Logic Circuits and Digital Systems – Spring 1390

Assignment #1 **Due date: TBA**

Hand in questions 2, 6 and 7 from this file & Problems 4, 6 ,8, 10 from reference book chapter 2.

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1 - Convert the following decimal numbers to the indicated bases:

(A) 7562.45 to octal.

(B) 1938.257 to hexadecimal.

(C) 175.175 to binary.

2 - Add and multiply the following numbers without converting to decimal.

(A) $(367)_8$ and $(715)_8$

(B) $(15F)_{16}$ and $(A7)_{16}$

(C) $(110110)_2$ and $(1011011)_2$

3 - Encode “LOGIC” character strings in ASCII code. Represent the encoded strings by hexadecimal numbers and apply odd parity to the whole ASCII code. Put the parity in the left side of the code.

4 – Perform the following conversions:

(A) $(8670)_8 = (?)_{BCD}$

(B) $(0101\ 1000\ 1001)_{BCD} = (?)_{16}$

5 - Define a 4-bit code for representing the decimal digits that has the property that the code words for any two digits whose difference is 1 differ in only one bit position and that this property also holds for the digits 0 and 9.

6 – Determine the base or bases which the following operations are performed:

(A) 15 × 31 = 545

(B) 302 / 20 = 12.1

7 – Perform the following conversions without changing the base to decimal:

(A) $(1010.01101)_2 = (?)_8 = (?)_{16}$

(B) $(AF06.9F)_{16} = (?)_2 = (?)_8$

8 – Assume A = +85 and B = +133 are decimal numbers. First convert the numbers into 2's complement format then calculate A+B, A-B, -A-B and B-A. Is overflow occurred? Convert results to decimal and check whether they are correct or not.

9 – Suppose A = 11101010 and B = 00101111 are signed numbers. Calculate A+B, A-B, -A-B and B-A by assuming that A and B are:

(A) Sign-magnitude numbers

(B) 1's complement numbers

(C) 2's complement numbers