Faculty of Engineering and Technology

Department of Electrical and Computer Engineering

ENCS 2110

EXP 3 Pre-Lab: Encoders, Decoders, Multiplexers, and Demultiplexers

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Section: 10

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- ✓ **Design a circuit which uses an SN74151 to implement a sum-of-products expression, as follows:.**

a) *Convert the following expression into summation form (i.e., F (A, B, C) =∑ (…)):*

$F(A,B,C)=AB'+B'C$

identify the minterms (cases where $F = 1$):

A	B	C	$F(A,B,C)=AB'+B'C$
0	0	0	0
0	0	1	1(m1)
0	1	0	0
0	1	1	0
1	0	0	1(m4)
1	0	1	1(m5)
1	1	0	0
1	1	1	0

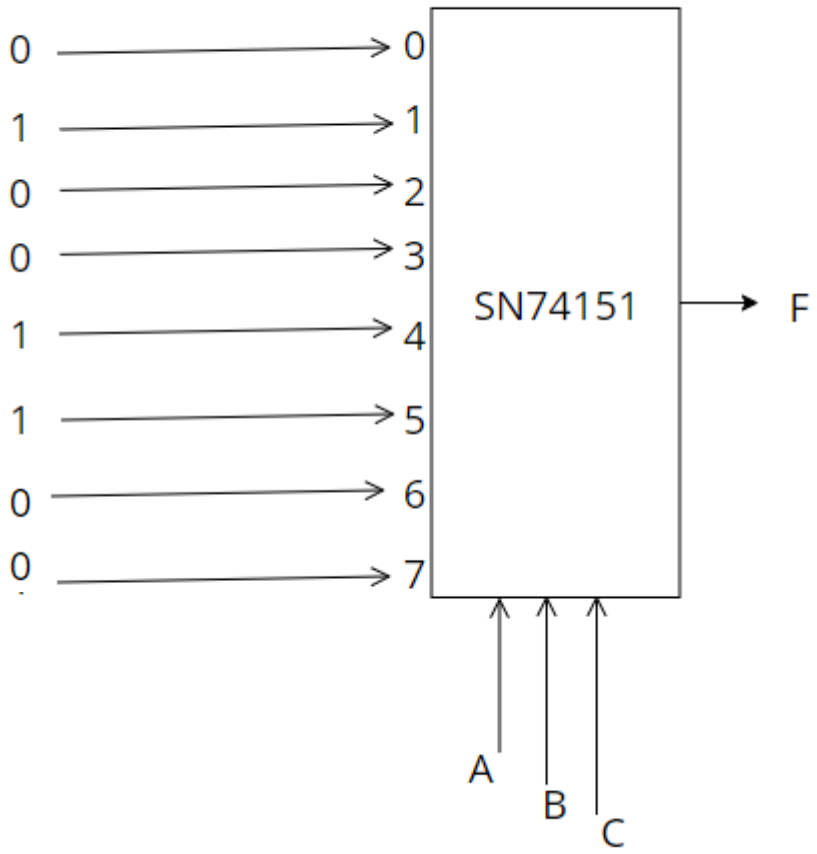
the summation form (Sum of Products) is:

- ❖ **F(A,B,C) = ∑(1,4,5) .**

b) *Sketch on Figure 3.1 the input connections necessary to implement the function in part (a). Observe that the inputs are connected to 0 or 1 depending on the value of the function for that min term.*

Implement using an 8-to-1 MUX (SN74151)

Select (A B C)	***MUX Input** In*
000 (m0)	1
001 (m1)	1
010 (m2)	0
011 (m3)	0
100 (m4)	1
101 (m5)	1
110 (m6) 0	**110** (m6) 0
111 (m7) 0	**111** (m7) 0



- ✓ **Design a circuit which uses an SN74138 Demultiplexer to implement a sum- of-products expression, as follows: a) Convert the following expression into summation (Sum of Products –SOP-) form (i.e. F(A,B,C)=∑(…)):**

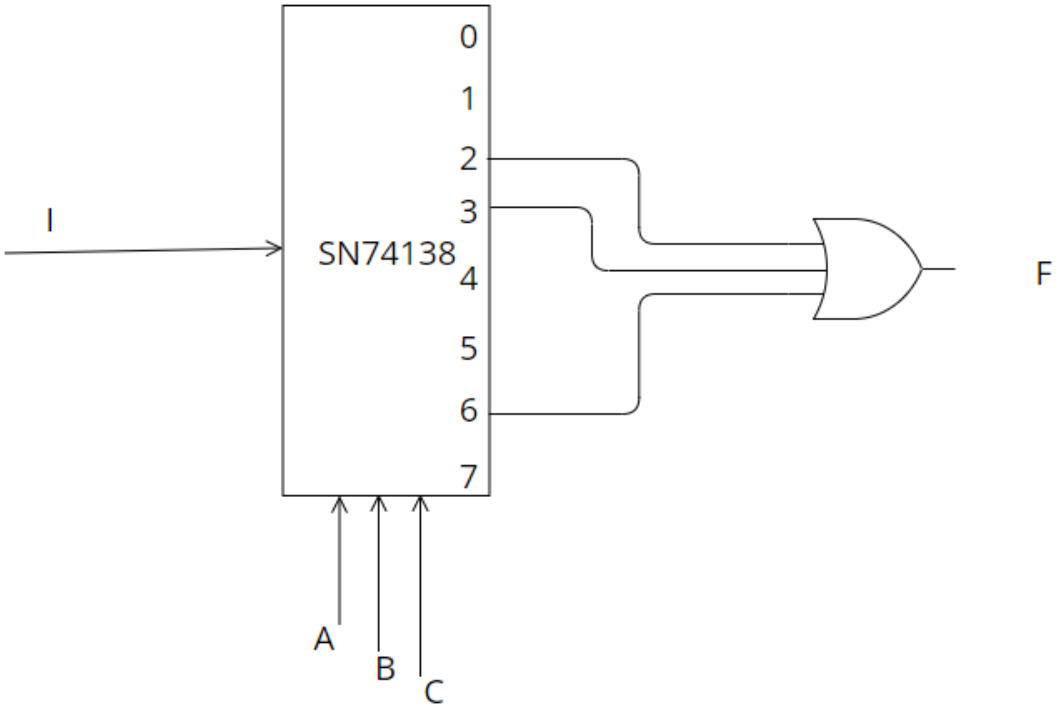
$F(A,B,C) = A'BC + B'C$

identify the minterms (cases where F = 1):

A	B	C	$F(A,B,C) = A'BC + B'C$
0	0	0	0
0	0	1	0
0	1	0	1(m2)
0	1	1	1(m3)
1	0	0	0
1	0	1	0
1	1	0	1(m6)
1	1	1	0

the summation form (Sum of Products) is:

- ❖ **F(A,B,C) = ∑(2,3,6) .**


0
1
2
3
4
5
6
7
I
SN74138
F
A
B
C