CSARCH1 Long Test 1 Mock Test

Positional Number System

1. How many unique symbols are there in the Hexadecimal System?
2. Given the number 12345.678_9, which digit is associated with the lowest place value?
3. Given the number $0x1AB23.45$, give the place value expansion.
4. **[T or F]** Any number represented in the Quinary Number System (Base 5) can have digits from $0-5$.
5. What is x if $322_4 = 134_x$?

Number Base Conversion

Complete the table. Limit to 2 fractional places for non-terminating fractional values.

Decimal	Binary	Base-4	Base-7	Octal	Hexadecimal
107.6875					
			66.232		
				227.21	

Binary Data Organization

0x1919FA23FA43C7BC
(Word defined as 32-bit)

LSb	
LSB	
LSNibble	
LSWord	
LSDoubleWord	
LSQuadWord	
MSb	
MSB	
MSNibble	
MSWord	
MSDoubleWord	
MSQuadWord	

0xFA3E0FF3141AABB2
(Word defined as 16-bit)

LSb	
LSB	
LSNibble	
LSWord	
LSDoubleWord	
LSQuadWord	
MSb	
MSB	
MSNibble	
MSWord	
MSDoubleWord	
MSQuadWord	

Address (Hex)	8-bit memory data (Hex)
1007	FF
1006	1A
1005	AB
1004	23
1003	78
1002	BA
1001	C5
1000	28

Big Endian
    2-byte hex data stored at address **1005**.
    4-byte hex data stored **1003**.
Litte Endian
    2-byte hex data stored **1001**.
    8-byte hex data stored at **1004**

Address (Hex)	16-bit memory data (Hex)
100E	F0CA
100C	A989
100A	1000
1008	7878
1006	2334
1004	A4BC
1002	1231
1000	5AC2

Big Endian
    2-byte hex data stored at address **1008**.
    4-byte hex data stored **1004**.
Litte Endian
    2-byte hex data stored **1002**.
    8-byte hex data stored at **1006**

2x vs 10y

1. Binary prefixes are mainly used in _____.
2. 10^y are also known as the ___ prefixes.
3. Determine which is larger: **3GiB** or **3GB**.
4. If specifications of a RAM stick is stated to have **8GB**, what is the actual value?

Complements

1. Given the following numbers, find the radix complement (r) and the diminished radix complement $(r-1)$.
    a. 6423_7 b. $CCA.1A$
2. $1011\ 1101_2 - 1111\ 1111_2 = $ _____ ? Is the result an overflow if the operands are unsigned? _____
3. $1100\ 1111_2 - 1111\ 1110_2 = $ _____ ? Is the result an overflow if the operands are unsigned? _____
4. $55_9 - 82_9 = $ _____ ? Is the result an overflow if the operands are unsigned? _____

Binary Codes for Decimals

Base-10	Binary	BCD	2421	Excess-3	84-2-1
199					
	1011011				

Boolean Algebra

1. Given the following function, find the number of variables, literals, and terms.
    A. $ABC + C'B'A + A$
    B. $(B+A)(C'+A)D$
2. Maxterm and Minterm are known as ____ forms.
3. In the context of truth tables, a function is **1** if a minterm evaluates to _.
4. In the context of truth tables, a function is **0** if a maxterm evaluates to _.
5. Given a function's sum of minterm and product of maxterm, their truth tables are (complementary, equal).
6. Given a function's sum of minterm and the complement of a function's product of maxterm, the indices are (complementary, equal).

Given the following boolean functions find the following:
For boolean funcitons in no's 1-3, find the following:
    a. (Σ notation) Canonical Sum of Minterm.
    b. (Π notation) Canonical Product of Maxterm.
    c. (Algebraic) Standard Product of Sum.
    d. (Algebraic) Standard Sum of Product.
    e. (Σ notation) Canonical Sum of Minterm of F'.
    f. (Algebraic) Product of Sum of F'.

1. $F(W, X, Y, Z) = XZ + WXY + WX'Z + W'Z + YZ'$
2. $F(A, B, C, D) = ACB' + B'C' + AD + ACD' + A'CB$
3. $F(A, B, C, D) = A'B'CD + AB' + A'BC' + B(A' + C')$

For boolean funcitons in no's 4-6, find the following:
    a. (Σ notation) Canonical Sum of Minterm.
    b. (Π notation) Canonical Product of Maxterm.
    c. (Algebraic) Standard Product of Sum.
    d. (Algebraic) Standard Sum of Product.
    e. (Σ notation) Canonical Sum of Minterm of F'.
    f. (Algebraic) Sum of Product of F'.

4. $F(A, B, C, D) = (D + B' + C')(A' + B' + C)(A' + D)$
5. $F(A, B, C, D) = (C' + A + D')(B + C)(B + D')(A + B' + C)$
6. $F(V, W, X, Y, Z) = (V + Y' + Z)(V + W + Y')(V + W + X')$

Good Luck!