Worksheet 10 Review

March 28, 2020

Question 1

a.

$$\begin{aligned}(165)_8 &= 5 \cdot 8^0 + 6 \cdot 8^1 + 1 \cdot 8^2 && (1)\\ &= 5 + 48 + 64 && (2)\\ &= 53 + 64 && (3)\\ &= 117 && (4)\end{aligned}$$

b.

$$\begin{aligned}(B4)_16 &= 4 \cdot 16^0 + 11 \cdot 16^1 && (1)\\ &= 4 + (11 \cdot 16) && (2)\\ &= 4 + 176 && (3)\\ &= 180 && (4)\end{aligned}$$

Question 2

a.

$$\begin{aligned}
357 \div 2 &= 178, \text{remainder } \mathbf{1},\\
178 \div 2 &= 89, \text{remainder } \mathbf{0},\\
89 \div 2 &= 44, \text{remainder } \mathbf{1},\\
44 \div 2 &= 22, \text{remainder } \mathbf{0},\\
22 \div 2 &= 11, \text{remainder } \mathbf{0},\\
11 \div 2 &= 5, \text{remainder } \mathbf{1},\\
5 \div 2 &= 2, \text{remainder } \mathbf{1},\\
2 \div 2 &= 1, \text{remainder } \mathbf{0},\\
1 \div 2 &= 0, \text{remainder } \mathbf{1}
\end{aligned}$$

Combining it together, the binary representation of 357 is $(101100101)_2$

b.

$$\begin{aligned}
1 \cdot 2^0 + 0 \cdot 2^1 + 1 \cdot 2^2 &= \frac{1+0+4}{8^0} = 5\\
0 \cdot 2^3 + 0 \cdot 2^4 + 1 \cdot 2^5 &= \frac{0+0+32}{8^1} = 4\\
1 \cdot 2^6 + 0 \cdot 2^7 + 1 \cdot 2^8 &= \frac{64+0+256}{8^2} = 5
\end{aligned}$$

Combining it together, the octal representation of $(101100101)_2$ is $(545)_8$.

c.

$$\begin{aligned}
357 \div 16 &= 22, \text{remainder } \mathbf{5},\\
22 \div 16 &= 1, \text{remainder } \mathbf{5},\\
1 \div 16 &= 0, \text{remainder } \mathbf{1},
\end{aligned}$$

Combining it together, the hexadecimal representation of 357 is $(155)_{16}$.

Correct Solution:

$$
\begin{aligned}
357 \div 16 &= 22, \text{remainder } \mathbf{5}, \\
22 \div 16 &= 1, \text{remainder } \mathbf{6}, \\
1 \div 16 &= 0, \text{remainder } \mathbf{1},
\end{aligned}
$$

Combining it together, the hexadecimal representation of 357 is $(165)_{16}$.

Question 3