Assignment-1
EEN-103

1. List the octal and hexadecimal numbers from 16 to 32. Also, using A, B, and C for the 10, 11 and 12 list the numbers from 8 to 28 in base 13.

2. Determine the base of the numbers in each case for the following options to be correct:

   (a) $14/2 = 5$,

   (b) $54/4 = 13$,

   (c) $24 + 17 = 40$.

3. Perform the following tasks:

   (a) Find the 16's complement of B2FA.

   (b) Convert B2FA to binary.

   (c) Find the 2's complement of the result in (b).

   (d) Convert the answer in (c) to hexadecimal and compare with the answer in (a).

4. Perform subtraction on the given unsigned binary numbers using the 2's complement of the subtrahend (number on the right side of the negative side). Where the result is negative, find its 2's complement and affix a minus sign.

   (a) $10011 - 10001$

   (b) $100010 - 100011$

   (c) $1001 - 101000$

   (d) $110000 - 10101$

5. The following decimal numbers are shown in sign-magnitude form: +9,286 and +801. Convert them to to signed-10's-complement form and perform the following operations:

   (a) $(+9,286) + (+801)$

   (b) $(+9,286) + (-801)$

   (c) $(-9,286) + (+801)$

   (d) $(-9,286) + (-801)$

   Note: Since the sum is +10,627, i.e. 5 digits and and sign is required for this. So use 6-bits to represent the sum in all the cases.

6. Construct a flow chart for the process of filling a bath tub with water which involves the following steps:

   (a) Turn on the hot and cold taps.

   (b) Is it too hot or cold? If it is, go to step 3, otherwise go to step 4.

   (c) Adjust the hot and cold taps and go back to step 2.

   (d) Wait for 2 minutes.

   (e) Is the bath full? If it is, go to step 7, otherwise go to step 6.

   (f) Go back to step 4.

(g) Turn off the hot and cold taps.

7. Write a flow chart that tells you how to read flow charts.

8. Write an algorithm to compute the factorial of a given non-negative integer, and draw the flowchart of the same. (For a given integer $n \geq 0$, the factorial is defined as $n! = 1 \cdot 2 \cdot 3 \cdot \cdots \cdot n$ with $0! = 1$.)