Assignment #6

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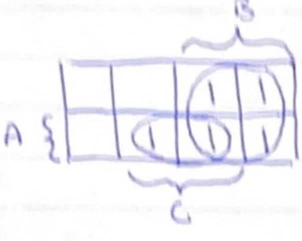
Q1)

i) $\bar{A}B + AC + AB\bar{C} = f$

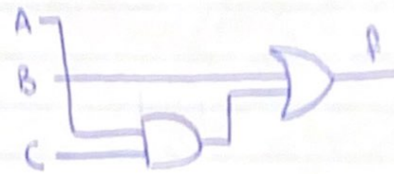
ii)

A	B	C	$\bar{A}$	$\bar{C}$	AC	$\bar{A}B$	$AB\bar{C}$	f
0	0	0	1	1	0	0	0	0
0	0	1	1	0	0	0	0	0
0	1	0	1	1	0	1	0	1
0	1	1	1	0	0	1	0	1
1	0	0	0	1	0	0	0	0
1	0	1	0	0	1	0	0	1
1	1	0	0	1	0	0	1	1
1	1	1	0	0	1	0	0	1

iii)

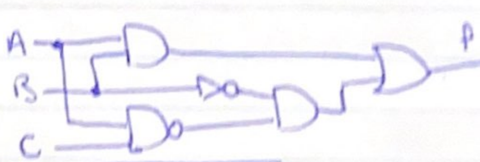


$f = B + AC$



iv) The simplified circuit is better since it not only has 2 operations instead of 4, but it also has no inverters, as opposed to the original circuit which has 2. This means the simplified circuit is more efficient.

Q2) i)



ii)

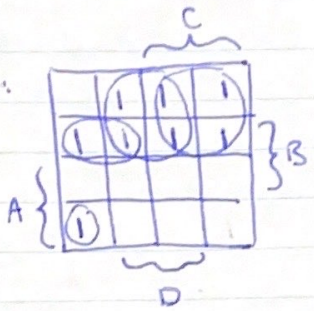
A	B	C	$\bar{B}$	$\overline{AC}$	AB	$\overline{AC}\,\bar{B}$	f
0	0	0	1	1	0	1	1
0	0	1	1	1	0	1	1
0	1	0	0	1	0	0	0
0	1	1	0	1	0	0	0
1	0	0	1	1	0	1	1
1	0	1	1	0	0	0	0
1	1	0	0	1	1	0	1
1	1	1	0	0	1	0	1

iii) $f = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + A\bar{B}\bar{C} + AB\bar{C} + ABC$

Q3)

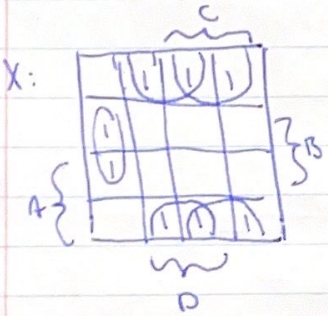
A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1
0	0	1	0	1	1	0	0
0	0	1	1	1	1	1	0
0	1	0	0	1	1	1	0
0	1	0	1	1	1	0	1
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	0
1	0	0	1	1	0	0	1
1	0	1	0	1	0	0	1
1	0	1	1	1	0	1	0
1	1	0	0	0	0	0	0
1	1	0	1	0	0	1	1
1	1	1	0	0	0	1	0
1	1	1	1	0	0	0	1

W:

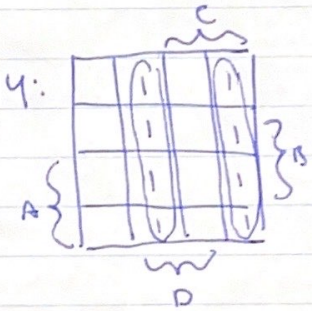


$$W = D\bar{A} + C\bar{A} + B\bar{C}\bar{A} + A\bar{D}\bar{B}\bar{C}$$

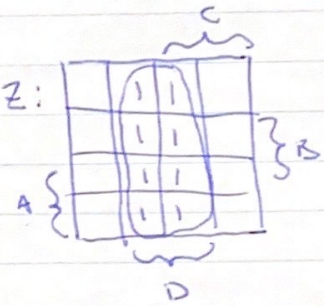
X:



Y:



Z:



$$X = B\bar{C}\bar{D} + \bar{B}D + \bar{B}C$$

$$Y = \bar{C}D + C\bar{D}$$

$$Z = D$$