Digital Electronics

Tutorial Sheet 4

1.* Rewrite $A + B$ using 2 NOT and 1 NAND functions.

2.** Rewrite $A + B + C + D$ using only NOT functions and two-input NAND functions.

3.** Using common sense and the rules of Boolean Algebra, simplify the following:
   a) $\overline{(A + B)}.\overline{C}$
   b) $A.(B + C) + C + \overline{A}.B.\overline{C}$
   c) $(A + \overline{B}).\overline{A}.B$
   d) $A.\overline{B}.C + B.C + A.\overline{C}$

4.** Show that $\overline{A}.\overline{C} + A\overline{C} + BC = B + \overline{C}$.

5.** Show that $A.\left(\overline{\overline{B} + A.\overline{C}}\right)$ can be implemented using one 3-input AND gate.

6.** By making appropriate substitutions for gates, draw circuits that are equivalent to the one below using: a) OR gates and INVERTORS only, b) NAND gates and INVERTORS only.