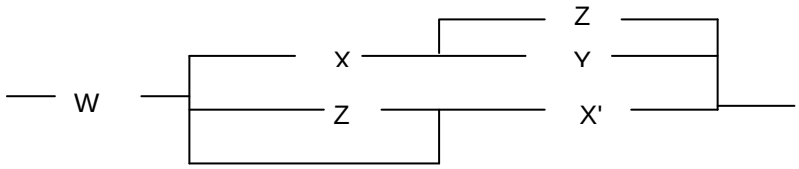
Home work Assignment 1

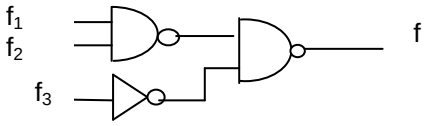
Last Date for hardcopy submission is: 28/8/2011

1. Reduce the following contact network to an equivalent network with smallest number of contacts

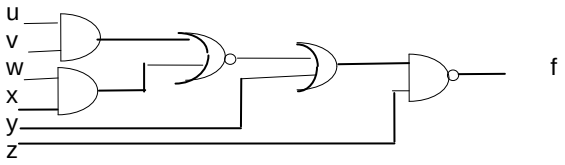


2. Expand f(w,x,y,z) = xy + y'z + xzw' into canonical sum of products and then express the same in the Decimal $\sum$ Notation and decimal $\prod$ notation. Find the minimal expression using Karnaugh Map.

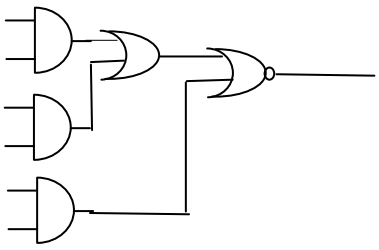
3. Given $f_1 = \sum 1,3,4,6,8,11,14$, $f_2 = \sum 1,3,4,10,11$ and $f_3 = \sum 3,5,8$. Find function f in $\sum$ decimal Notation for the following circuit



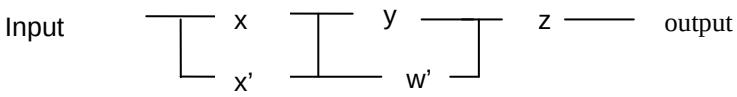
4. Transform the followuing logic network network that uses only NANDS



5. Transform the network below into a Nand network without going through its switching function. Give brief explanation



6. Simplify using algebraic properties and theorems
   (a) (x' + xyz') + (x' + xyz') (x + x'y'z)
   (b) (x+y) (x'+z) (Y+z)
   (c) Implement the f = (xy' + zw)(x + y'z) + xy as a contact network with smallest no of contacts
7. Express the transmission function (switching function) for the following contact network and give an equivalent network using the smallest number of switches.



8. Let the function f(x,y) = x' + y, derive the simplified expression for the function f (f (a+b,b),c).

9. A building has three floors with a common lamp on the stairs. Each floor has a switch through which a person on a floor can independently switch ON or OFF the Lamp by changing the switch position of a switch on his floor. You are required to give basic idea about how to do the job and then
(a) Work out the switching function for the lamp in terms contacts x, y and z. (3 contacts on three floors)
(b) Give the abstract contact network implementation of the switching function for the lamp. Convert the same into practical switch diagram (wiring diagram of the switches and lamp)

10. Can the following function f(x,y,z) = $\sum$ (0,1,3,5,6,7) be realised using a single threshold gate. If your answer is yes then assuming the initial values as w1=w2=w3=th=1, find the values of weights to implement the above function using the Hebb's delta rule. Illustrate all the steps of iterations till you get the desired weights. If your answer is No, then prove the same