EECS 281: Homework #4 Due: Thursday, October 7, 2004

Name: _____ Email: _____

1. Convert the 24-bit number 0x414243 to mime base64: _____

2. Convert the base64 "T2s=" to ASCII: _____

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

4. If 0x414243 is odd parity number then is it in error? _____

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

6. Write a "single" C code if statement of testing bits 5 and 2 in the variable int a are both true.

7. Write the C code function for a nand: unsigned int nand(unsigned int a, unsigned int b); no loops allowed. Example: nand(0x12, 0x35) is 0xffffffeff.

8. 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.

9. Write the C code function to return the bit position of the most significant bit: unsigned int bpos1(unsigned int a); (note: multiply and divide not allowed). Example: bpos1(16) is 4 and bpos1(17) is 4. How is this related to the log base 2 of a trunc(log2(17)) or ceil(log2(17))?

10. Write the C code function to return 2**i : unsigned int pow2(unsigned int i); (note: multiply and divide not allowed). Example: pow2(3) is 8.

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

12. Write the C code function to compute the hamming distance: int H(unsigned int a, unsigned int b); Example H(3, 5) is 2.

13. What is the hamming distance of 0 and 5? ___ 5 and 7? ___ 0 and 7? ___

14. Draw the n-cube of the code set 0, 5, 7 . What is the minimum distance between all these codes? What level of detection or correction does the code set 0, 5, 7 have?

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

16. Give the SOP of the f(a,b,c) minterms for NOT(4, 6), then give the minimize SOP. Is it smaller than problem 15?

17. Give the n-cube, k-map and SOP of the f(a,b,c) minterms for (0, 3, 5, 6), then give the minimize SOP. Why didn't it get smaller?

18. Give the k-map and SOP before and after minimizing the f(a,b,c) minterms for (0, 3, 5, 6)?

19. Minimize the f(a,b,c,d) minterms for (0, 5, 8, 10, 13). Give n-cube, k-map and SOP.

20. Minimize the f(a,b,c,d) minterms for (0, 5, 8, 10, 13) and a Don't Care minterm of 2. Give n-cube, k-map and SOP. Is it smaller than problem 19?

21. Give the truth table, minterms, maxterms, n-cube, and k-map of 01x, 1x1, x11 :