

1.3 Convert the binary number 10110001110001.01010111 to decimal format.

Solution

Following the same procedure as in the solution of problem 1.2,

$$\begin{aligned} 10110001110001 &= 1 \times 2^{13} + 1 \times 2^{11} + 1 \times 2^{10} + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^0 \\ &= 8192 + 2048 + 1024 + 64 + 32 + 16 + 1 = 11377 \end{aligned}$$

and the decimal part is

$$\begin{aligned} 0.01010111 &= 1 \times 2^{-2} + 1 \times 2^{-4} + 1 \times 2^{-6} + 1 \times 2^{-7} + 1 \times 2^{-8} \\ &= 0.25 + 0.0625 + 0.015625 + 0.0078125 + 0.00390625 = 0.33984375 \end{aligned}$$

Thus, the binary number 10110001110001.01010111 in decimal format is 11377.33984375

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