

Homework 3

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1. a) hw3-dec 3 Truth Table

A	F
0 0000	xxxxx
1 001	xxxxx
2 010	xxxxx
3 011	00000
4 100	001
5 101	010
6 110	011
7 111	100
8 01000	101
9 001	110
10 010	111
11 011	01000
12 100	001
13 101	010
14 110	011
15 111	100
16 10000	101
17 001	110
18 010	111
19 011	10000
20 100	001
21 101	010
22 110	011
23 111	100
24 11000	101
25 001	110
26 010	111
27 011	11000
28 100	001
29 101	010
30 110	011
31 11111	11100

 F_4 K-Maps:
$$A_4 = 0$$

$A_4 A_0$	$A_3 A_2$	00	01	11	10
00		d	0	0	0
01		d	0	0	0
11		0	0	0	0
10		d	0	0	0

$$A_4 = 1$$

$A_4 A_0$	$A_3 A_2$	00	01	11	10
00		0	1	1	1
01		0	1	1	1
11		1	1	1	1
10		0	1	1	1

$$F_4 = A_4 A_1 A_0 + A_4 A_2 + A_4 A_3$$

 F_3 K-Maps:
$$A_4 = 0$$

$A_4 A_0$	$A_3 A_2$	00	01	11	10
00		1	0	1	0
01		d	0	1	0
11		0	0	1	1
10		d	0	1	0

$$A_4 = 1$$

$A_4 A_0$	$A_3 A_2$	00	01	11	10
00		1	0	1	0
01		1	0	1	0
11		0	0	1	1
10		1	0	1	0

$$F_3 = A_3 A_2 + A_3 A_1 A_0 + \bar{A}_3 \bar{A}_2 \bar{A}_0 + \bar{A}_3 \bar{A}_2 \bar{A}_1$$

* A_4 is dropped due to covering and don't cares.



F_2 K-Maps:

$A_4 = 0$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	d	0	0	1
01	d	0	0	1
11	0	1	1	0
10	d	0	0	1

$A_4 = 1$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	1	0	0	1
01	1	0	0	1
11	0	1	1	0
10	1	0	0	1

$$F_2 = \bar{A}_2\bar{A}_0 + \bar{A}_2\bar{A}_1 + A_2A_1A_0$$

* A_4 is dropped due to covering and don't cares.

F_1 K-Maps:

$A_4 = 0$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	d	0	0	0
01	d	1	1	1
11	0	0	0	0
10	d	1	1	1

$A_4 = 1$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	0	0	0	0
01	1	1	1	1
11	0	0	0	0
10	1	1	1	1

$$F_1 = \bar{A}_1A_0 + A_1\bar{A}_0$$

* A_4 is dropped again.

F_0 K-Maps:

$A_4 = 0$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	d	1	1	1
01	d	0	0	0
11	0	0	0	0
10	d	1	1	1

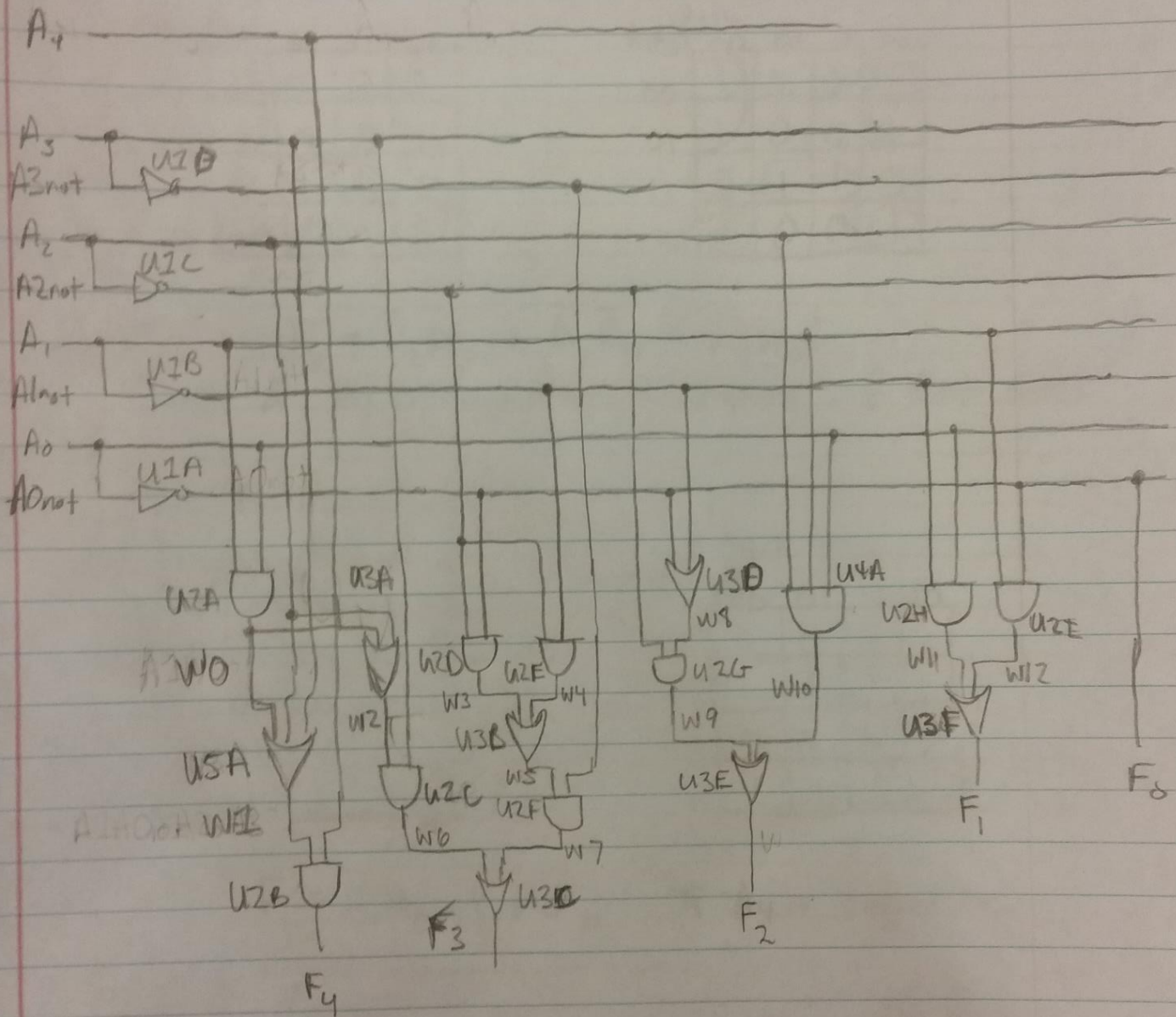
$A_4 = 1$

$A_1A_0 \backslash A_3A_2$	00	01	11	10
00	1	1	1	1
01	0	0	0	0
11	0	0	0	0
10	1	1	1	1

$$F_0 = \bar{A}_0$$

* A_4 is dropped again.

hw3_dec3 Schematic



Notes:

- $U1A = A_0$ - $U1B = A_1$

- $U1C = A_2$ - $U1D = A_3$

- $U1E = A_3_{not}$ - $U1F = A_2_{not}$

- $U1G = A_1_{not}$ - $U1H = A_0_{not}$

- $U1I = A_3$ - $U1J = A_2$

- $U1K = A_1$ - $U1L = A_0$

- $U1M = A_3_{not}$ - $U1N = A_2_{not}$

- $U1O = A_1_{not}$ - $U1P = A_0_{not}$

- $U1Q = A_3$ - $U1R = A_2$