

COMP-2650

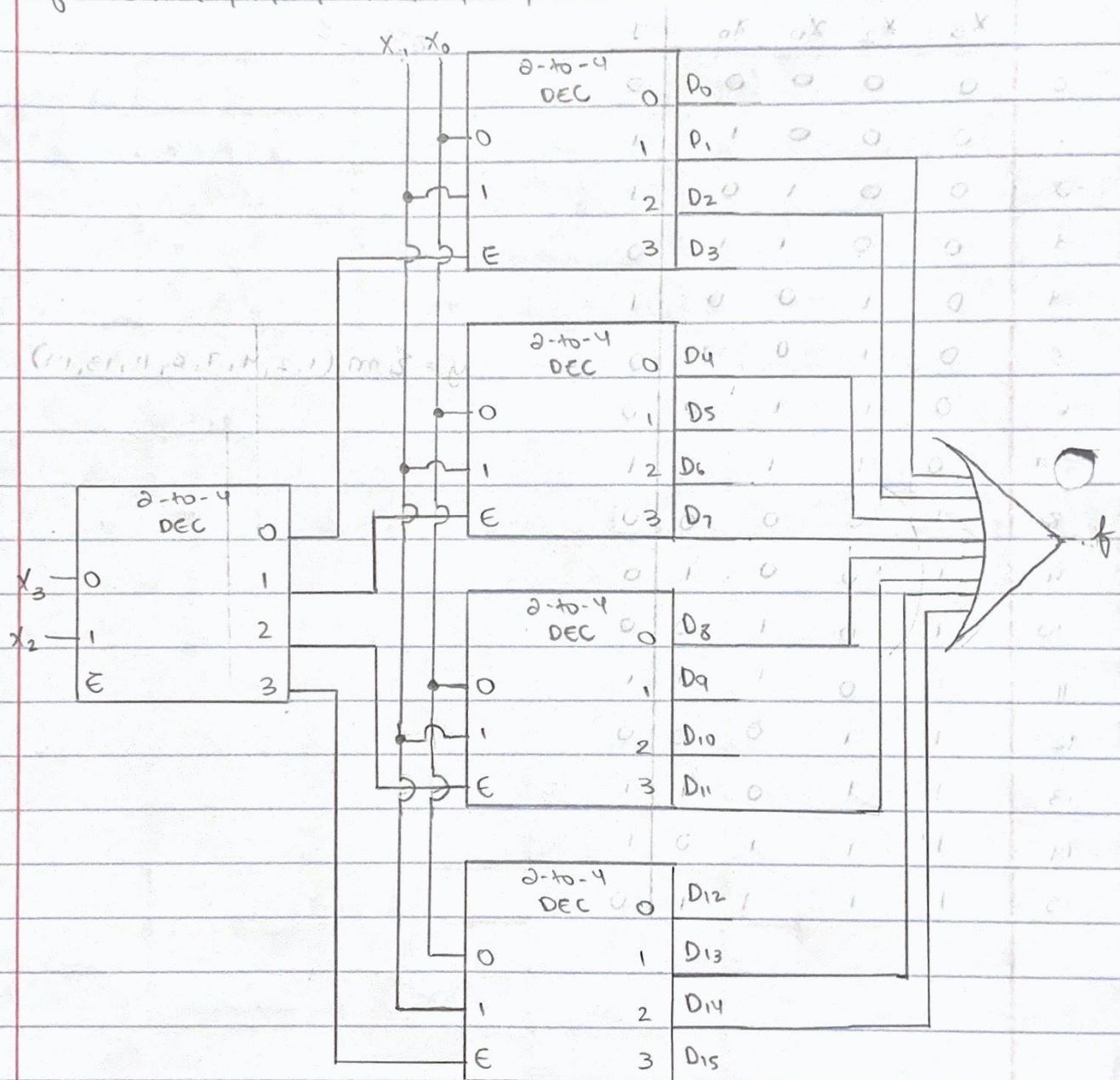
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Assignment #4

	x_3	x_2	x_1	x_0	y
0	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	1
3	0	0	1	1	0
4	0	1	0	0	1
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	0
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	1
15	1	1	1	1	0

$$y = \sum m(1, 2, 4, 7, 8, 11, 13, 14)$$

1. implement f with four 2-to-4 decoders at least
- $$f = \sum m(1, 2, 4, 7, 8, 11, 13, 14)$$



2. implement f with a 4-to-1 MUX with selection inputs x_1, x_2 (in that order)

x_1	x_2	y
0	0	$x_3 \oplus x_0$
0	1	$\overline{x_3 \oplus x_0}$
1	0	$x_3 \oplus x_0$
1	1	$x_3 \oplus x_0$

x_3	x_0	f
0	0	0
0	1	1
1	0	1
1	1	0

$$D_0 = D_3 = x_3 \overline{x_0} + \overline{x_3} x_0 = x_3 \oplus x_0 \text{ (XOR)}$$

x_3	x_0	f
0	0	1
0	1	0
1	0	0
1	1	1

$$D_1 = D_2 = x_3 x_0 + \overline{x_3} \overline{x_0} = \overline{x_3 \oplus x_0} \text{ (XNOR)}$$

