

Logic design (2016 fall)

Quiz # 2

Name: _____ ID: _____

1. (30%) Simplify the following expression to a minimum sum of products.

$$[(A'B')' + (A' + B' + C')' + C'D']'$$

$$\begin{aligned} & [(A'B')' + (A' + B' + C')' + C'D']' \\ & = [(A+B+ABC) + (C'D)]' \\ & = (A'B')(C+D') \\ & = A'B'C + A'B'D' \end{aligned}$$

2. (30%) Factor the following expression to obtain the minimum product of sum, which contains 4 terms.

$$Z + YV + XW$$

$$\begin{aligned} & Z + YV + XW \\ & = Z(1 + Y + XW + V + XW) + YV + XW(1 + Y + V) \\ & = Z + YZ + WXZ + VZ + WXZ + YV + WX + WXY + VWX \\ & = Z(Z + Y + WX) + V(Z + Y + WX) + WX(Z + Y + WX) \\ & = (Z + V + WX)(Z + Y + WX) \\ & = (Z + V + W)(Z + V + X)(Z + Y + W)(Z + Y + X) \end{aligned}$$

3. (40%) Prove whether the following two functions, G and F, are equal or not by filling the following truth table.

$$F = WX'Y + XY'$$

$$G = (W + X')(W + X'Y')$$

W	X	Y	$WX'Y$	XY'	$WX'Y + XY'$	$W + X'$	$W + X'Y'$	$(W + X')(W + X'Y')$
0	0	0	0	0	0	1	1	1
0	0	1	0	0	0	1	0	0
0	1	0	0	1	1	0	0	0
0	1	1	0	0	0	0	0	0
1	0	0	0	0	0	1	1	1
1	0	1	1	0	1	1	1	1
1	1	0	0	1	1	1	1	1
1	1	1	0	0	0	1	1	1

Two function not equal!!