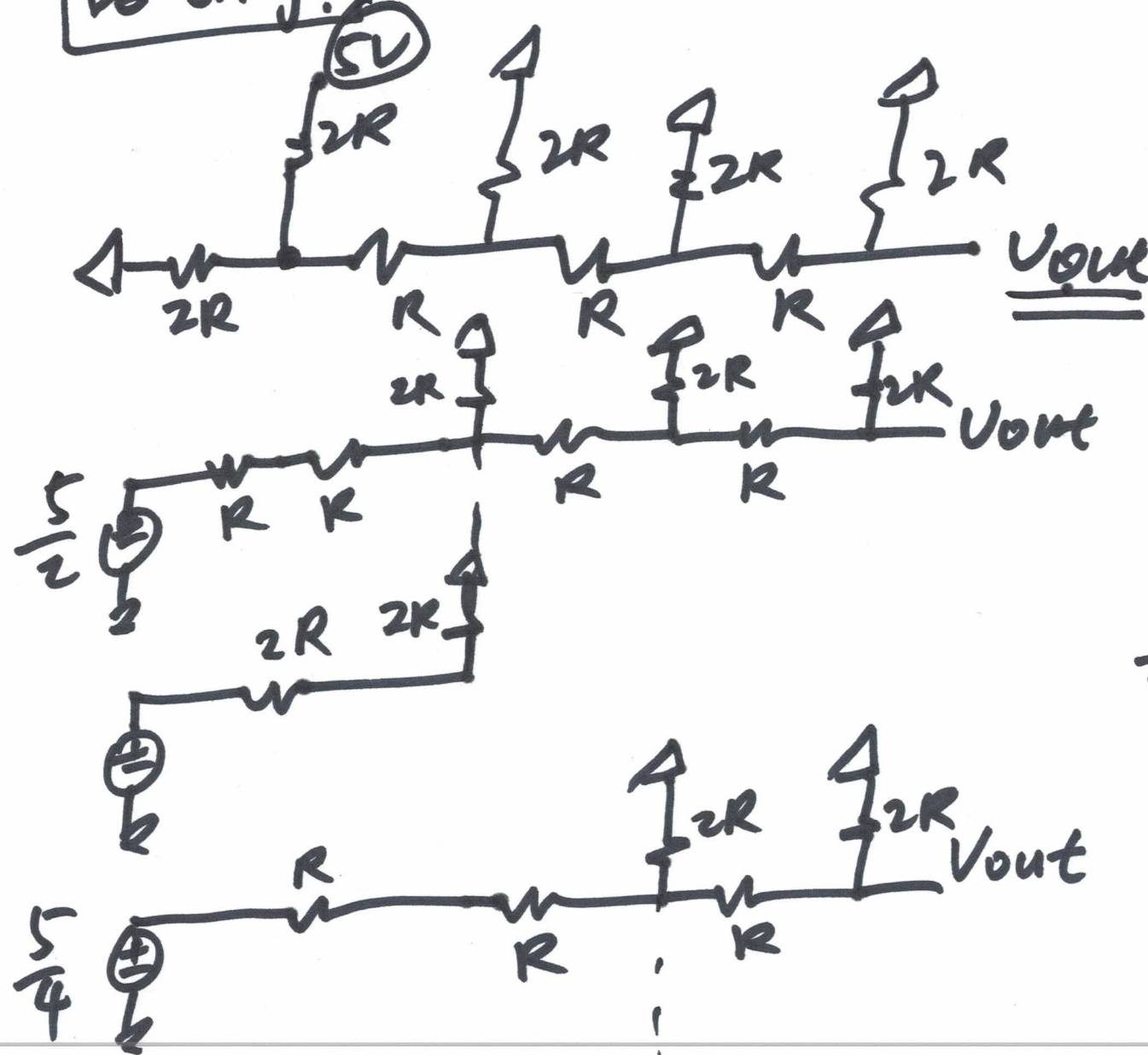
D_3 only:







Do only:

