DLD Assignment I

1) Simplify the boolean expressions to the minimum number of variables

a) (x+y+z')(x'y'+z) b) (x+y)'(x'+y')' c) x’y(w’+z’w)+y(x+x’zw) d)x'yz+xyz'+xyz+x'yz'

e) xyzw+xyz’w+x’ywf) (xy'+w'z)(wx'+yz')

g)Prove (A+C+D)(A+C+D')(A+C'+D)(A+B')=A+B'CD using boolean algebra.

2)For the given boolean expressions 1) Draw the logic diagram 2) Simplify using boolean algebra 3) Draw the logic diagram for simplified expression.

a)(x'y'+z)'+z+xy+wz b)w'x(z'+y'z)+x(w+w'yz) c)wxy'z+w'xz+wxyz d)x'z'+xyz+xz'

3) Find the complement of the following expressions

a) F= (a+c)(a+b')(a'+b+c') b) x(y'z'+yz) c) (BC'+A'D)(AB'+CD')

4) Write the truth table and the canonical sum of products (SOP) expression for the following

a) F(x,y,z)=∑ (1,3,5) b) F(A,B, C, D)=∑(2,4,7,10,12,14)

5) Write the truth table and the canonical products of sums(POS) expression for the following

a) F(x,y,z)=∏(3,5,7) b) F(A,B,C,D)=∏ (3,5,8,11)

1) Simplify into SOP using K-maps and draw the logic diagram for simplified expression

i) F(a,b,c,d)=∑(2,3,6,7,12,13,14) ii) F(a,b,c,d)=∑(1,3,4,5,6,7,9,11,13,15)

iii) F(a,b,c,d)=∑(0,2,3,5,7,8,10,11,14,15)

2) Simplify the boolean expression using four variable K-maps

i) ad’+b’c’d+bcd’+bc’d ii) (a'+b+d')(a'+b'+c')(a'+b'+c)(b'+c+d')

3) Simplify the following using K-maps and draw the logic diagram using only NAND gates

i) F(x,y,z)=∑(2,3,4,6,7) ii) F(a,b,c,d)=a’b’c’d+cd+ac’d

4) Simplify the following using K-maps and draw the logic diagram using only NOR gates

i) F(a,b,c,d)= ∏ (0,3,12,15) ii) F(a,b,c,d)=∏(1,3,6,9,11,12,14)

5) Simplify the following into SOP form (note: d stands for don't care)

i) F(a,b,c)=∑(0,1,4,5,6) d(a,b,c)=∑(2,3,7) ii) F(a,b,c,d)=∑(1,3,4,7,11) d(a,b,c,d)=∑(5,12,13,14,15)