**Digital Circuits**

**Tutorial 8**

1. Realise the following sets of function using a single decoder module and output logic:

   $f_1(A, B, C, D) = \sum m(2, 4, 10, 11, 12, 13)$
   $f_2(A, B, C, D) = \prod M(0, 1, 2, 3, 6, 7, 8, 9, 12, 14, 15)$
   $f_3(A, B, C, D) = B'C + ACD$

2. Design a code converter whose input is a 4-bit code (C3, C2, C1, C0) representing hexadecimal code (0, 1, 2, …….,8, 9, A, B, C, D, E and F) with the output driving a seven segment display digit to display the corresponding character. (The letters B and D are normally displayed in lower case to distinguish them from the numerals 8 and 0 respectively).

3. Find the output f(a, b, c) for the circuit shown in Figure 1.

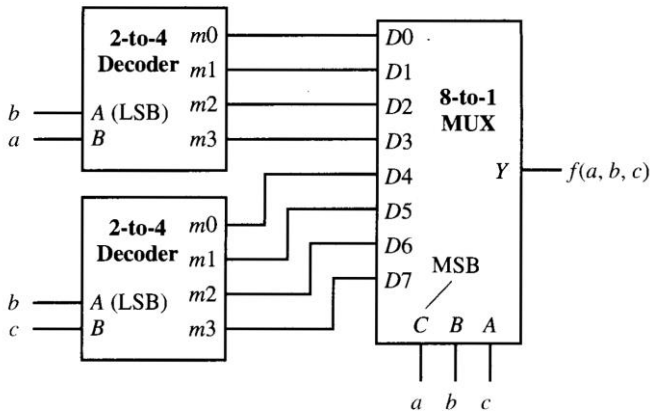


Figure 1

4. Design a 3-bit magnitude comparator with inputs A = $(a_2a_1a_0)_2$ and B = $(b_2b_1b_0)_2$ and three outputs: EQ(A=B), GT(A>B), and LT(A<B).

5. Design a three input /3bit multiplexer. Use only NAND gates.