Worksheet 10 Solution

March 19, 2020

Question 1

a.

$$(165)_8 = 5 \times 8^0 + 6 \times 8^1 + 1 \times 8^2 \tag{1}$$
$$= 5 + 48 + 64 \tag{2}$$
$$= 117 \tag{3}$$

b. **Reference Table**

Number	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

$$(B4)_{16} = 4 \times 16^0 + 11 \times 16^1 \tag{1}$$
$$= 4 + 176 \tag{2}$$
$$= 180 \tag{3}$$

Question 2

a.

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

Hence, the binary representation of 357 is (101100101).

b.

$$357 \div 8 = 44, \text{remainder } \mathbf{5}$$
$$44 \div 8 = 5, \text{remainder } \mathbf{4}$$
$$5 \div 8 = 0, \text{remainder } \mathbf{5}$$

Hence, the octal representation of 357 is $(545)_8$

c.

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

Hence, the hexadecimal representation of 357 is $(165)_{16}$

Question 3

a.

$$0.375 \times 2 = 0.750, +\mathbf{0}$$
$$0.750 \times 2 = 0.5, +\mathbf{1}$$
$$0.5 \times 2 = 0, +\mathbf{1}$$

Hence, the binary representation of 0.375 is $(0.011)_2$.