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Homework #4

Implement the function $F(A,B,C,D) = \sum m(0,1,3,4,8,9,15)$

a) 8-to-1 Mux using implementation table method.

A, B and C will be connected to the selection lines and D

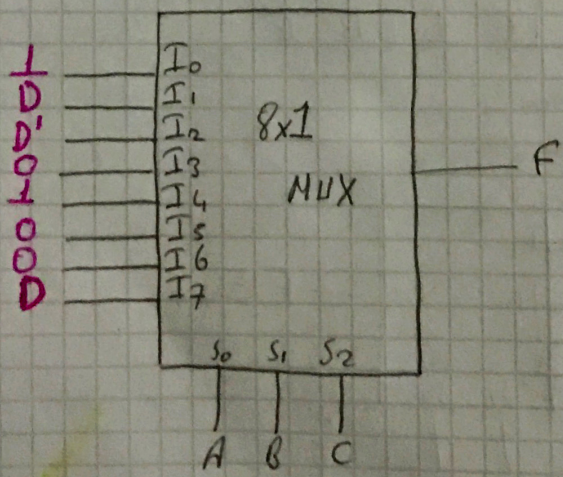
	A	B	C	D	F
m_0	0	0	0	0	1
m_1	0	0	0	1	1
m_2	0	0	1	0	0
m_3	0	0	1	1	1
m_4	0	1	0	0	1
m_5	0	1	0	1	0
m_6	0	1	1	0	0
m_7	0	1	1	1	0
m_8	1	0	0	0	1
m_9	1	0	0	1	1
m_{10}	1	0	1	0	0
m_{11}	1	0	1	1	0
m_{12}	1	1	0	0	0
m_{13}	1	1	0	1	0
m_{14}	1	1	1	0	0
m_{15}	1	1	1	1	1

$2^3 = 8$

A, B, C → selections

D → input

	$A'B'C'$	$A'BC$	$AB'C'$	ABC	$AB'C'$	$AB'C$	ABC'	ABC
	I_0	I_1	I_2	I_3	I_4	I_5	I_6	I_7
D'	0	2	4	6	8	10	12	14
D	1	3	5	7	9	11	13	15
	1	D	D'	0	1	0	0	D



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b) 4 to 1 MUX

using truth Table

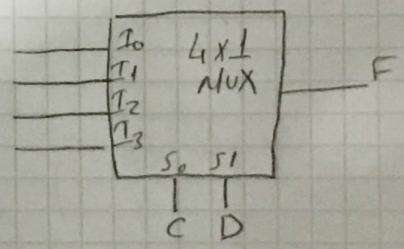
C and D will be connected to the Selection A and B

	A	B	C	D	F
m0	0	0	0	0	1
m1	0	0	0	1	1
m2	0	0	1	0	0
m3	0	0	1	1	1
m4	0	1	0	0	1
m5	0	1	0	1	0
m6	0	1	1	0	0
m7	0	1	1	1	0
m8	1	0	0	0	1
m9	1	0	0	1	1
m10	1	0	1	0	0
m11	1	0	1	1	0
m12	1	1	0	0	0
m13	1	1	0	1	0
m14	1	1	1	0	0
m15	1	1	1	1	1

C and D → used for selection Lines

A and B → used for data inputs

A'B'
(A+B)'
A'
A.B



CD = 00 (I_0)

A	B	F
0	0	1
0	1	1
1	0	0
1	1	1

A \ B	0	1
0	1	1
1		1

$F = A'B' + A'B + AB$

$F = A' + B$

CD = 01 (I_1)

A	B	F
0	0	1
0	1	0
1	0	0
1	1	0

A \ B	0	1
0	1	
1		

$F = A'B'$

$F = (A+B)'$

CD = 10 (I_2)

A	B	F
0	0	1
0	1	1
1	0	0
1	1	0

A \ B	0	1
0	1	1
1		

$F = A'B' + A'B$

$= A'$

CD = 11 (I_3)

A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

A \ B	0	1
0		
1		1

$F = AB$