EECS 281: **Sample Test 2 (4 pages)** **Due: Tuesday, October 12, 2004**

Name: ____________________ Email: ____________________ Grade: ________ (100 points max)

1. Using C++ data types for a **machine that uses a char of 9-bits and a short of 18 bits**, convert the following into two's complement big-endian binary and if not, then show why not?:

Give signed char range:	
Give unsigned char range:	
Give signed short range:	
Give unsigned short range:	
unsigned char x = 'A';	
unsigned char x = 0x255;	
signed char x = 255;	
unsigned char x = 128;	
unsigned char x = 35;	
signed char x = 127;	
signed char x = -128;	
signed char x = -07;	
signed short x = 35;	
signed short x = 'a';	

2. Using C++/C#/Java operator precedence, add the correct parenthesis (signed int a, b, ..., w, x, y, z;):

a = x | y ^ w & z;
a = z + y * z % w / v - c;

3. Using VHDL operator precedence, add the correct parenthesis:
a <= b + c SRL d AND e XOR f OR NOT g MOD h * i - j;

4. Using C++ convert the following into two's complement big-endian binary **that machine that uses a char of 10-bits**,: where unsigned char u, a=0x85, b=0x96, c=02; signed char s, w=0x80, x=0x96, y=0, z=0x15;
For addition and subtraction indicate if overflow and/or carry has occurred.

u = ~ a ;	
u = a & b;	
u = a ^ b;	
u = a ^ 'A';	
u = a - b;	
u = a << 2;	
s = - w ;	
s = w & x;	
s = w + x;	
s = x << 2;	

5. Convert the 24-bit number 0x414243 to mime base64: ________________

6. Convert the base64 "T2s=" to ASCII: ________________

7. What is the parity of 0x414243 (even or odd)?

8. Write a "single" C code statement of setting both bits 5 and 2 to 1 in the variable int a.

9. Write the C code function to count the number 1 bits in an integer: unsigned int bcount(unsigned int a); (note: multiply and divide not allowed). Example: bcount(0x1a) is 3.

10. What is the hamming distance of 0xAF and 0377 (show work)? ___________________

11. Give the n-cube, k-map, SOP of the f(a,b,c) minterms for (0,1,4,5,6), then give the minimize SOP, then draw the logic gate schematic.

Solution see wakerly Figure 4-29 and read text.

12. Minimize the f(a,b,c,d) minterms for (1,3,4,5,9,11,12,13,14,15). Show k-map, and label "prime implicants".

Solution see wakerly Figure 4-32 and read text.

13. Minimize the f(a,b,c,d) minterms for (1,2,3,5,7) and a Don't Care minterm of (10,11,12,13,14,15). Give k-map and Minimized SOP.

Solution see wakerly Figure 4-37 and read text.