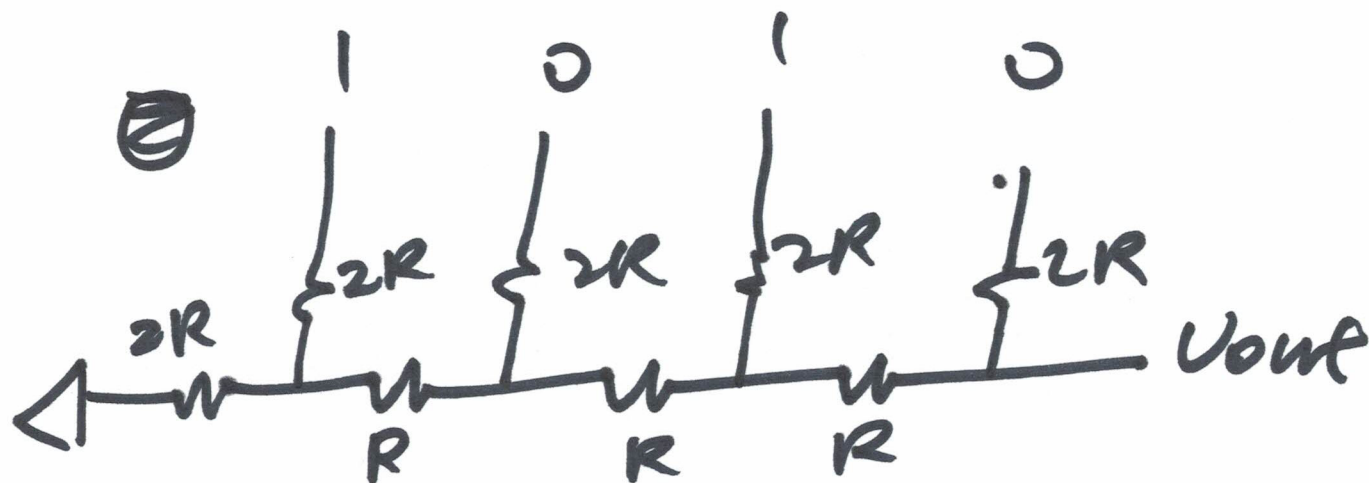
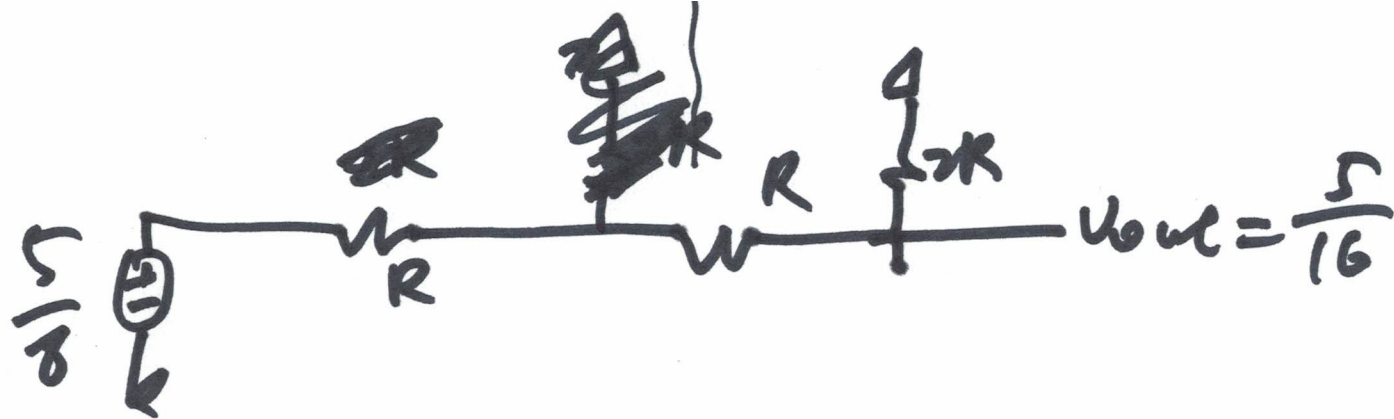


$$\frac{5V}{4}$$

$$\frac{5}{16} \cdot 15$$

$$\begin{aligned} & \frac{5}{2} + \frac{5}{4} + \frac{5}{8} + \frac{5}{16} \\ &= \frac{8+4+2+1}{16} \cdot 5 \\ &= \frac{15}{16} \cdot 5V \end{aligned}$$

(4)



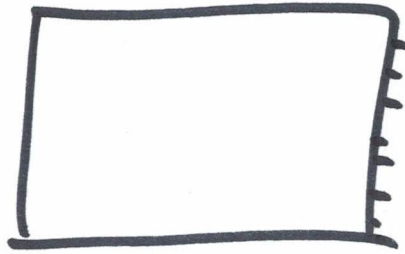
5

Analog
Input

ADC

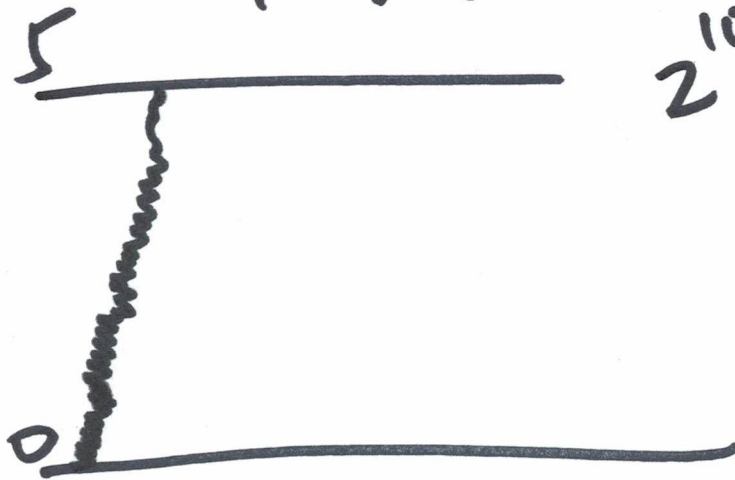
1mV

reference voltage
= 5V



$$U_{ref} = 5V$$

10-bit



$$\frac{5V}{2^{10}} \approx 5mV$$

$$\frac{5V}{1mV} = \frac{2^x}{1LSB}$$

$$2^x = 5000$$

$$\log_2 2^x = \log_2 5000$$
$$x = \log_2 5000 = 12.288$$

(6)

DAC

- Full-scale value

Example: