$$V_{out} = V_{ref} \times \sum_{i=1}^{n} \frac{b_{n-i}}{2^i}$$

Given the binary input 1101 0000 (7 6 5 4 3 2 1 0)

and $V_{ref} = 5V$

$$V_{out} = V_{ref} \times \sum_{i=1}^{8} \frac{b_{8-i}}{2^i}$$

$$= V_{ref} \times \left[\frac{b_7}{2^1} + \frac{b_6}{2^2} + \frac{b_5}{2^3} + \frac{b_4}{2^4} + \frac{b_3}{2^5} + \frac{b_2}{2^6} + \frac{b_1}{2^7} + \frac{b_0}{2^8} \right]$$

$$= 5 \times \left[\frac{1}{2} + \frac{1}{4} + \frac{0}{8} + \frac{1}{16} + \frac{0}{32} + \frac{0}{64} + \frac{0}{128} + \frac{0}{256} \right]$$

$$= 5 \times 0.8125$$

$$= 4.0625\ V$$

Fall - 2018

* A DAC is showing 4.2V output for the input code 101010. Calculate the LSB and reference voltage if it operates within 2V to 12V.