

Assignment 1

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Question 1:

a. 1110

$$8 \times 1 + 4 \times 1 + 2 \times 1 + 1 \times 0 = 14_{10}$$

b. 11011

$$16 \times 1 + 8 \times 1 + 0 \times 4 + 2 \times 1 + 1 \times 1 = 27_{10}$$

c. 101010

$$32 \times 1 + 16 \times 0 + 8 \times 1 + 4 \times 0 + 2 \times 1 + 0 \times 1 = 42_{10}$$

Question 2:

a. $2^{12} = 2^{10} \times 2^2 = 10^3 \times 4 \cong 4\,000$

Actual value: 4 096

$$\% \text{ Error} = ((4096 - 4000)/4096) * 100 = 2.3438 \%$$

b. $2^{16} = 2^{10} \times 2^6 = 10^3 \times 64 \cong 64\,000$

Actual value: 65 536

$$\% \text{ Error} = ((65536 - 64000)/65536) * 100 = 2.3438 \%$$

c. $2^{32} = 2^{30} \times 2^2 = 10^9 \times 4 \cong 4\,000\,000\,000$

Actual value: 4 294 967 296

$$\% \text{ Error} = ((4294967296 - 4000000000)/4294967296) * 100 = 6.8677 \%$$

Question 3:

- a) $F(A,B) = A(AB)' + B(AB)'$
 b) $F(A,B) = A(A'+B') + B(A'+B') \rightarrow \text{DeMorgan}$
 $F(A,B) = AA' + AB' + BA' + BB' \rightarrow \text{Inverse}$
 $F(A,B) = AB' + A'B$

Now we must prove that this expression is in fact SOP using K-maps

		B	
		0	1
A	0	m0	m1
	1	m2	m3

We will now find all the minterm:

$$F(A,B) = AB' + A'B$$

m2 m1

The minterms are:
 $\sum m(1,2)$

		B	
		0	1
A	0	0	1
	1	1	0

$\Rightarrow F(A,B) = AB' + A'B$ is SOP!

- c) $\prod M(0,3)$