ECN-104 ECE 2023 **Assignment 1** **Deadline: 19 March 11:59pm**

1. Convert the following numbers to decimal
   $(4310)_5$ $(198)_{12}$ $(735)_8$ $(525)_6$
2. Convert $(68BE)_{16}$ to binary
3. Convert the decimal number 431 to binary in two ways: (a) Covert directly to binary; (b) Convert first to hexadecimal and then from hexadecimal to binary. Which method is faster?
4. Convert the following to hexadecimal
   $(1.10010)_2$ $(110.010)_2$
5. Add and multiply the following numbers without converting them to decimal
   (a) $(1011)_2$ and $(101)_2$ (b) $(2E)_{16}$ and $(34)_{16}$
6. Obtain 1's and 2's compliment of the following binary numbers
   10000000, 11011010, 01110110, 11111111
7. Perform subtraction on the given unsigned binary numbers using the 2's compliment method. Clearly mention any negative result using a minus sign.
   10011-10001, 100010-100011, 1001-101000, 110000-10101
8. An 8-bit digital chip C_1 is made to store the value -X where X is the input. Another similar 8-bit digital chip C_2 is made to provide store the value of 11001100-X, where X is the input. Assume that a bit-flip operation takes approximately 1ns and a 1-bit addition takes 3ns. Quantitatively estimate the preferred ways of denoting negative numbers (signed-magnitude or signed-2's compliment) for chips C_1 and C_2 for fastest operation.