Sri Lanka Institute of Information Technology
B. Sc Degree in IT/IS/CSN, Diploma in Information Technology
Year 01 – Semester I – 2017
Mathematics for Computing (IT1030)
Tutorial 01

1. Consider the expressions.
   - *I.* $F = XY + X\bar{Y}$
   - *II.* $B = XYZ + XY\bar{Z} + \bar{X}\bar{Y}Z + \bar{X}\bar{Y}\bar{Z}$
   - *III.* $D = \bar{W}\bar{X}\bar{Y}\bar{Z} + \bar{W}\bar{X}YZ + \bar{W}X\bar{Y}\bar{Z} + \bar{W}XY\bar{Z}$

   Build the truth table for the above expressions.

2. Simplify the following expressions using rules of Boolean algebra.
   - *I.* $C + \overline{BC}$ - $(Answer - 1)$
   - *II.* $\overline{AB}\ (\bar{A} + B)(\bar{B} + B) - (Answer - \bar{A})$
   - *III.* $(A + C)(A\bar{D} + AD) + AC + C$ - $Answer - (A + C))$
   - *IV.* $\bar{A}\ (A + B)(AA + B)(A + \bar{B})$ - $(Answer - 0)$

3. Find the expression that gives the following truth table.

I.

X	Y	Z	Z
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

ii.

X	Y	Z	Z
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

iii.

X	Y	Z	G
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Iv.

X	Y	Z	E
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

4. Write the truth table for the following functions, and express the functions as sum-of-minterms and product-of-maxterms.

   I. $(XY + Z)(Y + XZ)$

   II. $(\bar{A} + B)(\bar{B} + C)$

   III. $WX\bar{Y} + WX\bar{Z} + WXZ + Y\bar{Z}$

5. Write down the De Morgan's Theorem.

6. With the aid of truth table justify De Morgan's Theorem.