

Worksheet 10 Review

March 28, 2020

Question 1

a.

$$(165)_8 = 5 \cdot 8^0 + 6 \cdot 8^1 + 1 \cdot 8^2 \quad (1)$$

$$= 5 + 48 + 64 \quad (2)$$

$$= 53 + 64 \quad (3)$$

$$= 117 \quad (4)$$

b.

$$(B4)_{16} = 4 \cdot 16^0 + 11 \cdot 16^1 \quad (1)$$

$$= 4 + (11 \cdot 16) \quad (2)$$

$$= 4 + 176 \quad (3)$$

$$= 180 \quad (4)$$

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, it 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 $(545)_8$.

Question 3