

COMP122 – Assignment – 1

Due: September 23, 2014

PROBLEMS

1 Verify that the functions $(x + y')(y + z)$ and $xy + xz + y'z$ are equivalent.

2 Show the truth tables for the following functions:

- $wx + xz + y'$
- $w + x + y + z$
- $w'x'yz + w'xyz + w'x'yz' + w'xyz'$

3 Verify DeMorgan's Law, as presented in Section 1.1.2.

4 Using DeMorgan's Law, give equivalent functions for the following.

- $(wxyz)'$
- $(wx)' + (y + z)'$
- $(wx)' + (wy)' + (wz)' + (xy)' + (xz)' + (yz)'$

5 For the following Karnaugh maps, show the maximum groupings and minimal logic equation.

$wx \backslash yz$	00	01	11	10
00	1	1	0	0
01	0	1	1	0
11	0	0	1	1
10	1	0	0	1

(a)

$wx \backslash yz$	00	01	11	10
00	1	1	0	1
01	1	1	1	0
11	1	1	1	0
10	1	0	0	1

(b)

6 For the following Karnaugh maps, show the maximum groupings (including don't cares if appropriate) and minimal logic equation.

$wx \backslash yz$	00	01	11	10
00	1	0	0	1
01	1	X	1	1
11	0	1	X	0
10	0	X	X	0

(a)

$wx \backslash yz$	00	01	11	10
00	X	1	1	X
01	0	X	X	0
11	0	0	X	0
10	X	X	X	X

(b)

7 For the following equations, construct the Karnaugh map, group terms, and generate equivalent minimal equations.

- $w'y'z + wxy' + w'xz + wxy$
- $w'x'y'z' + w'xy' + wy'z' + wxy'z + wyz'$
- $w'x'yz' + w'x'y'z + w'xy'z' + w'xyz + wx'y'z' + wx'yz + wxy'z + wxyz'$

8 Draw the circuit that implements each of the following equations.

- $w + xz + w'xy'$
- $(wx + xy + yz)'$
- $((w'x)' + (yz'))'$