CIS-350 – INFRASTRUCTURE TECHNOLOGIES
GROUP HOMEWORK #2

Topics: **Number Systems and Conversion Between Number Base**s

Write the Group # and Names of Group Members: Daniel / Charles/ Dalton

Logistics

1. Get in touch with your group. (See Groups folder on Blackboard.)
2. Discuss and work **all** 12 problems <u>collectively</u> with your group via E-mail, Discussion Forum, Blackboard Collaborate Ultra, and/or MS Teams. (Do <u>not</u> divide the work among the group members. If you collaborate on all problems, you may do better on the tests.)
3. Choose a recorder to prepare the final copy (**one per group**) and submit it via the Blackboard Assignments/Homeworks folder by the due date. <u>You must provide answers on these sheets</u>.
4. Be sure all group members' names are on the final copy. Do **not** add names of your group members who did not participate in the assignment or whose contribution was minimal.

Worth 70 points.

Assume <u>unsigned</u> numbers (≥0). You may use your calculator and scratchpad. If your calculator has built-in conversion functions, do not use them! You may show your work with calculations on pages 2 & 3 that follow (optional).

1. Convert to Binary:

decimal:	$(73)_{10}$	binary:	10010001
octal:	$(476)_8$	binary:	100111110
hexa:	$(CE9)_{16}$	binary:	1100111001

2. Convert to Octal:

decimal:	$(67)_{10}$	octal:	103
binary:	$(11101001)_2$	octal:	331
hexa:	$(DC)_{16}$	octal:	334

3. Convert to Decimal:

binary:	$(11100101)_2$	decimal:	229
octal:	$(275)_8$	decimal:	251
hexa:	$(DA4)_{16}$	decimal:	324

4. Convert to Hexadecimal:

binary:	$(11111001110)_2$	hexadecimal:	15¢E
octal:	$(657)_8$	hexadecimal:	316
decimal:	$(261)_{10}$	hexadecimal:	105

5. Convert Binary to Decimal, Octal, and Hexadecimal. (Note the decimal point):

binary:	$(1110101.011)_2$	decimal:	117.375
binary:	$(10110110.110110)_2$	octal:	$(266.53)_8$
binary:	$(11101100.10111101)_2$	hexadecimal:	EC.BD

6. Convert from Decimal to Hexadecimal and Octal. If the answer is irrational, stop at four hexadecimal digits. (Note the decimal point).

decimal: $(0.8671875)_{10}$ octal: 0.674

decimal: $(0.80078125)_{10}$ hexadecimal: $(0.CD)_{16}$

7. Convert Octal to Hexadecimal (through Binary). Note the decimal point.
$(763)_8 = (111110011.0011)_2 = (1F3)_{16}$

8. Convert Hexadecimal to Octal (through Binary)

$(DC.BA)_{16} = ($ 11011100.1011101 $)_2 = ($ 334.564 $)_8$

9. Convert Octal to Hexadecimal (through Binary). Note the decimal point.

$(56.76)_8 = (101110.11111)_2 = ($ $2E.F8)_{16}$

10. Convert Decimal to Hexadecimal through Binary. (Note the decimal point).

$(78.75)_{10} = (1001110.11)_2 = (4E.C)_{16}$

11. How many bits will it take to represent the decimal number 9,500,000? How many bytes will it take to store this number?

The number of bits = 24
The number of bytes = 3

12. Assume that some older computers used a 24-bit word to store numbers. What is the number of unique patterns that 24 bits can represent? What is the decimal range for this word size?

The number of unique patterns = 16,777,218
The decimal range = 0 to 16,777,218