Dr. Bassem Al-Halabi, S&E362   October 25, 2000

Name: Grade: **/10**

[5] **1)**   Design 2-b binary multiplier using one decoder and NAND gates. The bits of the input numbers and the output product are as given in the following equation:

$$A1\ A0 \times B1\ B0 = P3\ P2\ P1\ P0$$

[1] **1.a)**   Fill the following truth table that defines the relationship between the two 2-b numbers (total of 4 binary inputs) and the 4-b product.

[1] **1.b)**   Find the mintern expansion for each of the output bits directly from the truth table.

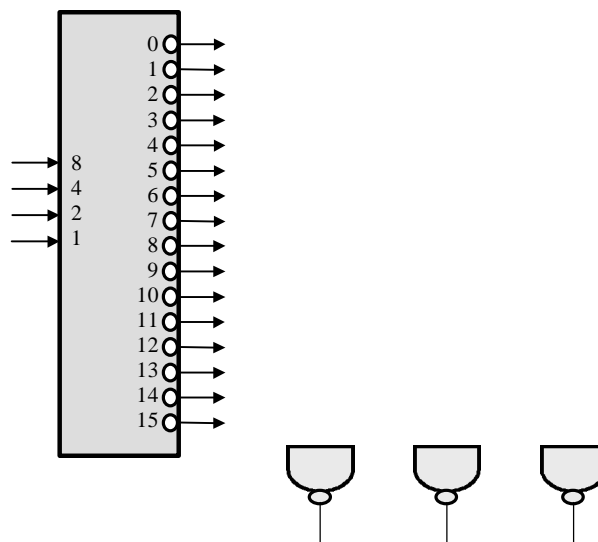| Inputs Numbers		Output Product	
A1A0	**B1B0**	P3 P2 P1 P0	decimal

P3 = _____

P2 = _____

P1 = _____

P0 = _____

[3] **1.c)**   Realize the above outputs using the following 4-16 decoder and NAND gates.

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[5] **2)**   Show the necessary input connections to realize the following Boolean expression using the 8-to-1 multiplexer shown below. Show all input and output connections.

$$F(A,B,C,D) = \sum m\,(1,3,4,5,8,10,12)$$

	00	01	11	10
00				
01				
11				
10				

	00	01	11	10
00				
01				
11				
10				

8 to 1 MUX

I0
I1   → F
I2
I3
I4
I5
I6
I7

S4 S2 S1

A B C