NIST College
Department of BScCSIT
First Semester
Digital Logic

Tutorial 1

Number Systems

1. Write the first 20 decimal in base 3.
2. Add and multiply the following numbers in the given base without converting to decimal.
   a. $(1230)_4$ and $(23)_4$
   b. $(367)_8$ and $(715)_8$
   c. $(2A6)_{16}$ and $(B7)_{16}$
   d. $(296)_{12}$ and $(57)_{12}$
3. Convert the decimal number 250.5 to base 3, base 4, base 4, base 7 and base 16.
4. Convert the following decimal number to binary: 12.0625, 10^4, 673.3, and 1998.
5. Convert the following binary numbers to decimal: 10.1001, 10110.01010, 1110101.110, 1101101.111
6. Covert the following numbers from the given base to the bases indicated:
   a. Decimal 225.225 to binary, octal and hexadecimal.
   b. Binary 11010111.110 to decimal, octal and hexadecimal.
   c. Octal 623.77 to decimal, binary, octal, and binary.
7. Convert the following numbers to decimal:
   a. $(1001001.011)_2$
   b. $(12121)_3$
   c. $1032.2)_4$
   d. $(4310)_5$
   e. $(0.343)_6$
   f. $(50)_7$
   g. $(8.3)_9$
   h. $(198)_{12}$
8. Obtain the 1's and 2's complement of the following binary numbers: 1010101, 0111000, 00000001, 100000, 00000, 111111.
9. Obtain the 9's and 10's complement of the following decimal numbers: 13579, 09900, 90090, 1000, 00000, 45689.
10. Find the 10's complement of $(935)_{11}$.
11. Perform the subtraction with the following decimal numbers using (1) 10's complement and (2) 9's complement. Check the answer by straight subtraction.
    a. 5250-321
    b. 753-864

    c. 3570-2100

    d. 20-1000

12. Perform the subtraction with the following binary numbers using (1) 2's complement and (2) 1's complement. Check the answer by straight subtraction.

    a. $110110 - 1101$

    b. $10010 - 10011$

    c. $110101 - 10000$

    d. $100 - 110000$

13. Perform the subtraction with the following decimal numbers using (1) 2's complement and (2) 1's complement.

    a. $56 - 89$

    b. 100- 200

    c. 32 -47

    d. 79-13

14. Represent the decimal number 8620 in:

    a. BCD

    b. Excess-3 code

    c. 2-4-2-1 code

    d. Binary number

15. Convert the following binary number into gray code:

    a. 110111

    b. 11011

    c. 110011

    d. 100000

16. Convert the following gray code into binary number:

    a. 110001

    b. 10000

    c. 1101010

    d. 110111100