

VE270 Homework 1

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Problem 1.

$$\begin{aligned}
 (1101101.011)_2 &= 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^0 + 1 \times 2^{-2} + 1 \times 2^{-3} \\
 &= 64 + 32 + 8 + 4 + 1 + 0.25 + 0.125 \\
 &= (109.375)_{10} \\
 (1101101.011)_2 &= (01101101.0110)_2 \\
 &= (6D.6)_{16}
 \end{aligned}$$

$$\begin{aligned}
 (87.64)_{10} &\approx 1 \times 2^6 + 1 \times 2^4 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-3} + 1 \times 2^{-7} + 1 \times 2^{-8} + 1 \times 2^{-9} \\
 &= (1010111.101000111)_2 \\
 (87.64)_{10} &\approx (001010111.101000111)_2 \\
 &= (157.507)_8 \\
 (87.64)_{10} &\approx 1 \times 3^4 + 2 \times 3^1 + 1 \times 3^{-1} + 2 \times 3^{-2} + 2 \times 3^{-3} + 2 \times 3^{-5} \\
 &= (10020.12202)_3
 \end{aligned}$$

Problem 2.

$$\begin{array}{r}
 \begin{array}{ccccccc}
 0 & 1 & 1 & 1 & 1 & 1 & \\
 & 6 & F & E & 5 & 8 & C \\
 + & & & 3 & A & D & D \\
 \hline
 & 7 & 0 & 2 & 0 & 6 & 9
 \end{array} \\
 (6FE58C - 3ADD)_{16} = (702069)_{16} \\
 \begin{array}{r}
 \begin{array}{cccccccc}
 1 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \\
 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 \\
 - & 1 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \\
 \hline
 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 1
 \end{array} \\
 (11100 - 10001111)_2 = (-1110011)_2 \\
 \begin{array}{r}
 \begin{array}{ccc}
 0 & 1 & 1 \\
 & 5 & 4 & 5 \\
 - & 2 & 6 & 7 \\
 \hline
 & 2 & 5 & 6
 \end{array} \\
 (545 - 267)_8 = (256)_8
 \end{array}$$